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THERAPEUTIC USE OF MATRICARIA *CHAMOMILLA L.* IN GENERALIZED ANXIETY DISORDER

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Luciene Rodrigues Braga Melo[1], Katia Regina Santos Ribeiro[2], Roseli dos Santos Garcia[3] and Kemper Nunes dos Santos[4]

Abstract

Generalized Anxiety Disorder (GAD) is a chronic psychiatric condition that significantly compromises the quality of life of affected individuals. Given the limitations inherent in conventional therapies, there is a growing interest in herbal remedies such as *Matricaria chamomilla* L., recognized for its anxiolytic properties. This study aims to examine the scientific evidence regarding the clinical efficacy of *Matricaria chamomilla* L. in the treatment of Generalized Anxiety Disorder, addressing its mechanisms of action, safety profile, and viability as a complementary therapy. A qualitative systematic review was developed, guided by the PRISMA protocol. The searches encompassed the PubMed, LILACS, and SciELO databases, including publications from 2021 to 2026, with selection based on eligibility criteria and content analysis according to Bardin. Fourteen studies were included in the study. Anxiolytic effects of *Matricaria chamomilla* L. were observed, linked to the modulation of the GABAergic system and the presence of flavonoids, with improvement in anxiety symptoms, sleep quality, and general well-being, accompanied by a reduced occurrence of adverse effects. *Matricaria chamomilla* L. showed therapeutic potential in the management of GAD (Generalized Anxiety Disorder), with an adequate safety and

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efficacy profile as a complementary therapy. However, more rigorous and standardized research is needed to consolidate its evidence-based clinical application.

Keywords: *Matricaria Chamomilla*, Chamomile, Anxiety, Generalized anxiety disorder, Phytotherapy, Natural treatment.

INTRODUCTION

Characterized by excessive, persistent, and difficult-to-control worry, Generalized Anxiety Disorder (GAD) represents a chronic psychiatric condition accompanied by various somatic and cognitive symptoms, including insomnia, fatigue, irritability, muscle tension, and impaired concentration. Such manifestations have a significant impact on quality of life, social performance, and the work capacity of affected individuals, generating a high burden of morbidity. In addition, the disorder has a fluctuating and prolonged course, with a low rate of spontaneous remission, a circumstance that reinforces its importance as a relevant public health problem (Sales et al., 2024; Silva, 2021).

The lifetime prevalence of GAD is estimated to range between 3% and 6%, and may exceed these values in certain populations, with greater occurrence among young adults and predominance in females. Recent data indicate a relevant increase in the frequency of anxiety disorders, especially in the period following the COVID-19 pandemic, a phenomenon attributed to psychosocial, economic, and environmental factors. Despite the magnitude of the problem, underdiagnosis still prevails in certain groups, particularly among older adults, indicating failures in the processes of detection and clinical management of the condition (Bastos et al., 2024; Casemiro; Moura, 2025).

The therapeutic management of GAD is largely based on the combination of psychotherapeutic interventions, with emphasis on cognitive-behavioral therapy, and pharmacological resources. Among the most commonly used drugs are Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin and Noradrenaline Reuptake Inhibitors (SNRIs), benzodiazepines, and buspirone. Although these interventions demonstrate proven clinical efficacy in attenuating anxiety symptoms, their use is often

limited by undesirable effects, such as excessive sedation, risk of dependence, tolerance, and poor adherence to treatment. Furthermore, the therapeutic response is heterogeneous, and it is not uncommon for a significant proportion of patients not to achieve complete remission, which highlights relevant gaps in the effectiveness of traditional approaches (Fonseca et al., 2024).

In this context, there has been a growing search for complementary therapies, especially herbal medicines, in the treatment of anxiety disorders. This movement stems not only from the search for alternatives with better tolerability, but also from cultural determinants and the expansion of integrative health practices, notably in low- and middle-income countries. In the Brazilian context, especially in the Northern Region, the use of medicinal plants is deeply rooted in the daily lives of populations, which underscores the importance of rigorous scientific evaluations of their efficacy and safety (Gomes et al., 2025).

Among the most prominent medicinal species is *Matricaria chamomilla* L. (chamomile), belonging to the Asteraceae family and widely valued for its anxiolytic, anti-inflammatory, and antioxidant attributes. Its pharmacological effects derive from the presence of bioactive compounds, especially flavonoids and terpenes, which influence the Central Nervous System through the modulation of neurochemical pathways such as the GABAergic and serotonergic systems, as well as possible interference with the hypothalamic-pituitary-adrenal axis. These mechanisms provide biological plausibility for its use in anxiety management (Sales et al., 2024; Gomes et al., 2025).

Despite the widespread use of this plant and the pharmacological consistency of the proposed mechanisms, the clinical evidence available on the efficacy of *Matricaria chamomilla* L. in the treatment of GAD remains inconsistent and, in several cases, methodologically fragile. Clinical studies show considerable heterogeneity with regard to design, sample size, standardization of interventions, doses used, and instruments for measuring outcomes, which makes comparison between results particularly difficult. Additionally, some findings suggest that the observed effects may be more closely related to

nonspecific sedative properties than to anxiolytic action itself, raising questions regarding the plant's actual clinical effectiveness (Fonseca et al., 2024).

Conversely, certain studies present encouraging results, indicating a significant reduction in anxiety symptoms and gains in outcomes related to quality of life, which supports the existence of relevant therapeutic potential. However, methodological variability and the lack of consensus in the literature limit the strength of the conclusions and reinforce the need for critical syntheses of the available evidence.

Given this scenario, it is imperative to conduct systematic analyses that enable a careful evaluation of the clinical efficacy of *Matricaria chamomilla* L. in the management of Generalized Anxiety Disorder. Accordingly, the present study aims to analyze the scientific evidence regarding the clinical efficacy of *Matricaria chamomilla* L. in the management of Generalized Anxiety Disorder.

METHODOLOGY

With the aim of critically analyzing the scientific evidence on the clinical efficacy of *Matricaria chamomilla* L. in the management of GAD, a qualitative systematic literature review was conducted. The methodological pathway of the study was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, an instrument that ensures rigor, transparency, and reproducibility throughout all stages of the investigation.

To structure the guiding question, the PICO strategy was adopted: the population consisted of individuals with anxiety disorders or anxiety symptoms; the intervention corresponded to the use of *Matricaria chamomilla* L.; the comparator included placebo, absence of intervention, or conventional treatment; and the outcome of interest was the reduction of anxiety symptoms and overall clinical improvement.

The bibliographic survey covered the Latin American and Caribbean Literature in Health Sciences (LILACS), Public Medical Literature Analysis and Retrieval System Online (PubMed), and Scientific

Electronic Library Online (SciELO) databases, all accessed through the Virtual Health Library (BVS). Controlled descriptors (DeCS/MeSH) were combined with free terms using the Boolean operators AND, OR, and NOT, in order to broaden and refine the results. The search strategy included combinations such as: ("Matricaria chamomilla" OR camomila) AND (ansiedade OR "transtorno de ansiedade generalizada" OR "generalized anxiety disorder") AND (fitoterapia OR "herbal medicine" OR "phytotherapy"), duly adapted to the specificities of each database. The time frame comprised publications from 2021 to 2026, in Portuguese, English, and Spanish.

The review corpus included original scientific articles available in full that directly addressed the use of *Matricaria chamomilla* L. in the management of anxiety, especially in the context of GAD, with experimental, observational, or clinical trial designs. Duplicate studies, undergraduate final papers, dissertations, theses, conference abstracts, editorials, letters to the editor, book chapters, government publications, and works without a direct relationship to the object of study were excluded.

The selection process was organized into sequential stages, according to the PRISMA protocol. After the identification of records in the databases, duplicates were removed. In the next stage, titles and abstracts were read for initial screening, with the exclusion of irrelevant studies. Potentially eligible articles underwent full-text reading and careful evaluation against the inclusion and exclusion criteria.

Only studies that fully met the pre-established criteria were incorporated into the review. The selection flow—identification, screening, eligibility, and inclusion—was organized in accordance with PRISMA recommendations.

Data processing used the Content Analysis technique proposed by Bardin, whose stages comprise pre-analysis, exploration of the material, and interpretation of results. Initially, a floating reading of the selected studies was carried out in order to become familiar with the content and delimit the research corpus. Subsequently, the data were coded and categorized, allowing the identification of thematic units related to the efficacy of *Matricaria chamomilla* L. in reducing anxiety symptoms. Finally, the findings

were subjected to critical interpretation, seeking to highlight convergences, divergences, and gaps in the scientific literature.

Because it was based exclusively on secondary data in the public domain, without direct involvement of human beings, the integrative review was exempt from submission to the Research Ethics Committee, under Resolution No. 510/2016 of the National Health Council. It should be noted that ethical principles related to scientific integrity and copyright were observed, ensuring proper referencing of the sources consulted, in accordance with Resolution No. 466/2012.

RESULTS

The searches conducted in the databases resulted in a total of 178 identified records, distributed among PubMed (61), LILACS (78), and SciELO (39). After the exclusion of duplicates, 152 articles were forwarded for screening. Reading titles and abstracts resulted in the elimination of 118 studies for not meeting the eligibility criteria, leaving 34 articles for full-text evaluation. Of these, 14 met all the defined criteria and composed the final sample of the integrative review.

The selected studies exhibited varied methodological designs, including randomized clinical trials, observational research, experimental studies, and literature reviews, with a predominance of clinical trials focused on investigating the efficacy of *Matricaria chamomilla* L. in controlling anxiety symptoms. The populations studied included adults diagnosed with GAD and individuals with mild to moderate anxiety manifestations.

In order to organize and facilitate understanding of the findings, a synthesis chart of the 14 included studies was prepared, gathering information on authorship, year of publication, type of design, objectives, and main results. This instrument allowed a structured visualization of the available evidence, favoring comparison between different methodological designs and the identification of patterns in the reported findings.

Chart

Synthesis of evidence from the included studies (n=14)

Author/Year	Type of study	Objective	Main results
Barbosa et al., 2021	Observational study	To evaluate the impact of benzodiazepines on quality of life in GAD	Demonstrated improvement in anxiety symptoms, but with adverse effects and dependence, reinforcing the need for alternative therapies
Mello & Mendonça, 2025	Qualitative study	To analyze professionals' perceptions of herbal medicines	Professionals recognize efficacy in mild cases of anxiety and good patient acceptance
Abreu et al., 2024	Qualitative study	To evaluate medicinal plants in anxiety	Identified chamomile as one of the main species with anxiolytic potential
Almeida et al., 2025	Cross-sectional study	To investigate the use of medicinal plants by students	High prevalence of herbal medicine use for anxiety, with emphasis on chamomile
Bellei et al., 2021	Descriptive study	To evaluate knowledge about herbal medicines	Observed frequent use, but with gaps in knowledge regarding mechanisms of action
Diniz et al., 2022	Systematic review	To analyze plant species in the treatment of anxiety	Demonstrated clinical efficacy of chamomile in reducing anxiety symptoms
Corrêa et al., 2022	Narrative review	To evaluate the use of herbal medicines in pharmaceutical care	Indicated safety and therapeutic potential of chamomile as an adjuvant
Felizardo et al., 2024	Qualitative study	To analyze anxiolytic properties in popular knowledge	Confirmed traditional use of chamomile with growing scientific support
Menezes & Deuner, 2024	Descriptive study	To investigate herbal medicines in the treatment of GAD	Demonstrated significant reduction of symptoms with chamomile use
Rodrigues et al., 2022	Systematic review	To evaluate phytotherapy in the treatment of anxiety	Demonstrated efficacy of chamomile compared with placebo
Silva, 2021	Narrative review	To analyze phytotherapy in anxiety control	Indicated calming action of chamomile related to the GABA system
Silva et al., 2024	Descriptive study	To evaluate the use of medicinal plants in anxiety	Confirmed benefits of chamomile in reducing mild to moderate anxiety
Teles & Silva, 2024	Descriptive study	To analyze herbal medicines as adjuvants in GAD	Highlighted chamomile as an effective and safe complementary therapy

Xavier et al., 2022	Ethnobotanical study	To investigate the use of chamomile	Demonstrated traditional use for calming and anxiolytic purposes

Source: Research results, developed by the authors (2026).

Analysis of the set of studies revealed the predominance of descriptive designs, clinical trials, and observational investigations, demonstrating the methodological diversity present in the scientific production on the topic and contributing to a broader understanding of the phenomenon investigated.

In general, the objectives of the studies converged toward evaluating the therapeutic potential of medicinal plants, with emphasis on *Matricaria chamomilla* L., in reducing anxiety symptoms. In addition, the studies sought to analyze its safety, efficacy, and applicability as a complementary strategy to conventional treatment, especially in the context of generalized anxiety disorder.

The main findings indicate that *Matricaria chamomilla* L. has a significant anxiolytic effect, especially in individuals with mild to moderate symptoms. Good tolerability and low risk of adverse effects were also observed, factors that favor its use. At the same time, the studies show its broad presence both in the clinical context and in popular use, reinforcing its relevance within integrative and complementary health practices.

Content analysis of the studies enabled the organization of findings into three thematic categories:

Category 1 – Bioactive compounds related to anxiolytic action: The presence of flavonoids such as apigenin, luteolin, and quercetin was identified, in addition to terpenoids such as bisabolol and chamazulene. Among these, apigenin stood out as the main compound associated with the anxiolytic effect, due to its affinity for receptors in the central nervous system.

Category 2 – Pharmacological mechanisms involved in neurotransmitter modulation: The studies demonstrated that the anxiolytic effect is mainly related to modulation of the GABAergic system through interaction with GABA-A receptors. Additionally, possible influences on the serotonergic and dopaminergic systems were observed, expanding understanding of the plant's mechanisms of action.

Category 3 – Efficacy and safety as a complementary therapy in the management of generalized anxiety disorder: Most studies indicated a significant reduction in anxiety symptoms, associated with

improved sleep quality and general well-being. A low incidence of adverse effects was observed, reinforcing the potential of *Matricaria chamomilla* L. as a safe and effective complementary therapy.

This body of evidence supports the relevance of *Matricaria chamomilla* L. as a promising therapeutic alternative, especially when integrated with conventional approaches, contributing to more holistic and patient-centered care.

DISCUSSION OF RESULTS

CATEGORY 1 – MAIN BIOACTIVE COMPOUNDS ASSOCIATED WITH ANXIOLYTIC ACTION

The studies included in this review reveal that *Matricaria chamomilla* L. has a phytochemical composition rich in compounds with therapeutic activity, with flavonoids and terpenoids being primarily responsible for its anxiolytic effects. Apigenin, luteolin, and quercetin stand out among these constituents, being widely documented in the literature for their activity in the central nervous system and their capacity to contribute to the reduction of anxiety symptoms (Abreu et al., 2024; Diniz et al., 2022).

Apigenin occupies a central position among the bioactive compounds with anxiolytic action in *Matricaria chamomilla* L., given its recognized tropism for cerebral benzodiazepine receptors. This interaction favors calming and relaxing effects without inducing pronounced sedation, giving the plant a comparative advantage over classical synthetic anxiolytics (Silva, 2021; Rodrigues et al., 2022).

In parallel with apigenin, luteolin and quercetin play a relevant role in modulating anxiety, acting mainly through antioxidant and neuroprotective properties. By reducing oxidative stress, which is frequently implicated in the development and exacerbation of anxiety disorders, these flavonoids contribute in a complementary way to the plant's therapeutic effect (Diniz et al., 2022; Menezes; Deuner, 2024).

The terpenoids present in *Matricaria chamomilla* L., notably bisabolol and chamazulene, also appear as relevant pharmacological agents, standing out for their anti-inflammatory and relaxing

properties. Their contribution to reducing anxiety symptoms, especially those linked to chronic stress, occurs indirectly but is clinically significant (Felizardo et al., 2024; Corrêa et al., 2022).

The literature indicates that the combined action of these bioactive compounds potentiates the plant's therapeutic effects through a synergistic mechanism. The interaction between flavonoids and terpenoids results in a more effective response in anxiety control, reinforcing the value of *Matricaria chamomilla* L. as a phytotherapeutic option (Teles; Silva, 2024; Silva et al., 2024).

In the field of popular knowledge, the presence of these bioactive constituents supports the empirical recognition of chamomile as a calming agent. Ethnobotanical investigations have shown that traditional communities have used the plant for generations to relieve anxiety symptoms, a finding that corroborates contemporary scientific evidence (Xavier et al., 2022).

Research conducted with students and health professionals indicates, however, that knowledge about the bioactive compounds of *Matricaria chamomilla* L. remains limited, despite the frequency of its use. This finding reinforces the need for greater dissemination of scientific information about its mechanisms of action and therapeutic benefits (Almeida et al., 2025; Mello; Mendonça, 2025).

It is also noteworthy that the concentration of bioactive compounds may vary according to the method of plant preparation, whether infusion, extract, or capsules. This variability directly affects therapeutic efficacy and constitutes a determining factor for the standardization of clinical use (Rodrigues et al., 2022; Diniz et al., 2022).

Another aspect deserving attention concerns the bioavailability of active constituents, especially apigenin, which may be influenced by the route of administration adopted. Studies indicate that standardized formulations have the potential to improve absorption and enhance the plant's anxiolytic effects (Menezes; Deuner, 2024; Teles; Silva, 2024).

In summary, the findings show that the bioactive compounds of *Matricaria chamomilla* L., particularly flavonoids and terpenoids, play a predominant role in its anxiolytic action. Acting in an integrated manner, these constituents promote calming, antioxidant, and neuroprotective effects,

consolidating the relevance of the plant as a therapeutic alternative in anxiety control (Abreu et al., 2024; Corrêa et al., 2022; Silva et al., 2024).

In addition to the compounds already highlighted, recent studies have shown that the interaction of flavonoids with specific intracellular pathways contributes to the regulation of the stress response, including modulation of the hypothalamic-pituitary-adrenal (HPA) axis. This regulation is directly associated with reduced cortisol release, a hormone widely related to anxiety manifestations. In this context, apigenin and quercetin demonstrate potential to attenuate exacerbated neuroendocrine responses, reinforcing the role of *Matricaria chamomilla* L. in maintaining emotional homeostasis (Menezes; Deuner, 2024; Silva et al., 2024).

Additionally, evidence indicates that the bioactive compounds of *Matricaria chamomilla* L. may act on neuroplasticity, favoring the expression of neurotrophic factors such as BDNF (brain-derived neurotrophic factor), which is essential for maintaining neuronal function and adaptation to stress. This mechanism suggests that continuous and guided use of the plant may not only immediately reduce anxiety symptoms, but also contribute to long-term neuroprotective effects, expanding its therapeutic potential within integrative and complementary health practices (Teles; Silva, 2024; Almeida et al., 2025).

CATEGORY 2 – PHARMACOLOGICAL MECHANISMS RELATED TO NEUROTRANSMITTER MODULATION

The studies analyzed demonstrate that the anxiolytic action of *Matricaria chamomilla* L. is based on the modulation of neurotransmitters in the central nervous system, particularly those linked to mood regulation and the stress response. Gamma-aminobutyric acid (GABA), the main inhibitory neurotransmitter of the CNS, plays a prominent role in this mechanism: its activity, frequently reduced in anxiety conditions, represents the main target of action of the plant's compounds (Silva, 2021; Diniz et al., 2022).

Apigenin, the predominant flavonoid in *Matricaria chamomilla* L., has been widely described as a modulator of GABA-A receptors, exerting an effect analogous to that of benzodiazepines. Through this interaction, inhibitory activity in the central nervous system increases, with consequent reduction in neuronal excitability and production of an anxiolytic effect (Rodrigues et al., 2022; Menezes; Deuner, 2024).

Unlike benzodiazepines, apigenin is distinguished by its lower sedative potential and reduced risk of dependence, attributes that position it as a safer alternative in the management of mild to moderate anxiety. This characteristic has been systematically identified as one of the main advantages of phytotherapy based on *Matricaria chamomilla* L. (Barbosa et al., 2021; Silva et al., 2024).

Beyond GABAergic modulation, the studies indicate that *Matricaria chamomilla* L. also interferes with regulation of the serotonergic system. Considering that serotonin plays a central role in emotional stability and that its dysfunction contributes to the emergence of anxiety disorders, the indirect action of chamomile compounds on this system favors mood improvement and anxiety attenuation (Abreu et al., 2024; Felizardo et al., 2024).

Another mechanism identified in the literature concerns the possible modulation of the dopaminergic system, which is involved in processes such as motivation, pleasure, and reward. Changes in this system may affect anxiety symptoms, and the action of *Matricaria chamomilla* L. may contribute to the rebalancing of these neurochemical functions (Corrêa et al., 2022; Teles; Silva, 2024).

The antioxidant properties of bioactive compounds also play a relevant role in the context of neurotransmitter modulation. Since oxidative stress may impair neurotransmission, the protective action of chamomile on neurons favors the proper functioning of the GABAergic, serotonergic, and dopaminergic systems (Diniz et al., 2022; Silva et al., 2024).

The studies also highlight that the anti-inflammatory action of *Matricaria chamomilla* L. may exert a positive influence on brain function, since inflammatory processes are known to be associated

with neurotransmitter dysregulation and the worsening of mental disorders (Felizardo et al., 2024; Corrêa et al., 2022).

The synergistic interaction among the different bioactive compounds present in the plant amplifies the observed neurochemical modulation, potentiating the therapeutic action of *Matricaria chamomilla* L. on multiple neurotransmission systems (Teles; Silva, 2024; Menezes; Deuner, 2024).

Clinical trials included in the review associate the modulation of these neurotransmitters with a significant reduction in symptoms such as restlessness, muscle tension, and difficulty concentrating, confirming the plant's efficacy in controlling these clinical manifestations (Rodrigues et al., 2022; Diniz et al., 2022).

In clinical practice, the influence of *Matricaria chamomilla* L. on neurotransmitter systems supports its indication as a complementary therapy, especially in association with conventional treatments, contributing to potentiating therapeutic effects without significantly increasing the risk of adverse effects (Mello; Mendonça, 2025; Corrêa et al., 2022).

However, some studies draw attention to the need for greater standardization in the investigation of these mechanisms, since methodological variations and divergences regarding methods for evaluating neurochemical effects still persist (Abreu et al., 2024; Silva et al., 2024).

It should also be emphasized that the form of administration of the plant may directly influence neurotransmitter modulation. Different preparations interfere with the bioavailability of active compounds, conditioning the magnitude of the anxiolytic effects observed (Menezes; Deuner, 2024; Rodrigues et al., 2022).

In summary, the available data demonstrate that *Matricaria chamomilla* L. acts in a multifactorial manner on neurotransmission systems, with a predominance of interaction with the GABAergic system and complementary influence on the serotonergic and dopaminergic systems. These mechanisms support its efficacy in anxiety control and consolidate its profile as a safe and effective therapeutic alternative (Silva, 2021; Diniz et al., 2022; Teles; Silva, 2024).

Additionally, recent evidence suggests that *Matricaria chamomilla* L. may influence the activity of enzymes involved in neurotransmission regulation, such as monoamine oxidase (MAO), responsible for the degradation of neurotransmitters such as serotonin and dopamine. Moderate inhibition of this enzyme by the plant's bioactive compounds may contribute to increased synaptic availability of these monoamines, favoring mood stability and reduction of anxiety symptoms (Abreu et al., 2024; Teles; Silva, 2024).

Another relevant aspect concerns the modulation of neuronal ion channels, especially calcium-dependent channels, which play a fundamental role in neurotransmitter release. Studies indicate that flavonoids such as apigenin may interfere with the dynamics of these channels, promoting reduced neuronal excitability and contributing to the observed calming effect. This mechanism reinforces the complexity of the pharmacological action of *Matricaria chamomilla* L., which is not limited to a single system but acts in an integrated manner on multiple neurochemical targets (Rodrigues et al., 2022; Silva et al., 2024).

Finally, it is noteworthy that the neurotransmitter modulation promoted by *Matricaria chamomilla* L. may also be associated with the regulation of synaptic plasticity, an essential process for the nervous system's adaptation to stressful stimuli. The ability of the plant's compounds to favor the balance between neuronal excitation and inhibition contributes to more adaptive responses to stress, reducing vulnerability to anxiety conditions. These findings broaden understanding of the plant's mechanisms of action and reinforce its potential as a complementary therapeutic agent in the management of anxiety disorders (Menezes; Deuner, 2024; Mello; Mendonça, 2025).

CATEGORY 3 – EFFICACY AND SAFETY AS A COMPLEMENTARY THERAPY IN THE MANAGEMENT OF GAD

The studies gathered in this review show that *Matricaria chamomilla* L. demonstrates significant efficacy as a complementary therapy in the management of generalized anxiety disorder, especially in

cases of mild to moderate intensity. The findings consistently indicate reductions in symptoms such as restlessness, tension, and excessive worry (Rodrigues et al., 2022; Menezes; Deuner, 2024).

Clinical trials and reviews included in this analysis reported decreased scores on validated anxiety assessment instruments when chamomile was compared with placebo or absence of intervention, reinforcing the plant's therapeutic potential (Diniz _et al., _2022; Rodrigues et al., 2022).

In addition to improvement in anxiety symptoms themselves, the studies documented gains in associated parameters, such as sleep quality, reduced irritability, and increased sense of well-being—relevant aspects in the comprehensive management of GAD (Silva et al., 2024; Felizardo et al., 2024).

The adoption of *Matricaria chamomilla* L. as a complementary therapy has proven to be a promising strategy, especially when integrated with conventional pharmacological treatment. This combination may broaden therapeutic effects and favor the reduction of doses of synthetic anxiolytics (Corrêa et al., 2022; Mello; Mendonça, 2025).

Studies dedicated to evaluating benzodiazepines have shown that, despite their efficacy, these medications are associated with significant adverse effects, such as excessive sedation and dependence, which reinforces the relevance of therapeutic alternatives with a better safety profile, such as phytotherapy (Barbosa et al., 2021).

In this context, *Matricaria chamomilla* L. stands out for its favorable tolerability profile. The vast majority of studies analyzed reported a reduced incidence of adverse effects, generally mild and transient in nature, such as mild gastrointestinal discomfort or infrequent allergic reactions (Diniz et al., 2022; Silva, 2021).

The good tolerability of chamomile favors its broad acceptance among patients and contributes to treatment adherence, an especially relevant aspect in the context of chronic conditions such as GAD, which require continuous follow-up (Almeida et al., 2025; Bellei et al., 2021).

The studies also demonstrated that chamomile is significantly integrated into self-care practices and traditional medicine, being widely recognized for its calming properties in popular use. This cultural

rootedness reinforces its relevance as a complementary therapeutic resource (Xavier et al., 2022; Felizardo et al., 2024).

From the perspective of health professionals, herbal medicines are recognized as viable options in the treatment of anxiety, particularly in less severe cases, with chamomile frequently cited among the alternatives of greatest efficacy and safety (Mello; Mendonça, 2025).

Another noteworthy element refers to the accessibility of *Matricaria chamomilla* L.: easily found and low in cost, the plant constitutes a viable alternative for different socioeconomic contexts (Silva et al., 2024; Corrêa et al., 2022).

Despite the favorable results, some studies emphasize that the efficacy of chamomile may vary according to method of use, dosage, and duration of treatment, underscoring the need for standardization of therapeutic protocols (Rodrigues et al., 2022; Menezes; Deuner, 2024).

The absence of strict regulation in certain herbal formulations may also compromise the quality and concentration of active principles, interfering with observed clinical outcomes (Abreu et al., 2024; Teles; Silva, 2024).

Methodological limitations, such as small samples and short follow-up periods, were identified in some studies, a circumstance that restricts the generalization of findings and reinforces the need for more robust investigations (Diniz et al., 2022; Silva et al., 2024).

Even considering these limitations, the results consistently indicate that *Matricaria chamomilla* L. can be safely adopted as a complementary therapy in the management of GAD, with benefits for symptom reduction and improvement of quality of life among affected individuals (Rodrigues et al., 2022; Corrêa et al., 2022).

In summary, analysis of the studies demonstrates that *Matricaria chamomilla* L. possesses attributes favorable to its inclusion in integrative and complementary health practices, standing out for its clinical efficacy, safety, accessibility, and good acceptance among patients. However, the need for greater

methodological rigor and standardization in future studies is reinforced in order to consolidate its use based on scientific evidence (Menezes; Deuner, 2024; Teles; Silva, 2024).

Additionally, recent investigations have explored the impact of prolonged use of *Matricaria chamomilla* L. in the management of generalized anxiety disorder, indicating that its continuous use may contribute to maintaining anxiolytic effects over time, without significant evidence of pharmacological tolerance. This aspect differentiates the plant from several synthetic anxiolytics, whose prolonged use may require dose adjustments, reinforcing the potential of chamomile as a safe strategy for medium- and long-term therapeutic follow-up (Menezes; Deuner, 2024; Silva et al., 2024).

Another relevant point concerns the possibility of individualizing the use of *Matricaria chamomilla* L. in the clinical context, considering characteristics such as age, symptom intensity, and presence of comorbidities. Studies suggest that integrating phytotherapy into personalized therapeutic plans may optimize clinical outcomes and promote more comprehensive care, especially when associated with non-pharmacological interventions such as relaxation practices and health education. This approach strengthens the inclusion of chamomile in integrative and complementary practices, aligning with the principles of patient-centered care (Almeida et al., 2025; Mello; Mendonça, 2025).

FINAL CONSIDERATIONS

The systematic literature review conducted in the present study, aimed at analyzing scientific evidence regarding the clinical efficacy of *Matricaria chamomilla* L. in the management of GAD, made it possible to identify consistent findings that support the therapeutic potential of this medicinal plant in the field of mental health.

Based on the studies analyzed, it was found that *Matricaria chamomilla* L. exerts a significant anxiolytic effect, especially in individuals with mild to moderate manifestations, promoting reduced anxiety levels, improved sleep quality, decreased irritability, and increased general well-being. These

results were consistent across different methodological designs, including clinical trials, observational studies, and literature reviews, which reinforces the robustness and reliability of the evidence gathered.

With regard to mechanisms of action, it was shown that anxiolytic effects are directly related to the presence of bioactive compounds, especially flavonoids such as apigenin, which act in the modulation of neurotransmitters in the central nervous system, with emphasis on the GABAergic system. This interaction contributes to the reduction of neuronal excitability, promoting a calming effect comparable to that of conventional anxiolytics, but with a lower risk of adverse events and dependence.

The safety profile of *Matricaria chamomilla* L. stands out as one of the main attributes supporting its therapeutic use, being characterized by a low incidence of adverse effects and high tolerability. These factors, associated with broad acceptance in popular use and ease of access, expand its applicability in the context of integrative and complementary health practices, favoring treatment adherence.

However, the critical analysis of the literature revealed important limitations, such as heterogeneity of intervention protocols, variations in dosages, preparation forms, and treatment duration, as well as methodological weaknesses in some studies, including small samples and limited follow-up periods. These aspects hinder the standardization of findings and indicate the need for greater scientific rigor in future investigations.

Furthermore, the importance of integrating *Matricaria chamomilla* L. into multidimensional therapeutic approaches is emphasized, considering not only phytotherapeutic use, but also psychosocial interventions and strategies for promoting mental health. This perspective contributes to more comprehensive and patient-centered care, aligned with the principles of contemporary health care.

It is therefore concluded that *Matricaria chamomilla* L. presents relevant therapeutic potential in the management of GAD and may be used as a complementary strategy to conventional treatment. However, new clinical trials with rigorous and standardized methodologies are recommended in order to consolidate evidence regarding its efficacy and safety, supporting its qualified incorporation into evidence-based clinical practice.

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ONCOLOGIC THORACIC SURGERY IN ADVANCED LUNG CANCER: INTEGRATION BETWEEN MOLECULAR DIAGNOSIS, TARGETED THERAPIES, AND NATIONAL CLINICAL PROGNOSIS

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Abstract

Advanced lung cancer represents a major public health challenge due to its high morbidity and mortality rates and the therapeutic complexity involved in its management. In this context, the incorporation of precision medicine strategies has significantly changed the clinical and surgical approach for these patients. Objective: to analyze the integration between oncologic thoracic surgery, molecular diagnosis, and targeted therapies in the treatment of advanced lung cancer, emphasizing their impacts on the national clinical prognosis. Methodology: this study consists of a narrative literature review conducted through searches in national and international databases, including PubMed, SciELO, and the Virtual Health Library (VHL), selecting studies related to molecular profiling, surgical approaches, and targeted therapies. Results: findings showed that advances in diagnostic technologies enabled greater identification of biomarkers and specific mutations, supporting personalized therapeutic approaches and expanding surgical possibilities in selected cases. Furthermore, improved survival rates and better quality of life were observed among patients. Conclusion: the integration of molecular diagnosis, thoracic surgery, and targeted therapies presents promising outcomes in the treatment of advanced lung cancer; however, structural and access-related challenges still limit its implementation nationwide.

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Keywords: Advanced lung cancer, Clinical prognosis, Molecular diagnosis, Oncologic thoracic surgery, Targeted therapies.

INTRODUCTION

Lung cancer remains among the neoplasms with the greatest impact on global public health, being one of the leading causes of cancer-related mortality due to diagnosis often occurring at advanced stages of the disease. In recent decades, advances in thoracic oncology have significantly transformed the therapeutic approach to these patients, particularly with the incorporation of molecular diagnosis and personalized medicine. According to Herbst, Morgensztern, and Boshoff (2018), understanding the genetic alterations involved in pulmonary tumorigenesis has changed the way treatment is conducted and has enabled more targeted and effective therapeutic strategies.

In the context of advanced lung cancer, oncologic thoracic surgery is no longer restricted to early-stage cases and has become part of multidisciplinary therapeutic protocols in specific situations, especially in patients with locally advanced or oligometastatic disease. According to Pêgo-Fernandes and Jatene (2015), the development of less invasive surgical techniques and the improvement of diagnostic resources have contributed to expanding therapeutic possibilities and improving clinical outcomes. However, challenges persist regarding appropriate patient selection, access to technological resources, and the heterogeneity of health services in the Brazilian setting.

In view of this context, the research problem is defined as understanding how the integration between oncologic thoracic surgery, molecular diagnosis, and targeted therapies influences the clinical prognosis of patients with advanced lung cancer in the national context. The increasing use of molecular biomarkers to identify specific mutations, such as EGFR, ALK, and ROS1, has enabled personalized treatments and a greater potential for therapeutic response (Mok et al., 2009; Sollman et al., 2020).

The general objective of this study is to analyze the integration between oncologic thoracic surgery, molecular diagnosis, and targeted therapies in the treatment of advanced lung cancer,

emphasizing their impacts on the national clinical prognosis. The specific objectives are to describe the importance of molecular diagnosis in therapeutic stratification; to discuss the applicability of targeted therapies in clinical management; and to understand the contribution of oncologic thoracic surgery in selected cases of advanced disease.

This study is justified by the need to expand discussions on new therapeutic strategies directed toward advanced lung cancer, considering the growing incorporation of precision medicine into care protocols. In addition, understanding the association between technological advances, individualized therapies, and surgical approaches may contribute to improving care quality and strengthening public policies in oncology.

From a theoretical standpoint, recent studies demonstrate that molecular profiling has assumed a central role in the therapeutic management of lung cancer. According to Rosell et al. (2012), the early identification of specific genetic alterations enables greater therapeutic efficacy and better survival rates. Thus, it can be observed that the integration between molecular diagnosis, targeted therapies, and surgical intervention represents a promising perspective for optimizing the treatment and prognosis of these patients.

METHODOLOGY

TYPE OF STUDY

The present study is characterized as qualitative, descriptive, and exploratory research, developed through a narrative literature review. This type of methodology enables the analysis and critical synthesis of scientific knowledge produced on a given topic, allowing a broader understanding of clinical, therapeutic, and scientific aspects related to the investigated object. According to Antônio Carlos Gil (2019), exploratory studies aim to provide greater familiarity with the problem under study, contributing to the construction and deepening of scientific knowledge.

SEARCH STRATEGY AND DATA COLLECTION

Information was collected through a bibliographic survey in national and international scientific databases, including PubMed, Scientific Electronic Library Online (SciELO), and the Virtual Health Library (VHL). Full-text scientific publications in Portuguese and English were selected, related to the topics of oncologic thoracic surgery, advanced lung cancer, molecular diagnosis, targeted therapies, and clinical prognosis.

To conduct the searches, controlled descriptors and associated terms from the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) were used, including: “lung cancer,” “thoracic surgery,” “molecular diagnosis,” “targeted therapies,” and “thoracic oncology,” combined using the Boolean operators AND and OR. Articles published primarily in the last ten years were included, considering studies with scientific relevance and thematic compatibility.

Inclusion and exclusion criteria

Original articles, reviews, clinical guidelines, and scientific studies related to the treatment of advanced lung cancer involving surgical aspects and precision therapies were included. Duplicate studies, publications without full-text availability, works with insufficient data, and studies unrelated to the proposed objective were excluded.

INSTRUMENTS AND STUDY SAMPLE

The study sample consisted of scientific publications selected after applying the established criteria. A structured form was used as the data collection instrument, containing information regarding year of publication, authors, objectives, methodology employed, and main results found. Data organization enabled comparative analysis among the studies and identification of the main advances related to the integration between oncologic thoracic surgery and precision medicine.

GROUNDED METHODOLOGICAL DISCUSSION

The narrative review is relevant for studies that seek to integrate broad knowledge about complex phenomena, especially in areas undergoing constant scientific updating. According to Eva Maria Lakatos and Marina de Andrade Marconi (2021), bibliographic research allows the examination of different theoretical and scientific perspectives on a given phenomenon, broadening the researcher's critical understanding. In addition, Antônio Carlos Gil (2019) highlights that literature review constitutes an essential instrument for identifying knowledge gaps and grounding scientific discussions. Thus, the adopted methodology proved appropriate for investigating the integration between molecular diagnosis, targeted therapies, and oncologic thoracic surgery in the context of advanced lung cancer.

RESULTS AND DISCUSSION

The advances observed in recent decades in the treatment of lung cancer have significantly changed clinical practice, especially with the incorporation of molecular diagnosis and the development of targeted therapies. Advanced lung cancer, historically associated with unfavorable prognoses and high mortality rates, has begun to present new therapeutic perspectives based on the identification of specific genetic alterations and the adoption of personalized medicine strategies. In this context, oncologic thoracic surgery has become part of multidisciplinary therapeutic models, expanding treatment possibilities in selected cases.

Historically, the surgical approach was predominantly indicated in early stages of the disease. However, recent evidence demonstrates that patients with locally advanced or oligometastatic disease may experience clinical benefits when systemic therapies are combined with surgical treatment. According to Herbst, Morgensztern, and Boshoff (2018), the evolution of biological knowledge about lung cancer has redefined therapeutic criteria, allowing greater individualization of clinical management.

The identification of biomarkers has become one of the pillars of therapeutic decision-making. Alterations in genes such as EGFR, ALK, ROS1, KRAS, and BRAF have come to play a central role in

the selection of specific therapies, providing better clinical responses in defined groups of patients. Studies by Mok et al. (2009) demonstrated superior results in patients with EGFR mutations treated with targeted therapies when compared with conventional chemotherapy protocols.

Table 1

Main molecular biomarkers related to advanced lung cancer

Biomarker	Genetic alteration	Associated targeted therapy	Clinical relevance
EGFR	Activating mutations	Gefitinib, Erlotinib, Osimertinib	Better therapeutic response
ALK	Gene rearrangements	Crizotinib, Alectinib	Increased survival
ROS1	Molecular rearrangement	Crizotinib	Personalized therapy
BRAF	V600E mutation	Dabrafenib + Trametinib	Tumor control
KRAS	Specific mutations	Emerging therapies	Recent therapeutic potential

Source: Adapted from Mok et al. (2009); Rosell et al. (2012); Herbst et al. (2018).

The results found demonstrate that molecular profiling has significantly modified the treatment of advanced lung cancer. The incorporation of genetic sequencing tests has made it possible to select patients with a greater probability of therapeutic response, reducing exposure to less effective and potentially toxic treatments.

In addition to molecular identification, a significant evolution in surgical techniques was observed. Minimally invasive procedures, including video-assisted thoracic surgery and robotic approaches, have come to present lower morbidity, reduced length of hospital stay, and better postoperative recovery. According to Pêgo-Fernandes and Jatene (2015), technological advances have contributed to expanding surgical indications in patients previously considered to have no therapeutic possibilities.

Table 2

Comparison between the traditional approach and the integrated treatment model

Aspects	Traditional model	Current integrated model
Diagnosis	Anatomopathological	Anatomopathological + molecular
Treatment	Standard chemotherapy	Personalized therapy
Surgery	Early stages	Selected advanced cases
Prognosis	Lower survival	Potential increase in survival
Management	Generalized	Individualized

Source: Adapted from Rosell et al. (2012); Pêgo-Fernandes and Jatene (2015).

In the Brazilian setting, despite the scientific advances observed, important barriers related to access to diagnostic and therapeutic technologies are still identified. Regional inequalities, structural limitations, and delays in performing molecular tests represent factors that may compromise the effectiveness of therapeutic strategies. Such challenges are especially evident in regions with lower availability of specialized thoracic oncology centers.

Another aspect identified during the analysis was the importance of multiprofessional work in the management of these patients. Integration among thoracic surgeons, oncologists, pathologists, radiologists, and nursing professionals allows therapeutic planning to be more individualized and appropriate to each patient's clinical and molecular characteristics. According to Rosell et al. (2012), multidisciplinary approaches have the potential to optimize clinical outcomes and increase survival.

The findings analyzed suggest that the association between oncologic thoracic surgery, molecular diagnosis, and targeted therapies represents a significant change in the treatment of advanced lung cancer. However, although the results are promising, the consolidation of this approach depends on expanding access to diagnostic technologies, strengthening hospital infrastructure, and implementing public policies capable of reducing healthcare inequalities in the national setting.

CONCLUSION

The present study aimed to analyze the integration between oncologic thoracic surgery, molecular diagnosis, and targeted therapies in the management of advanced lung cancer, emphasizing their impacts on the national clinical prognosis. Based on the analysis of the scientific literature, it was possible to understand how technological advances and the development of precision medicine have been transforming the therapeutic approach to this neoplasm, expanding treatment perspectives and the individualization of clinical management.

The main results showed that the identification of molecular biomarkers and specific genetic alterations enabled more targeted therapy, favoring the use of targeted therapies associated with better clinical responses, increased survival, and improved quality of life among patients. In addition, it was observed that oncologic thoracic surgery has become part of multidisciplinary strategies in selected cases of advanced disease, especially in patients with locally advanced or oligometastatic presentation. Thus, the association between modern diagnostic resources and individualized therapeutic approaches represents an important advance in contemporary oncologic care.

The research contributes to expanding discussions related to the incorporation of personalized medicine in the context of advanced lung cancer, reinforcing the relevance of integration among different therapeutic modalities and multidisciplinary planning in clinical decision-making. It also highlights the need to strengthen specialized services and expand access to diagnostic and therapeutic technologies, especially in the national setting, which is marked by structural inequalities and limitations in healthcare provision.

Despite the advances observed, important challenges remain regarding the broad implementation of these strategies in the health system. In this regard, it is suggested that future studies investigate the clinical and economic effectiveness of integrating thoracic surgery, targeted therapies, and molecular profiling in different Brazilian population contexts, in addition to exploring factors associated with access, therapeutic adherence, and impact on long-term survival. Such investigations may contribute to

the development of more effective public policies and to the improvement of care practices aimed at advanced lung cancer.

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MEDICINAL PLANTS IN THE ADJUVANT TREATMENT OF LUNG CANCER: SCIENTIFIC EVIDENCE, PHARMACOLOGICAL EFFECTS, AND IMPLICATIONS FOR CLINICAL PRACTICE

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Abstract

This chapter aims to analyze, in an expanded manner, the use of medicinal plants as an adjuvant strategy in the treatment of lung cancer, highlighting the available scientific evidence, the main pharmacological effects of bioactive compounds and the implications for clinical practice. This is an integrative literature review, conducted based on the selection of studies indexed in national and international databases, such as PubMed, Scopus and SciELO, prioritizing recent and relevant publications in the area of integrative oncology. The results show that several medicinal plants, including *Curcuma longa* (turmeric), *Zingiber officinale* (ginger) and *Camellia sinensis* (green tea), have antioxidant, anti-inflammatory, immunomodulatory and antiproliferative properties, acting on cellular pathways related to carcinogenesis and tumor progression, decreasing the activation of the pathways: Phosphatidylinositol 3-kinase (*Phosphoinositide 3-Kinase*), *Protein Kinase B* and *Mechanistic Target of Rapamycin*. Curcumin, Inhibits pathways such as NF-κB, COX-2, TNF-α, IL-1β and IL-6 and Modulates macrophages, lymphocytes and inflammatory cytokines; 6-gingerol, 8-gingerol, 10-gingerol, 6-shogaol, paradol, zingerone Reduces the activation of Nuclear Factor Kappa B (NF-κB), inhibits the *Protein Kinase B* (Akt) pathway, decreases the production of prostaglandins, reduces the synthesis of Nitric Oxide (NO – Nitric Oxide) and reduces the release of pro-inflammatory cytokines, such as Tumor Necrosis Alpha (TNF-α), Interleukin 1 Beta (IL-1β) and Interleukin 6 (IL-6), Epigallocatechin-3-gallate inhibits NF-κB, inflammatory mediators and pathways associated with chronic inflammation. Such substances can contribute to the reduction of

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adverse effects associated with chemotherapy, such as nausea, fatigue and systemic inflammation, promoting an improvement in patients' quality of life. However, important limitations were identified, such as the methodological heterogeneity of the studies, lack of dose standardization, scarcity of robust clinical trials and risks of drug interactions. It is concluded that the use of medicinal plants in the context of lung cancer has relevant therapeutic potential as a complementary approach, as long as it is based on scientific evidence and carried out under qualified professional supervision, with the development of more rigorous clinical research being essential for its safe incorporation into care practice.

Keywords: Adjuvant therapy, Integrative oncology, Lung cancer, Medicinal plants, Phytotherapy.

INTRODUCTION

Lung cancer remains one of the leading causes of cancer-related mortality worldwide, representing a major challenge for health systems due to its high incidence, late diagnosis, and unfavorable prognosis. According to the World Health Organization, the disease is among the most lethal globally and is strongly associated with risk factors such as smoking, exposure to environmental carcinogens, and genetic predispositions. In this context, the search for complementary therapeutic approaches has increased, with the use of medicinal plants standing out as an adjuvant strategy in oncological care.

The delimitation of the research problem centers on the following question: what scientific evidence supports the use of medicinal plants as adjuvant therapy in lung cancer, and what are their pharmacological effects and implications for clinical practice? Although phytotherapy has been widely used in traditional and complementary medicine, important gaps still remain regarding its efficacy, safety, and standardization in the oncological context (Greenwell; Rahman, 2015).

The general objective of this chapter is to analyze the use of medicinal plants as adjuvant treatment for lung cancer, based on updated scientific evidence. The specific objectives are: (i) to describe the main bioactive compounds present in medicinal plants with antineoplastic potential; (ii) to discuss the

pharmacological effects related to antitumor action; (iii) to evaluate the benefits and risks associated with the use of these therapies; and (iv) to reflect on their implications for clinical practice in oncology.

The justification for the development of this study is based on the growing interest in integrative oncology and on the need to expand therapeutic possibilities that contribute to improving patients' quality of life. According to David Gorski (2014), although many complementary therapies show promising potential, it is essential that they be rigorously evaluated from a scientific perspective to ensure their efficacy and safety. Moreover, the indiscriminate use of medicinal plants may entail risks, such as drug interactions and adverse effects, reinforcing the importance of professional guidance.

From a theoretical perspective, several studies have investigated the effects of natural compounds in combating cancer. Bharat B. Aggarwal et al. (2007) highlight the role of curcumin, derived from *Curcuma longa*, in modulating inflammatory and apoptotic pathways in tumor cells. Similarly, M. S. Butt and Sultan (2009) demonstrate the effects of green tea polyphenols (*Camellia sinensis*) in inhibiting cell proliferation. Greenwell and Rahman (2015), in turn, emphasize the potential of natural compounds in the discovery of new anticancer agents. These findings reinforce the relevance of scientific investigation into medicinal plants as therapeutic adjuvants, especially in the context of lung cancer.

Thus, this chapter seeks to contribute to a critical and evidence-based understanding of the use of medicinal plants in oncology, promoting an approach grounded in evidence and aligned with contemporary demands in clinical practice.

METHODOLOGY

TYPE OF STUDY

This chapter is characterized as an integrative literature review, with a qualitative approach and a descriptive-analytical nature, enabling the synthesis of scientific knowledge regarding the use of medicinal plants as adjuvant therapy in lung cancer. This type of study makes it possible to gather and analyze results from previously published research, contributing to a broader understanding of the

phenomenon under investigation. According to R. Whittemore and K. Knafl (2005), the integrative review is suitable for incorporating evidence into clinical practice, especially in interdisciplinary areas such as integrative oncology.

SEARCH STRATEGY AND DATA SOURCES

The search for studies was conducted in recognized scientific databases, including PubMed, Scopus, Web of Science, and SciELO. Controlled and uncontrolled descriptors were used, combined with Boolean operators (AND, OR), such as: “lung cancer,” “medicinal plants,” “phytotherapy,” “adjuvant therapy,” and “integrative oncology.” The selection prioritized articles published between 2010 and 2025, in Portuguese, English, and Spanish, ensuring currency and scientific relevance.

INCLUSION AND EXCLUSION CRITERIA

Original studies, systematic reviews, and clinical trials addressing the use of medicinal plants or derived compounds in the adjuvant treatment of lung cancer were included, with a focus on pharmacological effects, therapeutic efficacy, and safety. Duplicate studies, studies with unclear methodology, non-peer-reviewed publications, and those with no direct relationship to the proposed topic were excluded.

DATA SELECTION AND ANALYSIS PROCESS

Article selection took place in three stages: reading of titles, analysis of abstracts, and full-text reading of eligible studies. For data organization and analysis, an instrument was developed containing information such as authors, year of publication, type of study, main findings, and conclusions. The analysis was conducted qualitatively, allowing the results to be categorized into thematic axes, such as pharmacological properties, clinical benefits, and risks associated with the use of medicinal plants.

ETHICAL ASPECTS AND SCIENTIFIC RIGOR

Because this is research based on publicly accessible secondary data, submission to a research ethics committee was not required. However, ethical principles related to scientific integrity were respected, with proper citation of the authors and sources used. As emphasized by Denise F. Polit and Cheryl Tatano Beck (2017), methodological rigor is essential to ensure the reliability and validity of results in review studies.

METHODOLOGICAL DISCUSSION

The choice of the integrative review as the method proved appropriate for meeting the objectives of the study, since it allows for a comprehensive analysis of different research designs and the identification of gaps in scientific knowledge. However, limitations inherent to this type of study should be considered, such as the heterogeneity of the included works and the possible presence of publication bias. Even so, as argued by Brian Haynes and colleagues (2006), the use of systematized search and selection strategies contributes significantly to the quality of the evidence produced.

Thus, the methodology adopted enabled a critical and evidence-based analysis of the use of medicinal plants in the adjuvant treatment of lung cancer, providing relevant support for evidence-based clinical practice.

RESULTS AND DISCUSSION

The results of this integrative review show a growing scientific interest in the use of medicinal plants as adjuvant therapy in lung cancer, especially with regard to their pharmacological effects and their potential to improve patients' quality of life. The analysis of the selected studies made it possible to organize the findings into thematic categories, as presented in the following tables.

Table 1 presents the main medicinal plants identified in the studies, their bioactive compounds, and the pharmacological effects described in the literature.

Table 1

Medicinal plants and their pharmacological effects in lung cancer

Medicinal plant	Bioactive compound	Main pharmacological effect	Reference
Curcuma longa (turmeric)	Curcumin	Anti-inflammatory and antiproliferative	Aggarwal et al. (2007)
Camellia sinensis (green tea)	Polyphenols (EGCG)	Antioxidant and tumor inhibition	Butt; Sultan (2009)
Zingiber officinale (ginger)	Gingerol	Induction of apoptosis	Greenwell; Rahman (2015)

Source: Author's own work (2026).

It is observed that the bioactive compounds present in these plants act on different cellular pathways related to carcinogenesis, including the regulation of inflammation, oxidative stress, and programmed cell death. Curcumin has been widely studied for its ability to modulate transcription factors such as NF-κB (Aggarwal et al., 2007), inhibiting Nuclear Factor Kappa B (NF-κB), a transcription factor that regulates the expression of several genes involved in the inflammatory response; reducing the production of pro-inflammatory mediators, including Cyclooxygenase-2 (COX-2), an enzyme responsible for the synthesis of inflammatory prostaglandins; and cytokines such as Tumor Necrosis Factor Alpha (TNF-α), Interleukin-1 Beta (IL-1β), and Interleukin-6 (IL-6). As a result, inflammation, edema, and tissue damage are reduced (Mirzaei et al., 2021; Moller et al., 2023).

Curcumin exhibits significant antioxidant activity through the activation of Nuclear Factor Erythroid 2–Related Factor 2 (Nrf2), considered the main regulator of cellular antioxidant mechanisms. Activation of Nrf2 stimulates the expression of antioxidant enzymes, such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), and heme oxygenase-1 (HO-1), which act in the neutralization of reactive oxygen species and in the reduction of cellular oxidative stress (He et al., 2022; Zhang et al., 2023). Green tea polyphenols demonstrate potent antioxidant activity (Butt; Sultan, 2009). The main green tea polyphenols are: epigallocatechin-3-gallate (EGCG) – the main and most abundant catechin (50–65% of total catechins); epigallocatechin (EGC); epicatechin-3-gallate (ECG); and

epicatechin (EC). EGCG is considered primarily responsible for the biological effects of green tea. Green tea polyphenols also exhibit significant anti-inflammatory activity. EGCG is capable of inhibiting the activation of Nuclear Factor Kappa B (NF-κB), a transcription factor that regulates the expression of several genes involved in the inflammatory response. Consequently, there is a reduction in the production of pro-inflammatory mediators, including Tumor Necrosis Factor Alpha (TNF-α), Interleukin-1 Beta (IL-1β), Interleukin-6 (IL-6), and Cyclooxygenase-2 (COX-2), contributing to decreased inflammation and tissue injury (Yang; Wang, 2016; Zhang et al., 2023). The main bioactive compounds in ginger (*Zingiber officinale*) associated with anticarcinogenic activity are gingerols, especially 6-gingerol, and shogaols, mainly 6-shogaol. Compounds such as 8-gingerol, 10-gingerol, paradol, and zingerone are also present and exhibit antioxidant, anti-inflammatory, immunomodulatory, and antiproliferative properties (Sharma et al., 2022; Jia et al., 2023). 6-gingerol acts at different stages of carcinogenesis by reducing cell proliferation, interrupting the cell cycle, and inducing apoptosis (programmed cell death). This compound increases the expression of the Bax protein (B-cell lymphoma-associated X protein), which promotes apoptosis; reduces the expression of the Bcl-2 protein (B-cell lymphoma 2), responsible for cell survival; and activates caspases, enzymes that execute the process of programmed cell death. In this way, it promotes the elimination of genetically altered or potentially tumorigenic cells (Wala et al., 2022; Noor et al., 2024). 6-shogaol exhibits potent antiproliferative and pro-apoptotic activity. Its mechanism involves inhibition of the *Protein Kinase B*/Mechanistic Target of Rapamycin (Akt/mTOR) pathway. This pathway regulates cell growth, protein synthesis, metabolism, and cell survival, and is frequently hyperactivated in various types of cancer. 6-shogaol also reduces the activity of Nuclear Factor Kappa B (NF-κB), one of the main regulators of the inflammatory response, and of Signal Transducer and Activator of Transcription 3 (STAT3), a protein involved in cell proliferation, angiogenesis, and resistance to apoptosis (Jia et al., 2023; Figueroa-González et al., 2024).

The bioactive compounds in ginger also play an important role in preventing tumor invasion and metastasis. In a study conducted by Wala et al. (2022) with human breast adenocarcinoma cells, 6-

gingerol demonstrated the ability to reduce the expression of Matrix Metalloproteinases 2 (MMP-2) and 9 (MMP-9), enzymes responsible for degrading the extracellular matrix and basement membrane. The decreased activity of these enzymes resulted in a lower migratory and invasive capacity of tumor cells. Similarly, Chen et al. (2023) observed that 6-shogaol significantly reduced the mobility and invasion of colorectal cancer cells, an effect associated with the suppression of MMP-2 and MMP-9 expression and the modulation of signaling pathways related to metastasis. These results indicate that ginger compounds may hinder tumor dissemination by preserving the integrity of the extracellular matrix and limiting the invasive capacity of cancer cells (Wala et al., 2022; Chen et al., 2023).

Table 2 summarizes the main clinical benefits observed in the analyzed studies, especially in the context of adjuvant treatment.

Table 2

Clinical benefits of using medicinal plants as adjuvant therapy

Type of intervention	Observed benefits	Reference
Phytotherapy associated with chemotherapy	Reduction of nausea and vomiting	Ernst (2008)
Use of natural compounds	Decrease in systemic inflammation	Aggarwal et al. (2007)
Integrative therapies	Improvement in quality of life and well-being	Ernst (2008)

Source: Author's own work (2026).

The findings indicate that the use of these therapies may contribute significantly to symptom control and adherence to conventional treatment. According to Ernst (2008), integrative practices, when used appropriately, may promote relevant benefits in oncological care.

However, despite the promising results, Table 3 presents the main limitations identified in the literature.

Table 3

Limitations and risks associated with the use of medicinal plants

Identified limitation	Clinical implication	Reference
Lack of dose standardization	Difficulty in clinical application	Gorski (2014)
Few robust clinical trials	Low level of scientific evidence	Greenwell; Rahman (2015)
Possible drug interactions	Risk to patient safety	Gorski (2014)

Source: Author's own work (2026).

The critical analysis reveals that the methodological heterogeneity of the studies and the scarcity of controlled clinical trials limit the generalization of the results. In addition, the indiscriminate use of these substances may pose risks, especially due to interactions with chemotherapeutic drugs (Gorski, 2014).

Overall, the results demonstrate that medicinal plants have potential as adjuvant therapy in lung cancer (Table 1), particularly in the modulation of biological processes and symptom relief (Table 2). However, their use should be based on scientific evidence and carried out under professional supervision (Table 3), reinforcing the need for further clinical studies to ensure their safety and efficacy in healthcare practice.

CONCLUSION

This chapter aimed to analyze the use of medicinal plants as adjuvant treatment for lung cancer, based on scientific evidence, highlighting their pharmacological effects and implications for clinical practice. Based on the integrative review conducted, it was possible to achieve the proposed objectives, enabling the identification and discussion of the main bioactive compounds, their mechanisms of action, and their potential benefits in the oncological context.

The results showed that medicinal plants such as *Curcuma longa*, *Camellia sinensis*, and *Zingiber officinale* have antioxidant, anti-inflammatory, immunomodulatory, and antiproliferative properties, acting on important pathways related to carcinogenesis and tumor progression, such as the Nuclear Factor Kappa B (NF-κB) pathway, responsible for regulating inflammation and the expression of pro-inflammatory cytokines; the *Protein Kinase B*/Mechanistic Target of Rapamycin (Akt/mTOR) pathway, involved in cell growth, metabolism, and survival; the Mitogen-Activated Protein Kinase/Extracellular Signal-Regulated Kinase (MAPK/ERK) pathway, which controls cell proliferation and differentiation; the Signal Transducer and Activator of Transcription 3 (STAT3) pathway, associated with tumor proliferation, angiogenesis, and resistance to apoptosis; and the Wnt/β-catenin pathway, an important regulator of differentiation, cellular renewal, and tumor development. In addition, these bioactive compounds modulate the activity of Nuclear Factor Erythroid 2–Related Factor 2 (Nrf2), strengthening cellular antioxidant mechanisms, and reduce the expression of Matrix Metalloproteinases (MMP-2 and MMP-9), enzymes related to tumor invasion and metastasis formation. Together, the modulation of these pathways contributes to the reduction of chronic inflammation, oxidative stress, uncontrolled cell proliferation, angiogenesis, tumor invasion, and cancer progression.

Furthermore, it was found that the use of these substances may contribute to reducing the adverse effects of chemotherapy, such as nausea, vomiting, fatigue, and systemic inflammation, thereby improving patients' quality of life. However, relevant limitations were also identified, including the scarcity of robust clinical trials, lack of dose standardization, and risks of drug interactions.

As a contribution, this study reinforces the importance of integrative oncology and the use of evidence-based complementary approaches, offering theoretical support for health professionals in clinical decision-making. It also broadens the discussion on the need to integrate traditional and scientific knowledge safely and effectively in the care of oncology patients.

In oncology clinical practice, turmeric, ginger, and green tea should be understood as integrative and adjuvant strategies, and not as substitute treatments. Their use may contribute to symptom control,

reduction of inflammatory processes, and improvement in quality of life, but it must be individualized, taking into account the type of cancer, disease stage, chemotherapy regimen, liver function, bleeding risk, use of anticoagulants, and possible drug interactions. Therefore, the safest recommendation is that these therapies be used only with follow-up by the oncology, pharmaceutical, and nutritional team, respecting safe doses and avoiding concentrated supplements without professional evaluation.

Finally, future studies with more rigorous methodological designs are suggested, especially randomized clinical trials evaluating the efficacy, safety, dosage, and possible interactions of medicinal plants in the treatment of lung cancer. Such investigations are essential to consolidate the use of these therapies in clinical practice, ensuring greater reliability and safety for patients.

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THERAPEUTIC INNOVATION IN PANCREATIC CANCER: CLINICAL, ECONOMIC, AND HEALTHCARE IMPLICATIONS OF THE INTRODUCTION OF DARAXONRASIB INTO ONCOLOGY PRACTICE

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Abstract

Pancreatic cancer remains one of the malignancies with the poorest prognosis, characterized by high mortality rates and limited therapeutic options, particularly in advanced stages. In this context, this chapter aims to analyze the clinical, economic, and healthcare implications of introducing daraxonrasib into contemporary oncology practice. The methodology consisted of a narrative review of national and international scientific literature, including indexed articles, clinical studies, and technical documents published between 2020 and 2026, focusing on targeted therapies directed at KRAS gene mutations. The findings indicate that daraxonrasib represents an innovative therapeutic strategy by specifically targeting molecular alterations associated with tumor progression, contributing to improved survival outcomes, better disease control, and potentially fewer adverse effects when compared with conventional treatments. However, its incorporation into healthcare systems presents challenges related to high costs, the need for genomic testing, and the reorganization of specialized services to ensure equitable access for eligible

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patients. It is concluded that daraxonrasib has the potential to transform pancreatic cancer management, highlighting the importance of precision medicine and the continuous assessment of its clinical, economic, and healthcare impacts in modern oncology.

Keywords: Oncology, Pancreatic cancer, Precision medicine, Targeted therapy, Daraxonrasib.

INTRODUCTION

Pancreatic cancer represents one of the greatest challenges in contemporary oncology due to its high biological aggressiveness, frequently late diagnosis, and low long-term survival rates. According to the World Health Organization (2024), this neoplasm ranks among the leading causes of cancer mortality worldwide and is responsible for a significant clinical, social, and economic impact on healthcare systems. Most patients present with locally advanced or metastatic disease at the time of diagnosis, limiting curative therapeutic possibilities and contributing to unfavorable prognoses.

In recent decades, advances in the understanding of the molecular biology of pancreatic ductal adenocarcinoma have made it possible to identify genetic alterations associated with tumor progression, with particular emphasis on mutations in the KRAS gene, which are present in approximately 90% of cases of the disease (Mizrahi et al., 2020). This scenario has driven the development of targeted therapies capable of acting specifically on molecular mechanisms involved in pancreatic carcinogenesis, opening new perspectives for personalized treatment.

In this context, daraxonrasib emerges as a promising therapeutic innovation aimed at the selective blockade of oncogenic pathways related to KRAS mutations. Although preliminary results indicate potential clinical benefit in terms of tumor control and increased survival, its incorporation into healthcare practice raises questions related to effectiveness, safety, cost-effectiveness, and patient accessibility to new treatments (Moore et al., 2024).

Given this panorama, the research problem guiding this chapter consists of understanding the clinical, economic, and healthcare implications arising from the introduction of daraxonrasib into the

management of pancreatic cancer. This issue is relevant due to the increasing incorporation of high-cost technologies in oncology and the need to balance therapeutic innovation, the sustainability of healthcare systems, and expanded access to treatments.

The general objective of this study is to analyze the clinical, economic, and healthcare implications of the introduction of daraxonrasib into oncology practice for pancreatic cancer. Its specific objectives are to describe the main epidemiological and molecular aspects of the disease; discuss the mechanisms of action and clinical outcomes associated with daraxonrasib; and assess the challenges related to the incorporation of this technology into healthcare services.

The relevance of this topic is grounded in the need to expand knowledge about new therapeutic strategies directed at pancreatic cancer, contributing to evidence-based clinical decision-making and to the formulation of public policies that favor the rational use of innovative technologies. As highlighted by Neoptolemos et al. (2018), the advancement of precision medicine has the potential to significantly modify the prognosis of patients with tumors historically associated with high mortality rates.

From a theoretical perspective, this study is based on the concepts of precision oncology, targeted therapies, and health technology assessment, considering that the incorporation of new drugs requires an integrated analysis of clinical benefits, economic impacts, and organizational repercussions for healthcare systems (Porter; Teisberg, 2007; Drummond et al., 2015). Thus, the discussion of daraxonrasib goes beyond isolated therapeutic outcomes, encompassing aspects related to sustainability, equity, and the quality of oncological care.

METHODOLOGY

TYPE OF RESEARCH

This study is characterized as qualitative, descriptive, and exploratory research, developed through a narrative literature review. The choice of this approach is justified by the need to gather, analyze, and discuss scientific evidence related to the clinical, economic, and healthcare implications of the

introduction of daraxonrasib in the treatment of pancreatic cancer. According to Gil (2022), exploratory studies allow greater proximity to the investigated phenomenon, favoring the construction of knowledge on emerging topics that remain insufficiently consolidated in the literature.

SEARCH STRATEGY AND STUDY SELECTION

The bibliographic search was conducted in national and international databases widely recognized in the health field, including PubMed, Scopus, Web of Science, the Virtual Health Library (VHL), and the Scientific Electronic Library Online (SciELO). Descriptors related to the topic were used in Portuguese and English and combined with Boolean operators, such as: “câncer de pâncreas,” “pancreatic cancer,” “KRAS inhibitors,” “targeted therapy,” “precision oncology,” “daraxonrasib,” and “health technology assessment.”

Scientific articles, systematic reviews, clinical trials, institutional documents, and technical reports published between 2020 and 2026 were included, provided they were available in full and related to the clinical, economic, or healthcare aspects of targeted therapies directed at KRAS gene mutations. Duplicate studies, works without direct relevance to the topic, and publications without recognized scientific support were excluded.

INSTRUMENTS AND ANALYTICAL PROCEDURES

Data were collected through the critical and systematic reading of the selected studies. The extracted information was organized into previously defined thematic categories: clinical aspects of pancreatic cancer, mechanisms of action of daraxonrasib, economic impacts of technological incorporation, and healthcare repercussions for oncology services.

Data analysis was conducted descriptively and interpretively, enabling the identification of convergences, divergences, and gaps in the scientific literature. According to Marconi and Lakatos

(2021), documentary and bibliographic analysis makes it possible to understand complex phenomena through the integration of different sources of information.

STUDY SAMPLE

The sample consisted of scientific publications and technical documents selected according to the established inclusion criteria. Priority was given to studies of high methodological quality, especially clinical trials, systematic reviews, and international guidelines related to the treatment of pancreatic cancer and the development of targeted therapies for KRAS mutations.

The selection sought to include evidence from different healthcare contexts, enabling a comprehensive analysis of the potential benefits and challenges associated with the implementation of daraxonrasib in clinical practice.

ETHICAL ASPECTS

As this is a literature review based on secondary data in the public domain, submission to a Research Ethics Committee was not required, in accordance with the guidelines established by Resolution No. 510/2016 of the Brazilian National Health Council. Nevertheless, the principles of scientific integrity, methodological rigor, and appropriate citation of the consulted sources were respected.

METHODOLOGICAL DISCUSSION

The adoption of a narrative review proved appropriate for understanding a recent and constantly evolving topic, such as the use of daraxonrasib in precision oncology. Recent studies emphasize that the development of therapies directed at molecular alterations in the KRAS gene represents one of the main frontiers of therapeutic innovation in solid tumors, including pancreatic cancer (Mizrahi et al., 2020).

Moreover, the incorporation of new pharmacological technologies requires assessments that go beyond traditional clinical outcomes, encompassing economic, organizational, and social aspects. In this

regard, Drummond et al. (2015) emphasize that health technology assessment should consider not only the efficacy of treatments, but also their financial sustainability and impact on healthcare systems.

Thus, the methodology adopted made it possible to gather relevant evidence for a broad understanding of the topic, favoring a critical discussion of the benefits, limitations, and challenges related to the introduction of daraxonrasib into contemporary oncological care.

RESULTS AND DISCUSSION

The literature analysis showed that pancreatic cancer remains one of the most lethal neoplasms in the global oncological scenario. Despite advances in diagnosis and treatment, overall patient survival remains limited, especially in cases diagnosed at advanced stages. In this context, the development of targeted therapies directed at the tumor's molecular alterations has been identified as a promising strategy to improve clinical outcomes (Mizrahi et al., 2020).

Among the most recent therapeutic innovations, daraxonrasib emerges as an alternative aimed at blocking specific mutations in the KRAS gene, one of the most frequent genetic alterations in pancreatic adenocarcinoma. Preliminary clinical studies demonstrate favorable results regarding control of tumor progression and increased progression-free survival, reinforcing the potential of precision medicine in modern oncology (Moore et al., 2024).

Table 1

Main challenges of conventional treatment and potential contributions of daraxonrasib

Aspect	Conventional Treatment	Introduction of Daraxonrasib
Therapeutic specificity	Low	High
Control of tumor progression	Moderate	Potentially superior
Systemic toxicity	High	Lower in selected patients
Need for biomarkers	Limited	Essential
Treatment personalization	Restricted	Expanded
Survival potential	Limited	Promising

Source: Prepared by the author based on Mizrahi et al. (2020) and Moore et al. (2024).

The studies analyzed indicate that the main advantage of daraxonrasib is related to its ability to act directly on molecular pathways associated with tumor growth. Unlike conventional chemotherapy regimens, which have systemic action and lower selectivity, targeted therapies seek to affect specific mechanisms involved in carcinogenesis, reducing damage to healthy cells and enhancing the therapeutic response (Neoptolemos et al., 2018).

Another relevant aspect identified in the literature concerns the economic impact of incorporating this technology. Although the drug has the potential to reduce indirect costs related to hospitalizations, complications, and disease progression, its high initial cost represents a challenge for both public and private healthcare systems. As Drummond et al. (2015) point out, the adoption of innovative technologies must be accompanied by cost-effectiveness assessments capable of demonstrating clinical benefits consistent with the investments made.

Table 2

Implications of the introduction of daraxonrasib into oncology practice

Assessed Dimension	Main Impacts
Clinical	Greater therapeutic precision and potential increase in survival
Economic	Increased initial costs and need for cost-effectiveness assessment
Healthcare	Increased demand for molecular diagnosis
Organizational	Need for professional training and service adaptation
Social	Possibility of improving patients' quality of life

Source: Prepared by the author based on Drummond et al. (2015), Porter and Teisberg (2007), and Moore et al. (2024).

From the healthcare perspective, it was observed that the use of daraxonrasib requires significant changes in the organization of oncology services. The identification of eligible patients depends on the performance of advanced genomic tests, requiring adequate laboratory infrastructure and teams trained to interpret the results. This reality reinforces the need for integration among molecular diagnosis, clinical oncology, and health management, elements considered fundamental for the consolidation of personalized medicine (Porter; Teisberg, 2007).

Furthermore, the studies indicate that the expansion of targeted therapies may contribute to a shift in the healthcare paradigm for pancreatic cancer. Historically associated with unfavorable prognoses and few therapeutic options, this type of cancer is beginning to benefit from more individualized approaches, based on each patient's genetic characteristics. However, the effectiveness of this transformation will depend on expanded access to diagnostic and therapeutic technologies, especially in countries with healthcare systems marked by regional inequalities.

Table 3

Summary of the main findings identified in the literature

Category	Findings
Epidemiology	High mortality and late diagnosis
Molecular aspects	High frequency of KRAS gene mutations
Clinical benefits	Better tumor control and potential increase in survival
Economic challenges	High acquisition and implementation costs
Healthcare challenges	Need for genomic testing and service reorganization
Future perspectives	Expansion of precision medicine in oncological treatment

Source: Prepared by the author based on the studies analyzed.

The results demonstrate that daraxonrasib represents a relevant innovation for the treatment of pancreatic cancer, especially because of its ability to direct therapy toward the molecular characteristics of the disease. However, its incorporation requires strategic planning, economic evaluation, and strengthening of healthcare infrastructure to ensure that clinical benefits are effectively translated into gains for patients and healthcare systems. Thus, the findings corroborate recent literature by showing that precision medicine tends to occupy an increasingly central role in the future of oncology (Mizrahi et al., 2020; Moore et al., 2024).

CONCLUSION

The present study aimed to analyze the clinical, economic, and healthcare implications of the introduction of daraxonrasib into oncology practice for the treatment of pancreatic cancer. Considering the high mortality associated with this neoplasm and the limitations of conventional treatments, the study sought to understand how this therapeutic innovation may contribute to the advancement of oncological care and to the consolidation of precision medicine.

The results obtained showed that daraxonrasib represents a promising strategy in the management of pancreatic cancer by acting in a targeted manner on specific molecular alterations, especially those related to the KRAS gene. The literature analyzed indicates potential for improved tumor control,

increased progression-free survival, and greater treatment personalization when compared with traditional therapeutic approaches. In addition, it was observed that the use of targeted therapies may favor the reduction of certain adverse effects resulting from conventional chemotherapy, contributing to better quality of life for patients.

On the other hand, the study also demonstrated that the incorporation of daraxonrasib into healthcare systems involves important challenges. These include the high costs associated with the drug, the need to perform genomic tests to identify eligible patients, and the demand for technological infrastructure and specialized human resources. Such factors reinforce the importance of continuous cost-effectiveness assessments and strategic planning to ensure equitable access to therapeutic innovations.

As a contribution, this research broadens the discussion on the multidimensional impacts of new targeted therapies in the context of pancreatic cancer, bringing together scientific evidence that may support clinical, managerial, and policy decisions related to the incorporation of technologies in oncology. The study also highlights the relevance of integrating scientific advances, healthcare system sustainability, and the qualification of care provided to oncology patients.

Finally, it is suggested that future research monitors the results of ongoing clinical studies on daraxonrasib, especially those focused on the assessment of overall survival, quality of life, long-term safety, and cost-effectiveness in different healthcare contexts. Investigations addressing the implementation of this technology in public healthcare systems may also contribute to the development of strategies capable of expanding patient access to the benefits of precision medicine. Thus, it is expected that the advancement of targeted therapies will continue to promote significant transformations in the treatment of pancreatic cancer and in contemporary oncology practice.

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BACTERIAL AND VIRAL MENINGITIS: CLINICAL, DIAGNOSTIC, AND THERAPEUTIC UPDATES IN LIGHT OF NEW SCIENTIFIC EVIDENCE

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Abstract

Bacterial and viral meningitis remain among the leading causes of morbidity and mortality associated with infectious diseases of the central nervous system, requiring continuous updates in clinical and therapeutic protocols in light of emerging scientific evidence. This chapter aims to analyze recent advances related to diagnosis, clinical management, and treatment of bacterial and viral meningitis, highlighting contemporary challenges for healthcare practice and public health. This is a narrative review based on the analysis of scientific articles, clinical guidelines, and national and international institutional documents addressing the topic. The findings demonstrate that the incorporation of more sensitive diagnostic methods, including molecular testing and advanced laboratory techniques, has improved the speed of etiological identification and therapeutic decision-making. Early recognition of clinical signs combined with timely treatment initiation remains a determining factor in reducing complications and mortality. It is concluded that integrating diagnostic advances, evidence-based therapeutics, and strengthened health surveillance is essential to improving clinical outcomes in patients with meningitis.

Keywords: Bacterial meningitis, Clinical diagnosis, Health surveillance, Therapeutics, Viral meningitis.

INTRODUCTION

Bacterial and viral meningitis constitute important causes of inflammation of the meninges and remain among the main infectious conditions associated with the central nervous system across different age groups. Despite advances related to vaccination, laboratory diagnosis, and antimicrobial treatment, these conditions still have considerable clinical relevance due to their potential for rapid progression, the occurrence of neurological sequelae, and their impact on health systems. According to van de Beek et al. (2016), meningitis remains a medical emergency that requires early recognition and immediate intervention in order to reduce mortality and clinical complications.

Meningitis has distinct etiologies, with bacterial forms generally being associated with greater clinical severity when compared with viral forms. Among the main bacterial agents, *Neisseria meningitidis*, *Streptococcus pneumoniae*, and *Haemophilus influenzae* stand out, while enteroviruses are among the most frequently identified viral agents (Tunkel et al., 2017). The development of more sensitive and rapid diagnostic methods, especially molecular techniques, has significantly changed the clinical management of these infections, enabling greater accuracy in etiological identification and therapeutic targeting.

In this context, the following research problem is defined: how have clinical, diagnostic, and therapeutic updates contributed to improving care for patients with bacterial and viral meningitis in light of new scientific evidence?

The general objective of this chapter is to analyze clinical, diagnostic, and therapeutic updates related to bacterial and viral meningitis in light of recent scientific evidence. The specific objectives are to identify the main advances in diagnostic methods; discuss contemporary therapeutic approaches used in the management of these diseases; and analyze the impacts of these updates on healthcare delivery and patients' clinical outcomes.

The justification for this study is based on the epidemiological and clinical relevance of meningitis and on the continuous need for healthcare professionals to remain updated in view of changes observed in diagnostic and therapeutic protocols. As emphasized by the World Health Organization (2021), reducing the global burden of meningitis depends not only on strengthening prevention and vaccination, but also on improving early diagnosis and timely access to treatment.

From a theoretical standpoint, recent evidence shows that the incorporation of molecular tests, automated laboratory techniques, and evidence-based clinical protocols has contributed to faster diagnosis and to reducing the inappropriate use of antimicrobials (Roos; Tunkel, 2020). In addition, studies indicate that early recognition of clinical signs and immediate initiation of therapy remain determining factors in reducing neurological sequelae and mortality associated with meningitis (Solomon; Michael, 2022). Thus,

understanding the scientific advances related to bacterial and viral meningitis is essential for improving care quality and strengthening health surveillance and care strategies.

METHODOLOGY

STUDY DESIGN

This chapter is characterized as qualitative research, with a descriptive and exploratory approach, developed through a narrative literature review. This type of investigation makes it possible to gather, analyze, and interpret knowledge produced on a given topic, allowing a critical construction of the current state of scientific evidence (Gil, 2022). This methodological approach was chosen due to the need to comprehensively discuss the clinical, diagnostic, and therapeutic updates related to bacterial and viral meningitis.

According to Minayo (2014), qualitative research favors an in-depth understanding of complex phenomena present in healthcare practices and makes it possible to integrate different theoretical and scientific perspectives. Thus, the narrative review proved suitable for understanding recent advances and contemporary challenges related to the management of meningitis.

PROCEDURES FOR INFORMATION COLLECTION

Information collection was carried out through a bibliographic survey in scientific databases and nationally and internationally recognized institutional documents. Publications available on platforms such as the Virtual Health Library (VHL), Scientific Electronic Library Online (SciELO), PubMed, and official documents published by leading health organizations were consulted.

Materials produced by the World Health Organization (WHO), the Brazilian Ministry of Health, and international institutions related to epidemiological surveillance and infectious diseases were also considered.

To guide the search, descriptors in Portuguese and English were used in combination with Boolean operators, including the terms: “bacterial meningitis,” “viral meningitis,” “laboratory diagnosis,” “treatment,” “bacterial meningitis,” “viral meningitis,” “clinical diagnosis,” and “therapeutics.”

Inclusion and exclusion criteria

Studies preferably published between 2015 and 2026, available in full text, in Portuguese or English, and addressing clinical, diagnostic, therapeutic, or epidemiological aspects related to bacterial and viral meningitis were included.

Duplicate studies, studies with insufficiently described methodology, publications with no direct relationship to the research object, and materials lacking recognized scientific or institutional support were excluded.

ANALYSIS TECHNIQUES AND INSTRUMENTS

After the selection of bibliographic material, exploratory, analytical, and interpretative reading of the selected documents was carried out. The information was then organized into thematic categories related to the central axes of the study: clinical updates, diagnostic advances, and therapeutic approaches.

As a data interpretation strategy, thematic analysis based on the principles described by Bardin (2016) was used, making it possible to identify recurring patterns, scientific convergences, and relevant aspects for understanding the transformations observed in meningitis care.

CHARACTERIZATION OF THE DOCUMENTARY SAMPLE

The documentary sample consisted of scientific articles, systematic reviews, clinical guidelines, international consensus statements, and institutional documents related to bacterial and viral meningitis.

Priority was given to studies produced by researchers and organizations recognized in the fields of infectious diseases, neurology, and public health, with the aim of encompassing different diagnostic and

therapeutic approaches. The selection of material sought to ensure methodological diversity and scientific currency, allowing a comprehensive view of the topic.

METHODOLOGICAL FOUNDATION AND SCIENTIFIC DISCUSSION

The use of the narrative review made it possible to integrate knowledge produced in different clinical and epidemiological contexts, favoring a critical analysis of recent evidence related to meningitis. According to Gil (2022), reviews of this nature contribute to the systematization of knowledge and to broadening scientific interpretations of a given phenomenon.

Furthermore, authors in the field emphasize that the rapid evolution of diagnostic and therapeutic methods requires continuous updating of clinical practices in order to ensure better outcomes for patients (Tunkel et al., 2017; Van de Beek et al., 2016). In this sense, the adopted method made it possible to identify relevant advances in the use of molecular techniques, updated therapeutic protocols, and strategies aimed at early diagnosis.

Thus, the applied methodology enabled the construction of a grounded analysis of the main scientific evidence related to bacterial and viral meningitis, contributing to the understanding of current challenges and future perspectives in the field of healthcare delivery and health surveillance.

RESULTS AND DISCUSSION

The analysis of the scientific literature showed that bacterial and viral meningitis continue to represent an important challenge for health services due to their high morbidity, potential for neurological complications, and need for early diagnosis. The reviewed studies demonstrated that recent scientific advances have contributed to significant changes in clinical management, especially through the incorporation of more sensitive diagnostic methods and the updating of therapeutic protocols.

The findings indicated that bacterial meningitis remains associated with greater clinical severity and a higher risk of sequelae when compared with viral forms. However, early recognition of clinical

signs and the use of faster diagnostic strategies have favored improved clinical outcomes and reduced time to treatment initiation.

Table 1

Comparison of clinical and laboratory characteristics of bacterial and viral meningitis

Variable	Bacterial meningitis	Viral meningitis
Clinical onset	Sudden	Progressive or acute
Fever	Frequent	Frequent
Altered mental status	More common	Less frequent
Cerebrospinal fluid – cellularity	Predominance of neutrophils	Predominance of lymphocytes
Cerebrospinal fluid proteins	Elevated	Mildly elevated
Cerebrospinal fluid glucose	Reduced	Generally normal
Prognosis	Higher risk of complications	More favorable course

Source: Adapted from Tunkel et al. (2017), van de Beek et al. (2016), and Solomon and Michael (2022).

Among the results found, the increasing use of molecular techniques for diagnostic confirmation stood out. The studies showed that tests based on molecular biology have expanded the capacity for rapid identification of the etiological agent, reducing therapeutic delays and increasing clinical accuracy.

In addition to diagnostic advances, an important update in therapeutic approaches was observed, with emphasis on early treatment initiation, continuous monitoring, and the rational use of antimicrobials.

Table 2

Main diagnostic and therapeutic updates identified

Aspect	Observed updates	Clinical benefits
Molecular diagnosis (PCR)	Greater speed in etiological identification	Reduced time to treatment
Automated laboratory tests	Improved diagnostic accuracy	Support for clinical decision-making
Early antibiotic therapy	Immediate initiation in suspected bacterial cases	Reduced mortality
Antiviral therapy	Targeted use in specific cases	Reduced clinical progression
Neurological monitoring	Expansion of hospital surveillance	Reduction of sequelae

Source: Prepared based on Roos and Tunkel (2020), WHO (2021), and Tunkel et al. (2017).

Another observed result concerns the role of prevention and epidemiological surveillance. The studies indicated that the expansion of vaccination coverage against bacterial agents and the strengthening of surveillance systems directly contribute to reducing incidence and to the early identification of outbreaks.

Table 3

Impacts of scientific advances on the management of meningitis

Dimension analyzed	Observed impacts
Diagnosis	Greater speed and accuracy
Treatment	More targeted approaches
Hospital care	Improvement in clinical outcomes
Epidemiological surveillance	Early detection of cases
Public health	Reduction of morbidity and mortality

Source: Adapted from the World Health Organization (2021) and van de Beek et al. (2016).

The discussion of the results demonstrates that new scientific evidence has been significantly modifying care for patients with bacterial and viral meningitis. Strengthening early diagnosis, combined with therapeutic updating and preventive actions, contributes to reducing complications, optimizing health resources, and improving the quality of care provided.

CONCLUSION

This chapter aimed to analyze clinical, diagnostic, and therapeutic updates related to bacterial and viral meningitis in light of recent scientific evidence, seeking to understand how scientific advances have contributed to improving care and clinical outcomes. To this end, aspects related to clinical manifestations, contemporary diagnostic methods, therapeutic strategies, and the impacts of these changes on healthcare practice were discussed.

The results obtained demonstrated that meningitis remains an important cause of morbidity and mortality associated with infectious diseases of the central nervous system, especially in bacterial cases, which have a greater potential for severe progression and the occurrence of neurological sequelae. However, it was observed that technological and scientific advances in recent decades have promoted relevant changes in the clinical management of these diseases.

Among the main findings, the expanded use of molecular diagnostic methods stands out, especially tests capable of accelerating etiological identification, allowing faster and more targeted interventions. Important updates in therapeutic protocols were also identified, with emphasis on early treatment initiation, continuous monitoring, and the rational use of antimicrobials and specific therapies according to the agent involved.

Another aspect highlighted concerns the strategic role of epidemiological surveillance and preventive actions, especially vaccination against vaccine-preventable bacterial agents. The studies analyzed demonstrated that integrated measures involving prevention, timely diagnosis, and evidence-based treatment favor reduced mortality, fewer complications, and better quality of care.

As a scientific contribution, this study gathered and discussed recent evidence on bacterial and viral meningitis, offering an updated view of the main advances observed in the clinical and laboratory fields. In addition, the chapter contributes to strengthening the discussion on the need for continuous updating of healthcare professionals in view of scientific and technological transformations related to the care of these infections.

For future research, the development of multicenter studies aimed at evaluating the effectiveness of new diagnostic methods in different care settings is recommended, as well as investigations into the impacts of technological incorporation on reducing diagnostic time and improving patients' clinical outcomes. It is also suggested that research related to epidemiological monitoring and strategies for meningitis prevention in different populations be expanded.

It is concluded that the advancement of scientific evidence has significantly transformed the management of bacterial and viral meningitis, making early diagnosis, evidence-based therapy, and health surveillance essential elements for improving care and reducing the burden of these diseases on public health.

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SEXUAL ABUSE AND SUICIDAL IDEATION IN ADOLESCENCE

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Abstract

This investigation discusses the correlation between childhood sexual abuse and suicidal ideation in adolescence, analyzing the psychological, pathophysiological, and sociocultural implications of this interface. The general objective of this study is to analyze the impact of childhood sexual abuse on the development of suicidal ideation in adolescents. Grounded in an exhaustive literature review, the study brings together contributions from psychology and neuroscience to elucidate how the traumatic rupture imposed by abuse destabilizes the processes of subjectivation and psychic symbolization, favoring the development of psychiatric disorders, including anxiety, depression, post-traumatic stress disorder, and borderline personality disorder. The evidence also indicates the existence of underlying neurobiological mechanisms, such as alterations in the function of the hypothalamic-pituitary-adrenal axis, which predispose individuals to suicidal behavior. In light of this, the research highlights the need for early therapeutic interventions, combined with effective public policies, that promote the resignification of trauma and prevent the transgenerational perpetuation of suffering.

Keywords: Sexual Abuse, Suicidal Ideation, Subjectivation, Psychiatric Disorders, Neurobiological Mechanisms.

INTRODUCTION

Sexual abuse in adolescence, often concealed beneath a mantle of silence, and suicidal ideation, as a distorted reflection of psychic pain, are deeply intertwined phenomena that generate emotional,

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cognitive, and existential repercussions in the subject. When sexual abuse imposes itself as a traumatic experience, it ruptures the integrity of the body and the possibility of constructing a healthy self, resulting in a displacement of desire and a distortion of one's own image. Suicidal ideation, in turn, emerges as an attempt to erase unbearable pain or, paradoxically, as a desire to return to that primitive place of nonexistence, where the pain of abuse might finally cease.

A history of childhood sexual abuse is related to a greater risk of suicidal ideation and suicide attempts. Moreover, Bedi et al. (2011) indicate that this type of traumatic experience increases vulnerability to psychological disorders, especially major depression and post-traumatic stress disorder, which are the focus of this analysis. Since these disorders are also associated with an elevated risk of suicide, it is still not entirely clear whether a history of abuse contributes to this risk independently or whether it is mediated by subsequent psychiatric conditions. Some investigations suggest that the probability of developing major depression and attempting suicide among individuals exposed to traumatic events is largely concentrated among those who develop post-traumatic stress disorder.

Bedi et al. (2011) found that the risk of suicidal behavior associated with childhood sexual abuse is well documented in both men and women. The authors point to a strong relationship between this experience and susceptibility to suicide in diverse groups, including university students and patients in psychosomatic clinics of both sexes.

Based on this premise, this article proposes an examination of these experiences, seeking to understand how sexual abuse operates within the psychic structures of adolescents and how suicidal ideation, as a manifestation of extreme suffering, is configured as a complex field of resistance and, at the same time, as an attempt to recover the capacity for symbolization lost within the traumatic dynamic.

To address this topic, this research is organized around the following research question: How does childhood sexual abuse affect psychic formation and contribute to the development of suicidal ideation in adolescence?

The general objective of this study is to analyze the impact of childhood sexual abuse on the development of suicidal ideation in adolescents. To this end, it seeks to investigate the risk and protective factors related to suicidal ideation in victims of childhood sexual abuse, as well as to understand the coping strategies and psychosocial support available to adolescents who experienced this form of abuse during childhood.

The justification for conducting this research lies in the need to deepen the understanding of the effects of childhood sexual abuse on the psychic formation of the subject and, more specifically, the impact that such a traumatic experience may have during adolescence, a period of identity reconfiguration and intensification of psychic processes. Suicidal ideation, often treated superficially, may be interpreted from a psychoanalytic perspective as a sign of profound psychic suffering arising from traumas that have not been adequately symbolized or processed. The relevance of this study therefore lies in its capacity to shed light on the complex interactions between sexual abuse and suicidal ideation, enabling a more in-depth reflection on how the marks of this abuse reverberate in the psychic life of the adolescent. This research also seeks to contribute to the field of psychology by offering a new interpretation of the relationship between these issues, promoting not only a better theoretical understanding but also indicating possibilities for intervention and care for those who live with the consequences of this silenced pain.

LITERATURE REVIEW

DATA ON SEXUAL ABUSE AND SUICIDAL IDEATION

A study conducted by Kumar et al. (2021) sought to understand the relationship between sexual abuse, depression, impulsive behavior, and suicidal ideation among adolescents, revealing that those who suffered sexual abuse are significantly more likely to report suicidal thoughts. The results indicate that boys who experienced sexual abuse are 7.12 times more likely to present suicidal ideation, while for girls the risk is 2.09 times higher, compared with those who did not experience this form of violence. The

research also revealed that 25% of boys and 9.3% of girls who suffered sexual abuse reported suicidal ideation, figures significantly higher than those found among adolescents who did not suffer this type of violence. The study also identified violence in the family environment as a relevant risk factor, showing that adolescents whose mothers were victims of physical abuse present an elevated risk of suicidal ideation. For boys, this risk is 3.79 times higher, while for girls it is 1.96 times higher.

The research demonstrates that victimization through sexual abuse can lead to intense psychological suffering, contributing to self-destructive behaviors, including suicide attempts. Also according to Kumar et al. (2021), sexual abuse in childhood and adolescence is strongly associated with psychiatric disorders, such as depression and post-traumatic stress disorder, both of which significantly increase the risk of suicide. The study also indicated that adolescents with moderate to severe depressive symptoms are between 6 and 7 times more likely to report suicidal ideation, while those with impulsive or aggressive behavior present a similarly elevated risk. For the authors, these data reinforce the interconnection between sexual abuse, mental health, and suicidal tendencies, indicating that these factors frequently coexist and mutually intensify one another.

Another relevant aspect identified by Kumar et al. (2021) is the difficulty of communication with parents, which was shown to be a protective factor against suicidal ideation. The research showed that adolescents who are able to communicate with their parents and report their difficulties presented lower rates of suicidal ideation, reinforcing the importance of family support in mitigating these risks. The study also suggested that victims of sexual abuse frequently experience feelings of hopelessness, social isolation, and low self-esteem, factors that may lead them to consider suicide.

Mainali et al. (2023) sought to establish a correlation between childhood sexual abuse and its impacts on the mental health of children and adolescents, with emphasis on the development of Post-Traumatic Stress Disorder as one of the main mediators of the risk of suicidal ideation. Post-Traumatic Stress Disorder is one of the most common diagnoses among victims of sexual abuse, being found in 57% of adolescents who suffered sexual trauma.

Mainali et al. (2023) explain that previous sexual abuse increases symptoms of Post-Traumatic Stress Disorder in children who have suffered sexual abuse, which suggests that mental health professionals should take this factor into account when treating young victims of this type of trauma. Childhood sexual abuse is widely recognized as a traumatic event that can produce severe and lasting psychological effects, including sexual dysfunction, sadness, anxiety, fear, aggressiveness, and suicidal ideation. The authors also emphasize that childhood sexual abuse increases the prevalence of suicide among adolescents by up to 150%, and the association persists even after controlling for factors such as major depressive disorder. In addition, the suicide rate among victims of child abuse is between 10.7 and 13 times higher than in the population with no history of abuse.

Mainali et al. (2023) also emphasize that patients who present both Post-Traumatic Stress Disorder and a history of sexual abuse are more likely to report suicidal ideation and suicide attempts. The risk of suicide was 29% higher in this group than among those diagnosed only with Post-Traumatic Stress Disorder without the presence of childhood sexual abuse. However, when adjusted for other factors, such as major depressive disorder and substance use disorder, the isolated effect of a history of sexual abuse on suicidal ideation was not significant. This factor suggests that the high prevalence of depression and substance abuse among those who suffered abuse may be the main factor responsible for the increased risk of suicide. Indeed, major depressive disorder emerged as one of the strongest predictors of suicidal ideation and suicide attempts, followed by the fact that the victim was female.

The study conducted by Mainali et al. (2023) also observed that female adolescents are more likely to present self-destructive behaviors than male adolescents. Sexually abused girls tend to develop disorders such as eating disorders and suicide attempts, while boys frequently manifest behavioral problems and academic difficulties. Furthermore, rates of sexual abuse are approximately twice as high among girls as among boys (20.2% versus 9.1%). The authors also state that cultural and socioeconomic factors play a significant role; for example, Hispanic adolescents showed higher rates of sexual abuse, substance use, and suicide attempts, possibly due to poverty and limited access to health services.

Martin et al. (2004) investigated the relationship between childhood sexual abuse and suicidal behavior in adolescents, highlighting differences between boys and girls. The researchers analyzed a sample of 2,485 students, with a mean age of 14 years, and found a significant association between sexual abuse and suicide. The results showed that adolescent victims of sexual abuse were much more likely to report suicidal thoughts, plans, threats, self-harm, and suicide attempts.

Among boys, sexual abuse proved to be an independent risk factor for suicide; that is, even without presenting depression or hopelessness, these adolescents were between 10 and 15 times more likely to plan or attempt suicide. Among girls, however, the relationship between sexual abuse and suicide was mediated by factors such as depression, hopelessness, and family dysfunction. Nevertheless, girls who reported a high level of emotional distress related to the abuse presented a threefold greater risk of developing suicidal ideation and planning.

The prevalence of sexual abuse, also according to Martin et al. (2004), was 5.4% among girls and 2.0% among boys, with abused girls frequently presenting severe depressive symptoms, while abused boys demonstrated a higher risk of suicidal behavior, regardless of the presence of depression or hopelessness. The data indicated that 73% of abused adolescents had thought about suicide, compared with 25% of non-abused adolescents; 55% of abused adolescents had made suicide plans, compared with 12% of non-abused adolescents; and 24% of abused adolescents had attempted suicide, compared with only 5% of non-abused adolescents. In addition, 32% of abused adolescents reported having made five or more suicide attempts, which reinforces the severity of the impact of sexual abuse.

The study by Martin et al. (2004) also indicated that abused adolescents attempted suicide more frequently and did so in a more serious manner, with 36% requiring hospitalization after a suicide attempt, compared with only 8% of non-abused adolescents. Many reported multiple attempts, demonstrating that sexual abuse not only increases the likelihood of suicidal ideation but also intensifies the recurrence of self-destructive behaviors.

Martin et al. (2004) suggest that the way in which an adolescent processes sexual abuse may influence their vulnerability to suicide. Family support and access to psychological treatment are factors that may reduce the impact of abuse. However, adolescents who demonstrated a high level of psychological distress related to the abuse presented a much greater risk of suicide, independently of other factors.

PATHOPHYSIOLOGY OF SUICIDE

To begin this topic, we present the definition of suicide according to Chachamovich et al. (2009, p. 518):

> Suicide is considered the outcome of a complex and multidimensional phenomenon, resulting from the interaction of various factors. There is consensus among researchers in suicidology that no single factor can account for an attempted suicide or suicide itself. On the contrary, the factors that contribute to this phenomenon occur together. Among the risk factors extensively studied in the international literature are previous suicide attempts, genetic factors, social and family support, and psychopathology.

O'Brien and Sher (2013) discuss that childhood sexual violence is a highly prevalent phenomenon and is associated with a wide range of psychopathologies, encompassing Axis I and II disorders, impulsive and maladaptive behavioral patterns, as well as a significantly increased risk of suicidal ideation and suicidal behavior in adolescence and adulthood. The understanding of the psychobiological mechanisms underlying this correlation remains inconclusive; however, the literature indicates that the psychopathological trajectory of victimized individuals reveals a confluence of risk factors that require in-depth investigation.

The authors developed a systematic review of publications indexed in the main databases of the behavioral sciences, considering epidemiological, social, and clinical studies from the last two decades, and demonstrate that childhood sexual abuse (CSA) is strongly correlated with psychiatric diagnoses such as depression, post-traumatic stress disorder, conduct disorders, eating disorders, chemical dependency,

panic disorder, and borderline personality disorder. In addition to its structural impact on psychic constitution, CSA favors the manifestation of impulsivity and high-risk behaviors, configuring itself as a predisposing factor for suicide attempts.

According to O'Brien and Sher (2013), the complexity of this association stems from a multifactorial intersection in which mediating psychopathologies, maladaptive personality traits, and the direct effects of the traumatic experience are dynamically interrelated. Sexual abuse, therefore, acts as a vector of prolonged psychic suffering, promoting deficient emotional regulation patterns and difficulties in elaborating trauma, which heightens vulnerability to suicidal behavior. Thus, the interface between mood disorders, impulsivity, and suicidal predisposition emerges as a fundamental construct for understanding the phenomenon.

For the authors, the formulation of effective preventive strategies must consider not only the mitigation of the incidence of abuse, but also the expansion of access to mental health services, especially those aimed at early intervention and the strengthening of protective factors. Education, combined with the improvement of psychosocial support networks, constitutes an essential measure for reducing the prevalence of childhood sexual violence and, consequently, the psychiatric and suicidal morbidity associated with this extreme form of violation of the rights of children and adolescents.

PSYCHOSOCIAL EFFECTS OF SEXUAL ABUSE

Lacono, Trentini, and Carola (2021) present an analysis of the psychological, neurobiological, and behavioral impacts of childhood sexual abuse, emphasizing how this type of trauma can affect the mental health of adolescents and persist throughout life. Thus, according to the authors, childhood sexual abuse is associated with the development of psychiatric disorders, emotional and cognitive dysfunctions, as well as impacts on stress regulation and neural plasticity.

Among the most common psychological consequences of childhood sexual abuse, the authors highlight post-traumatic stress disorder, major depression, generalized anxiety disorder, dissociative

disorders, and personality disorders, including borderline personality disorder. Lacono, Trentini, and Carola (2021) emphasize that adolescents who suffered abuse are more likely to develop symptoms such as hypervigilance, flashbacks, emotional dysregulation, impulsivity, irritability, difficulties in identity formation, and problems establishing healthy affective bonds.

Lacono, Trentini, and Carola (2021) also explain that victims of childhood sexual abuse have a significantly higher risk of presenting suicidal behavior and self-harm. According to the authors, the relationship between sexual abuse and suicide is mediated by factors such as feelings of hopelessness, low self-esteem, cognitive distortions regarding one's own worth, and the internalization of guilt for what occurred. Furthermore, adolescents who do not receive adequate support may develop patterns of self-destructive behavior, including recurrent suicide attempts and a greater propensity for the abusive use of psychoactive substances.

Sexual abuse, as explained by Lacono, Trentini, and Carola (2021), can alter victims' neurobiological functioning, causing impacts on the hypothalamic-pituitary-adrenal axis, which is responsible for stress regulation. This imbalance may result in hyperactivation of the stress response, making the individual more vulnerable to psychiatric disorders. The research indicates that these neurobiological alterations may also affect neural plasticity, impairing brain areas responsible for emotional processing, decision-making, and impulse control, which may explain the higher incidence of impulsive and aggressive behaviors among victims of abuse.

Another important finding pointed out by the authors is the relationship between childhood sexual abuse and the development of dissociative disorders. Dissociation functions as a defense mechanism against trauma and may manifest through symptoms such as depersonalization (the sensation of being disconnected from one's own body), derealization (the perception that the surrounding environment is not real), and dissociative amnesia. This condition may compromise the formation of the adolescent's identity, leading to difficulties in emotional regulation and socialization.

In addition to psychological and neurobiological impacts, Lacono, Trentini, and Carola (2021) also highlight significant behavioral consequences, such as hypersexualization or hyposexualization. Some victims may develop inappropriate sexualized behaviors, difficulty establishing boundaries in affective relationships, and greater vulnerability to new episodes of violence. Others, conversely, may present aversion to physical contact and avoid any type of affective involvement.

Lacono, Trentini, and Carola (2021) further emphasize that the effects of childhood sexual abuse may be transmitted intergenerationally. Children of mothers who suffered abuse present a greater predisposition to emotional disorders and difficulties in affective and behavioral development. Factors such as the absence of family support and economic difficulties may further aggravate this situation, perpetuating cycles of trauma within families.

Corroborating other literature cited above in this work, Lopez-Castroman et al. (2013) point out that childhood sexual abuse causes lasting emotional impacts, frequently leading to the development of psychiatric disorders such as depression, post-traumatic stress disorder (PTSD), generalized anxiety disorder, and personality disorders. Other common feelings include guilt, shame, humiliation, and fear, which may compromise self-esteem and the ability to establish healthy relationships throughout life. There is evidence that child abuse affects emotional regulation and cognitive functioning, making these victims more vulnerable to the development of negative thought patterns and hopelessness.

According to Lopez-Castroman et al. (2013), the relationship between sexual abuse and suicide is one of the most concerning findings in the scientific literature. The early onset of abuse and its duration are critical factors: the earlier a child suffers abuse, the greater the severity of their suicidal intent. In addition, the severity of the abuse and its recurrence significantly increase the likelihood of multiple suicide attempts. The study by Lopez-Castroman et al. (2013) showed that victims of sexual abuse who attempted suicide presented a higher incidence of personality disorders, with borderline personality disorder being one of the most common.

Also according to the authors, another relevant aspect is the coexistence of sexual abuse with other forms of maltreatment, such as physical abuse and neglect, which amplify emotional impacts and further increase the risk of suicide. Child abuse may also alter brain development, especially in areas responsible for emotional processing and stress regulation. These neurological alterations may contribute to impulsivity, difficulty in decision-making, and reduced capacity to cope with negative emotions, factors that are strongly associated with suicidal behavior.

According to Lopez-Castroman et al. (2013), the absence of social support and isolation increase victims' vulnerability to suicide, since many survivors are reluctant to report abuse due to fear of retaliation, shame, or distrust of protection systems. Prolonged silence contributes to the intensification of depressive symptoms and to feelings of hopelessness, making suicide a perceived escape from suffering. Furthermore, revictimization—that is, the experience of new episodes of abuse throughout life—is a recurrent factor among victims of childhood sexual abuse, further aggravating their mental health and suicide risk.

Hink et al. (2022) highlight various strategies for preventing suicide in adolescents, emphasizing the need for systematic screening and early intervention. In this context, one of the main recommendations is the implementation of universal screening for depression, post-traumatic stress disorder, and suicide risk among adolescents treated in trauma centers. For example, in the United States, fewer than 50% of patients are screened for suicide, 25% for depression, and only 7% for PTSD in trauma centers, leaving up to 90% of cases without adequate diagnosis and treatment.

Hink et al. (2022) also emphasize that patients presenting in medical emergencies with a history of self-harm or suicidal ideation have a significantly increased risk of suicide in the subsequent 12 months. Thus, the early identification of these individuals is fundamental to reducing mortality rates.

THE ROLE OF THERAPEUTIC INTERVENTION

Pelisoli and Piccoloto (2010) address the need for an articulated network of services and programs to offer adequate support to children who have already been victims of sexual abuse. The authors highlight that, in Brazil, the care network for this population still presents weaknesses, such as the scarcity of specialized professionals, the lack of priority given to mental health issues, and delays in protection services. They identify factors such as precarious referral processes and the lack of articulation among the health, justice, and social assistance sectors as barriers to victims' access to the necessary treatment.

One of the main intervention strategies identified, according to Pelisoli and Piccoloto (2010), is multidisciplinary psychological follow-up involving the Guardianship Council, the Juvenile Court, health services, and justice services. The authors also mention the effectiveness of a cognitive-behavioral group therapy model that includes psychoeducation, stress inoculation training, and relapse prevention. This model has demonstrated positive results in reducing symptoms of depression, anxiety, and post-traumatic stress disorder in children who are victims of abuse.

However, Pelisoli and Piccoloto (2010) mention that, despite the importance of psychological interventions, many children who need specialized support do not begin treatment, even after referral, reinforcing the need for public policies that facilitate victims' access to psychotherapy and other mental health services. They also emphasize the urgency of training different professionals to work in the reception and treatment of these children, ensuring adequate support.

For Santos and Macedo (2020), psychosocial care for child victims of sexual abuse in Brazil still presents numerous structural deficiencies, resulting in insufficient and fragmented reception. One of the main problems identified by the authors is the lack of an integrated and specialized network that offers continuous and humanized support to victims, causing many children not to receive adequate support after disclosure of the abuse. Santos and Macedo (2020, p. 33) also point to the problem of the

psychosocial care flow, stating that:

> In general terms, much of the data shows that one of the greatest challenges encountered by professionals who work directly with victims of sexual abuse is related to the flow of care. Many statements point to professionals' lack of knowledge regarding the protocols developed by the Ministry of Health and, in other cases, the failure to follow the regulations. Consequently, underreporting of abuse cases has increased, since the absence of communication among protection networks results in the failure of agencies/policies to assume responsibility for the cases and, therefore, complaints do not materialize.

The authors mention the Psychosocial Care Centers (CAPS), which could offer psychotherapeutic support, but normally serve only cases of severe psychiatric disorders, thereby failing to include children whose symptoms have not yet reached a severe level of psychopathology. In addition, many health and social assistance units, such as the Social Assistance Reference Centers (CRAS), have a broader focus on social vulnerability and are not structured to deal specifically with traumas arising from sexual abuse.

Santos and Macedo (2020) emphasize the importance of psychotherapy for children and adolescents who are victims of sexual abuse, as it is essential to minimize the emotional impacts of trauma, preventing the worsening of symptoms such as depression, post-traumatic stress disorder, and anxiety. However, there is a significant shortage of specialized public services to offer this type of support. Psychology professionals working in the Specialized Social Assistance Reference Centers (CREAS) frequently report difficulties in referring victims to adequate psychological treatment due to the lack of available specialized services.

Santos and Macedo (2020) also address psychoeducation as a way to help professionals understand the dynamics of sexual abuse, its impacts, and ways of acting when faced with a report of violence. In the school context, social skills training helps teachers establish relationships of trust with students, creating a safe environment in which they can express their fears. Santos and Macedo (2020, p. 124) cite other forms of abuse prevention in the school context, including:

> The use of educational videos, workshops, lectures with professionals from different fields (law, psychology, etc.) are some of the alternatives that may be used. Often, sex education in schools is limited to simple lessons on the anatomy and physiology of sexual organs and the presentation of sexually transmitted diseases. This space could be used to address the issue of non-consensual relations and abusive and illegal relationships established in the most varied contexts. Certainly, many students would benefit from an explanation that goes beyond biology, including power relations, feelings, health, and law.

Santos and Macedo (2020) emphasize the urgency of implementing public policies that ensure the strengthening of the protection network for children who are victims of sexual abuse, including the creation of specialized services for psychosocial care and the development of family support programs.

The prevention of childhood sexual abuse and its impacts is an urgent issue that requires intersectoral interventions involving the field of Psychology and the sectors of health, education, and justice. The consequences of this violence go beyond the individual suffering of victims, generating demands on mental health, social assistance, and public security systems. It is in this sense that Pelisoli and Piccoloto (2010, p. 128) state that:

> The impact of childhood sexual abuse is social, psychological, health-related, and economic, and its prevention avoids generating a very large demand involving children and families in the health and justice sectors and makes an immeasurable difference in the lives of these people. It is therefore necessary for the field of Psychology to orient itself more toward prevention, thus minimizing the countless harms caused by this violence that victimizes so many children and adolescents and is repeated across generations.

The reflection proposed by Pelisoli and Piccoloto (2010) highlights the intersectionality of the impacts of childhood sexual abuse, transcending the individual sphere to reach structural dimensions of society. From a psychosocial perspective, the perpetuation of this violence establishes a transgenerational cycle of vulnerability, in which unprocessed traumas resonate in patterns of psychic suffering, emotional dysregulation, and impairments in socio-affective development. Moreover, the overload placed on health and justice systems reveals a reactive paradigm, which intervenes in harms that have already been established rather than acting at the root of the problem. Psychology, as a field of knowledge production and practice, must shift its axis from remediation to prevention, incorporating strategies of education,

community support, and public policies that strengthen protection networks and promote resilience. Such a change in perspective not only minimizes human and institutional costs, but also transforms the relational structure of communities, reducing the reproduction of abusive dynamics and expanding.

METHODOLOGY

The methodology used consists of a bibliographic investigation, based on the analysis of theoretical works that address childhood sexual abuse and suicidal ideation in adolescence, with a focus on the contributions of psychoanalysis and psychic theories that understand the processes of subjectivation and trauma. The research is guided by analytical categories that seek to understand the effects of abuse on the constitution of the self, the dynamics of sexuality and desire in the adolescent, and the manifestations of suicidal ideation as a reflection of unsymbolized psychic pain. The data sources include psychoanalytic studies on trauma and subjectivity, articles that discuss the relationship between sexual abuse and its psychological repercussions, as well as investigations into manifestations of extreme suffering in adolescence, with suicidal ideation understood as a symptom of psychic destructuring. The search for and analysis of the data will focus on the dimensions of the unconscious, psychic defenses, and the possibility of symbolic recovery through the therapeutic process.

RESULTS AND DISCUSSION

This investigation analyzed the intersection between childhood sexual abuse and suicidal ideation in adolescence, highlighting the psychic, pathophysiological, and sociocultural consequences of this relationship. The reviewed data show a strong correlation between the traumatic experience of abuse and susceptibility to suicidal behavior, mediated by psychiatric disorders and neurobiological alterations.

The reviewed literature corroborates the hypothesis that childhood sexual abuse has a significant impact on the psychic formation of the subject, predisposing individuals to the development of disorders such as depression, post-traumatic stress disorder (PTSD), and borderline personality disorder. Studies

such as those by Kumar et al. (2021) indicate that adolescent victims of sexual abuse are seven times more likely to develop suicidal ideation. The fragmentation of the self and the impossibility of symbolizing trauma are key factors that explain this phenomenon.

Psychic dissociation also stands out as a defense mechanism, as demonstrated by Lacono, Trentini, and Carola (2021), hindering the elaboration of trauma and intensifying suicidal impulsivity. The psychic suffering resulting from victimization manifests through patterns of self-destructive behavior, including self-harm and recurrent suicide attempts.

Childhood sexual abuse also causes alterations in the hypothalamic-pituitary-adrenal axis, as described by O'Brien and Sher (2013), leading to an exacerbated stress response and greater vulnerability to psychiatric disorders. Studies indicate that victims of abuse present neurochemical dysregulation, especially in the serotonergic and dopaminergic systems, which contributes to depressive symptoms and impulsivity.

Mainali et al. (2023) showed that adolescents with a history of sexual abuse and PTSD present a 29% higher risk of suicide attempt. However, when adjusted for other factors, such as major depressive disorder and substance abuse, the direct impact of abuse on suicide appears to be mediated by these psychiatric conditions.

Martin et al. (2004) highlight significant differences in the impact of sexual abuse between genders. While abused boys tend to present suicidal behavior independently of psychiatric disorders, girls frequently develop depression as a mediator of suicide risk. Female adolescents are also more likely to present eating disorders and self-harm, while boys frequently demonstrate academic difficulties and aggressive behaviors.

Sociocultural factors also play a crucial role in vulnerability to suicide. Studies indicate that economic and cultural barriers hinder access to adequate psychosocial support, perpetuating the cycle of trauma. Victims who face difficulties in communicating with family members demonstrate a significantly greater risk of suicidal ideation, as evidenced by Kumar et al. (2021).

The evidence indicates that psychological and social support is essential to mitigate the effects of childhood sexual abuse and reduce the incidence of suicidal ideation. However, as analyzed by Santos and Macedo (2020), the care network for victims still presents significant gaps, including the underreporting of cases and deficiencies in coordination among the health, justice, and social assistance sectors.

Cognitive-behavioral therapy has proven effective in restructuring dysfunctional cognitive patterns, preventing future suicide attempts. Pelisoli and Piccoloto (2010) emphasize that preventive programs in schools, involving education about abuse and socio-emotional skills, may be fundamental strategies for reducing the incidence of this violence.

The findings of this research demonstrate the urgent need for interdisciplinary strategies to address the impacts of childhood sexual abuse and the prevention of suicide in adolescence. In addition to clinical-therapeutic interventions, it is essential to strengthen public policies that guarantee protection and adequate reception for victims.

Only through an integrated and multidisciplinary approach will it be possible to minimize the repercussions of abuse and promote the resignification of the traumatic experience, preventing the perpetuation of transgenerational psychic suffering.

CONCLUSION

The interrelationship between childhood sexual abuse and suicidal ideation in adolescence, as outlined throughout this analysis, transcends a reductionist and causal perspective, revealing itself as a multidimensional construct in which psychic, neurobiological, and sociocultural factors interact in a complex manner. The empirical evidence presented corroborates that the traumatic experience of childhood sexual abuse disrupts fundamental processes of psychic symbolization, weakening the foundations of subjectivity and predisposing the individual to conditions of chronic psychic suffering. Furthermore, the pathophysiological implications of this experience, by modulating neuroendocrine

structures and affecting emotional regulation, intensify the propensity for the development of severe psychiatric disorders, notably those linked to impulsivity and hopelessness.

In view of this scenario, it becomes imperative to improve prevention and intervention strategies through an intersectoral approach that encompasses not only clinical-therapeutic support, but also the reformulation of public policies aimed at assisting vulnerable populations. It is crucial to invest in reception mechanisms that transcend mere symptomatic containment and make effective work toward the resignification of trauma possible. Only through a comprehensive and multidisciplinary perspective will it be viable to minimize the harmful repercussions of this experience and, above all, restore the symbolic capacity of the victimized subject, preventing the transgenerational cycle of suffering from perpetuating itself.

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FROM HOMELESSNESS TO HOLDING: THE USE OF TRANSITIONAL OBJECTS IN THE CLINIC OF ADDICTIONS

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Abstract

This study analyzes the psychic function assumed by the drug-object in subjective experience, based on Donald W. Winnicott's theory of transitional objects and transitional phenomena, investigating its possible articulations with the clinic of addictions. This is a theoretical study of a qualitative nature, developed through a bibliographic review. The investigation gathered and analyzed twenty-three works, including writings by Winnicott, scientific articles, book chapters, and academic materials selected through the descriptors addiction, addictive object, transitionality, Winnicott, toxicomania, drug addiction, and playing. The results indicate that, in certain clinical configurations, the relationship with the drug-object may operate as an attempt to confront experiences of helplessness, early environmental failures, and difficulties in processes of emotional maturation. It was identified that investment in the addictive object may assume functions of holding, illusion, continuity of being, and psychic support, albeit in a precarious, repetitive, and potentially destructive manner. It is concluded that the approximation between the clinic of addictions and Winnicott's theory of transitional phenomena contributes to a less moralizing and less reductionist understanding of the addictive phenomenon, favoring a clinical listening attentive to the subject's singularity and to the subjective functions attributed to the drug-object.

Keywords: Holding, Object, Addict, Transitional, Self.

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INTRODUCTION

The clinic of addictions calls for a form of listening that goes beyond explanations centered exclusively on the substance, on the moralization of consumption, or on the diagnostic classification of dependence. The term addiction derives from the Latin *addictio*, associated with the idea of submission to a master or creditor. In Ancient Rome, the condition of *addictus* could designate a person's subjection as a result of debts. Based on this origin, Gurfinkel (2007) proposes thinking of the relationship with the addictive object as a modality of bond marked by servitude, in which the subject seems to remain attached to the object in a kind of affective debt.

In the psychoanalytic field, addictions may be understood not only through the pharmacological effects of substances, but also through the psychic functions that the drug-object may assume for the subject. Schimith, Murta, and Queiroz (2019), revisiting Lima (2008), indicate that the drug may be invested as an extension of subjective reality and as a resource for sustaining forms of expression, pleasure, or self-representation. From this perspective, the drug-object may be experienced as a source of relief and holding in the face of anxieties that find no other means of elaboration. Such a dynamic may refer to a relationship of affective dependence, in which the substance is invested as though it exercised a caregiving function, even though its effects may be destructive.

This study takes as its reference the notions of toxicomania and drug addiction, understood as forms of problematic and intensely invested relationships with psychoactive substances. It does not intend, however, to establish a rigid opposition between these terms, since their uses vary across clinical, psychiatric, legal, and psychoanalytic fields. Santiago (2017) points out that toxicomania cannot be reduced to a fixed or exclusively medical category, since it involves particular modes of the subject's relationship with jouissance, suffering, and the object. Schimith, Murta, and Queiroz (2019) also emphasize the multifactorial character of the phenomenon, whose severity depends on the articulation among subjective, social, and contextual conditions. For the purposes of this research, toxicomania and

drug addiction will be addressed as expressions of addictive bonds in which the drug may assume specific subjective functions.

Henceforth, the expression addictive object or drug-object will be adopted as a conceptual operator to designate the place occupied by the substance in the subject's psychic economy. This choice is inspired by Gurfinkel's formulations (2007), especially his proposal to shift the understanding of addictions to the field of object relations and transitional phenomena. Rather than conceiving the drug merely as an external object of consumption, this perspective makes it possible to investigate the functions of holding, defense, illusion, and support that may be attributed to the addictive object in certain clinical cases.

The delimitation of the research problem therefore stems from the need to investigate how the drug-object may be understood, in the clinic of addictions, based on Winnicott's theory of transitional objects and transitional phenomena. The study begins from the hypothesis that, in some clinical configurations, the relationship with the drug may operate as an attempt at psychic support in the face of early failures in the caregiving environment, difficulties in processes of emotional maturation, and fragilities in the constitution of the self. The question guiding the study is: how can Winnicott's theory of transitional objects and transitional phenomena contribute to understanding the function assumed by the drug-object in the clinic of addictions?

The general objective of this study is to analyze the psychic function assumed by the drug-object in subjective experience, based on Donald W. Winnicott's theory of transitional objects and transitional phenomena, investigating its possible articulations with the clinic of addictions. Specifically, it seeks to discuss the contributions of Winnicott's theory of emotional maturation to the understanding of addictions; to examine the relationships among early environmental failures, processes of self-constitution, and modalities of psychic dependence; and to analyze how the drug-object may be invested as an attempt to obtain holding, continuity of being, and psychic support in clinical contexts marked by experiences of helplessness and environmental fragility.

The relevance of this study lies in the possibility of contributing to a more complex and less reductionist clinical approach to addictions. Although the literature on toxicomania is extensive, Santiago (2017) highlights the importance of questioning the ways in which the subject becomes attached to the drug, avoiding exclusively moralizing, medicalizing, or criminalizing readings. The approximation between the clinic of addictions and Winnicott's theory makes it possible to privilege the singular history of care, experiences of helplessness, and particular modes of organizing psychic suffering. In this direction, the contributions of Kupermann, Paulo, and Freudiana (2008), as well as those of Céfalo and Santos (2018), support the problematization of the affective and defensive functions that may be assumed by the addictive object.

The brief theoretical review begins with the contributions of Gurfinkel (2007), who brings addictions closer to object relations and the problematics of transitionality. This formulation dialogues with the work of Winnicott (1975; 1983), especially with his elaborations on dependence, the sufficiently good environment, holding, the constitution of the self, the false self, playing, and transitional phenomena. For Winnicott (1983), emotional maturation initially depends on an environment capable of adapting to the baby's needs, favoring experiences of continuity of being. When environmental failures are intense or early, the subject may resort to defensive solutions in order to preserve some degree of psychic integration.

In the field of object phenomena, Winnicott (1975) situates the transitional object and transitional phenomena in an intermediate area of experience, between subjective reality and shared reality. These phenomena participate in the process through which the child moves from absolute dependence to relative dependence and, progressively, toward forms of relative independence. Winnicott's professional experience with children separated from their homes during the Second World War contributed to the development of his reflections on deprivation, antisocial tendency, and the importance of the environment, as discussed by Migliorini and Freitas (2018).

The hypothesis of this research is not to equate the drug directly with the transitional object. Rather, it seeks to investigate whether, in certain clinical configurations, the drug-object may be invested as a precarious attempt to constitute an area of holding, illusion, and continuity. Such an approximation makes it possible to understand addiction as a subjective solution which, although it may produce suffering and destructiveness, may also express an attempt at psychic survival. Thus, the study proposes a clinical listening that does not assume the simple replacement of the drug-object by the figure of the psychotherapist, but that considers the construction of a sufficiently good space of care, capable of welcoming the singularity of the subject's relationship with the addictive object.

PLAYING, TRANSITIONALITY, AND THE CONSTITUTION OF POTENTIAL SPACE IN WINNICOTT'S THEORY

The notion of the transitional object is introduced on the basis of Donald Woods Winnicott's clinical observations during his work with children in the context of the Second World War. During this period, the author identified that many children kept with them affectively invested objects, such as toys, clothing, or letters, which played a significant role in managing separation from the mother and in maintaining the continuity of emotional experience (Migliorini and Freitas, 2018).

Based on these observations, Winnicott (1975) formulates the concept of potential space, defined as an intermediate area of experience between internal reality and external reality. It is a field in which playing, creativity, and transitional phenomena are located, constituting a fundamental zone for subjective constitution.

Playing, in this context, is not reduced to a recreational activity, but represents a structuring experience in emotional development. It allows the subject to move between initial omnipotent control and the progressive recognition of the object's externality. In this movement, the object is initially experienced as an extension of the self and, gradually, comes to be recognized as independent and external (Winnicott, 1953/1975).

This process is directly related to the maternal function of adaptation to the baby's needs. Winnicott (1975) describes that, at the beginning of life, the sufficiently good mother offers almost complete adaptation, enabling the baby to experience the illusion of omnipotence. Subsequently, this adaptation is gradually reduced, allowing disillusionment to be introduced in a tolerable way and making possible the emergence of the capacity to recognize the object's otherness.

In this context, the imaginative elaboration of bodily functions constitutes one of the fundamental processes in the constitution of the psyche. According to Fulgencio and Campos (2022), it concerns the way in which the baby organizes bodily sensations and affective experiences, attributing meaning to them at a pre-verbal and non-symbolized level.

Fantasy, in Winnicott (1971/1975), is not understood as a distortion of reality, but as a primary form of organizing subjective experience. It participates in the construction of initial meanings and sustains the process of constituting the self in interaction with the environment. Creative apperception, in turn, refers to the subject's capacity to experience the world as lived in a singular way, being a fundamental condition for psychic vitality.

DEPENDENCE, EMOTIONAL MATURATION, AND THE CONSTITUTION OF THE SELF IN WINNICOTT'S THEORY

Winnicott (1963/1983) proposes that emotional development occurs in progressive stages of dependence in relation to the environment, which structure the constitution of the self from the earliest moments of life. In the stage of absolute dependence, the baby does not yet distinguish between itself and the environment, being completely sustained by the maternal function, which assumes a fundamental role through what is called primary maternal preoccupation. This condition allows the mother to identify deeply and sensitively with the baby's needs, favoring an almost complete adaptation to its initial demands (Winnicott, 1963/1983).

As development advances, the stage of relative dependence begins, in which a progressive differentiation between “me” and “not-me” becomes possible. This process occurs through the gradual introduction of tolerable failures in maternal adaptation, which allow the baby to experience small frustrations without a rupture in the continuity of being, thus favoring the constitution of a more stable bond with external reality (Winnicott, 1963/1983; Winnicott, 1975).

Along this path, the phase of relative independence should not be understood as absolute autonomy, but as a mode of psychic organization in which dependence and autonomy coexist in a paradoxical and structuring manner. The subject begins to integrate their psychic experience with the social world, while still maintaining fundamental bonds with the environment that sustains them, which shows that independence, in Winnicott, is always relative and supported by prior environmental conditions (Winnicott, 1963/1983).

When the environment fails early or significantly in its sustaining function, impairments in emotional development may arise, expressed in states of privation or deprivation, accompanied by psychic disorganizations and defensive forms of functioning. In such situations, environmental failure directly affects the subject’s continuity of being, compromising their capacity for psychic integration and requiring the construction of more rigid defenses for the maintenance of the self (Winnicott, 1963/1983).

It is in this context that the notion of holding becomes central in Winnicott’s theory, designating the function of physical and psychic support exercised by the caregiving environment. When this function is sufficiently good, it favors the integration of the self and healthy emotional development; conversely, when it fails significantly, defensive organizations may emerge, such as the false self, which is constituted as an excessive adaptation to the demands of the environment to the detriment of subjective spontaneity (Winnicott, 1963/1983; Winnicott, 1975).

Kupermann, Paulo, and Freudiana (2008), cited by Nascimento, Oliveira, and Soares (2020), emphasize that the false self may be associated with subjective experiences of unreality, submission, and loss of creative spontaneity, insofar as the subject begins to organize their psychic life primarily according

to external demands. In this type of functioning, there is a weakening of the experience of self-authorship, with a reduction in psychic vitality and in the spontaneous expression of the self (Kupermann, Paulo, and Freudiana, 2008; Nascimento, Oliveira, and Soares, 2020).

In contrast to this mode of organization, Winnicott (1971/1975) introduces the notion of creative apperception, understood as the capacity of the subject to experience reality as their own and as meaningful, this being a fundamental condition for the feeling of psychic vitality and authenticity. It is, therefore, a central axis in Winnicott's theory, allowing one to understand the difference between a psychic life lived creatively and an existence marked by passive adaptation to the environment.

Based on this distinction between creative experience and passive adaptation to reality, it becomes possible to understand that the capacity to live the world spontaneously and singularly is directly related to the maintenance of an intermediate area of experience, as described by Winnicott in the notion of potential space and transitional phenomena (Winnicott, 1971/1975). When this area suffers interruptions or weakening resulting from early environmental failures, the subject may resort to substitute forms of psychic support, in which certain objects come to occupy functions equivalent to the original transitional experiences, opening a space for problematizing the field of addictions from the perspective of Winnicott's theory (Winnicott, 1975; Gurfinkel, 2007).

TRANSITIONAL OBJECT AND ADDICTIONS

The concept of the transitional object, developed by Winnicott (1975), refers to objects or phenomena that occupy an intermediate area of experience between internal reality and external reality. These objects do not belong entirely to either of these poles, but constitute a zone of mediation that is fundamental in the process of subjective constitution, especially with regard to the development of the capacity for symbolization, separation, and elaboration of the absence of the primary object.

In this sense, transitional phenomena are directly implicated in the constitution of the self, since they allow the subject to sustain the experience of absence without a rupture in the continuity of being. It

is a potential area of experience in which illusion, creativity, and reality may coexist, favoring the progressive construction of more integrated forms of relation with the world and with the other (Winnicott, 1975).

Based on this theoretical matrix, Gurfinkel (2007) proposes an important inflection by bringing the field of addictions closer to object relations and transitional phenomena. For the author, the addictive object cannot be understood only in its chemical or pharmacological dimension, but must be thought of as an object invested in the subject's psychic economy, sustaining specific modalities of dependence, repetition, and attempted subjective regulation.

This proposition makes it possible to shift the understanding of addictions away from an exclusively biomedical, legal, or moralizing reading, relocating the phenomenon within the field of object relations and the psychic functions attributed to the object. Within this framework, the drug-object may be understood as an element that, in certain clinical configurations, occupies an intermediate position between failure and an attempt at environmental support, functioning as a resource of psychic organization in the face of discontinuity in subjective experience (Gurfinkel, 2007).

METHODOLOGY

RESEARCH DESIGN

The research is characterized as a bibliographic review of a qualitative, theoretical, and exploratory nature. The bibliographic review makes it possible to gather, systematize, and interpret previously published works on a given research problem, favoring the construction of conceptual and critical analyses concerning the object under investigation (Gil, 2002; Lakatos; Marconi, 2003). In the present study, this design makes it possible to articulate the clinic of addictions with Donald Winnicott's psychoanalytic formulations on emotional maturation, environment, self, and transitionality.

PROCEDURES FOR SURVEYING AND SELECTING THE MATERIAL

The bibliographic survey was carried out through searches in books, book chapters, scientific articles, dissertations, and academic materials available in specialized journals and research databases, such as PePSIC and Google Scholar. The descriptors addiction, addictive object, transitionality, Winnicott, toxicomania, drug addiction, and playing were used, both separately and in combination.

The selection of the corpus considered the following criteria: relevance to the research problem; psychoanalytic or interdisciplinary approach to addictions; presence of discussions on Winnicott's theory; and contribution to the analysis of the subjective function of the drug-object. Duplicate materials, texts with no direct relation to the objectives of the research, and works that addressed substance use exclusively from pharmacological or epidemiological perspectives were excluded.

CORPUS AND RESEARCH SOURCES

The corpus consisted of twenty-three materials, including works by Donald Woods Winnicott, scientific articles, book chapters, and academic productions. Among the central works, Playing and Reality (Winnicott, 1975) and The Maturational Processes and the Facilitating Environment: Studies in the Theory of Emotional Development (Winnicott, 1983) stand out. The contributions of Gurfinkel (2007), Santiago (2017), Schimith, Murta, and Queiroz (2019), Migliorini and Freitas (2018), Kupermann, Paulo, and Freudiana (2008), and Céfalo and Santos (2018) were also mobilized. These materials were located in academic journals and repositories in the fields of psychoanalysis, psychology, and health, including publications linked to Revista UNESP, Revista de Psicanálise, Escola de Ciências da Saúde e Bem-Estar CISBEM/FMU, Jornal de Psicanálise, Psicologia USP, and Estudos de Psicanálise.

ANALYSIS TECHNIQUE

The analysis was guided by interpretative reading and thematic organization of the material, a procedure compatible with qualitative research based on theoretical review (Minayo, 2014). The corpus

was examined along the following axes: addictions and object relations; emotional maturation and environment; constitution of the self and false self; transitional objects and phenomena; early environmental failures; and subjective functions of the drug-object.

The interpretation sought to identify approximations, differences, and tensions between formulations concerning the clinic of addictions and Winnicottian concepts. The aim was not to produce generalizations about all forms of substance use or about all clinical experiences of addiction, but rather to construct a theoretical reading capable of supporting a clinical listening attentive to the singularity of subjects and to the functions assumed by the addictive object.

RESULTS AND DISCUSSION

Based on the research problem and the methodological proposal adopted, the discussion of the results will be organized into two main thematic axes, which aim to deepen the articulation between Winnicott's theory of transitional phenomena and the clinic of addictions. The first axis, entitled "From Homelessness to Holding," will address the relationships among early environmental failures, experiences of helplessness, and the constitution of psychic strategies of support, emphasizing how the drug-object may be invested as an attempt to produce holding, continuity of being, and reparation of ruptures in the field of primary care. The second axis, called "Affect and Other Drugs," will problematize the different modalities of affective investment in the addictive object, discussing how the drug may operate not only as a substance of consumption, but as support for bonds, emotional regulation, and substitute forms of attachment, articulating these dynamics with the notions of transitionality, false self, and organization of the self in Donald W. Winnicott's theory.

FROM HOMELESSNESS TO HOLDING

In this direction, Schimith, Murta, and Queiroz (2019), revisiting Lima (2008), indicate that the drug may operate as an extension of subjective reality, being invested as support for the organization of

affective experiences and for the production of singular meanings. This perspective makes it possible to understand addiction beyond its pharmacological dimension, situating it within the field of modalities of object relation traversed by affective, symbolic, and contextual determinants of psychic experience.

At the clinical level, addiction may be expressed through impulsive behaviors that are difficult to contain, frequently accompanied by a lowering of symbolic mediation in established relationships. In this context, one observes a displacement of contents from the field of fantasy to the concreteness of the object, which becomes invested with a privileged status of psychic reality, intensifying forms of dependence and restricting processes of symbolization (Schimith, Murta, and Queiroz, 2019).

From a Winnicottian perspective, such a configuration may be understood based on the way in which the addictive object is invested as a functional substitute for primary experiences of care, assuming characteristics associated with holding, sheltering, and psychic support. In situations marked by early environmental failures, the object comes to be used as an attempt to repair experiences of helplessness, precariously sustaining the subject's continuity of being (Winnicott, 1963/1983; Lima, 2022).

In this scenario, the addictive object acquires an ambivalent status, insofar as it simultaneously promotes subjective relief and reinforces modalities of psychic dependence. According to Gurfinkel (2011), this dynamic is often associated with impasses in the social bond and with intense reactions of rupture and distrust in the intersubjective field, with repercussions even for the clinical management of addiction.

The repeated recourse to the object may thus be understood as the expression of a psychic organization marked by fragilities in the constitution of the self, often associated with defensive forms of functioning such as the false self. In these cases, subjective experience tends to be structured around experiences of emptiness, devaluation, and loss of spontaneity, with impairment of transitional processes and of the subject's creative capacity (Winnicott, 1960/1983; Winnicott, 1975; Chissini, 2022).

In more severe situations, the addictive object may occupy a central position in the psychic economy, organizing the subject's affective regulation and functioning as a privileged axis of stabilization

in the face of experiences of imminent disintegration. This configuration shows that substance use is not reduced to a behavior of consumption, but is articulated with specific forms of subjective organization in the face of environmental failures and the precariousness of available symbolic resources (Lima, 2022).

In view of this, the importance is highlighted of a clinical listening that is not restricted to the logic of replacing the drug-object with the figure of the therapist, but that is sustained by the investigation of the psychic functions attributed to the object in the subjective economy. Within this framework, clinical management aims to make possible the symbolic elaboration of these functions, favoring the emergence of more complex forms of relation with reality and with psychic suffering.

AFFECT AND OTHER DRUGS

The drug-object may be understood as a resource invested, in certain clinical configurations, for the regulation of states of psychic suffering. In this sense, Padilha (2020) highlights that the substance may perform a function of sustaining subjective continuity, even though such a function does not necessarily imply psychic integration or symbolic elaboration of the experience.

In contexts of crisis, in which symbolic resources prove insufficient for the metabolization of affects, the drug-object may occupy a position analogous to that of the transitional phenomena described by Winnicott (1975), functioning as a provisional mediation between internal and external reality. However, unlike the transitional object, such a function tends not to be oriented primarily toward symbolic constitution or the development of psychic creativity.

According to Gurfinkel (2007), while the transitional object sustains processes of emotional maturation and the expansion of symbolic capacity, the drug-object may become fixed in the concreteness of the substance, promoting a progressive reduction of potential space and restricting the possibilities of subjective elaboration. In this movement, the object ceases to operate as a mediator and begins to function as the almost exclusive organizer of psychic experience.

This centrality tends to have repercussions on the decrease in the capacity for symbolization and on the limitation of investment in other modalities of bond, with the consequent impoverishment of coping strategies. In many cases, one observes the recurrent use of the substance as an automatic response to experiences of frustration, loss, or anxiety, to the detriment of the psychic elaboration of these experiences (Sedeu, 2014).

With the intensification of this pattern, a process of psychic and/or physical dependence may be configured in which the object begins to structure the subject's emotional regulation. Under these conditions, affective states of helplessness, emptiness, and anxiety tend to reappear recurrently, requiring the repeated use of the substance as a strategy of subjective stabilization (Gurfinkel, 2011).

Thus, the articulation between Winnicottian theory and the clinic of addictions makes it possible to understand the drug-object not only as a substance of consumption, but as a psychic operator invested in the attempt to sustain subjective experience in the face of environmental failures and fragilities in the constitution of the self, demonstrating the need for a clinical listening guided by the singularity of the subject and by the psychic functions attributed to the object.

CONCLUSION

This study aimed to analyze the psychic function assumed by the drug-object in subjective experience, based on Donald W. Winnicott's theory of transitional objects and transitional phenomena, investigating its possible articulations with the clinic of addictions. It also sought to understand how this function relates to experiences of early environmental failures, processes of self-constitution, and modalities of psychic support present in the subject's relationship with the addictive object.

The research results indicate that the relationship with the drug-object is not restricted to the neurophysiological or behavioral dimension of dependence, but also involves psychic determinants linked to primary experiences of care, holding, and the constitution of potential space. In this context, the drug-object may be invested as a psychic operator that assumes functions of support, continuity of being, and

affective regulation in the face of experiences of helplessness and environmental fragility. It was also observed that, in certain clinical configurations, such investment may affect processes of symbolization and creativity, insofar as it occupies the subject's potential space and presents itself as a privileged resource for organizing experience.

As a contribution, this study makes it possible to broaden the understanding of the phenomenon of addictions from a Winnicottian psychoanalytic perspective, by demonstrating that the drug-object may be thought of in terms of its psychic function in the subjective economy. This reading contributes to a less reductionist approach that is more sensitive to the subject's singularity, favoring clinical implications that consider the specific modes of organization of psychic suffering and the functions attributed to the object.

With regard to limitations, the exclusively bibliographic character of the research is highlighted, which restricts direct articulation with empirical clinical material. In this sense, it is recommended that future investigations deepen the relationship between theory and clinic through case studies and qualitative research in diverse institutional contexts. It is further suggested that dialogue be strengthened between the Winnicottian approach and other contemporary psychoanalytic perspectives in the clinic of addictions, so as to broaden the understanding of the different psychic functions assumed by the drug-object in modes of subjective suffering.

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INFECTIONS CAUSED BY MULTIDRUG-RESISTANT MICROORGANISMS IN CRITICALLY ILL PATIENTS: CLINICAL, ECONOMIC, AND HEALTHCARE IMPACTS ON THE SUS

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Abstract

Infections caused by multidrug-resistant microorganisms represent one of the main contemporary challenges for healthcare, especially among critically ill patients admitted to intensive care units. This study aimed to analyze the clinical, economic, and healthcare impacts of infections caused by multidrug-resistant microorganisms within the context of the Brazilian Unified Health System (SUS). This is a narrative literature review conducted through the analysis of national and international scientific publications available in indexed health databases, as well as institutional documents related to infection control and antimicrobial resistance. The results showed that the dissemination of these agents is associated with increased morbidity and mortality, prolonged hospital stays, greater need for intensive support, and higher hospital costs resulting from the use of more complex therapies and expanded consumption of healthcare resources. A significant impact on hospital management was also observed,

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with overload of healthcare teams and challenges in the effective implementation of prevention and control protocols. It is concluded that addressing infections caused by multidrug-resistant microorganisms requires integrated strategies involving epidemiological surveillance, antimicrobial stewardship programs, strengthening of patient safety practices, and structural investments in the SUS.

Keywords: Brazilian Unified Health System, Critically ill patients, Healthcare, Infection control, Microbial resistance.

INTRODUCTION

Healthcare-associated infections (HAIs) constitute an important public health problem on a global scale, especially when associated with the spread of multidrug-resistant microorganisms (MDRMs). The increase in antimicrobial resistance has been recognized as a growing threat to therapeutic effectiveness, directly affecting clinical outcomes, healthcare costs, and the sustainability of health systems (World Health Organization, 2023). Among critically ill patients admitted to intensive care units (ICUs), this scenario becomes even more concerning due to greater clinical vulnerability, the frequent presence of invasive procedures, and the intensive use of antimicrobials.

Microbial resistance is understood as the acquired or natural capacity of microorganisms to survive the action of drugs that were previously effective in controlling or eliminating them (PAHO, 2021). Among the main agents associated with infections in critical care settings are bacteria such as *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and methicillin-resistant *Staphylococcus aureus*, which are frequently related to increased clinical severity, higher morbidity and mortality, and longer hospital stays (Magiorakos et al., 2012).

In the Brazilian context, the Unified Health System (SUS) faces significant challenges in light of the growing incidence of these infections, especially because of the need to expand resources allocated to treatment, acquire higher-cost antimicrobials, and strengthen prevention and control measures. In addition

to the financial impact, repercussions are observed in the quality of care, prolonged bed occupancy, and increased demand for specialized care (ANVISA, 2023).

Given this context, the following research problem is established: what are the clinical, economic, and healthcare impacts resulting from infections caused by multidrug-resistant microorganisms in critically ill patients treated within the scope of the Unified Health System?

The general objective of this study is to analyze the clinical, economic, and healthcare impacts of infections caused by multidrug-resistant microorganisms in critically ill patients in the SUS. The specific objectives are to identify the main microorganisms associated with infections in critically ill patients; discuss the clinical repercussions related to morbidity and mortality and prolonged hospitalizations; assess the economic impacts on hospital services; and understand healthcare strategies aimed at preventing and controlling microbial resistance.

The development of this study is justified by the epidemiological, scientific, and social relevance of the topic, considering that antimicrobial resistance has been identified as one of the greatest contemporary challenges for health systems. According to O'Neill (2016), without effective interventions, resistant infections may become an important cause of mortality and increased global healthcare costs in the coming decades. In the context of the SUS, understanding the impacts of these infections is essential to support decisions related to care planning, epidemiological surveillance, and the qualification of care.

In the theoretical field, different studies indicate that integrated strategies involving antimicrobial stewardship programs, infection control, continuing education for teams, and the strengthening of public policies have the potential to reduce adverse events and improve healthcare indicators (Allegranzi et al., 2017). Thus, discussing the problem of infections caused by multidrug-resistant microorganisms in critically ill patients is essential to promote greater efficiency in health services and the sustainability of the SUS.

METHODOLOGY

TYPE OF RESEARCH

The present study is characterized as an integrative literature review, a methodological approach that allows the gathering, analysis, and synthesis of research results on a given topic, enabling a broad understanding of the knowledge produced and favoring the incorporation of scientific evidence into health practice. As proposed by Souza, Silva, and Carvalho (2010), this method contributes to integrating studies with different designs and expanding the critical analysis of the phenomenon under investigation.

The choice of the integrative review is justified by the need to comprehensively understand the clinical, economic, and healthcare impacts related to infections caused by multidrug-resistant microorganisms in critically ill patients treated in the Unified Health System (SUS), considering the multiplicity of factors involved in antimicrobial resistance.

SEARCH STRATEGY AND DATA SOURCES

The review was constructed through a bibliographic survey in databases recognized in the health field, selected for their scientific relevance and thematic scope. Publications indexed in the Virtual Health Library (VHL), Latin American and Caribbean Health Sciences Literature (LILACS), Scientific Electronic Library Online (SciELO), Medical Literature Analysis and Retrieval System Online (MEDLINE/PubMed), and official institutional documents related to the topic were considered.

To define the search terms, standardized Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) were used, combined with the Boolean operators AND and OR. Among the main descriptors employed were: “microbial resistance,” “critically ill patients,” “hospital infection,” “intensive care unit,” “multidrug-resistant organisms,” and “Unified Health System.”

According to Mendes, Silveira, and Galvão (2008), the use of systematized search strategies contributes to greater methodological rigor and reduces bias in the selection of evidence.

ELIGIBILITY CRITERIA

Previously defined inclusion and exclusion criteria were adopted for the composition of the bibliographic sample.

Inclusion criteria

Studies were included if they:

- addressed infections caused by multidrug-resistant microorganisms in critically ill patients;
- presented a relationship with clinical, economic, or healthcare impacts;
- were available in full text;
- were published in Portuguese, English, or Spanish;
- were published within the period previously established for analysis.

Exclusion criteria

The following were excluded:

- articles duplicated across databases;
- studies with no direct relationship to the research objective;
- editorials, letters to the editor, simple abstracts, and works without full-text availability;
- publications without sufficient methodological detail.

The adoption of these criteria aimed to increase the scientific consistency of the findings and ensure greater reliability in the analysis process.

DATA COLLECTION, ORGANIZATION, AND ANALYSIS

After the initial selection of studies, an exploratory reading of titles and abstracts was carried out, followed by a full reading of the eligible texts. The extracted information included author, year of

publication, objective, method employed, main results, and contributions to understanding the impacts of infections caused by multidrug-resistant microorganisms.

Data analysis was conducted through descriptive synthesis and critical interpretation of the literature, allowing the identification of convergences and divergences among the selected studies. According to Bardin (2016), the thematic organization of findings favors the systematic interpretation of content and the construction of grounded inferences.

METHODOLOGICAL FOUNDATION AND DISCUSSION OF THE METHOD

The integrative review was adopted because it allows a broad approach to a complex and multifactorial problem, such as antimicrobial resistance in critically ill patients. This method favors the articulation of different scientific evidence and makes it possible to identify trends, gaps, and contributions to the strengthening of public health policies.

According to Whittemore and Knafl (2005), integrative reviews have the potential to consolidate knowledge and support clinical and managerial decision-making. In the context of the SUS, understanding the effects of infections caused by multidrug-resistant microorganisms is essential to support epidemiological surveillance strategies, the rational use of antimicrobials, and the qualification of hospital care.

RESULTS AND DISCUSSION

The findings of the present integrative review show that infections caused by multidrug-resistant microorganisms in critically ill patients constitute one of the main patient safety problems in intensive care units, with significant impacts on morbidity and mortality, length of hospital stay, and hospital costs. The literature demonstrates that the combination of patients' clinical severity, frequent use of invasive devices, and prolonged exposure to antimicrobials favors the selection of resistant microorganisms, especially in highly complex hospital settings (World Health Organization, 2023).

The studies analyzed indicate a predominance of multidrug-resistant Gram-negative microorganisms, especially *Klebsiella pneumoniae*, *Acinetobacter baumannii*, and *Pseudomonas aeruginosa*, in addition to methicillin-resistant *Staphylococcus aureus* (MRSA). These agents are frequently associated with severe infections, such as ventilator-associated pneumonia, bloodstream infections, and sepsis, and they have a high capacity for environmental persistence and resistance to multiple classes of antimicrobials.

The distribution of the main microorganisms identified in the analyzed literature is presented below.

Table 1

Main multidrug-resistant microorganisms in critically ill patients

Microorganism	Type	Main infections	Clinical relevance
Klebsiella pneumoniae	Gram-negative	Pneumonia, sepsis, UTI	High resistance to carbapenems
Acinetobacter baumannii	Gram-negative	Ventilator-associated pneumonia	High hospital persistence
Pseudomonas aeruginosa	Gram-negative	Respiratory and systemic infections	High environmental adaptability
Staphylococcus aureus (MRSA)	Gram-positive	Skin and bloodstream infections	Methicillin resistance

Source: Prepared by the authors, based on Magiorakos et al. (2012).

Magiorakos et al. (2012) emphasize that these microorganisms are classified as priorities by the World Health Organization due to their high resistance and significant clinical impact, especially in critical hospital environments.

Regarding clinical impacts, it is observed that infections caused by multidrug-resistant microorganisms are associated with increased mortality, a higher incidence of severe sepsis, the need for prolonged ventilatory support, and therapeutic failures. These factors contribute to the worsening of clinical outcomes and to the increased complexity of care in ICUs.

Table 2

Clinical impacts of infections caused by multidrug-resistant microorganisms

Clinical impact	Description	Healthcare consequence
Increased mortality	Greater risk of death in critically ill patients	Need for prolonged intensive care
Severe sepsis	Exacerbated systemic inflammatory response	Use of last-line antibiotics
Prolonged hospitalization	Longer hospital stay	Reduced bed turnover
Therapeutic failure	Resistance to multiple antimicrobials	Need for rescue therapies

Source: Prepared by the authors, based on World Health Organization (2023).

In addition to clinical impacts, the results reveal important economic and healthcare repercussions within the Unified Health System (SUS). Increased costs are mainly related to the use of high-cost antimicrobials, the need for patient isolation, and prolonged hospitalization in intensive care units. This scenario results in overburdened health services and reduced bed availability.

Table 3

Economic and healthcare impacts on the SUS

Dimension	Observed impact	Consequence for the health system
Economic	Increased costs with antimicrobials	Higher hospital expenditure per patient
Healthcare	Overload of healthcare teams	Reduced quality of care
Structural	Prolonged ICU bed occupancy	Lower hospital turnover
Organizational	Need for patient isolation	Pressure on hospital infrastructure

Source: Prepared by the authors, based on the Brazilian Health Regulatory Agency – ANVISA (2023).

According to ANVISA (2023), microbial resistance represents a growing threat to the sustainability of health systems, requiring structured infection prevention and control policies, as well as the strengthening of epidemiological surveillance.

The integrated discussion of the findings shows that the problem goes beyond the clinical dimension, affecting structural and organizational aspects of health services. Studies indicate that the implementation of antimicrobial stewardship programs, associated with rigorous infection control

measures, can significantly reduce the dissemination of multidrug-resistant microorganisms and improve clinical outcomes (Allegranzi et al., 2017).

Furthermore, the literature reinforces the importance of hand hygiene, the rational use of invasive devices, and adherence to isolation protocols as fundamental prevention measures. Mendes, Silveira, and Galvão (2008) emphasize that the integration of scientific evidence and clinical practice is essential for improving care quality and reducing adverse events.

Thus, it is observed that infections caused by multidrug-resistant microorganisms in critically ill patients represent a systemic challenge for the SUS, requiring integrated actions involving clinical management, epidemiological surveillance, and public health policies aimed at the sustainability of care and patient safety.

CONCLUSION

The present study aimed to analyze the clinical, economic, and healthcare impacts of infections caused by multidrug-resistant microorganisms in critically ill patients within the context of the Unified Health System (SUS). Overall, the findings of the integrative review demonstrated that these infections represent an important public health problem, especially in intensive care units, where patients' clinical severity and the high use of invasive devices favor the dissemination of resistant microorganisms.

The main results showed that infections caused by multidrug-resistant microorganisms are associated with increased mortality, a higher incidence of severe sepsis, prolonged hospital stays, and therapeutic failures due to the limitation of effective antimicrobial options. In addition, a significant impact on the health system was observed, with increased hospital costs, greater consumption of high-cost antimicrobials, and overload of healthcare teams, compromising the efficiency and response capacity of the SUS.

In view of this, it is concluded that antimicrobial resistance constitutes a complex and multifactorial challenge that goes beyond the clinical dimension and directly affects the economic and

organizational aspects of health services. The contributions of this research reinforce the importance of integrated infection prevention and control strategies, with emphasis on the rational use of antimicrobials, strict adherence to hygiene practices, and the implementation of effective epidemiological surveillance programs.

As a suggestion for future studies, the development of field research and multicenter studies within the scope of the SUS is recommended, capable of more accurately quantifying the costs associated with infections caused by multidrug-resistant microorganisms, as well as evaluating the effectiveness of specific infection-control interventions in intensive care units.

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THE POPULARIZATION OF WEIGHT-LOSS PENS AND THEIR IMPACTS ON PUBLIC HEALTH: THERAPEUTIC BENEFITS, EMERGING RISKS, AND REGULATORY CHALLENGES IN CONTEMPORARY BRAZIL

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Abstract

The popularization of so-called “weight-loss pens,” based primarily on GLP-1 receptor agonists such as semaglutide and liraglutide, has transformed obesity treatment in contemporary Brazil, while also raising important public health issues. This study aims to analyze the therapeutic benefits, emerging risks, and regulatory challenges associated with the growing use of these medications. It consists of a narrative review of the scientific literature and official documents from regulatory and health agencies, with a critical analysis of the available evidence. The results indicate that these drugs show significant efficacy in weight reduction and glycemic control, contributing to the management of obesity and type 2 diabetes. However, an increase in indiscriminate use, self-medication, and easier access for uses outside clinical indications has been observed, which may lead to gastrointestinal adverse effects, risk of pancreatitis, and potential long-term impacts that have not yet been fully clarified. It is concluded that, despite their relevant therapeutic benefits, the popularization of these medications requires the strengthening of health regulation, monitoring of use, and health education strategies to ensure safety and rational use.

Keywords: GLP-1 receptor agonists, Health regulation, Obesity, Public health, Semaglutide.

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INTRODUCTION

Obesity is recognized as a multifactorial chronic disease and one of the main contemporary public health challenges, associated with an increased risk of type 2 diabetes, cardiovascular diseases, and premature mortality. In recent decades, advances in metabolic pharmacotherapy have expanded treatment options, especially with the development of glucagon-like peptide-1 (GLP-1) analogs, such as semaglutide and liraglutide. In the current context, the growing popularization of so-called “weight-loss pens” has been observed, a phenomenon that extends beyond the clinical environment and reaches the social and aesthetic use of these medications.

In this scenario, the research problem of this study may be formulated as follows: in what ways does the popularization of weight-loss pens affect public health in Brazil, considering their therapeutic benefits, emerging risks, and regulatory challenges?

The general objective is to analyze the impacts of the popularization of GLP-1 receptor agonists on Brazilian public health. The specific objectives are: (a) to describe the therapeutic benefits of these medications in the treatment of obesity and type 2 diabetes; (b) to identify risks associated with indiscriminate and unsupervised use; and (c) to discuss the regulatory and health-related challenges associated with access to and commercialization of these drugs in contemporary Brazil.

The justification for this study is based on the epidemiological relevance of obesity and the significant increase in demand for injectable weight-loss medications, often outside formal clinical indications. This phenomenon raises concerns regarding safety, self-medication, and unequal access, requiring critical analysis from the perspective of public health and health regulation.

From a theoretical standpoint, studies indicate that GLP-1 receptor agonists represent a milestone in the treatment of obesity, due to their efficacy in reducing body weight and improving metabolic outcomes. Wilding et al. (2021) demonstrated, in a randomized clinical trial published in the New England Journal of Medicine, that semaglutide promotes significant body weight reduction in adults with

obesity. In addition, Davies et al. (2015) showed the efficacy of liraglutide in glycemic control and weight loss in patients with type 2 diabetes.

However, authors such as Rubino et al. (2022) warn that, despite the clinical benefits, the expanded use of these medications without appropriate medical supervision may increase the risk of adverse effects and encourage inappropriate use, especially in contexts involving the aesthetic medicalization of obesity. In addition, the World Health Organization emphasizes that the irrational use of medicines constitutes an important global public health problem, contributing to health risks and inequalities in access (World Health Organization, 2023).

In Brazil, the National Health Surveillance Agency (ANVISA, 2024) reinforces the need for controlled prescription and professional monitoring, highlighting the importance of safety in the use of these medications and the strengthening of health regulation.

Thus, the growing dissemination of weight-loss pens reveals a tension between therapeutic innovation, improper social use, and regulatory challenges, becoming a relevant topic for scientific analysis and for strengthening public health policies in the country.

METHODOLOGY

TYPE OF RESEARCH

This study is characterized as qualitative research, specifically a narrative literature review, with a descriptive and analytical approach. A narrative review allows for the critical synthesis of previously published scientific knowledge, enabling a broader understanding of complex phenomena related to public health, such as the growing use of GLP-1 receptor agonists and their social and health impacts (Gil, 2019).

SEARCH STRATEGY AND STUDY SELECTION

The selection of bibliographic material was conducted through consultation of recognized scientific databases, such as PubMed, SciELO, and Google Scholar, as well as official documents from regulatory agencies and health institutions. Descriptors such as “obesity,” “GLP-1,” “semaglutide,” “liraglutide,” “weight-loss pens,” and “public health” were used.

Scientific articles published in the last ten years were included, preferably randomized clinical trials, systematic reviews, and institutional documents. Duplicate materials, studies without peer review, and publications without direct relevance to the topic were excluded.

DATA ANALYSIS TECHNIQUES

The data were analyzed using the technique of content analysis, as proposed by Bardin (2016), allowing the findings to be categorized into three main axes: (a) therapeutic benefits of GLP-1 receptor agonists; (b) risks associated with indiscriminate use; and (c) regulatory challenges and implications for public health.

This technique enables the critical interpretation of results, going beyond the description of studies and favoring an understanding of the relationships between the use of these medications and their social and health impacts.

METHODOLOGICAL DISCUSSION AND FOUNDATION

The choice of a narrative review is justified by the topicality and complexity of the subject, especially given the rapid dissemination of so-called “weight-loss pens” and the scarcity of consolidated studies on their long-term impacts on public health. According to Gil (2019), this type of review is appropriate when the aim is to integrate different theoretical and empirical perspectives on an emerging phenomenon.

In addition, the content analysis proposed by Bardin (2016) makes it possible to identify patterns and trends in the reviewed studies, contributing to a deeper interpretation of the risks and benefits associated with the use of these medications. Such an approach is particularly relevant in public health topics, in which clinical, social, and regulatory aspects are complexly interrelated.

Thus, the adopted methodology ensures a critical and well-founded analysis of the literature, contributing to the understanding of the impacts of the popularization of GLP-1 receptor agonists in the contemporary Brazilian context.

RESULTS AND DISCUSSION

The findings of the analyzed literature indicate that the popularization of weight-loss pens, especially those based on GLP-1 receptor agonists such as semaglutide and liraglutide, has promoted important changes in obesity treatment, while also intensifying clinical and public health challenges. Evidence indicates that these medications present consistent efficacy in reducing body weight and improving metabolic control, especially in individuals with obesity associated with type 2 diabetes (Wilding et al., 2021; Davies et al., 2015). However, there is also a growing use outside clinical indications, driven by aesthetic goals and by the widespread promotion of these drugs in contemporary society.

Clinical studies demonstrate that semaglutide promotes significant body weight reduction in patients with obesity, with results superior to placebo in a large-scale randomized trial (Wilding et al., 2021). In addition, liraglutide also proves effective in improving glycemic control and reducing weight in patients with type 2 diabetes, reinforcing its role as a relevant therapeutic tool (Davies et al., 2015).

Table 1

Clinical efficacy of GLP-1 receptor agonists in selected studies

Study	Medication	Population	Main results
Wilding et al. (2021)	Semaglutide	Adults with obesity	Significant reduction in body weight and metabolic improvement
Davies et al. (2015)	Liraglutide	Patients with type 2 diabetes	Improved glycemic control and weight reduction

Source: Author's own work (2026).

These results consolidate GLP-1 receptor agonists as one of the most important recent innovations in the pharmacological treatment of obesity, especially in cases of high metabolic risk.

On the other hand, the literature also highlights risks associated with the indiscriminate use of these medications. Rubino et al. (2022) emphasize that, although effective, these drugs may cause adverse effects such as nausea, vomiting, constipation, and, in rarer cases, pancreatitis. In addition, there is growing concern regarding use without medical supervision, especially when motivated by aesthetic purposes, which increases the likelihood of inappropriate use and early discontinuation of treatment.

Table 2

Main risks associated with the use of GLP-1 receptor agonists

Risk	Description	Potential impact
Use without prescription	Self-medication and aesthetic use	Increase in adverse events
Gastrointestinal effects	Nausea, vomiting, constipation	Discontinuation of treatment
Pancreatitis (rare)	Pancreatic inflammation	Severe complications
Lack of long-term data	Recent and expanding use	Uncertainty regarding prolonged safety

Source: Author's own work (2026).

In the context of public health, the World Health Organization warns that the irrational use of medicines constitutes a relevant global problem, contributing to health risks and inequalities in access to essential therapies (World Health Organization, 2023). In Brazil, the National Health Surveillance Agency reinforces that these medications should be used exclusively under prescription and professional monitoring, due to their safety profile and the need for continuous monitoring (ANVISA, 2024).

However, it is observed that the growing popularization of weight-loss pens has exceeded the boundaries of clinical practice, revealing weaknesses in regulation and in the control of use.

Table 3

Public health impacts and regulatory challenges

Dimension	Identified problem	Consequence
Health regulation	Limited oversight	Irregular use and lack of control
Health education	Low level of public information	Self-medication and misuse
Access	High cost of medications	Inequality in treatment
Social use	Aesthetic medicalization	Deviation from clinical indication

Source: Author's own work (2026).

Thus, the results demonstrate a tension between significant therapeutic benefits and emerging risks associated with the dissemination of these medications. While they represent an important advance in obesity treatment, they also raise concerns regarding the medicalization of body aesthetics, indiscriminate use, and regulatory challenges. Therefore, it is essential to strengthen health education policies, health surveillance, and the rational use of medicines, in order to ensure that the benefits of these drugs are achieved safely and equitably among the population.

CONCLUSION

This study aimed to analyze the impacts of the popularization of weight-loss pens based on GLP-1 receptor agonists in the context of Brazilian public health, considering their therapeutic benefits, emerging risks, and regulatory challenges. Overall, the results show that these medications represent an important advance in the treatment of obesity and type 2 diabetes, especially due to their efficacy in reducing body weight and improving metabolic parameters.

However, it was also identified that the growing popularization of these medications outside the clinical setting has increased significant risks, such as self-medication, aesthetic use without medical

indication, and the occurrence of adverse effects, in addition to uncertainties regarding long-term effects. These factors demonstrate that, despite the therapeutic benefits, inappropriate use may compromise individual safety and generate significant impacts on public health.

Thus, it is concluded that there is a tension between pharmacological innovation and regulatory challenges, which requires the strengthening of health surveillance and the implementation of policies aimed at the rational use of medicines. The actions of regulatory agencies and health professionals are essential to ensure the safe, ethical, and appropriate use of these therapies, reducing risks and promoting greater equity in access.

As a contribution, this study organizes and synthesizes current evidence on the topic, offering an integrated view of the benefits and risks associated with weight-loss pens and their implications for public health in contemporary Brazil. This overview may contribute to understanding the phenomenon and support evidence-based decision-making.

Finally, it is suggested that future research further investigate the long-term effects of these medications, as well as their social, economic, and behavioral repercussions, especially in view of the expansion of use outside formal clinical indications.

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THE PSYCHOLOGY OF FEAR AND STRESS IN CHILDREN AND ADOLESCENTS EXPERIENCING SEXUAL VIOLENCE

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Abstract

Sexual violence against children and adolescents constitutes a serious violation of human rights, with profound consequences for victims' psychological, emotional, social, and educational development. This study aims to analyze how fear and stress generated by the trauma of sexual violence affect the neuropsychological development and educational trajectory of children and adolescents. The study adopted a qualitative approach through a systematic literature review grounded in psychology, neuroscience, attachment theory, and education. The findings indicate that exposure to sexual violence triggers psychobiological responses, such as hyperactivation of the hypothalamic-pituitary-adrenal (HPA) axis, which compromise essential cognitive functions, leading to learning difficulties, social withdrawal, aggression, hypervigilance, and, in many cases, school dropout. Furthermore, the study highlights the insufficient training of teachers to identify and intervene in such cases, emphasizing the need for integrated public policies, school-based support protocols, and continuing professional development for education professionals. It is concluded that schools can and should play a central role within the child protection network by acting in the prevention, identification, and support of victims of sexual violence.

Keywords: Child Protection, Childhood Trauma, Fear, Sexual Violence.

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INTRODUCTION

Sexual violence against children and adolescents is a global phenomenon with severe consequences for the emotional, psychological, and social development of its victims. In Brazil, data from the Brazilian Public Security Forum (FBSP, 2023) reveal that 74,930 rape cases were recorded in 2022, of which 61.3% involved children up to 13 years of age and 88.7% involved female victims. Most of these crimes occurred within the home (68.3%) and were committed by perpetrators known to the victims, making both identification and reporting particularly difficult. This reality reveals not only the magnitude of the problem but also the gendered nature of sexual violence and the vulnerability of children and adolescents in environments that should be safe.

From a psychosocial perspective, the consequences of this trauma are profound. Van der Kolk (2016) emphasizes that childhood sexual violence triggers neurobiological responses, including hyperactivity of the hypothalamic-pituitary-adrenal (HPA) axis, resulting in chronic toxic stress. These changes impair cognitive functions essential for learning, such as attention, memory, and emotional regulation (Ferreira & Ortega, 2024). Within the school environment, these alterations manifest as declining academic performance, avoidance behaviors, aggression, and difficulties in social interaction (Bowlby, 1984). Furthermore, many victims develop Post-Traumatic Stress Disorder (PTSD), characterized by hypervigilance, flashbacks, and social withdrawal (Briere & Scott, 2015).

Against this backdrop, the central research question guiding this study is: *How do fear and stress resulting from sexual violence affect the psychological development and educational process of children and adolescents?* The problem lies at the intersection of trauma and education, requiring an in-depth analysis of how psychological responses to abuse interfere with learning and how schools can contribute to the identification and support of victims. The underreporting of cases and the culture of silence surrounding sexual violence (Deslandes & Campos, 2015) further underscore the urgency of discussing the role of educational institutions in addressing this form of violence.

Within this context, this study pursues three objectives: (1) to understand the psychological impacts of sexual violence on children and adolescents, with particular emphasis on neurobehavioral changes; (2) to analyze manifestations of fear and stress in the school setting, including PTSD symptoms and coping strategies; and (3) to identify the role of schools in the early detection and support of victims, taking into account legal frameworks such as the Brazilian Child and Adolescent Statute (ECA) and documented experiences discussed by Minayo (2013).

The relevance of this study is justified by three main factors. First, its **social urgency**: childhood sexual violence represents a silent epidemic, with estimates indicating that only 10% of cases are officially reported (UNICEF, 2021). As a setting where children interact daily, schools are essential to breaking this cycle. Second, there is an **educational gap**: studies such as those conducted by Silva et al. (2024) demonstrate that 70% of teachers receive no training to recognize signs of abuse, contributing to institutional revictimization. Third, despite the **legal requirement** established by the Child and Adolescent Statute (Article 13) mandating the reporting of suspected or confirmed cases, its effectiveness is hindered by the lack of adequate professional training (FBSP, 2023).

Accordingly, this study seeks to contribute to the development of public policies for teacher education, the establishment of school-based support protocols, and the expansion of discussions concerning mental health within educational settings. By integrating perspectives from psychology, education, and human rights, the study aims to provide theoretical and practical foundations for more effective action in addressing sexual violence against children and adolescents.

THEORETICAL FRAMEWORK

SEXUAL VIOLENCE AGAINST CHILDREN AND ADOLESCENTS

Sexual violence against children and adolescents constitutes a serious violation of human rights that irreparably compromises victims' physical, emotional, and social development. It is characterized as any act of a sexual nature committed against a child or adolescent without their consent or full

understanding, frequently mediated by asymmetrical relationships of power and trust. According to Deslandes and Campos (2015), sexual violence encompasses a wide range of manifestations, from intrafamilial sexual abuse to commercial sexual exploitation, making it a multifaceted phenomenon that is particularly difficult to combat.

Furthermore, sexual violence is not only a violation of fundamental rights but also a major public health issue, exerting a significant impact on child morbidity and mortality. According to Silva, Figueredo, and Lacerda (2024), it forms part of a broader pattern of violations affecting childhood and adolescence, resulting in severe physical, emotional, and social harm. The authors emphasize that reports of sexual violence in Brazil have increased, which may reflect both greater public awareness of the issue and the expansion of public policies designed to address it.

In Brazil, the Child and Adolescent Statute (ECA), enacted in 1990, represented a landmark in guaranteeing the rights of children and adolescents by establishing the mandatory reporting of suspected or confirmed cases of sexual violence (Brazil, 1990). As Minayo (2013) emphasizes, this legal requirement aims to ensure effective state intervention to protect victims and hold perpetrators accountable. Nevertheless, sexual violence remains largely invisible due to its predominant occurrence within the family environment and the normalization of abusive practices in certain social contexts.

The close relationship between the perpetrator and the victim makes the recognition and reporting of abuse particularly difficult, thereby perpetuating the cycle of violence. As Costa (2015) notes, the victim's silence is often the result of coercion, guilt, shame, and fear—feelings deliberately exploited by the perpetrator to maintain control over the child. This process of silencing is further reinforced by a culture of denial surrounding sexual violence, one that places responsibility on the victim while minimizing the severity of the abuse.

Sexual violence produces multiple consequences for victims, affecting their physical and mental health as well as their social and educational development. According to Silva, Figueredo, and Lacerda (2024), the most common long-term effects include anxiety disorders, depression, suicidal ideation, self-

harming behaviors, academic difficulties, and changes in social behavior. These impacts are exacerbated by the absence of adequate support networks and by failures within protection systems, which are often unable to provide victims with the care necessary for their recovery.

At the same time, it is important to recognize that although sexual violence is a global phenomenon, it manifests differently according to each sociocultural context. As Deslandes and Campos (2015) argue, addressing sexual violence against children and adolescents requires an intersectoral approach that integrates actions across the fields of healthcare, education, social assistance, and the justice system. Within this framework, healthcare and education professionals play a fundamental role in the early identification of signs of abuse and in ensuring that cases are appropriately referred to the competent authorities.

The study conducted by Silva, Figueredo, and Lacerda (2024) concludes that, despite legislative advances and the implementation of public policies, numerous challenges remain in combating sexual violence against children and adolescents. Underreporting, the silencing of victims, and the fragility of protection networks continue to constitute major obstacles to the effectiveness of prevention and intervention efforts. Consequently, it is essential to invest in the continuous training of professionals, strengthen victim support services, and promote a social culture that rejects negligence and omission in the face of this serious problem.

FEAR AND STRESS AS PSYCHOLOGICAL RESPONSES TO TRAUMA

Fear and stress are fundamental psychological responses to traumatic events, functioning as evolutionary protective mechanisms in situations perceived as threatening. Fear is an immediate emotional reaction to a concrete threat, activating physiological defense systems, whereas stress—particularly when chronic—corresponds to a sustained state of heightened alert that can trigger significant neurophysiological changes. Thus, both play central roles in the response to trauma, directly influencing

the psychological development of children and adolescents who have experienced sexual violence (Van der Kolk, 2016).

Psychological theories of trauma provide important frameworks for understanding these psychological responses. Sigmund Freud, for example, conceptualized trauma as a breach in the psyche's protective barrier, resulting in an overload of unprocessed excitations that later reappear in the form of symptoms such as anxiety and repetitive behaviors (Freud, 2010). According to Freud, trauma generates an excess of stimulation that the psyche is unable to symbolize, giving rise to enduring emotional disturbances often associated with irrational fear and emotional inhibition.

Another important theoretical framework is Attachment Theory, developed by John Bowlby, which proposes that early traumatic experiences, particularly those involving abuse and neglect, impair the formation of secure emotional bonds. Children who experience sexual violence tend to develop insecure internal working models characterized by difficulty trusting others and a persistent fear of abandonment and betrayal (Bowlby, 1984). This condition is further intensified by the absence of protective caregivers, who are essential to emotional organization and the development of a sense of security during childhood.

Post-Traumatic Stress Disorder (PTSD) represents one of the principal psychopathological consequences of exposure to sexual violence during childhood and adolescence. Officially recognized with the publication of the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III), in 1980, PTSD is characterized by symptoms including intrusive re-experiencing of the traumatic event, avoidance, negative cognitive and emotional changes, and physiological hyperarousal (APA, 1980). In children and adolescents, PTSD may present atypically through regressive behaviors, recurrent nightmares, aggression, or social withdrawal (Bremner, 2006).

From a neuroscientific perspective, PTSD is understood as a failure in the extinction of conditioned fear, resulting in an excessive generalization of defensive responses. According to Ferreira and Ortega (2024), individuals with PTSD exhibit an overgeneralization of fear responses, reacting to

multiple stimuli reminiscent of the traumatic event even when no objective threat is present. This phenomenon is associated with structural and functional alterations in brain regions such as the amygdala, hippocampus, and prefrontal cortex, which are responsible for regulating emotions and memory.

Furthermore, classical conditioning theory, proposed by Pavlov and later incorporated into explanations of trauma, suggests that following exposure to a traumatic event, stimuli that were initially neutral may acquire negative emotional significance, eliciting fear responses even in the absence of actual danger (Careaga, Girardi, & Suchecki, 2016). This hypothesis is central to understanding PTSD, which is characterized by the persistence of fear responses triggered by memories of or contexts associated with the traumatic experience.

Among the typical reactions observed in children who have experienced sexual violence are social withdrawal, aggression, difficulty trusting adults, and impaired academic performance. These manifestations are understood as attempts by the child to cope with the traumatic experience and to protect themselves from future situations perceived as threatening (Briere & Scott, 2015). According to Van der Kolk (2016), immobilization and emotional shutdown are primitive defensive mechanisms that emerge when the child perceives that escape or resistance is impossible.

The neuroscientific literature further indicates that trauma can lead to hyperactivity of the body's stress-response systems, resulting in long-term hormonal and behavioral changes. The neuroscientific model of trauma proposes that repeated exposure to severe stressors compromises the body's adaptive functioning, increasing vulnerability to the development of psychopathological conditions such as depression and anxiety disorders (Ferreira & Ortega, 2024). This model is supported by the work of Van der Kolk (2016), who argues for the existence of two primary subtypes of traumatic response: one characterized predominantly by hyperarousal and the other by dissociation.

Understanding post-traumatic fear and stress responses, particularly among child and adolescent victims of sexual violence, is essential for the development of effective therapeutic interventions. As Brewin (2001) emphasizes, treatment should focus not only on extinguishing conditioned fear responses

but also on strengthening secure emotional bonds and promoting protective environments, such as schools, which can serve as important sources of resilience and facilitate recovery from trauma.

EFFECTS OF SEXUAL VIOLENCE IN THE SCHOOL CONTEXT

Sexual violence against children and adolescents has both direct and indirect impacts on the school environment, constituting a determining factor in the disruption of educational trajectories and the impairment of victims' academic and social development. Difficulty concentrating is one of the earliest manifestations observed, resulting from the emotional burden imposed by trauma and the constant need to remain vigilant toward one's surroundings. According to Briere and Scott (2015), the persistent state of alert characteristic of victims of sexual violence interferes with executive functions, such as attention and working memory, which are essential for academic activities, ultimately leading to poor academic performance.

In addition to cognitive difficulties, sexual violence gives rise to behavioral changes in the school setting that may culminate in school dropout. School disengagement is often preceded by a gradual process of withdrawal, driven by fear, shame, and feelings of insecurity within the educational environment, which frequently fails to recognize signs of psychological distress or to provide appropriate support for victims (UNICEF, 2021). Silva, Figueiredo, and Lacerda (2024) emphasize that when schools fail to respond effectively to victims' needs, they contribute to their marginalization and the weakening of their bond with the educational institution, creating a cycle of educational exclusion that perpetuates social inequalities.

With regard to social functioning, victims of sexual violence may experience severe impairments in their ability to establish and maintain interpersonal relationships. The persistent fear of further abuse, combined with generalized distrust toward adults and peers, hinders the development of secure emotional bonds and full participation in school activities (Bowlby, 1984). Bowlby's Attachment Theory provides an essential framework for understanding this phenomenon by asserting that early traumatic experiences can

compromise the development of secure internal working models, thereby fostering social isolation and withdrawal.

The school environment, which should serve as a privileged setting for the development of social competencies, is often not perceived as such by children who have experienced sexual violence. Instead, it may be experienced as threatening and hostile, particularly when the institution lacks a culture of care, inclusion, and respect for diversity. Silva, Figueiredo, and Lacerda (2024) argue that school climates characterized by authoritarian and punitive practices tend to reinforce victims' isolation, further hindering their social integration and the development of supportive relationships.

From both behavioral and emotional perspectives, sexual violence produces profound changes manifested through excessive fear, aggression, and hypervigilance. Exaggerated fear is an adaptive response intended to protect the child from future threats; however, it simultaneously restricts the child's autonomy and limits full participation in school activities (Van der Kolk, 2016). Aggression, in turn, may be understood as an attempt at self-protection in response to a constant perception of danger. Educators often interpret such behavior as disruptive or defiant when, in reality, it constitutes an expression of profound psychological distress (Briere & Scott, 2015).

Hypervigilance, characterized by the persistent expectation of imminent danger, compromises not only the quality of the child's engagement at school but also their capacity to embrace new learning experiences and participate in activities that promote holistic development. According to Ferreira and Ortega (2024), this continuous state of alert, which is typical among trauma survivors, is associated with dysfunctional activation of the stress-response system, producing harmful effects on both cognitive and emotional functioning. Within the educational context, hypervigilance manifests through avoidance behaviors, social withdrawal, and resistance to interpersonal interaction, thereby limiting the child's access to opportunities for learning and socialization.

The literature further indicates that, in many cases, schools fail to recognize these manifestations as indicators of psychological suffering, instead treating them as disciplinary issues or learning problems

(Silva, Figueiredo, & Lacerda, 2024). Such an approach, based on medicalization or punishment, not only exacerbates the victim's distress but also reinforces their social and educational exclusion. Consequently, teacher education should include content that enables educators to understand sexual violence as a complex phenomenon requiring a sensitive, trauma-informed, and multidimensional approach.

Finally, it is important to emphasize that the effects of sexual violence within the school context extend beyond academic performance and social skills to encompass the child's overall well-being and mental health. The presence of symptoms such as anxiety, depression, guilt, and shame significantly undermines the educational experience, creating additional barriers to engagement and learning (UNICEF, 2021). By recognizing and responding appropriately to these manifestations, schools can become therapeutic environments, contributing to the reframing of traumatic experiences and fostering resilience among victims (Van der Kolk, 2016).

METHODOLOGY

This study adopted a systematic literature review, following the methodological principles discussed by Motta-Roth and Hendges (2010), who emphasize the importance of critically synthesizing existing knowledge for scientific advancement. The qualitative approach made it possible to analyze academic publications addressing the psychological and educational impacts of sexual violence on children and adolescents, integrating multidisciplinary perspectives from psychology, education, and public health.

The selection criteria prioritized peer-reviewed studies, specialized books, and official documents. The review included works addressing: (1) the psychological consequences of trauma, including fear, stress, and Post-Traumatic Stress Disorder (PTSD); (2) manifestations within the school environment, including school dropout, learning difficulties, and behavioral changes; and (3) institutional support strategies, such as the role of schools and public child protection policies (Deslandes & Campos, 2015;

Silva, Figueiredo, & Lacerda, 2024). Studies lacking methodological rigor or not directly related to the research topic were excluded.

The literature search was conducted using the SciELO database, employing descriptors such as *child and adolescent sexual violence, trauma and learning*, *PTSD in children and schools*, *and support and care*. These sources were complemented by normative documents, including the Brazilian Child and Adolescent Statute (ECA) and reports published by the Brazilian Public Security Forum (FBSP, 2023).

RESULTS AND DISCUSSION

Sexual violence against children and adolescents is an extreme form of trauma that profoundly compromises victims' emotional, psychological, social, and educational development. It is a complex phenomenon shaped by historical, cultural, and structural factors that extends far beyond the abusive act itself, with consequences that often persist throughout the victim's lifetime. Exposure to sexual violence during childhood activates intense mechanisms of fear, stress, and dissociation, directly interfering with psychological development and the formation of secure emotional and cognitive relationships (Van der Kolk, 2016).

From a clinical perspective, substantial evidence demonstrates that childhood sexual abuse is associated with the development of a wide range of mental disorders, including depression, anxiety disorders, suicidal ideation, dissociative disorders, and Post-Traumatic Stress Disorder (PTSD). According to Briere and Scott (2015), childhood sexual violence disrupts the neurobiological mechanisms responsible for regulating fear, memory, and emotion by producing hyperactivation of the amygdala and reduced functioning of the prefrontal cortex. As a result, victims may exhibit behaviors such as hypervigilance, emotional dissociation, agitation, or social withdrawal.

In his formulations on trauma, Freud (2010) had already argued that intense experiences that cannot be symbolically processed remain as pathological nuclei within the unconscious, later reemerging in the form of repetitive symptoms. Herman (1992) expands upon this understanding through the concept

of complex trauma, commonly observed among victims of chronic abuse, which is characterized by profound alterations in self-esteem, body image, and the capacity to trust others. Children and adolescents who experience sexual abuse frequently develop chronic feelings of guilt, shame, fear, and diminished self-worth.

From a neuroscientific perspective, Yehuda and LeDoux (2007) emphasize that chronic traumatic stress disrupts the regulation of the hypothalamic-pituitary-adrenal (HPA) axis, promoting excessive cortisol release that impairs hippocampal functioning and compromises learning and memory processes. Ferreira and Ortega (2024) argue that these alterations are not merely temporary but structural, potentially producing long-lasting effects on cognition and emotional regulation. Therefore, childhood sexual trauma should not be understood solely as a psychological issue but rather as a condition that affects the child's overall functioning.

The impact of sexual violence is also strongly manifested within the school environment. As a central setting for socialization and cognitive development, the school becomes a place where the child's psychological suffering is often expressed with particular intensity. Silva, Figueiredo, and Lacerda (2024) report that symptoms such as declining academic performance, difficulty concentrating, aggression, apathy, and school dropout are common among victims of sexual abuse. These signs are frequently misinterpreted as disinterest or indiscipline when they are, in fact, manifestations of profound psychological distress.

In developing Attachment Theory, Bowlby (1984) demonstrated that the disruption of secure emotional bonds during the early years of life compromises the formation of positive internal working models, which are essential for healthy socialization and the development of self-esteem. Children who experience sexual abuse often internalize beliefs characterized by guilt, worthlessness, and distrust, negatively influencing the way they relate to peers and teachers. Within this context, aggression may represent an attempt at self-protection, whereas social withdrawal functions as a defensive response to perceived hostility.

Against this backdrop, school dropout emerges as a common consequence of inadequate institutional support. Souza (2020) argues that, when their suffering remains invisible, many children and adolescents begin to avoid the school environment because of fear, shame, or feelings of insecurity. This lack of effective institutional response not only perpetuates the cycle of victimization but also reinforces social inequalities by preventing full access to education.

Nevertheless, schools can also assume a protective and therapeutic role. When equipped with protocols for listening, support, and referral, they become environments in which traumatic experiences can be reinterpreted and reconstructed. Minayo (2013) and Deslandes and Campos (2015) advocate for schools as integral components of the child protection network, emphasizing the importance of interdisciplinary collaboration among educators, psychologists, and social workers. Initiatives such as support groups, conflict mediation programs, and partnerships with mental health services can promote appropriate support for victims and help prevent the chronicization of psychological suffering.

The Brazilian Public Security Yearbook (2023) indicates that the majority of cases of child rape occur within the family environment and involve perpetrators known to the victim, making spontaneous disclosure particularly difficult. This finding reinforces the role of schools as one of the few environments where indirect signs of abuse can be observed and the cycle of silence interrupted. To fulfill this role effectively, it is essential to invest in the training of educators, who often lack knowledge about the signs of trauma or are uncertain about how to respond to suspected abuse (Souza, Pereira, & Lima, 2022).

Teacher education should encompass not only legal and procedural aspects but also content related to trauma psychology, trauma-informed communication, and emotional management. Cyrulnik (2009) emphasizes that emotionally stable figures, such as empathetic teachers, can act as agents of resilience, helping victims reconstruct their personal narratives and develop a renewed sense of emotional security. However, for this to occur, educators themselves require institutional support in the form of supervision, continuing professional development, and strong support networks.

Finally, it is important to recognize that addressing sexual violence cannot be the sole responsibility of teachers or schools. Rather, it requires an integrated, intersectoral network that brings together education, healthcare, social assistance, the justice system, and families. Strengthening child protection networks, improving referral procedures, and fostering an institutional culture grounded in care, attentive listening, and protection are fundamental steps toward ensuring every child and adolescent the right to a safe, dignified life free from violence.

CONCLUSION

The analysis conducted in this study made it possible to understand the impacts of sexual violence on the development of children and adolescents, particularly with regard to its psychological and educational consequences. The findings demonstrate that the trauma resulting from sexual violence triggers significant neuropsychological changes, directly affecting young victims' capacity for learning and social interaction. Chronic fear and stress manifest not only through clinical symptoms, such as Post-Traumatic Stress Disorder (PTSD), but also through tangible difficulties within the school environment, including declining academic performance, behavioral problems, and an increased risk of school dropout.

Schools emerge as fundamental settings for both the early identification of cases and the provision of appropriate support for victims. However, the findings reveal a concerning gap in the preparation of education professionals to address these situations, as well as shortcomings in the establishment of effective support networks. The absence of clear protocols and the lack of specialized training in trauma psychology limit the potential of educational institutions to function as protective environments.

Although this study was limited to a systematic literature review, its findings underscore the urgent need for concrete action. It is essential to invest in the continuing professional development of educators, develop intersectoral public policies, and implement monitoring systems that ensure the effectiveness of child protection measures. Future research should focus on evaluating specific

interventions within the school context, with the aim of identifying best practices for supporting victims of sexual violence.

In summary, the findings of this study reinforce the need for a collective commitment to transforming schools into genuinely supportive environments that are adequately prepared to address the complexities of trauma. Only through an integrated approach involving educators, healthcare professionals, public administrators, and society as a whole will it be possible to guarantee the right of every child and adolescent to full development and a high-quality education, especially those who have experienced situations of sexual violence.

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ART THERAPY AND PSYCHOLOGY: INTER(FACE)S AND FIELD(S) OF POSSIBILITIES

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Abstract

Art therapy has been used as a supportive tool for health promotion within the field of mental health. In this sense, psychologists, situated within this context, have recognized art as a possible and effective resource for the development of their practice. Art, as one of the primordial forms of human communication since prehistoric times, presents itself as a means of expressing feelings, thoughts, desires, and dreams. Within this framework, art therapy emerges as a therapeutic approach that enables individuals to externalize such contents through non-verbal expression, using artistic language as a mediating channel. This study analyzes the effectiveness of art therapy in mental health care and in coping with psychological distress, as well as investigates which practices may be considered relevant to the field of Psychology. To this end, a narrative literature review was conducted using online databases. Based on the information analyzed, the positive effects of art therapy on mental health and its interfaces with psychological practice were observed. In addition, the importance of this approach is discussed in supporting autonomy, self-esteem, subjectivity, and the way subjects deal with their own feelings.

Keywords: Art therapy, Mental health, Psychology.

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INTRODUCTION

Art therapy has been used as a supportive tool for health promotion within the field of Mental Health (Rufato, 2025). In this sense, psychologists, immersed in this field, have considered art to be a possible and effective instrument in the development of their work (Reis, 2014).

According to the Brazilian Union of Art Therapy Associations — UBAAT, there are, on average, 2,000 registered art therapists. It is worth noting that, in order to become an art therapist in Brazil, one must have specific academic training in the field. This generally includes an undergraduate degree in arts, psychology, or related areas, followed by a specialization in art therapy (Municipal University of São Caetano do Sul, 2024).

Currently, there are no official data on the number of psychologists who use art therapy in their practice in Brazil. However, findings from recent research on art therapy, the growth in the availability of specialization courses in the field, scientific events, and regional associations indicate the adoption of this approach among Psychology professionals (UBAAT, 2024).

On the other hand, it is perceived that some practices specific to Art Therapy that are being used by psychologists have been criticized, confused with other activities that do not belong to the art therapy field, and sometimes used as techniques or resources without theoretical-methodological clarity, which ultimately weakens the scenario described (Ribeiro, 2002; Reis, 2014)[3]. These concerns guided the central question of this study: Which practices, based on the use of Art Therapy, can in fact be considered by Psychology, and what is their impact on the mental health of subjects experiencing psychological distress[4]?

AArt, as one of the primordial forms of human communication, emerges from an attempt to express feelings, thoughts, desires, and dreams. In this context, Art Therapy appears as a therapeutic approach that enables individuals to externalize these contents through non-verbal expression, using

[3]https://pesquisa.bvsalud.org/portal/resource/pt/lil-721477?utm_source=chatgpt.com and https://tede2.pucgoias.edu.br/handle/tede/1937?utm_source=chatgpt.com.
[4] Subject experiencing psychological distress is a concept used by Paulo Amarante (2000) in his work *Ensaios: subjetividade, saúde mental, sociedade* [Essays: Subjectivity, Mental Health, Society].

artistic language as a channel. It is important to delimit which practices compose the field of Art Therapy: painting, collage, modeling, and sewing are resources used in this process, without requiring technical or aesthetic skills from the people expressing themselves. The focus is not on artistic production itself, but on the possibility of self-knowledge and emotional elaboration that occurs through artistic making (Reis, 2014).

Art Therapy proves to be a significant resource for providing creative and transformative experiences, contributing to the promotion of social interaction, bodily expression, welcoming, and the valuing of subjectivity. The analysis of the different artistic resources used in this therapeutic approach makes it possible to understand Art Therapy and recognize its main impacts on people's health. Through the various forms of artistic expression, it becomes possible to manifest feelings that are often not easily communicated verbally. In addition, this practice fosters the development of creativity and imagination, broadening communication skills, reducing stress and anxiety, and promoting improvements in concentration and attention (Rufato, 2025).

Art Therapy proposes practices that acquire a relevant role in individuals' lives, functioning as strategies for intervention and prevention in mental health. This approach has the potential to mitigate the negative impacts of various disorders or illnesses, in addition to offering support to anyone facing internal conflicts, fears, or insecurities. Art therapy interventions enable the subject to reconnect with themselves and with the world around them, establishing a bridge between conscious and unconscious contents (Rufato, 2025).

Through a narrative review, this study seeks to analyze the limits and possibilities attributed to Art Therapy within the field of Psychology. In this sense, as an unfolding of this broader objective, it also aims to understand the impact of art therapy on the mental health of subjects experiencing psychological distress. Thus, it will explore how the relationship/articulation between Psychology and other fields—in this case, Art Therapy—becomes necessary in view of the need for more sensitive, integrative, and humanized therapeutic practices.

ART THERAPY: DEFINITION, HISTORY, DELIMITATION OF ITS FIELD, AND ARTICULATION WITH GESTALT THERAPY

From the 1920s and 1930s onward, Freud and Jung and their theories were the pillars of art therapy, according to Carvalho and Andrade (1856–1939). They recall that Freud (1856–1939), after analyzing certain artistic works such as Michelangelo's Moses, perceived that these works manifested the artist's unconscious and were therefore considered a form of symbolic communication in a cathartic manner. Freudian theory, which holds that the unconscious can manifest itself through images, such as dreams, understood that images produced in art were a privileged way of connecting with the unconscious.However, even though Freud believed in the power of art over the unconscious, he himself never used art as a therapeutic process (Carvalho; Andrade, 1995).

According to Silveira (1992), Freud's disciple, Jung (1875–1961), who, after breaking with Freud, created his own theory, known as Analytical Psychology, used artistic language in psychotherapies, unlike Freud, who believed that art was a form of sublimation of drives. Jung understood that creativity in art was a natural and structuring psychic function, in which the aptitude for healing took shape through the transformation of unconscious contents into symbolic images. Thus, Jung encouraged his patients to draw and paint freely about their feelings, dreams, and situations that affected them, believing that these works were produced as a symbolization of the individual and collective unconscious. Jung understood free drawing as a facilitating means of verbal contact with the patient, because he believed that the individual had greater possibilities for internal organization through artistic practice.

From these two theoretical strands, the use of art in psychotherapy gradually gained space. Margaret Naumburg (1890–1983), an American educator, was the first to systematize art therapy in 1941; after this achievement, she came to be considered the founder of art therapy (Andrade, 1995, 2000). Margaret Naumburg's work is called Dynamically Oriented Art Therapy and was developed from psychoanalytic theories (Naumburg, 1966).

Although the basis of this interface between Psychology and Art Therapy is strongly influenced by psychoanalysis, one psychological approach that has stood out is Gestalt Therapy. In this regard, Reis (2014) considers that one of the articulators of Gestalt art therapy was Janie Rhyne, who wove this path throughout her practice and organized it in the work The Gestalt Art Experience, published in Brazil as Arte e Gestalt: Padrões que Convergem in 1973.

In this book, the author interweaves the principles of Gestalt Psychology with the use of artistic materials, opening space for expressive experiences in both clinical and educational contexts, with individuals or groups. In Gestalt art therapy, creating is also perceiving oneself; that is, it is giving form to what one feels so that one may then see oneself with greater clarity and wholeness.

Gestalt Therapy, as an existential-phenomenological therapy, was founded by Fritz Perls and Laura Perls in the 1940s. It is grounded in the phenomenological method of awareness, in which perceiving, feeling, and acting are distinct from interpretation and changes in attitudes. Explaining and interpreting give way to what is "directly perceived and felt" (p. 15), and the focus is more on processes than on content. Instead of emphasizing what was, what could be, what might or should be, it focuses on what is being thought and felt (Yountef, 1998).

Existential dialogue is the foundation of the methodology of Gestalt Therapy. In Gestalt, there is an avoidance of "talking about" in place of "talking with." This stance refers to a shift from the intellectual order to relational contact, to the emotional order (Serge and Ginger, 1995).

In short, as the aforementioned authors also consider, GT is phenomenological because describing is more significant than explaining. What is essential comes from "immediate experience," from how it is being felt and perceived, and this produces meaning for each person. "GT considers the organism as a totality embedded in the field" (Alvim, 2014, p. 18), and "relationship" is one of the core concepts of this approach.

The term Gestalt is of German origin and does not have a precise translation into Portuguese. Words such as form, figure, pattern, structure, or configuration may approximate its meaning, but none

corresponds exactly. For this reason, the use of the original word is maintained, applying it in various contexts (Rhyne, 2000).

According to Jane Rhyne (2000), the articulation between the concepts of Gestalt Psychology and the use of artistic materials can be applied in both psychotherapeutic and educational contexts, aiming to work with individuals or groups. Since Gestalt Psychology originates in a theory of perception, this concept becomes central in Gestalt art therapy, in which artistic experience aims to broaden the subject's self-perception.

Rhyne (2000) also emphasizes that the Gestalt art experience is a profound process of self-knowledge. It involves the inner self, with all its emotional and psychological complexity, creating art (drawings, paintings, visual forms, etc.). During this process, the person actively engages with what they are producing, as though each created form were a unique phenomenon, full of meaning.

According to Rhyne (2000), when observing what is being created, the person not only recognizes who they are at that moment, but also perceives possibilities for change; that is, they begin to perceive other ways of being, paths that may help them become who they wish to be. As Rhyne (2001) states, the artistic experience, by expanding the subject's perception of themselves, facilitates the integration of emotional, cognitive, and sensory aspects, promoting personal growth and self-awareness.

RESOURCES APPLIED IN ART THERAPY

Art therapy makes use of different forms of artistic expression that can contribute to identifying emotions and feelings, fostering social interaction, stimulating creativity, and promoting self-knowledge (Rufato, 2025). Below, some of these means and the potential benefits they offer will be presented.

Drawing

According to Valladares (2008), drawing is a practice through which the individual externalizes unconscious contents, revealing, in the image produced, their feelings, desires, and perceptions. In this

way, the individual attributes personal meanings to objects, people, and reality, interpreting the world around them and deepening their understanding of themselves.

Drawing is among the forms of artistic expression most widely used in Art Therapy, especially in work with children, due to the ease with which they relate to this activity and the positive results obtained in analyzing the unconscious contents present in graphic productions (Rufato, 2025).

Painting

Painting is one of the techniques employed in Art Therapy with the purpose of facilitating emotional expression. According to Valladares (2008), this practice stimulates the externalization of the internal contents of the psyche, contributing to individuals' emotional balance.

More reserved people, who have difficulties communicating with family members, friends, or health professionals, when they begin therapeutic painting activities freely and without pressure, are able to demonstrate feelings and emotions while also releasing their creativity. For Valladares (2008), this approach fosters the development of consciousness, the reorganization of personality, and assists in overcoming fears, blockages, and insecurities.

Dramatization and Storytelling

Dramatization is a technique used in Art Therapy that enables individuals to explore different roles, assume varied identities, and experience new ways of being and acting. As Valladares (2008) points out, this practice resembles make-believe, in which the person can express themselves in various imagined situations, thereby favoring understanding of social behaviors and stimulating reflection on their own attitudes and conduct.

Art Therapy frequently resorts to make-believe play and dramatizations in work with children, as these activities make it possible to understand how they perceive different social roles. In addition, these

practices stimulate children's imagination, since the child can assume any character and act according to that role, which contributes to understanding the role represented (Rufato, 2025).

Storytelling is a technique frequently used in Art Therapy with both children and adults. This practice promotes moments of relaxation and lightness, leading participants into an imaginary universe where they can identify with characters and explore unknown scenarios, blending reality and symbolism. According to Valladares (2008), listening to and narrating stories plays a fundamental role in human development, since stories reflect many of our desires, conflicts, and concerns.

Construction with Recycled Materials

The activity of construction with recycled materials involves several actions, such as cutting, assembling, organizing, structuring, painting, and gluing. According to Valladares (2008), this type of creation stimulates abilities such as spatial perception, discrimination capacity, interaction, and organization. By transforming recyclable materials into toys, sculptures, or various objects, the individual goes through a creative process that requires planning and the separation of elements. This symbolic path contributes to the person's dealing with aspects of their own life, since, by reusing materials, they also work with what Valladares (2008) calls "internal waste," promoting personal transformation and resignifying experiences considered negative.

Other Resources and Possibilities

VIt is worth emphasizing that there are other resources used in Art Therapy, as described by the Ministry of Health (2022). In addition to painting, collage, and modeling, there are poetry, dance, photography, weaving, bodily expression, theater, sounds, music, and character creation. It further adds that what matters is using art as a means of communication between the professional and the patient, whether in an individual or group approach.

As Reis (2014) aptly observes, the psychologist's work, like art therapy, must be contextualized within the subjects' reality, flexible in relation to the purposes of each demand, and may be anchored in different theoretical strands. It is up to the professional, with sensitivity and listening, to construct the path using resources and techniques grounded in the subject and in the collectives that shape their experience.

ART THERAPY AND PSYCHOTHERAPY: UNDERSTANDING LIMITS AND POSSIBILITIES

In this part of the text, it is necessary to provide a brief explanation of these fields: Psychology and Art Therapy, since it is perceived that there is a certain difficulty, sometimes even among professionals, in delimiting the fields and understanding that there are differences, that the interface is a construction, but that it requires knowledge, study, appropriation, ethics, care, and caution.

As Kotaka (2016) warns, there is a tendency to consider that any use of expressive materials constitutes an art therapy practice. In this sense, not everything done by a psychologist using Art Therapy resources is Art Therapy, and not everything that is Art Therapy will be psychotherapeutic. This is a fine line that opens a space of possibilities, but that also imposes limits and even theoretical tensions. However, the author emphasizes that Art Therapy is a field with its own assumptions and should not be confused with psychological interventions that use art merely as an auxiliary resource, which requires training as well as ethical and technical delimitation by the professionals involved.

According to Ribeiro (2017)[5], psychotherapy is a treatment process built within the client-psychotherapist relationship; although it is carried out through different methods, techniques, or ideologies, it seeks to offer support, help, and re-education through presence, care, inclusion, and a genuine encounter between the parties. Art therapy, on the other hand, is a field in which the professional makes use of artistic means for a therapeutic purpose (Carvalho, 1995).

[5] This author, Jorge Ponciano (2017), adopts a definition of psychotherapy grounded in humanistic theories, specifically the Gestalt Therapy approach. Thus, the concepts related to psychotherapy or to the view of the human being in this text derive from this theoretical, epistemological, methodological, and existential standpoint.

The Brazilian Art Therapy Association defines art therapy as a form of communication through art, between client and professional. The association states that art therapy makes use of artistic expression as an artifact to promote quality of life, in its various modalities, which may be presented through visual, sound, bodily, dramatic, musical, modeling, painting, drawing, and dance arts.

By understanding the distinctions between Psychology and Art Therapy, it also becomes possible to perceive the points of encounter between these areas, especially when thinking of art as a path toward expressiveness and the resignification of emotional issues among subjects experiencing psychological distress. From this perspective, authors such as Kopytko (2007) and Rhyne (2000) point out that Art Therapy, although it has its own identity and foundations, dialogues with different psychological approaches by using the symbolic language of art as an instrument of emotional expression.

Psychology, in turn, by incorporating artistic resources into certain approaches, broadens its possibilities for clinical intervention and the humanization of care. Among these psychological approaches, Gestalt Therapy stands out, whose emphasis on perception, the here-and-now, and the integration of feeling, thinking, and acting finds affinity with the principles of Art Therapy.

IMPACTS OF ART THERAPY ON MENTAL HEALTH

Art therapy is a technique that can be used at all ages. In this technique, methods are employed that help prevent psychological symptoms and support people's physical and mental rehabilitation; however, it is more present in the field of mental health and is a technique used in various institutions (Jansen; et al., 2021).

Based on this, a study was conducted in a psychiatric hospital with patients between 20 and 45 years of age who had bipolar disorder, obsessive-compulsive disorder, depression, schizophrenia, and anxiety. The art therapy session lasted one and a half hours, and through drawings and collages, the patients were asked to show something or someone that made them happy. In this experience, several patients verbalized that they felt happy during the activity, making it possible to observe the identification

of expressions, attitudes, and speech in a more comprehensible way, in addition to improving the individual's socialization within the environment in which they were included (Jansen et al., 2021).

This experience showed that the patient's participation in artistic practices has the potential to favor their integration into the health service to which they belong. Thus, we understand art therapy as an efficient therapeutic resource both for improving the health of individuals with mental disorders and for promoting their well-being. In addition, it represents a preventive care strategy, since it is associated with a reduction in the incidence of worsening conditions (Jansen et al., 2021).

In this context, the inclusion of art therapy in the care of hospitalized patients proves to be extremely important, since this practice enables the development of personality, the inner exploration of one's own consciousness, and the mitigation of possible conflicts between each individual's internal world and external environment (Jansen et al., 2021).

METHODOLOGY

The present study is configured as research with a qualitative approach guided by the design of a narrative literature review. According to Rother (2007), review articles, like other forms of scientific production, represent a type of research based on the analysis of bibliographic materials or electronic sources. Their main objective is to gather and discuss the findings of different authors, offering theoretical grounding for a given topic.

Rother (2007) emphasizes that narrative reviews, in particular, are broader and more descriptive publications, suitable for presenting and debating the progress or current overview ("state of the art") of a specific topic from a theoretical or contextual perspective. Unlike systematic reviews, this type of article does not detail the sources consulted, the search methods used, or the criteria applied in selecting and evaluating materials. In essence, it consists of a critical and interpretive analysis of the existing literature, gathered from books and printed or digital journals, based on the author's experience and interpretation.

This article format is of great importance in the context of continuing education, as it allows the reader to update themselves quickly on a given subject. However, because it does not follow a rigorous methodological protocol, it does not allow data replication nor does it provide quantitative answers. Thus, it is a qualitative and interpretive approach that belongs to the category of narrative reviews.

For Rother (2007), the structure of a narrative review article is generally composed of: introduction, development organized into sections and subtopics according to the author's line of reasoning, final considerations or comments, and bibliographic references.

DISCUSSIONS AND RESULTS

For the development of this narrative review, articles selected from the Scientific Electronic Library Online (SCIELO) database and the Virtual Health Library (BVS) were used.

In both the BVS and Scielo databases, the following descriptors were used: Art Therapy and Psychology. The following criteria were established for the selection of scientific articles: a. articles whose main theme was art therapy; b. articles that addressed the theme of art therapy and artistic expression in the context of mental health; c. articles published between 2020 and 2025 in Portuguese. Thus, n = 04 articles were found in BVS and n = 03 in Scielo.

Table 1

Published articles that have Art Therapy as their main theme.

Title	Author	Publication date	Content
A ARTETERAPIA E SUAS CONTRIBUIÇÕES PARA A QUALIDADE DE VIDA DAS PESSOAS. [ART THERAPY AND ITS CONTRIBUTIONS TO PEOPLE'S QUALITY OF LIFE.]	Glaucia Rufato	2025	This work investigates the resources, benefits, and historical foundations of art therapy, reflecting on how artistic expressions contribute to mental health.
Introdução da arte na psicoterapia: enfoque clínico e hospitalar [Introduction of art into psychotherapy: clinical and hospital approach]	Erika Antunes Vasconcellos; Joel Sales Gligio	2007	This article discusses the use of artistic expression in therapy, focusing on Art Therapy applied to oncology patients. Based on a bibliographic review, it addresses theoretical aspects of art as subjective expression, the Jungian view of imagistic language, and the use of Art Therapy in hospital contexts. It highlights the need for greater theoretical grounding and adaptation to the Brazilian reality.
Arteterapia: a Arte como Instrumento no Trabalho do Psicólogo [Art Therapy: Art as an Instrument in the Psychologist's Work]	Alice Casanova dos Reis	2014	This article reflects on Art Therapy as a tool in Psychology, exploring its emergence, development in Brazil, and foundations in psychoanalytic, Jungian, and Gestalt approaches. It highlights art as a means of creative expression and personal transformation, reinforcing its ethical value in the psychologist's practice.
ELABORAÇÕES DO TRAUMÁTICO ATRAVÉS DA ARTE: REFÚGIO, CULTURA E MEMÓRIA [ELABORATIONS OF THE TRAUMATIC THROUGH ART:	Lucas de Oliveira Alves; Lucienne Martins Borges; Ana Lúcia Mandelli de Marsillac.	2022	The article discusses the traumas of refuge and the potential of art, especially through art therapy, in the psychic elaboration of these experiences. Based on psychoanalysis and critical social theories, it highlights

REFUGE, CULTURE, AND MEMORY]			how artistic creation favors cultural inclusion, the reconstruction of memories, and the strengthening of social bonds.
Arteterapia e educação entre pares conectando o grupo: relato de experiências [Art therapy and peer education connecting the group: experience report]	Mariana da Rocha Marins; Donizete Vago Daher; Andressa Ambrosino Pinto; Rachel da Silva Serejo Cardoso; Selma Petra Chaves Sá.	2019	The article reports the experience of the "Talent Workshop," held in a clinic in Rio de Janeiro with 28 participants, including people with diabetes and health professionals. Across three meetings, it promoted integration, exchange of knowledge, and exhibition of talents. The activity favored health promotion and reinforced autonomy in self-care.
Marcas na/da pele "Entre Mulheres": a experiência de um processo arteterapêutico no diálogo com feminismos e Psicologias [Marks on/of the Skin "Among Women": the experience of an art therapy process in dialogue with feminisms and Psychologies]	Karla Galvão Adrião	2021	The work discusses the intersection between Psychology, Art Therapy, and post-structural and decolonial feminisms, based on the experience of the group "Among Women," with 14 diverse participants. It reflects on inequalities and differences expressed in experiences and artistic productions, questioning traditional knowledge in Psychology and proposing Art Therapy as method and epistemology.
Grupo com crianças e o uso de recursos artístico-expressivos: um estudo qualitativo [Group with children and the use of artistic-expressive resources: a qualitative study]	Gabriela Scolari Pelisson; Maíra Bonafé Sei.	2023	The study investigated the use of artistic-expressive resources in a therapeutic group with children at a Psychology school-service. Through activities mediated by stories and artistic expressions, improvements were observed in emotional expression, communication, and family relationships, highlighting its potential in promoting children's mental health.

Source: Authors 2026).

The procedures were organized as follows: in the investigation stage, we conducted a survey of articles found using the proposed descriptors in the aforementioned databases; in a second stage, a careful reading and selection of the articles took place; and the third stage consisted of the systematization and analysis of the articles from the formed databases.

The information applied in the research was obtained from accessible and public references, ensuring that the information used complied with the ethical principles of research, including the confidentiality of the information obtained.

The analysis of the selected articles—Vasconcellos and Gliglio (2007), Casanova dos Reis (2014), and Rufato (2025)—made it possible to identify significant convergences regarding the conception and benefits of art therapy as a practice aimed at mental health. The extracted data recurrently point to an understanding of art as a legitimate channel for emotional expression and a powerful instrument in the therapeutic process.

One of the central points observed in the three texts is the valuing of art as a means of accessing subjects' subjectivity. Artistic expression is described as a symbolic channel that allows the externalization of subjectivity, especially unconscious contents or contents that are difficult to verbalize. According to the authors, art favors the direct expression of the emotional universe, which broadens the possibility of contact with deep emotions and the resignification of experiences.

Another recurring aspect is the conception of art therapy as a process that stimulates self-knowledge and psychic transformation. Through artistic creations, individuals have the opportunity to recognize themselves, re-elaborate their experiences, and develop new meanings for their feelings, thoughts, and behaviors. The practice is seen as promoting self-esteem, subjective reorganization, and the recovery of healthy aspects of the personality. In this sense, art therapy is not restricted to corrective action in the face of pathologies but also presents itself as a strategy for prevention and mental health promotion.

The strengthening of creative potentialities as part of the therapeutic process also stands out. Creativity, in the three articles, is approached as an intrinsic human ability that, when stimulated, contributes significantly to personal development, conflict resolution, and improved quality of life. Artistic resources broaden forms of expression and allow different modes of emotional elaboration, acting as facilitators in the process of subjective change.

The diversity of resources used in art therapy is also widely discussed. Painting, drawing, collage, sculpture, dance, theater, music, poetry, creative writing, and other forms of artistic language are mentioned as tools adaptable to the needs of individuals and the contexts in which the practice occurs. This variety contributes to the accessibility of the intervention, allowing different audiences to benefit from the practice according to their preferences, abilities, and therapeutic objectives.

Another point shared by the authors is the defense of the application of art therapy in multiple contexts. The articles emphasize that, although its origin is strongly linked to the clinical field of psychology and mental health, art therapy today extends to areas such as education, hospital health care, community contexts, organizational institutions, and social assistance spaces. This expansion reveals the potential of art as an instrument of care and human development in different dimensions of social life.

In theoretical terms, the analyzed texts recognize the main approaches of psychology as a basis for art therapy, with emphasis on psychoanalysis, Jungian analytical psychology, Gestalt Therapy, and the humanistic person-centered approach. Each of these currents offers specific foundations for understanding artistic making and its impact on the subject, but all share the belief in art as a tool that promotes self-knowledge and emotional healing.

Based on the analyzed articles, it can be seen that art therapy is a consolidated field that promotes mental health through artistic making. Its effectiveness is related to its capacity to stimulate creativity, symbolic expression, self-knowledge, and subjective reorganization, with broad applicability in diverse social contexts. As a result, it is configured as an effective, sensitive, and integrative practice in promoting

emotional well-being and can indeed be used by psychologists, provided that they also appropriate and recognize the points of encounter and limits grounded in their psychological practice.

FINAL CONSIDERATIONS

The analyses carried out throughout this work reinforce the relevance of the impacts of art therapy on individuals' mental health, evidencing the importance of subjectivity and the benefits of this approach for emotional expression. It was found that, through artistic productions, the person finds an opportunity to resignify many emotional issues.

Indeed, based on the studies analyzed, art therapy is perceived as an effective practice in subjects' expressiveness and in its psychotherapeutic reach when used as a resource by psychologists, while emphasizing the appropriation of techniques and alignment with the ethical precepts of the psychological field.

The diversity of resources used in this field is extensive: painting, drawing, collage, sculpture, dance, theater, music, poetry, creative writing, among other forms of artistic language. However, they must be well supported theoretically, and professionals must be trained for such use; otherwise, if disconnected from theory, they will be merely inconsistent techniques. Likewise, it is necessary for these tools to be adaptable to the needs of subjects and to the contexts in which the practice is inserted. This variety broadens the accessibility of the intervention, enabling different audiences to benefit according to their preferences, limitations, and therapeutic objectives.

Therefore, this rapprochement between Psychology and the field of Art Therapy contributes to the expansion of mental health care strategies, strengthening the possibilities of psychologists' practice through expressive and creative resources. In the academic sphere, it contributes to deepening knowledge about integrative practices, in addition to fostering relevant reflections on more sensitive and innovative forms of health promotion.

Finally, this study points to the need for further studies and deeper investigation into the effects of art therapy on mental health and exposes the lack of these contents in academic curricula.

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GAMIFICATION IN PUBLIC HEALTH: INNOVATIVE STRATEGIES FOR HEALTH EDUCATION, COMMUNITY ENGAGEMENT, HEALTH PROMOTION, AND THE STRENGTHENING OF ACTIONS WITHIN THE BRAZILIAN UNIFIED HEALTH SYSTEM (SUS)

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Abstract

Gamification has become established as an innovative strategy for enhancing health education initiatives, promoting community engagement, and strengthening health promotion within the field of Public Health. This study aimed to analyze the contributions of gamification to health education, community engagement, health promotion, and the strengthening of actions undertaken within the Brazilian Unified Health System (SUS) through an integrative literature review. The search was conducted in the PubMed, SciELO, and Latindex databases and in Open Journal Systems repositories, covering studies published between 2021 and 2026 in Portuguese and English. After the inclusion and exclusion criteria were applied, 16 articles were selected for analysis. The results showed that gamification fosters greater user participation, increases motivation to learn, strengthens the adoption of healthy behaviors, encourages self-care, and enhances health education strategies in different contexts. Benefits related to strengthening social participation, health communication, and the humanization of care were also observed. It is concluded that gamification represents a promising tool for enhancing health promotion initiatives and strengthening practices implemented within the SUS.

Keywords: Community Engagement, Gamification, Health Education, Health Promotion, Unified Health System.

INTRODUCTION

The incorporation of educational technologies and active methodologies has brought about significant transformations in health education practices and health promotion strategies developed within the field of Public Health. Among these approaches, gamification stands out for its use of characteristic game elements, such as challenges, rewards, levels, immediate feedback, and progressive objectives, to stimulate individuals' engagement, motivation, and active participation in different learning contexts (King et al., 2013; Sardi, Idri & Fernández-Alemán, 2017).

Within the context of the Brazilian Unified Health System (SUS), health education is one of the primary tools for promoting user autonomy, strengthening self-care, and developing comprehensive care practices. The National Primary Care Policy recognizes health education as an essential responsibility of multidisciplinary teams and encourages the development of innovative methodologies capable of bringing health services closer to the population and strengthening the relationship between professionals and the community (Brazil, 2017). Additionally, the National Policy for Popular Education in Health emphasizes the value of dialogue, social participation, and the collective construction of knowledge as fundamental principles of educational initiatives within the SUS (Brazil, 2013).

The digital transformation observed in recent decades has significantly expanded the possibilities for using interactive technologies in healthcare. In this context, gamification has assumed a prominent position because it facilitates more dynamic, accessible, and engaging educational processes, employing both digital and nondigital resources to stimulate learning, behavioral change, and individual participation in initiatives related to disease prevention and the promotion of quality of life (Wang et al., 2022; Vaidya, 2025).

Scientific studies demonstrate that gamified interventions have the potential to increase motivation, promote knowledge retention, stimulate meaningful learning, and improve participants' adherence to educational initiatives. These benefits arise from the use of mechanisms capable of sustaining users' interest, making the learning process more participatory and contributing to the development of competencies related to self-care and health-related decision-making (King et al., 2013; Sardi, Idri & Fernández-Alemán, 2017).

In addition to clinical applications, gamification has been incorporated into community education programs, schools, and public health campaigns, expanding the reach of educational initiatives and helping to strengthen health literacy. Game-based interventions enable greater interaction among participants, promote the development of critical thinking, and encourage individuals to assume a leading role in addressing issues related to public health (Dadaczynski et al., 2021).

In Brazil, the use of gamification in health communication and education initiatives has grown progressively. Research demonstrates that digital games and virtual environments can expand the dissemination of public health information, making content more accessible and encouraging greater public participation in initiatives conducted by health services. At the same time, specific methodologies for developing educational games have been proposed as tools capable of enhancing health education programs intended for different audiences (Vasconcellos & Araujo, 2011; Dias et al., 2014).

Despite the many potential benefits identified, the implementation of gamification in health services continues to face significant challenges. Issues related to the design of evidence-based interventions, adaptation to different sociocultural contexts, technological accessibility, professional training, and the evaluation of outcomes constitute limitations that must be considered to ensure the greater effectiveness of these strategies (Glass & Galati, 2025).

In this context, the use of gamification emerges as a promising alternative for strengthening initiatives developed within the SUS, particularly in Primary Health Care, where health promotion, disease prevention, community participation, and continuing education are fundamental pillars of care. In addition to supporting the shared construction of knowledge, this strategy helps bring professionals and users closer together, thereby strengthening the principles of comprehensiveness, equity, social participation, and social oversight established in Brazilian public policies (Brazil, 2023; Brazil, 2013).

The conceptual model of gamification applied to Public Health demonstrates that integrating game mechanics, motivation, active learning, social interaction, and behavioral change facilitates the development of more effective and participatory educational interventions. Understanding the components that structure this process is therefore essential to support its application at different levels of healthcare.

Recent experiences reinforce the effectiveness of this approach in different healthcare contexts. The development of educational games aimed at preventing burns among young Brazilians resulted in a significant improvement in participants' knowledge and a high level of acceptance of the strategy,

demonstrating the potential of gamification as a health education tool (Gonçalves et al., 2026; Wang et al., 2022).

Against this backdrop, there is a clear need to deepen knowledge of the contributions of gamification to Public Health, considering its potential to expand community engagement, improve health education processes, strengthen health promotion, and contribute to the effective implementation of the principles and guidelines of the Brazilian Unified Health System.

Accordingly, this study aims to analyze the contributions of gamification to Public Health, emphasizing its potential as an innovative strategy for health education, community engagement, health promotion, and the strengthening of initiatives implemented within the SUS.

METHODOLOGY

This study is characterized as an integrative literature review, a method that makes it possible to collect, evaluate, and critically synthesize the available scientific evidence on a given topic, thereby enabling a broad understanding of the knowledge produced. This approach facilitates the identification of scientific gaps, research trends, and relevant contributions to professional practice, constituting an important tool for supporting evidence-based decision-making in the field of Public Health.

The following guiding question was established as the central focus of the investigation: What are the contributions of gamification to health education, community engagement, health promotion, and the strengthening of initiatives developed within the Brazilian Unified Health System? The formulation of this question guided every stage of the study, from the development of the search strategy to the analysis and interpretation of the findings.

The studies were identified between July and August 2026 by searching PubMed, SciELO, and Latindex, as well as scientific repositories available through the Open Journal Systems (OJS) platform. These sources were selected because of their relevance to the dissemination of national and international

research in Public Health, Health Education, and Health Technologies, ensuring broader coverage in the retrieval of publications.

The search strategies were developed using the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH), combined with the Boolean operators AND and OR in accordance with the specific requirements of each database. The Portuguese descriptors used were “Gamificação,” “Educação em Saúde,” “Promoção da Saúde,” “Saúde Coletiva,” “Sistema Único de Saúde,” “Engajamento Comunitário,” and “Tecnologia Educacional.” The English terms used were “Gamification,” “Health Education,” “Health Promotion,” “Public Health,” “Community Engagement,” “Primary Health Care,” and “Unified Health System.”

Regarding the inclusion criteria, scientific articles published between 2021 and 2026, available in full text in Portuguese or English, were considered if they addressed the use of gamification, serious games, or strategies based on game elements applied to health education, health promotion, community participation, Primary Health Care, Public Health, or initiatives developed within the Brazilian Unified Health System. Original studies, literature reviews, and quantitative, qualitative, and mixed-methods studies related to the subject of the investigation were also included.

Conversely, duplicate publications, abstracts from scientific events, editorials, letters to the editor, dissertations, theses, book chapters, studies without full-text availability, articles published in languages other than Portuguese and English, and research focused exclusively on the technological development of games without a direct relationship to health education or health promotion were excluded.

During the selection stage, the publications retrieved from the databases were initially identified, after which duplicate records were removed. Titles and abstracts were then read to assess their thematic relevance. Studies considered potentially eligible underwent full-text review, and only those that fully met the previously established criteria were included in the review.

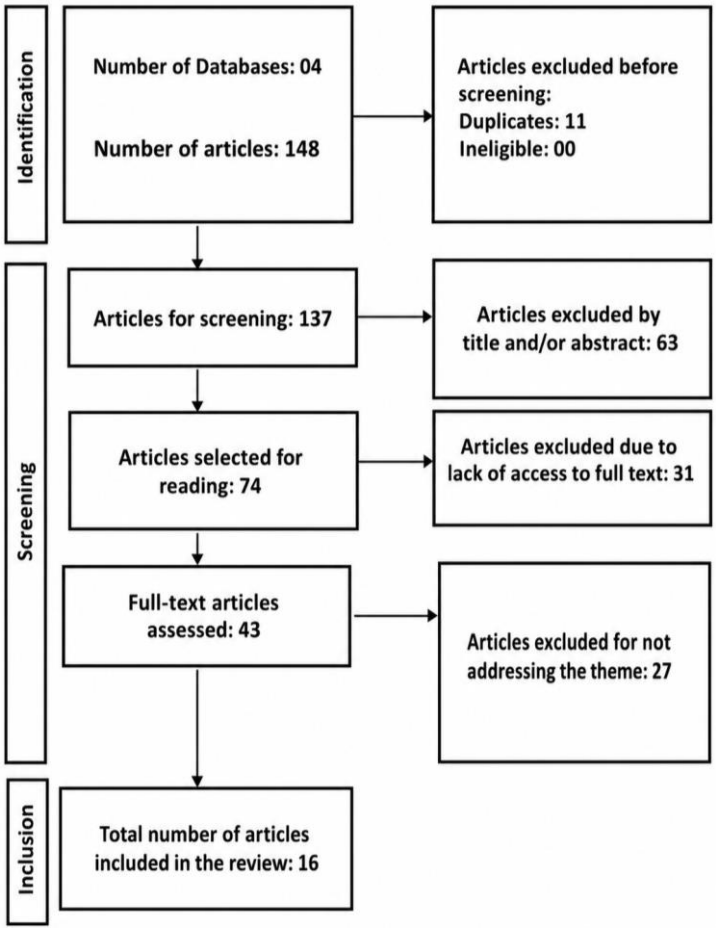
After the final sample had been determined, information was extracted using an instrument developed by the researchers that covered authorship, year of publication, country in which the study was

conducted, objective, methodological design, population investigated, type of gamified intervention, main findings, limitations, and contributions to health education, community engagement, health promotion, and the strengthening of initiatives developed within the SUS. The data were subsequently organized into synoptic tables and subjected to descriptive and interpretive analysis.

The sequence of methodological stages employed in this integrative review is summarized in Figure 1, which presents the process of identification, screening, eligibility assessment, and inclusion of the studies selected for the final research sample.

Figure 1

Flowchart of the stages of the integrative literature review.



Source: Authors (2026).

Because this study exclusively uses previously published scientific evidence available in publicly accessible databases, without any direct involvement of human participants or access to individual information, it does not require review by a Research Ethics Committee, as established by Resolutions No. 466/2012 and No. 510/2016 of the Brazilian National Health Council.

RESULTS AND DISCUSSION

The application of the search strategy in the selected databases, followed by the screening, eligibility assessment, and full-text review stages, resulted in the selection of 16 studies that met the inclusion criteria established for this integrative review. The publications analyzed, produced between 2021 and 2026, encompass different methodological approaches and demonstrate the use of gamification in various Public Health settings, including initiatives focused on health education, health promotion, strengthening community engagement, encouraging the adoption of healthy behaviors, and improving actions implemented within the Brazilian Unified Health System.

The characteristics of the selected studies, considering authorship, year of publication, objective, study focus, and main findings, are presented in Table 1.

Table 1

Characteristics of the studies included in the integrative review

Author/Year	Study objective	Study focus	Main findings
Souza, Rolim, and Longhi (2026)	To analyze the contributions of gamification to the humanization of care within the SUS.	Humanization of care.	The study showed that gamification promotes greater user participation in health initiatives, strengthens the relationship between professionals and the community, and increases adherence to educational practices. The authors emphasize that gamified strategies enhance the humanization of care by promoting communication, welcoming care, and shared responsibility among individuals in the care process.
Damaševičius, Maskeliūnas, and Blažauskas (2023)	To synthesize evidence on serious games and gamification in healthcare.	Evidence review.	The study demonstrated benefits for learning, treatment adherence, prevention, and rehabilitation, although

			it emphasized the need for more methodologically robust studies.
Yıldız, Yıldız, and Kayacik (2024)	To evaluate scientific output on gamification in health education.	Health education.	The study identified substantial growth in research related to gamification in recent years, demonstrating the international expansion of the topic. The authors observed a predominance of studies focusing on health education, pedagogical innovation, and the development of professional competencies, indicating the consolidation of gamification as an emerging educational strategy.
Santos *et al.* (2026)	To evaluate gamification in teaching the National Health Promotion Policy.	Health workforce education.	The study found greater student involvement during the learning process, facilitating an understanding of the principles of the National Health Promotion Policy. The use of game-based elements promoted meaningful learning, active participation, and the development of critical thinking regarding professional practice within the SUS.
Upadhyay, Bhatnagar, and Goel (2026)	To integrate gamification into traditional teaching in health leadership programs.	Professional training.	The study observed increased motivation, interaction among participants, knowledge retention, and the development of managerial competencies.
Timbo *et al.* (2025)	To evaluate board games for adolescent training and education.	Primary Health Care.	The games promoted active learning, strengthened the relationship with the healthcare team, and increased adolescent engagement in educational initiatives.
Santos *et al.* (2023)	To describe a review protocol on gamification in adolescent health education.	School health.	The protocol reinforces the potential of gamification to encourage healthy habits, student participation, and health promotion in the school environment.
Toun (2024)	To discuss gamification as a communication strategy.	Health communication.	The study showed that gamified elements strengthen interactions between users and institutions, increasing engagement and the effectiveness of communication strategies. The use of challenges, rewards, and continuous feedback proved relevant to stimulating active participation and facilitating health learning processes.
Mazéas *et al.* (2022)	To evaluate the effectiveness of gamification in promoting physical activity.	Health promotion.	The meta-analysis demonstrated that gamified interventions significantly increased physical activity levels, improving adherence to physical activities and the long-term maintenance

			of healthy behaviors. The authors emphasize that elements such as challenges, rewards, and continuous monitoring enhance participant engagement and motivation.
Tesi *et al.* (2023)	To investigate gamification as a primary prevention tool in public health.	Public health prevention.	The study identified the potential to encourage preventive behaviors, expand knowledge, and strengthen educational initiatives aimed at disease prevention. The approach proved promising for enhancing health education programs and strengthening preventive interventions in different community contexts.
Gkintoni *et al.* (2024)	To review the use of gamification to promote the physical and mental health of children and adolescents.	Child and adolescent health.	The study demonstrated improvements in well-being, physical activity, mental health, and young people's involvement in health promotion initiatives.
Cheng and Ebrahimi (2023)	To analyze gamification as a mental health promotion strategy.	Mental health.	The authors identified benefits related to engagement, stigma reduction, strengthened self-care, and expanded access to mental health interventions.
Nowbuth *et al.* (2023)	To review the use of gamification in education on antimicrobial resistance.	Health education.	The study demonstrated significant improvements in knowledge regarding the rational use of antimicrobials, greater awareness of bacterial resistance, and the strengthening of prevention-oriented educational initiatives. Gamification showed potential to make complex content more accessible and encourage meaningful learning among different audiences.
Bas-Sarmiento *et al.* (2025)	To evaluate gamified digital interventions for health promotion and disease prevention.	eHealth and health promotion.	Gamified digital interventions promote positive changes in health-related behaviors, encourage healthy habits, and increase participants' involvement in educational activities. The results also demonstrated high acceptability and the potential to expand the reach of preventive initiatives in school and community settings.
Naderizadeh *et al.* (2026)	To investigate the impact of gamification on changes in preventive behaviors.	Public health education.	The results demonstrated improved adherence to preventive practices, greater motivation, and the strengthening of Public Health education initiatives.
Matkovic (2026)	To review gamification-based engagement strategies in health education for smartphone users.	Mobile health technologies.	The study concluded that gamified applications increase participation, facilitate continuous learning, and strengthen health education and promotion interventions. They also stand out as accessible tools for

			strengthening health education, self-care, and health promotion programs across different age groups.

Source: Authors (2026).

The studies analyzed demonstrate that gamification has become established as an innovative strategy capable of strengthening different dimensions of Public Health, particularly those related to health education, community engagement, health promotion, and the improvement of initiatives developed within the Brazilian Unified Health System. Overall, the evidence indicates that the use of game elements promotes greater individual participation, increases motivation to learn, encourages behavioral change, and strengthens educational processes centered on users' active involvement.

Furthermore, the studies converge regarding the potential of gamification to bring professionals and communities closer together, making educational practices more engaging, participatory, and effective. In this context, the discussion of the findings was organized into two thematic areas.

GAMIFICATION AS A STRATEGY FOR HEALTH EDUCATION AND STRENGTHENING LEARNING

Health education is one of the pillars of health promotion and represents an important means of developing individual and community autonomy. In this context, the incorporation of gamification has significantly changed how educational content is developed and shared, fostering more participatory, dynamic, and user-centered learning processes. The studies analyzed converge in demonstrating that the use of game mechanics promotes greater participant involvement and enhances the effectiveness of educational initiatives.

In this regard, Yıldız, Yıldız, and Kayacik (2024) demonstrate that scientific research on gamification applied to health education has grown substantially in recent years, reflecting recognition of this methodology as an innovative strategy for teaching and training healthcare professionals. The authors emphasize that the increase in publications accompanies the need to develop methodologies capable of

responding to technological transformations and the emerging educational demands within health systems.

Supporting this perspective, Damaševičius, Maskeliūnas, and Blažauskas (2023) state that serious games and gamified strategies produce consistent improvements in knowledge acquisition, skill development, and participants' adherence to educational processes. According to the authors, challenge- and reward-based learning promotes greater knowledge retention than traditional teaching methods, making the educational process more meaningful and stimulating.

This understanding is also reinforced by Matkovic (2026), who emphasizes that the widespread use of mobile devices represents an important opportunity to expand the reach of health education initiatives. The author argues that gamified applications enable continuous learning, facilitate access to information, and promote active user participation, thereby supporting the development of self-care and shared responsibility for one's own health.

Similarly, Upadhyay, Bhatnagar, and Goel (2026) demonstrate that integrating gamification into traditional teaching produces substantial improvements in participant performance, increasing motivation, interest in the content, and interaction during educational activities. According to the authors, elements such as progressive challenges, immediate feedback, and rewards help consolidate knowledge and encourage competencies related to leadership, communication, and problem-solving.

The findings presented by Santos et al. (2026) also reinforce the effectiveness of this approach by demonstrating that the use of gamification in teaching the National Health Promotion Policy led to a better understanding of the principles that guide initiatives developed within the SUS. The authors observed that learning became more meaningful when students actively participated in constructing knowledge, demonstrating that participatory methodologies strengthen the critical education of future professionals.

Similarly, Timbo et al. (2025) found that board games used in Primary Health Care supported both professional training and adolescent participation in educational initiatives. The authors emphasize that

the interaction facilitated by the games strengthened the relationship between the healthcare team and the community, making the learning process more accessible, collaborative, and responsive to local needs.

In the school environment, Santos et al. (2023) emphasize that gamification has considerable potential to promote health-related knowledge among adolescents, encouraging the adoption of healthy habits from the early stages of life. The authors note that gamified interventions stimulate greater student participation, increase interest in the content, and strengthen the development of autonomy in making health-related choices.

From another perspective, Nowbuth et al. (2023) demonstrate that gamification also produces relevant results in education concerning the rational use of antimicrobials. The authors observed a significant increase in participants' knowledge of antimicrobial resistance, demonstrating that game-based resources facilitate an understanding of complex content and strengthen educational initiatives aimed at disease prevention.

Complementing this evidence, Toun (2024) emphasizes that communication is essential to the success of gamified strategies. According to the author, interactive resources help bring institutions and users closer together, increasing engagement and strengthening the circulation of health information. This perspective aligns with the other studies in indicating that more participatory educational processes tend to produce better learning and behavioral outcomes.

Overall, there is broad agreement among the authors regarding the potential of gamification to enhance health education. Regardless of the target audience or setting in which it is applied, the evidence indicates that gamified methodologies promote greater motivation, meaningful learning, the development of critical thinking, and strengthened participant agency. Gamification has therefore become established as an important pedagogical resource for increasing the effectiveness of educational initiatives developed in Public Health, contributing to education that is more participatory, critical, and aligned with health promotion principles.

GAMIFICATION, COMMUNITY ENGAGEMENT, AND THE STRENGTHENING OF HEALTH PROMOTION INITIATIVES WITHIN THE BRAZILIAN UNIFIED HEALTH SYSTEM

Health promotion requires the development of strategies capable of stimulating the population's active participation in identifying problems, making decisions, and adopting practices conducive to improving living conditions. From this perspective, gamification has gained prominence by transforming users into active participants in the educational process and promoting greater interaction among professionals, health services, and communities. The studies analyzed demonstrate consensus regarding the potential of this approach to expand community engagement, strengthen preventive initiatives, and enhance health promotion efforts in different care settings.

In discussing the incorporation of gamification within the Brazilian Unified Health System, Souza, Rolim, and Longhi (2026) emphasize that this strategy extends beyond its exclusively technological dimension and constitutes a tool capable of strengthening the humanization of care. According to the authors, the use of game-based elements promotes more horizontal relationships between professionals and users, enhances supportive reception, and encourages individuals to share responsibility for their own healthcare. This perspective reinforces the principle that health innovation should be associated with strengthening the principles of the SUS, particularly social participation, comprehensiveness, and person-centered care.

This understanding is supported by the meta-review conducted by Damaševičius, Maskeliūnas, and Blažauskas (2023), whose results demonstrate that gamification produces positive effects not only on learning but also on adherence to health interventions, self-care, and the maintenance of healthy behaviors. The authors emphasize that active user participation increases the effectiveness of interventions, making health promotion initiatives more sustainable and capable of producing lasting behavioral changes.

Similarly, Mazéas et al. (2022) found that gamified interventions focused on physical activity significantly increased participant adherence and improved physical activity levels. The authors observed

that mechanisms such as progressive challenges, symbolic rewards, individualized goals, and continuous monitoring encouraged greater user commitment, demonstrating that motivation is one of the principal factors underlying the success of gamified health promotion strategies.

The results presented by Bas-Sarmiento et al. (2025) support this interpretation by demonstrating that gamified digital interventions promote consistent changes in the lifestyle habits of children and adolescents. According to the authors, combining technological resources with game elements enhances user participation, increases interest in educational initiatives, and strengthens programs aimed at disease prevention and the promotion of quality of life, particularly in school and community settings.

From another perspective, Gkintoni et al. (2024) demonstrate that children and adolescents are highly receptive to gamified methodologies, facilitating the simultaneous development of physical health, mental health, and socioemotional competencies. The authors emphasize that a game-based environment helps reduce barriers to learning, increase interest in the proposed activities, and encourage healthy behaviors that can be sustained throughout life, thereby strengthening preventive initiatives from the earliest stages of human development.

Mental health promotion also emerges as an important field for the application of gamification. In this regard, Cheng and Ebrahimi (2023) state that gamified resources expand access to mental health interventions, promoting participant engagement and reducing stigma-related barriers. According to the authors, the use of interactive strategies strengthens self-care, encourages adherence to therapeutic practices, and contributes to the development of emotional skills that are fundamental to maintaining psychological well-being.

In the field of disease prevention, Tesi et al. (2023) demonstrate that gamification is a relevant tool for enhancing primary prevention programs in Public Health. The authors observed that interventions based on challenges, rewards, and collaborative participation increase public awareness of risk factors, facilitate behavioral change, and strengthen educational campaigns aimed at disease prevention.

Similar results were identified by Naderizadeh et al. (2026), who demonstrated the positive impact of gamification on the adoption of preventive behaviors in public health education programs. According to the authors, gamified strategies increase individuals' motivation to incorporate preventive practices into their daily lives, promote greater participation in educational activities, and contribute to the consolidation of healthier lifestyles. These findings demonstrate that strengthening health promotion depends primarily on the population's active participation in the proposed interventions.

In addition to the benefits observed among health service users, the literature also demonstrates positive effects on professional education and practice. Yıldız, Yıldız, and Kayacik (2024) emphasize that the growth of research on gamification accompanies the need to develop innovative practices capable of integrating education, care, and health promotion. Likewise, Upadhyay, Bhatnagar, and Goel (2026) note that gamified methodologies facilitate the development of competencies related to leadership, teamwork, and decision-making, which are fundamental to improving professional practice within the context of Public Health.

The studies conducted by Santos et al. (2026) and Timbo et al. (2025) complement this discussion by demonstrating that gamified strategies bring professionals, students, and communities closer together. While the first study demonstrates significant gains in learning about public health promotion policies, the second reveals that educational games strengthen the relationship between adolescents and Primary Health Care teams, increasing participation in initiatives conducted by the services. Consistently, Santos et al. (2023) reinforce the conclusion that adopting gamification in schools contributes to consolidating healthy habits from adolescence onward, thereby expanding the reach of health promotion strategies.

Another relevant aspect concerns the use of gamification as a health communication tool. Toun (2024) states that gamified elements make communication processes more engaging and encourage greater interaction between institutions and the population. This perspective aligns with the findings of Nowbuth et al. (2023), who demonstrated a substantial improvement in knowledge about antimicrobial

resistance following gamified educational interventions, indicating that game-based resources facilitate the understanding of complex content and strengthen health education campaigns.

Matkovic (2026), in turn, emphasizes that the widespread use of smartphones significantly expands the potential reach of gamified interventions, allowing educational initiatives to move beyond the physical boundaries of health services. According to the author, mobile platforms enable continuous monitoring, real-time feedback, and greater user autonomy, characteristics that help maintain engagement and consolidate healthy behaviors.

In summary, there is a high degree of agreement among all the studies analyzed regarding the potential of gamification to strengthen health promotion, expand community engagement, and enhance initiatives developed within the Brazilian Unified Health System. The evidence indicates that this strategy promotes greater social participation, strengthens the relationship between users and professionals, encourages sustainable behavioral changes, and increases the effectiveness of educational initiatives.

Gamification therefore constitutes an important methodological innovation for Public Health, contributing to the strengthening of health promotion and disease prevention practices and to the consolidation of the principles underpinning the SUS.

CONCLUSION

This integrative review made it possible to analyze the contributions of gamification to Public Health, demonstrating its potential as an innovative strategy for health education, community engagement, health promotion, and the strengthening of initiatives developed within the Brazilian Unified Health System. Based on the synthesis of scientific evidence published between 2021 and 2026, it was found that incorporating game elements facilitates educational processes that are more dynamic, participatory, and centered on users' needs, increasing the effectiveness of interventions in different care settings.

Regarding the guiding question of this study, gamification was found to contribute significantly to strengthening health education, expanding community engagement, promoting healthy behaviors, and improving initiatives developed within the SUS. The evidence demonstrated that gamified strategies promote greater motivation, active participation, knowledge retention, and the development of individual autonomy, all of which are essential to consolidating health promotion practices grounded in shared responsibility, social participation, and the collective construction of care.

The results also demonstrated that gamification has broad applicability in different Public Health settings, including Primary Health Care, schools, professional education, mental health promotion, disease prevention, encouragement of physical activity, rational antimicrobial use, and education intended for children, adolescents, and other population groups. In all these contexts, the studies agreed on this strategy's capacity to strengthen educational processes, stimulate behavioral changes, and bring users closer to health services, facilitating interventions that are more humanized and aligned with the principles of the Brazilian Unified Health System.

Another relevant aspect identified concerns the strengthening of user participation in health initiatives. By transforming individuals into active agents in the learning process, gamification strengthens the relationship between professionals and communities, improves health communication, and encourages the development of self-care. Furthermore, the use of digital technologies, mobile applications, serious games, and other interactive tools expands the reach of educational initiatives, helping make health promotion strategies more accessible, engaging, and effective across different sociocultural contexts.

Despite the promising results, the literature analyzed indicates the need to expand scientific research on the long-term effectiveness of gamified interventions, particularly in the context of Public Health and Brazilian public policies. It is therefore recommended that experimental research, multicenter studies, and longitudinal evaluations be conducted to investigate the effects of gamification on health

promotion indicators, adherence to interventions, behavioral change, and quality of care, thereby strengthening the evidence needed to support its incorporation into health services.

It is therefore concluded that gamification represents an innovative and effective strategy compatible with the principles of health promotion and the Brazilian Unified Health System, contributing to the enhancement of educational practices, the strengthening of community engagement, and the development of care models that are more participatory, humanized, and centered on the population's needs. In light of the evidence presented, incorporating gamification into Public Health initiatives constitutes an important alternative for enhancing health education, expanding social participation, and strengthening the effectiveness of public policies aimed at improving the population's health conditions.

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A PERSPECTIVE ON CHILD VULNERABILITY: POST-TRAUMATIC STRESS DISORDER IN CHILDREN WHO ARE VICTIMS OF SEXUAL ABUSE

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Abstract

Child sexual abuse constitutes a serious violation of human rights, with profound repercussions for children's physical, emotional, social, and cognitive development. Among the various consequences arising from this form of violence, Post-Traumatic Stress Disorder (PTSD) stands out as a psychopathology frequently diagnosed in victims who have experienced traumatic events, particularly in situations involving abuse. Within the school environment, where children spend a substantial portion of their time, PTSD manifestations may become evident through learning difficulties, social withdrawal, behavioral changes, and declining academic performance. This study aims to analyze the effects of child sexual abuse on the psychological development of school-aged children, with particular emphasis on the manifestation of PTSD and its implications for everyday school life. The methodology employed consisted of a bibliographic review based on scientific articles, specialized books, legislation, and institutional documents addressing child sexual abuse, PTSD symptoms in children, and the role of schools within the child protection network. Analysis of the selected sources demonstrated that PTSD, when not diagnosed and treated at an early stage, can seriously impair children's subjectivity, hindering their social integration and compromising their learning process.

Keywords: Child Sexual Abuse, Consequences, Psychology, Trauma.

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INTRODUCTION

Childhood is a fundamental stage in human physical, emotional, social, and cognitive development. However, when this period is marked by traumatic experiences, such as sexual abuse, this crucial stage of life may be significantly compromised. Sexual violence against children violates fundamental rights and triggers a series of psychological consequences, among which Post-Traumatic Stress Disorder (PTSD) stands out as one of the most frequent and devastating.

PTSD is characterized by symptoms such as persistent re-experiencing of the traumatic event, avoidance of situations associated with the trauma, negative alterations in mood, and heightened arousal, all of which compromise children's well-being and daily functioning. When this psychopathological condition is not properly identified and treated, it may produce long-lasting effects on children's academic and social lives, impairing learning, the development of interpersonal relationships, and self-esteem. Children with PTSD may exhibit dysfunctional behaviors, social withdrawal, aggression, or declining academic performance, requiring special attention from educational institutions.

In this context, schools represent a strategic setting for identifying signs of psychological distress and ensuring the appropriate referral of victims to the child protection network. As the second primary environment of children's socialization, schools are well positioned to detect behavioral and emotional changes that may indicate situations of abuse. Nevertheless, omission, insufficient training, or lack of awareness among educators continue to constitute barriers to the effective protection of children who are victims of sexual violence.

Accordingly, this study aims to analyze the relationship between child sexual abuse and the development of Post-Traumatic Stress Disorder in school-aged children, emphasizing its impact on school life and the role of education professionals in identifying and referring suspected cases. The choice of this topic is justified by the need to expand interdisciplinary discussion surrounding this phenomenon, raising awareness among educators, healthcare professionals, and legal practitioners regarding the importance of coordinated action in preventing and addressing sexual violence against children.

To achieve this objective, a bibliographic research methodology will be employed, drawing upon scientific studies and publications concerning child sexual abuse, PTSD, and the role of schools in protecting vulnerable children. The analysis seeks to contribute theoretical reflections capable of supporting more sensitive educational practices committed to children's rights and the proper care of victims, thereby promoting greater attention to the mental health and dignity of children exposed to situations of violence.

THEORETICAL FRAMEWORK

PHYSICAL AND EMOTIONAL CONSEQUENCES OF CHILD SEXUAL ABUSE

Sexual abuse began to be recognized as a political issue during the 1960s amid the critiques advanced by the second wave of the feminist movement. This movement challenged the patriarchal model of the family, which, according to its analysis, legitimized violence perpetrated by men against women and by adults against children. During the 1980s and 1990s, this critique was incorporated into emerging social movements dedicated to defending the rights of children and adolescents, which came to address child and adolescent sexual abuse as a distinct political issue requiring specific attention and targeted intervention (Lowenkron, 2010).

Sexual abuse is characterized by the imposition of erotic or sexual practices upon children or adolescents through physical violence, intimidation, or manipulation of their will. These practices may range from behaviors that do not involve direct physical contact—such as voyeurism, exhibitionism, and the production of sexual images—to acts involving sexual contact, with or without penetration. It is a phenomenon with its own particular dynamics, often beginning in subtle ways. As the perpetrator gains the victim's trust, sexually motivated behaviors gradually become increasingly intimate and invasive (Santos & Dell'Aglio, 2010).

In this regard, it is important to note that sexual abuse is not limited to sexual intercourse itself but also includes behaviors such as inappropriate touching, manipulation of the child's genitals, the use of

obscene language, the unauthorized exposure of the child's image, exhibition of the perpetrator's genitalia, as well as oral, anal, or vaginal sexual acts (Amorim et al., 2021).

According to Lowenkron (2010), the definition of sexual abuse centers on the asymmetry of power between the parties involved—whether due to differences in age, level of experience, social status, or other forms of inequality—as well as on the psychological harm inflicted upon the victim. Abuse may occur through physical force, promises, threats, coercion, emotional manipulation, deception, or other forms of pressure. A fundamental aspect in characterizing sexual abuse is the invalidity of a child's sexual consent, since under no circumstances can a child be regarded as an autonomous individual capable of consenting to a sexual relationship with an adult and, in certain situations, not even with an older child or adolescent. In such contexts, the child is treated solely as an object for another person's sexual gratification.

The manifestation of sexual violence encompasses multiple dimensions, including the exercise of power within the family environment, social and cultural conditioning, and the very logic of abuse, characterized by domination and the demand for obedience, whereby the stronger individual subjects the weaker to their will (Faleiros, 2001).

Sexual violence has a profound impact on a child's life, as the child is subjected to acts against their will, resulting in physical pain, emotional distress, and intense internal confusion. In many cases, the child feels powerless in the face of the situation, uncertain of how to respond, and may even come to believe that they somehow consented to what occurred because of their inability to understand and confront the violence they have experienced (Brilhante, 2022).

Children exposed to psychological violence frequently experience long-term consequences, including growth disorders, impaired motor coordination, learning difficulties, and emotional and social maladjustment, which may manifest through aggressive or passive behaviors, hyperactivity, and alterations in sphincter control. Within their daily environment, children who are immersed in settings characterized by this type of violence—particularly when it is recurrent—tend to normalize such

experiences, perceiving them as ordinary. As an adaptive response, they begin to reproduce these behaviors automatically, which may ultimately contribute to the development of individuals predisposed to engaging in violent behavior (Brilhante, 2022).

Children who have been victims of sexual abuse may develop a broad range of psychopathological disorders, including Post-Traumatic Stress Disorder (PTSD), dissociative disorders, depressive disorders, Attention-Deficit/Hyperactivity Disorder (ADHD), eating disorders, psychosomatic symptoms, delinquent behavior, and substance abuse (Borges & Dell'Aglio, 2008).

Post-Traumatic Stress Disorder (PTSD) is the psychopathology most frequently associated with sexual abuse. It is an anxiety disorder that develops following exposure to a traumatic event. Its occurrence is linked to the victim's subjective appraisal of the experience, characterized by intense feelings of fear and terror, and is marked by symptoms such as intrusive re-experiencing of the trauma, avoidance behaviors, and heightened physiological arousal, all of which significantly impair the individual's daily functioning over time (Habigzang et al., 2010).

According to Inoue and Ristum (2008), manifestations of Post-Traumatic Stress Disorder during childhood and adolescence tend to be more severe and debilitating because the affective and cognitive functions of the central nervous system have not yet reached full development or regulation.

CONSEQUENCES OF CHILD SEXUAL ABUSE ON THE VICTIM'S ACADEMIC PERFORMANCE AND THE ROLE OF THE SCHOOL

Child sexual abuse is a highly complex phenomenon that requires a multidisciplinary approach. Throughout this process, several issues emerge as priorities, demanding coordinated action and collaboration among different fields of knowledge and sectors of practice (Fuks, 2006).

According to Amorim et al. (2021), child sexual abuse often occurs without the child being fully aware that they are the victim of violence. As children grow older and begin to understand the seriousness of the situation, perpetrators frequently resort to strategies such as coercive agreements, blackmail, and

threats to silence them and prevent disclosure. Consequently, many children remain silent for extended periods, overwhelmed by fear and shame and effectively held captive by their abusers. The consequences of this form of violence can be severe, including damage to both physical and mental health, profound psychological trauma, long-term sequelae, and limitations that may be either temporary or permanent.

The authors further state that when sexual abuse is not identified and addressed at an early stage, it can seriously undermine a child's self-esteem, generate deep-seated fears, and lead to numerous other consequences that often extend into adulthood. Among its potential effects are impairments in overall development, particularly with regard to personality formation and the functioning of various cognitive processes (Amorim et al., 2021).

Similarly, Pereira and Williams (2008) argue that children who experience violence within the family environment exhibit impairments in their development. The adverse effects of intrafamilial violence are reflected in cognitive and emotional functioning, as well as in academic and social domains. Declining academic performance among child victims has been consistently documented as a consequence of abuse in both international research and studies conducted in Brazil.

The effects of child sexual abuse on cognitive abilities may vary from one individual to another, depending on the quality of each person's psychological resources, which are shaped by social interaction, personal experiences, emotional relationships, identification processes, and family dynamics. Nevertheless, there is broad consensus in the literature that sexual abuse during childhood has a significant impact, disrupting the child's typical developmental trajectory. Frequently observed cognitive and intellectual impairments include declining academic performance, attention and concentration difficulties, impairments in language and learning, as well as reduced motivation toward both school activities and life in general (Amorim et al., 2021).

Addressing violence therefore requires the effective integration of multiple sectors, including healthcare, public safety, the justice system, and education, in addition to the active participation of organized civil society. Besides parents or legal guardians, educators are likely the individuals who spend

the greatest amount of time with children and adolescents, given the number of hours they attend school within the Brazilian educational system. However, current practices may result in the loss of this crucial opportunity to identify and intervene in situations of violence affecting this population (Inoue & Ristum, 2008).

Within this context, schools must commit themselves to promoting and safeguarding the rights of children and adolescents, while educators' engagement reinforces efforts to protect these rights. Teachers play an essential role in identifying and reporting cases of sexual violence, particularly during the early years of elementary education, when they interact with students on a daily basis for approximately four hours each day (Inoue & Ristum, 2008).

During childhood, one of the clearest indicators of exposure to stressful experiences is a change in the child's behavior, particularly when significant alterations occur in the environment in which they live and interact. From this perspective, psychology and education work in an integrated manner to recognize these behavioral changes in order to detect possible traumatic experiences. Since children spend a substantial portion of their time at school, this setting becomes essential for the early identification of signs of emotional distress and for timely intervention (Brilhante, 2022).

REFRAMING THROUGH PSYCHOLOGY

According to research, various stressful experiences during childhood can be characterized as traumatic. These traumas are not confined to the moment in which they occur but tend to have lasting effects, particularly in adulthood, where they are associated with psychological distress, mental disorders, and mood disturbances. In this context, psychological support plays a fundamental role in shaping how children interpret such stressors, contributing to the development of a healthier understanding of these experiences. Child psychology, in turn, helps children recognize and manage the feelings and emotions associated with these events, fostering more adaptive coping strategies (Brilhante, 2022).

Trauma is characterized by an excessive influx of stimuli that exceeds the individual's capacity for

tolerance, compromising their ability to regulate and psychologically process these experiences. Such situations involve overwhelming levels of stimulation that the child is unable to discharge, making it necessary to defend against them or mentally integrate them in order to avoid a psychological rupture that would result in significant mental disorganization. The consequence of this intense effort is the creation of a kind of psychological capsule that immobilizes these elements, whose quantity and intensity would otherwise be devastating to the individual's psychic structure (Fuks, 2006).

Trauma originates from potentially traumatic experiences that have not been adequately processed at the psychological level by those who have experienced them. Trauma may manifest in various ways, depending on factors such as the frequency of exposure to the event, its duration, the context in which it occurred, the individual's ability to assign meaning to the experience, and, above all, age—a factor that encompasses and intensifies all the others. With regard to psychological development, childhood represents a particularly critical period, especially up to approximately seven years of age, when personality is still being formed. Even after this stage, mental and emotional maturation continues to develop gradually, requiring considerable time before individuals are able to assign immediate meaning to their lived experiences (Brilhante, 2022).

For human development to occur fully, both developmental processes—the mental and the emotional—must be properly consolidated, which is not yet the case during childhood. Consequently, children rely on their parents or caregivers as references for interpreting the events they experience. However, in many situations, particularly when exposed to risky or potentially traumatic contexts, children depend solely on the very individuals involved in those events to make sense of their experiences. This may lead to the distorted internalization of adverse situations, causing children to perceive harmful or abusive experiences as "normal" or acceptable because of the influence and manipulation exerted by the responsible adults (Brilhante, 2022).

As a public health issue, sexual abuse must be understood, studied, and discussed within the health sciences. However, its scope extends far beyond this field. Education, the justice system, and social

assistance are also directly involved in intervention efforts, making the phenomenon inherently interdisciplinary (Pelisoli & Dell'Aglio, 2014).

Working in collaboration with the child protection network, psychologists play a fundamental role in welcoming, intervening, reporting, and protecting children who are victims of abuse. Through therapeutic intervention, psychologists seek to help children reframe the experiences they have endured, facilitating the processing of trauma and enabling them to understand that, although abuse constitutes a deeply painful chapter in their lives, it is one that can ultimately be overcome (Silva, 2018).

METHODOLOGY

This study is characterized as a qualitative bibliographic research project whose objective is to gather, analyze, and discuss knowledge produced regarding Post-Traumatic Stress Disorder (PTSD) in children who are victims of sexual abuse, particularly within the school context. The bibliographic approach enables a critical understanding of the topic through the collection and analysis of previously published materials, thereby providing a solid theoretical and scientific foundation for the proposed discussion.

The selection of materials was carried out through searches in widely recognized academic databases, including SciELO (Scientific Electronic Library Online), the Virtual Health Library (BVS), Google Scholar, the CAPES Journal Portal, and the UNESP Journal Portal. The following descriptors were used: “child sexual abuse,” “post-traumatic stress disorder,” “sexual abuse in childhood,” “child vulnerability,” and “educational impacts of sexual abuse,” among others. Combinations of these terms were refined through the use of Boolean operators such as AND and OR.

The inclusion criteria comprised articles published between 2005 and 2025, available in Portuguese, and specifically addressing the impacts of child sexual abuse on children's mental health, with emphasis on the development of PTSD and its repercussions on academic performance and social

relationships. Exclusion criteria included duplicate materials, opinion articles lacking an empirical basis, and studies that did not focus on childhood or that addressed the topic only tangentially.

Following the initial screening process, the texts that contributed most significantly to the objectives of the research were selected. The review process was conducted in two stages: an exploratory reading focused on abstracts and keywords, followed by a selective and critical reading aimed at an in-depth analysis of the content of the selected texts. The data obtained were organized into thematic categories, facilitating the systematization of the main findings regarding the psychosocial effects of child sexual abuse, with particular emphasis on the manifestation of PTSD and the role of schools in identifying and supporting victims.

This methodology made it possible to establish a solid theoretical foundation that supported a critical analysis of the phenomenon of sexual violence against children from the perspective of psychological and educational vulnerability. Based on this review, it was possible to construct an overview of the emotional consequences of abuse and to highlight the importance of interdisciplinary action in addressing this issue.

RESULTS AND DISCUSSION

This section presents the findings obtained from the analysis of the scientific articles selected through the bibliographic review and discusses the principal results in light of the theoretical framework underpinning this study. A total of six (6) articles met the methodological inclusion criteria and are presented in Table 1, organized according to author(s), year, title, and objective.

Table 1

Selected Articles

Author(s)/Year	Title	Objective
Rover et al. (2020)	*Violência contra a criança: indicadores clínicos na odontologia* [Violence Against Children: Clinical Indicators in Dentistry]	To report the orofacial manifestations of different types of child maltreatment and the role of dentists in assessing these conditions.
Brilhante (2022)	*A atuação da psicologia infantil na ressignificação de traumas* [The Role of Child Psychology in the Reframing of Trauma]	To understand which stressful situations are most likely to intensify trauma and how psychologists can intervene preventively to prevent these experiences from becoming lasting trauma in adulthood.
Macari et al. (2024)	*Influência do trauma na infância sobre a saúde mental* [The Influence of Childhood Trauma on Mental Health]	To analyze and synthesize the available information on the influence of childhood trauma on mental health, focusing on the Brazilian context and public health policies related to the topic.
Inoue e Ristum (2008)	*Violência sexual: caracterização e análise de casos revelados na escola* [Sexual Violence: Characterization and Analysis of Cases Disclosed at School]	To analyze cases of sexual violence identified or disclosed within the educational context, describing their forms, incidence, the profiles of victims and perpetrators, those responsible for identifying the cases, and the circumstances surrounding their disclosure.
Fuks (2006)	*Consequências do abuso sexual infantil* [Consequences of Child Sexual Abuse]	To analyze the manifestations of child sexual abuse.
Amorim et al. (2021)	*Desempenho intelectual e crenças disfuncionais em crianças vítimas de abuso sexual* [Intellectual Performance and Dysfunctional Beliefs in Children Who Are Victims of Sexual Abuse]	To assess the intelligence of a group of children who experienced sexual abuse and examine its relationship with dysfunctional beliefs.

Source: Prepared by the author.

The analysis of the selected studies made it possible to identify a wide range of emotional, cognitive, and behavioral consequences resulting from child sexual abuse. The findings also demonstrated that these impacts are multidimensional, affecting children's academic performance, self-esteem, capacity for social interaction, and overall development.

In their literature review, Rover et al. (2020) observed that, in addition to physical signs, children who have experienced sexual abuse may exhibit a variety of psychological disorders, including fear, anger, anxiety, emotional distress, depression, and social isolation. Behaviors such as compulsive lying, distrust of adults, frequent crying without an apparent reason, reluctance to return home, and declining

academic performance are also important indicators. Other possible signs include fecal retention, difficulties related to sexuality, excessive masturbation, and sexualized behaviors. Furthermore, poor oral and personal hygiene may indicate neglect or emotional suffering.

The abuse itself may cause children to blame themselves for what occurred and to perceive themselves as negatively different from other children, leading to feelings of inferiority and inadequacy. These children frequently exhibit symptoms of anxiety and are at greater risk of developing depressive disorders. In addition, they demonstrate a high prevalence of psychiatric disorders, which hinders their social adjustment and results in psychological responses that differ significantly from those observed in other children (Almeida et al., 2021).

According to Fuks (2006), discussing the effects of abuse—whether immediate or long-term—necessarily involves addressing the risk of profound disruption in the child's processes of subject formation. Without the support of others, victims encounter considerable difficulty in symbolizing the trauma they have experienced. Consequently, the traumatic experience tends to persist in its psychological effects, hindering the reconstruction of the self and compromising personal identity. It is essential to recognize that child sexual abuse constitutes a tragic and concrete rupture in a child's life and that, for a variety of reasons, children often find it extremely difficult to express what they have experienced. In this regard, one of the principal challenges faced by professionals, as in other highly complex situations, is to create conditions that enable the traumatic experience to be symbolized and, ultimately, psychologically processed.

According to Amorim et al. (2021), children who are victims of sexual abuse and exhibit dysfunctional characteristics tend to develop a negative perception of themselves and of the world around them, expressing distrust in both their own abilities and in other people. These children frequently struggle to trust others, experience profound feelings of shame, and may develop a strong sense of hopelessness and a diminished desire to live. Consequently, suicide has become one of the leading causes of death among adolescents who have experienced such abuse.

Brilhante (2022) examines the role of child psychology in the reframing of trauma, highlighting how psychological intervention contributes to addressing the traumatic consequences of child sexual abuse. According to the author, the identification of possible cases of violence requires attention to physical indicators, such as unexplained injuries or bruises, as well as signs including inappropriate clothing for weather conditions, irritability, and aggressive behavior toward others. In cases of sexual violence, however, manifestations tend to be more emotional than physical. Children may exhibit social withdrawal, excessive embarrassment in ordinary situations, frequent crying, avoidance of physical contact with adults, and intense fear.

Macari et al. (2024), through a literature review, found that a considerable number of adults who seek psychological treatment for current psychological difficulties are often dealing, directly or indirectly, with unresolved childhood trauma. This finding underscores the importance of investigating early adverse experiences. The studies reviewed emphasize the relationship between childhood trauma and mental disorders in adulthood, highlighting the profound and long-lasting influence of experiences during early childhood.

Furthermore, the authors concluded that among the mental disorders most commonly associated with traumatic childhood experiences are Generalized Anxiety Disorder, Major Depressive Disorder, and Binge Eating Disorder, all of which exhibit high prevalence rates. These findings reinforce the importance of carefully considering children's lived experiences, since accumulated emotional burdens—whether consciously recognized or not—may contribute to the development of these disorders later in life (Macari et al., 2024).

Inoue and Ristum (2008) found that the family is the child's primary environment for development and socialization, with the school representing the second most significant setting in this process. When the family itself is responsible for perpetrating violence against the child or adolescent, or when it fails in its duties of care, guidance, and protection, the school often becomes the only institution capable of safeguarding the well-being of its students. This does not imply that schools should assume

responsibilities that properly belong to families; rather, schools should work collaboratively by helping families recognize and fulfill their responsibilities. Possible strategies include promoting citizenship education, providing information and guidance to caregivers, and, whenever necessary, reporting cases of violence to the appropriate authorities.

The authors conducted their study using records from the User Care Protocol of the Viver Program, located in Salvador, Bahia, which contained information provided by victims or their legal representatives. Between December 21, 2001, and August 31, 2004, a total of 2,522 service records were analyzed. Of these, only 22 cases of violence were identified and referred by educators, meaning that, following disclosure, the victims received medical, legal, social, and psychological assistance. This finding highlights an alarming problem: either educators are unaware of the rights of the children and adolescents under their responsibility or, despite being aware of those rights, they choose to remain silent when confronted with suspected or confirmed cases of sexual violence, thereby failing to fulfill their legal and ethical duty to report and protect victims (Inoue & Ristum, 2008).

In light of these findings, the results underscore the urgent need to strengthen child protection networks through increased investment in public policies, professional training, and expanded access to mental health services. When left untreated, trauma can severely compromise children's psychological and social development, perpetuating a cycle of suffering and exclusion. Accordingly, addressing child sexual abuse and its consequences must be understood as a collective responsibility that extends across the fields of healthcare, education, social assistance, and the justice system.

CONCLUSION

The present study sought to examine the vulnerability of children who are victims of sexual abuse and the psychological consequences resulting from this form of violence, with particular emphasis on the development of Post-Traumatic Stress Disorder (PTSD). Based on the analysis of scientific literature, it was found that PTSD is one of the principal psychopathological manifestations among victims,

significantly affecting their ability to process and symbolize traumatic experiences, as well as impairing their cognitive and emotional development and their social and academic functioning.

The evidence reviewed demonstrates that child sexual abuse disrupts the child's psychological structure, creating obstacles to the processes of subject formation and frequently resulting in severe symptoms such as anxiety, depression, dissociation, suicidal behavior, and learning difficulties. These findings underscore the importance of coordinated action among child protection networks—including the healthcare, education, justice, and social assistance sectors—to ensure appropriate support for victims and to develop strategies that promote active listening, comprehensive care, and the reframing of traumatic experiences.

Finally, it is important to emphasize that addressing child sexual abuse requires not only the strengthening of public policies but also the continuous training and awareness of professionals who work with children. Active listening, trauma-informed care, and therapeutic intervention are essential to enable children to overcome trauma and resume healthy development. Combating sexual violence against children must be understood as a continuous and collective responsibility, grounded in the protection of human rights and the promotion of children's dignity.

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ACUTE RESPIRATORY INFECTIONS IN CHILDREN: CHALLENGES IN PREVENTION, DIAGNOSIS, AND CARE IN PRIMARY HEALTH CARE

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Abstract

Acute respiratory infections (ARIs) are among the leading causes of childhood morbidity and mortality worldwide, particularly among children under five years of age, and constitute a major challenge for Primary Health Care (PHC) services. This chapter aimed to discuss the principal challenges related to the prevention, early diagnosis, and comprehensive care of acute respiratory infections in childhood, emphasizing the strategic role of PHC in reducing complications and preventable hospitalizations. The methodology consisted of a narrative literature review based on scientific articles published in recent years, as well as national and international technical documents and guidelines concerning the clinical management of pediatric ARIs. The findings showed that factors such as insufficient vaccination coverage, exposure to environmental pollution and secondhand smoke, socioeconomic inequalities, malnutrition, and barriers to accessing health services contribute to the high incidence of these diseases. The review also found that health care team training, the use of clinical protocols, monitoring for signs of severity, and health education directed toward families support timely diagnosis, the early initiation of therapeutic measures, and reductions in childhood morbidity and mortality. It is concluded that strengthening Primary Health Care, together with preventive measures, epidemiological surveillance, and child- and family-centered care, is an essential strategy for improving clinical outcomes and promoting greater equity in child health care.

Keywords: Acute respiratory infections, Child, Early diagnosis, Prevention, Primary Health Care.

INTRODUCTION

Acute respiratory infections (ARIs) constitute one of the principal public health problems in childhood and are responsible for high morbidity, hospitalization, and mortality rates, particularly among children under five years of age. These conditions encompass a range of diseases affecting the upper and lower respiratory tracts, including the common cold, pharyngitis, acute otitis media, sinusitis, bronchiolitis, and pneumonia. Although most cases are self-limiting, a significant proportion may

progress to severe forms, especially among children with weakened immunity, prematurity, malnutrition, or chronic diseases, thereby requiring timely, high-quality care (World Health Organization, 2024).

Within Primary Health Care (PHC), ARIs are among the leading reasons for pediatric consultations. PHC plays a strategic role in health promotion, disease prevention, early diagnosis, appropriate treatment, and the longitudinal follow-up of children, thereby helping reduce complications and hospital admissions for ambulatory care–sensitive conditions. In this context, multidisciplinary practice, combined with immunization initiatives, epidemiological surveillance, breastfeeding promotion, and health education, strengthens comprehensive care and supports better clinical outcomes (Brasil, 2023).

Despite advances in public child health policies, respiratory infections remain a major challenge for health systems, particularly in middle- and low-income countries. Social determinants such as poverty, inadequate housing, household overcrowding, low educational attainment among caregivers, environmental pollution, exposure to secondhand smoke, and barriers to accessing health services contribute to persistently high rates of childhood illness and hospitalization. Furthermore, the seasonal circulation of respiratory viruses, such as respiratory syncytial virus (RSV), influenza, rhinovirus, and, more recently, SARS-CoV-2, underscores the need to continuously strengthen preventive and care strategies (UNICEF, 2023; World Health Organization, 2024).

Against this background, the following research question was defined: What are the principal challenges related to the prevention, diagnosis, and care of acute respiratory infections in children within Primary Health Care, and which strategies can help reduce the childhood morbidity and mortality associated with these diseases?

The general objective of this chapter is to analyze the challenges involved in the prevention, diagnosis, and care of acute respiratory infections in children within the context of Primary Health Care.

The specific objectives are to characterize the principal risk factors associated with childhood ARIs; discuss available preventive strategies, including immunization, breastfeeding, and health

education; analyze the importance of early diagnosis and evidence-based clinical management; and highlight the role of Primary Health Care in organizing care and reducing preventable hospitalizations.

The relevance of this study is justified by the high epidemiological burden of respiratory infections in the pediatric population and the social, economic, and health care impacts arising from these conditions. In addition to being a major cause of school absenteeism, overcrowding in emergency services, and hospital admissions, ARIs can increase public health expenditures and compromise the quality of life of children and their families. Accordingly, the production of scientific knowledge concerning preventive measures and care strategies can support health professionals, managers, and public policymakers working to strengthen child health care (OPAS, 2023).

From a theoretical perspective, several studies have shown that interventions implemented in Primary Health Care can significantly reduce severe cases of respiratory infections, particularly when combined with expanded vaccination coverage, the promotion of exclusive breastfeeding during the first six months of life, the monitoring of child growth and development, and the early recognition of signs of severity. World Health Organization guidelines emphasize that integrating epidemiological surveillance, protocol-based clinical care, and educational initiatives for families is one of the pillars of addressing childhood respiratory diseases (World Health Organization, 2024). Likewise, the Brazilian Ministry of Health emphasizes that comprehensive, humane, and continuous care within Primary Health Care supports timely diagnosis, reduces complications, and strengthens the comprehensiveness of care provided to children (Brasil, 2023).

METHODOLOGY

TYPE OF RESEARCH

This chapter was developed through a qualitative, descriptive narrative literature review designed to compile and discuss scientific evidence on acute respiratory infections in children, emphasizing challenges related to their prevention, diagnosis, and care within Primary Health Care (PHC). Narrative

reviews enable the integration of different theoretical and scientific perspectives, fostering a broad understanding of issues relevant to clinical practice and the formulation of public health policies (Rother, 2007).

LITERATURE SEARCH STRATEGY

The literature search was conducted in national and international databases recognized by the scientific community, including PubMed/MEDLINE, the Virtual Health Library (Biblioteca Virtual em Saúde—BVS), the Scientific Electronic Library Online (SciELO), and LILACS. Official documents issued by the Ministry of Health, the World Health Organization (WHO), and the Pan American Health Organization (OPAS) were also consulted because of their relevance to the development of clinical recommendations and protocols.

Controlled descriptors from the Health Sciences Descriptors (Descritores em Ciências da Saúde—DeCS) and Medical Subject Headings (MeSH) were used and combined through the Boolean operators AND and OR. The principal terms included “acute respiratory infections,” “child,” “primary health care,” “prevention,” “diagnosis,” “pneumonia,” “bronchiolitis,” and “child health.”

INCLUSION AND EXCLUSION CRITERIA

Scientific articles published between 2020 and 2025 were included if they were available in full text in Portuguese, English, or Spanish and addressed aspects related to the epidemiology, risk factors, prevention, diagnosis, treatment, or organization of care for acute respiratory infections in the pediatric population.

Duplicate studies, editorials, letters to the editor, conference abstracts, dissertations, theses not published in journals, articles without full-text access, and publications not directly related to the objective of this chapter were excluded.

DATA COLLECTION AND ANALYSIS

Following study selection, the material underwent exploratory and analytical reading, after which the principal information concerning the objectives, methodology, results, and conclusions of each publication was extracted. The data were subsequently organized thematically according to the following categories: risk factors, preventive measures, early diagnosis, clinical management, and the role of Primary Health Care.

The analysis was interpretive and critical and sought to identify convergences, divergences, and gaps in the available scientific knowledge. According to Gil (2019), bibliographic research allows researchers to examine different scientific contributions concerning a particular phenomenon, supporting well-founded and up-to-date interpretations.

METHODOLOGICAL FOUNDATION

The narrative review was chosen because it enables a comprehensive approach to acute respiratory infections in childhood by integrating epidemiological, clinical, and health care knowledge. According to Rother (2007), this method is widely used to synthesize knowledge, discuss concepts, and support health care decision-making, particularly when the objective is not to measure the effects of interventions but to understand different aspects related to a particular health problem.

Furthermore, the use of recent publications and documents prepared by national and international organizations strengthens the scientific consistency of the discussions presented, making it possible to relate the available evidence to practices implemented in Primary Health Care. This strategy contributes to the development of an up-to-date framework for the prevention, early diagnosis, and comprehensive care of acute respiratory infections in children, supporting the work of health professionals and the implementation of measures aimed at reducing childhood morbidity and mortality.

RESULTS AND DISCUSSION

The literature analysis showed that acute respiratory infections (ARIs) remain among the leading causes of illness, hospitalization, and mortality in children under five years of age, particularly in developing countries. Although progress has been made in vaccination coverage, access to health services, and the implementation of clinical protocols, socioeconomic and environmental factors continue to have a significant influence on the incidence and severity of these conditions (World Health Organization, 2024; Brasil, 2023).

The studies analyzed indicate that viral infections account for most cases treated in Primary Health Care, particularly those caused by respiratory syncytial virus (RSV), influenza, rhinovirus, adenovirus, and, more recently, SARS-CoV-2. Among bacterial infections, pneumonia remains the leading cause of childhood hospitalization and death, especially when associated with delayed diagnosis and the presence of risk factors (Rudan et al., 2013; World Health Organization, 2024).

The literature also shows that several factors increase children's vulnerability to ARIs, including the absence of exclusive breastfeeding, low vaccination coverage, malnutrition, prematurity, air pollution, exposure to secondhand smoke, household overcrowding, and inadequate basic sanitation. These determinants reinforce the understanding that addressing respiratory infections extends beyond clinical care and requires intersectoral initiatives aimed at promoting health and reducing social inequalities (UNICEF, 2023; OPAS, 2023).

Table 1

Principal risk factors associated with acute respiratory infections in children

Risk factor	Observed impact
Low vaccination coverage	Greater susceptibility to preventable respiratory infections
Insufficient breastfeeding	Reduced immune protection
Prematurity	Greater risk of severe disease
Malnutrition	Impaired immune response
Secondhand smoke	Increased incidence of bronchiolitis and pneumonia
Environmental pollution	Airway irritation and worsening of symptoms
Adverse socioeconomic conditions	Greater exposure to risk factors and difficulty accessing services

Source: Prepared by the author based on Brasil (2023), OPAS (2023), and WHO (2024).

Regarding diagnosis, the studies showed a consensus on the importance of careful clinical assessment in Primary Health Care. The early identification of signs such as tachypnea, intercostal retractions, cyanosis, respiratory distress, persistent fever, and reduced oxygen saturation enables timely referral to specialized services, thereby reducing complications and preventable deaths (Brasil, 2023).

Primary Health Care stands out as the principal level of care responsible for preventing and diagnosing respiratory infections early and for monitoring affected children. Strategies such as well-child visits, immunization, breastfeeding promotion, and guidance for families concerning hand hygiene, respiratory etiquette, and the recognition of signs of severity have proven effective in reducing the incidence and severity of ARIs (Starfield, 2002).

Table 2

Strategies for preventing acute respiratory infections in Primary Health Care

Strategy	Expected benefits
Vaccination	Reduction in severe cases and hospitalizations
Exclusive breastfeeding	Strengthening of childhood immunity
Frequent hand hygiene	Reduction in viral transmission
Health education	Early identification of warning signs
Well-child follow-up	Early diagnosis and growth monitoring
Control of tobacco exposure	Reduction in respiratory diseases

Source: Prepared by the author based on the Ministry of Health (2023) and WHO (2024).

Another recurring theme in the literature concerns the need for the continuing professional development of Family Health Strategy (Estratégia Saúde da Família—ESF) teams. Studies show that trained professionals identify clinical signs of severity more accurately, use antimicrobial agents rationally, and implement more effective educational initiatives with families, thereby reducing hospitalizations for ambulatory care–sensitive conditions (Mendes, 2019).

The findings corroborate the international literature by demonstrating that prevention remains the most effective strategy for reducing childhood morbidity and mortality from respiratory infections. Investments in immunization, improved living conditions, epidemiological surveillance, health education, and stronger Primary Health Care are fundamental measures for reducing the burden of these diseases and promoting greater equity in child health care (World Health Organization, 2024).

Table 3

Summary of the principal findings in the literature

Aspect analyzed	Evidence identified
Epidemiology	High incidence among children under five years of age
Principal agents	Respiratory syncytial virus, influenza, rhinovirus, and pneumococcus
Risk factors	Malnutrition, prematurity, low vaccination coverage, secondhand smoke, and poverty
Diagnosis	Predominantly clinical, combined with an assessment of signs of severity
Role of PHC	Prevention, early diagnosis, health education, and continuous follow-up
Expected impact	Reduction in hospitalizations and childhood mortality

Source: Prepared by the author based on the literature review (2020–2025).

CONCLUSION

Acute respiratory infections remain among the principal challenges to child health, particularly among children under five years of age, because of their high incidence, potential for clinical deterioration, and impact on health services. In this context, this chapter aimed to analyze the challenges related to the prevention, diagnosis, and care of these conditions in Primary Health Care, highlighting the importance of integrated strategies for reducing childhood morbidity and mortality.

The literature review showed that factors such as insufficient vaccination coverage, malnutrition, prematurity, exposure to secondhand smoke, environmental pollution, adverse socioeconomic conditions, and barriers to accessing health services contribute significantly to the occurrence and worsening of respiratory infections in childhood. Conversely, initiatives implemented in Primary Health Care, such as immunization, breastfeeding promotion, the monitoring of child growth and development, health education, and the early identification of signs of severity, were found to be fundamental to reducing complications, hospital admissions, and preventable deaths, corroborating the recommendations of the Ministry of Health and the World Health Organization.

The findings reinforce that strengthening Primary Health Care is an essential strategy for ensuring comprehensive, continuous, and humane care for children. The work of multidisciplinary teams, combined with the use of evidence-based clinical protocols and the longitudinal monitoring of families,

contributes to improving the quality of care, optimizing health system resources, and expanding the capacity of services to resolve health needs.

This chapter contributes to an understanding of the principal epidemiological, preventive, and care-related aspects of acute respiratory infections in children by bringing together up-to-date scientific evidence that can support the practice of health professionals, academic education, and the development of public policies aimed at promoting child health. It also emphasizes the need to strengthen intersectoral initiatives capable of addressing the social determinants that influence the occurrence of these diseases.

Finally, it is recommended that future research prioritize longitudinal and multicenter studies on the effectiveness of interventions implemented in Primary Health Care, as well as investigations into the effects of climate change, air pollution, new health technologies, and continuing professional education strategies on the prevention and management of acute respiratory infections in the pediatric population. The continuous production of scientific evidence will contribute to improving care practices and developing more effective public policies to protect children's health.

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SEXUAL VIOLENCE, JUVENILE DELINQUENCY, AND PSYCHOSOCIAL HARM: IMPACTS OF VICTIMIZATION IN CHILDHOOD AND ADOLESCENCE

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Abstract

Sexual violence against children and adolescents represents one of the most serious violations of human rights, with profound repercussions for victims' mental health, identity formation, and social integration. This qualitative study, based on a literature review, aimed to analyze the impacts of sexual victimization during childhood and adolescence, highlighting the relationship between sexual violence, juvenile delinquency, and psychosocial harm. The literature review demonstrated that the immediate effects of sexual violence manifest as symptoms of depression, anxiety, and post-traumatic stress disorder, impairing cognitive functioning and hindering academic performance. When left undiagnosed and untreated, these consequences extend to broader social dimensions, including social isolation, stigmatization, and weakened emotional bonds. The findings further indicate that juvenile delinquency may emerge as a possible outcome of early victimization experiences, particularly in contexts characterized by social exclusion and a lack of institutional support. It is concluded that sexual violence should be understood as a structural phenomenon requiring interdisciplinary responses and integrated public policies capable of preventing, identifying, and intervening effectively. Addressing this issue requires not only accountability but also qualified, trauma-informed support and the promotion of the dignity of children and adolescents.

Keywords: Adolescence, Juvenile Delinquency, Psychosocial Harm, Sexual Violence.

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INTRODUCTION

Sexual violence against children and adolescents constitutes one of the most serious violations of human rights and remains a persistent phenomenon across diverse social contexts. In Brazil, data from the Brazilian Public Security Forum (Fórum Brasileiro de Segurança Pública—FBSP) (2023) reveal that approximately 70% of reported victims are under 18 years of age, the majority of whom are female, highlighting the structural vulnerability of this population and the persistence of asymmetrical power relations. By affecting individuals who are still in the process of cognitive, social, and emotional development, sexual violence causes profound disruptions to life trajectories, interfering not only with victims' immediate mental health but also with their ability to establish interpersonal relationships, achieve academic success, and integrate into society.

Scientific research indicates that early victimization is associated with the development of various psychological disorders, including depression, anxiety, post-traumatic stress disorder, eating disorders, and suicidal ideation (Habigzang; Koller, 2012; Macari et al., 2024). These psychosocial harms directly affect academic performance and community participation by impairing cognitive and emotional functions that are essential for learning and socialization. At the same time, evidence suggests that sexual violence may be associated with engagement in risk-taking behaviors and juvenile offending during adolescence, thereby increasing vulnerability to pathways leading to juvenile delinquency (Patias; Silva; Dell'Aglio, 2016; Widom; Maxfield, 2001).

The relevance of investigating this topic lies in the need to understand sexual violence not merely as an individual traumatic event but as a structural factor that perpetuates cycles of social exclusion and marginalization. Accordingly, this study is justified by the importance of examining, in an integrated manner, the relationship between sexual violence, juvenile delinquency, and psychosocial harm in order to broaden both academic and societal understanding of the issue and to provide a foundation for the development of effective public policies to address it.

This study is based on the hypothesis that sexual victimization during childhood and adolescence contributes to the development of severe psychosocial consequences, including emotional disorders, educational difficulties, and social isolation, while also increasing the likelihood of involvement in delinquent behavior—not as an inevitable outcome, but as the result of the interaction among multiple risk factors. Accordingly, the objective of this article is to analyze the impacts of sexual violence on the development of children and adolescents, emphasizing its repercussions for mental health, psychosocial harm, and the potential for juvenile delinquency. By adopting an interdisciplinary perspective, the study seeks to contribute to strengthening the scientific debate and to the development of prevention and intervention strategies aimed at disrupting the intergenerational reproduction of violence.

THEORETICAL FRAMEWORK

SEXUAL VIOLENCE AND ITS CONSEQUENCES

Sexual violence is one of the most complex and devastating forms of human rights violations, with consequences that extend beyond the physical domain and profoundly affect victims' emotional, social, and identity development. It is a multifactorial phenomenon shaped by power relations, gender inequalities, sociocultural contexts, and structural factors, making it an inherently interdisciplinary subject of analysis (Minayo, 2017). In the case of children and adolescents, its severity is even greater because it involves individuals undergoing psychological, cognitive, and social development, whose consent is legally invalid and whose vulnerability makes them particularly susceptible to victimization (Habigzang; Koller, 2012).

The concept of sexual violence encompasses a range of abusive practices, including rape, sexual harassment, commercial sexual exploitation, child pornography, and incest. In the context of children and adolescents, the literature indicates that most cases occur within environments of trust, such as the family or institutional settings, and are perpetrated by individuals known to the victims through a process referred to as child grooming (Finkelhor, 2014). This dynamic reinforces power asymmetries and

contributes to the victim's silence, as victims frequently experience fear, shame, or confusion regarding the abuse they have suffered.

The consequences of sexual violence are multidimensional. From a psychological perspective, they include the development of disorders such as depression, post-traumatic stress disorder, suicidal ideation, and dissociative states (Habigzang; Koller, 2012). In addition, there are significant social consequences, including social isolation, difficulties in establishing healthy emotional relationships, declining academic performance, and stigmatization (Dell'Aglio; Koller, 2011). From a legal and public policy perspective, sexual violence requires a coordinated response involving multiple sectors—including the justice system, healthcare, education, and social assistance—to ensure comprehensive protection for victims, as established by the Child and Adolescent Statute (Estatuto da Criança e do Adolescente—ECA) (Brazil, 1990) and the guidelines of the World Health Organization (WHO, 2020).

Another key aspect concerns the perpetuation of cycles of violence. Research indicates that children and adolescents who have experienced sexual victimization are more vulnerable to engaging in risk-taking behaviors, psychoactive substance use, and even juvenile delinquency (Patias; Silva; Dell'Aglio, 2016; Belsky et al., 2020). This phenomenon, often described as the intergenerational transmission of violence, demonstrates that sexual violence is not limited to an isolated episode but may shape life trajectories and perpetuate social inequalities (Assis; Constantino, 2020).

Therefore, understanding sexual violence and its consequences requires moving beyond the individual dimension and situating the phenomenon within a broader context characterized by structural inequalities, patriarchy, the absence of effective public policies, and shortcomings in the child protection system. In this regard, academic research plays a fundamental role not only in examining the effects of sexual violence but also in informing prevention, intervention, and recovery strategies capable of breaking the cycles of vulnerability affecting children and adolescents across diverse social contexts.

JUVENILE DELINQUENCY AS A POSSIBLE CONSEQUENCE

Juvenile delinquency is a complex and multifactorial phenomenon that cannot be reduced to a matter of individual choice or merely a lack of discipline. Rather, it is a socially constructed process shaped by structural vulnerabilities, socioeconomic inequalities, and adverse early-life experiences, among which sexual violence occupies a prominent place. The literature indicates that children and adolescents who have experienced sexual victimization are at greater risk of engaging in delinquent behavior and other risk-taking activities, owing both to the psychological impacts of trauma and to the absence of adequate social support (Patias; Silva; Dell'Aglio, 2016).

Criminological theories contribute to understanding this process. The cycle of violence perspective, for example, argues that experiences of victimization may be internalized and later expressed through aggressive or delinquent behavior (Widom; Maxfield, 2001). This hypothesis is supported by longitudinal studies demonstrating a significant association between childhood sexual abuse and an increased likelihood of involvement in criminal offenses during adolescence and early adulthood (Lalor; McElvaney, 2010). Furthermore, longitudinal research indicates that early trauma and severe victimization leave profound marks on fundamental developmental processes. From this perspective, adolescents affected by such forms of violence are more vulnerable to engaging in risk-taking behaviors, psychoactive substance use, and, in more severe cases, juvenile delinquency (Belsky et al., 2020).

Within the Brazilian context, research has shown that the life trajectories of adolescents in conflict with the law are closely associated with experiences of multiple forms of violence, with sexual violence being among the most devastating (Assis; Constantino, 2020). This reality demonstrates that juvenile delinquency should be understood as a possible consequence of the interaction between early victimization, failures within the child protection network, and structural inequalities. Moreover, the criminalization of these adolescents, rather than the implementation of policies centered on care and prevention, tends to reinforce cycles of social exclusion and recidivism (Batista, 2011).

Another important aspect concerns the relationship between sexual victimization and psychoactive substance use, which is frequently observed among adolescents serving socio-educational measures. Drug use often emerges as a strategy for numbing psychological pain or seeking acceptance within alternative social groups; however, it ultimately increases vulnerability to involvement with the juvenile justice system (Dell'Aglio; Koller, 2011).

Accordingly, juvenile delinquency should not be interpreted as the inevitable destiny of victims of sexual violence but rather as one of the possible manifestations of life trajectories marked by disrupted emotional bonds, the absence of institutional support, and social exclusion. Recognizing this connection is essential for moving beyond reductionist perspectives and for developing public policies that integrate the justice system, healthcare, education, and social assistance, promoting both accountability and social reintegration while prioritizing the prevention of new cycles of violence.

PSYCHOSOCIAL HARM

The psychosocial harm resulting from sexual violence during childhood and adolescence extends far beyond immediate trauma, constituting long-term impacts that significantly interfere with human development, socialization, and identity formation. These consequences affect cognitive, emotional, relational, and social dimensions, potentially compromising both the victim's mental health and their opportunities for social integration (Dell'Aglio; Koller, 2011).

From a psychological perspective, the literature identifies a strong association between sexual victimization and the development of disorders such as depression, anxiety, post-traumatic stress disorder, eating disorders, and suicidal ideation (Habigzang; Koller, 2012; Macari et al., 2024). These conditions tend to impair fundamental cognitive functions, including attention, memory, and concentration, directly affecting academic performance and social interactions. Furthermore, early exposure to sexual violence undermines self-esteem, leading to the internalization of feelings of guilt, shame, and stigmatization (Finkelhor; Browne, 1985).

From a social perspective, psychosocial harm is manifested through difficulties in establishing healthy emotional relationships, social isolation, and distrust of authority figures, all of which may hinder victims' reintegration into institutional settings such as schools and the broader community (Assis; Constantino, 2020). In many cases, the absence of adequate support and the revictimization experienced within judicial and healthcare institutions further reinforce the cycle of social exclusion, increasing vulnerability to risk-taking behaviors such as psychoactive substance use, school dropout, and involvement in delinquent activities (Patias; Silva; Dell'Aglio, 2016).

It is important to emphasize that these consequences are not limited to the individual level but also have broader societal implications. Sexual violence and its psychosocial effects place a significant burden on healthcare, education, and justice systems, while generating substantial social and economic costs associated with reduced productivity, increased demand for specialized services, and the risk of the intergenerational perpetuation of violence (WHO, 2020). From this perspective, understanding psychosocial harm requires an interdisciplinary approach that considers both the subjective dimensions of the traumatic experience and the structural conditions that intensify its effects.

Accordingly, psychosocial harm should not be viewed merely as a secondary consequence of sexual violence but rather as a central element in understanding the cycle of vulnerability affecting children and adolescents who have experienced sexual victimization. A critical analysis of these impacts underscores the urgent need for integrated public policies that ensure prevention, early diagnosis, and qualified psychosocial care, thereby breaking the reproduction of inequalities and creating conditions that support the reframing of traumatic experiences and the promotion of human dignity.

METHODOLOGY

This study is characterized as qualitative research based on a literature review. This methodological approach was selected because it enables the critical analysis of diverse scientific and institutional publications addressing sexual violence against children and adolescents, juvenile

delinquency, and the psychosocial harm associated with these phenomena. As Gil (2019) emphasizes, literature review research makes it possible to compile, interpret, and discuss previously systematized knowledge, making it an appropriate method for achieving an in-depth theoretical understanding of a complex social issue.

To develop the theoretical framework, scientific articles, specialized books, doctoral dissertations, master's theses, and technical reports published by national and international organizations, such as the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), were selected. These sources were chosen because of the academic and social relevance of the topic, as well as the need to engage with interdisciplinary perspectives encompassing psychology, education, criminology, public health, and law.

The literature search was conducted using the SciELO, Google Scholar, Virtual Health Library (Biblioteca Virtual em Saúde—BVS), CAPES Journal Portal (Portal de Periódicos CAPES), and PubMed databases. The following search terms were used: sexual violence, child sexual abuse, juvenile delinquency, juvenile offending, psychosocial harm, and post-traumatic stress disorder. These terms were combined using Boolean operators (AND/OR) to broaden the scope of the search while refining the results.

The inclusion criteria comprised publications in Portuguese, English, and Spanish published between 2005 and 2025 that addressed, directly or indirectly, the relationship between sexual violence, adolescence, juvenile delinquency, and psychosocial consequences. The exclusion criteria consisted of duplicate publications, opinion articles lacking empirical support, journalistic texts, and studies focusing exclusively on sexual violence against adults, without addressing childhood or adolescence.

Following the initial screening, the abstracts were examined to assess their relevance, after which a selective and critical reading of the full texts was conducted. This analysis was guided by the identification of thematic categories aligned with the objectives of the study: (i) sexual violence and its consequences; (ii) juvenile delinquency as a possible consequence; and (iii) psychosocial harm. A

comparative analysis of the findings sought to identify convergences, gaps, and contradictions within the literature, thereby supporting the development of an integrated and critical discussion.

Accordingly, the methodology adopted provided a solid and up-to-date theoretical foundation for examining the implications of sexual violence for the development of children and adolescents and its relationship with juvenile delinquency and psychosocial exclusion.

RESULTS AND DISCUSSION

The analysis of the scientific literature demonstrates that sexual violence during childhood and adolescence constitutes a highly traumatic experience whose repercussions extend far beyond the occurrence of the abusive act and may persist throughout the victim's life. In Brazil, data from the Brazilian Public Security Forum (Fórum Brasileiro de Segurança Pública—FBSP) (2023) indicate that approximately 70% of victims of sexual violence are under 18 years of age, the majority of whom are girls, confirming the strong intersection between gender, age, and social vulnerability. This reality reinforces the need to understand sexual violence as a phenomenon that extends beyond the individual sphere and must be situated within the broader context of structural inequalities and the fragility of child protection networks.

At the individual level, the consequences are multifaceted. Research shows that children and adolescents who have experienced sexual victimization exhibit high rates of disorders such as depression, anxiety, dissociation, and, particularly, post-traumatic stress disorder, which impairs fundamental cognitive functions—including attention, memory, and emotional regulation—and directly affects academic performance (Habigzang; Koller, 2012; Macari et al., 2024). In this regard, the school environment becomes a crucial setting both for identifying warning signs and for providing initial support. However, as Inoue and Ristum (2008) emphasize, the lack of adequate training among educators remains a significant barrier to the early identification of cases, thereby prolonging victims' psychological suffering.

Another recurring finding in the literature is the association between early sexual victimization and juvenile delinquency. Although this relationship is not deterministic, longitudinal studies indicate that adolescents who have experienced sexual abuse are more vulnerable to engaging in delinquent behavior due to weakened emotional bonds, emotional dysregulation, and early exposure to high-risk environments (Widom; Maxfield, 2001; Patias; Silva; Dell'Aglio, 2016). The cycle of violence perspective reinforces the notion that, in some cases, experienced violence may later be reproduced, representing one of the possible pathways through which trauma is internalized.

The psychosocial consequences are not limited to mental health. Studies demonstrate that adolescents who have experienced sexual victimization are more likely to drop out of school, experience social isolation, use psychoactive substances, and engage in risky sexual behaviors (Dell'Aglio; Koller, 2011; Lalor; McElvaney, 2010). The combination of these factors contributes to the perpetuation of trajectories of social exclusion, marginalization, and revictimization, producing a cumulative effect that reinforces the intergenerational nature of violence (Assis; Constantino, 2020).

Therefore, the findings discussed indicate that sexual violence during childhood and adolescence should not be understood as an isolated event but rather as a multidimensional phenomenon capable of profoundly compromising victims' subjective development and social functioning. The association among sexual victimization, juvenile delinquency, and psychosocial harm underscores the need for interdisciplinary responses involving healthcare, education, the justice system, and social assistance in order to break cycles of violence and promote effective opportunities for recovery and social reintegration.

CONCLUSION

The analysis conducted throughout this study has shown that sexual violence during childhood and adolescence cannot be understood merely as an isolated traumatic event but rather as a complex social phenomenon shaped by cultural, structural, and institutional factors that perpetuate cycles of

vulnerability. By affecting individuals who are still in the process of development, sexual abuse compromises fundamental dimensions of human development, leaving lasting effects that are reflected in the body, subjectivity, and social relationships. The findings indicate that immediate consequences, such as anxiety, depression, and post-traumatic stress disorder, tend to evolve into persistent psychosocial harm when appropriate intervention is lacking, extending their impact to the educational, community, and interpersonal spheres.

One of the most significant findings of this study is the association between sexual victimization and an increased likelihood of involvement in delinquent behavior during adolescence. Although this relationship is not deterministic, the literature indicates that experiences of sexual violence weaken emotional regulation mechanisms, disrupt bonds of trust, and facilitate involvement in high-risk environments, in which juvenile delinquency may emerge as one possible response to the absence of support and opportunities. From this perspective, delinquency should be understood not as an individual's moral failing but as the expression of life trajectories disrupted by violence, social exclusion, and the shortcomings of protective public policies.

From a psychosocial perspective, the impacts of sexual violence are manifested on multiple levels: within the educational setting, through declining academic performance and social isolation; within family relationships, through the breakdown of trust; and within the community, through stigmatization and revictimization. When left unaddressed, this dynamic increases the risk of the intergenerational perpetuation of violence, creating a cycle marked by pain, silence, and the reproduction of abusive practices. Thus, beyond identifying its individual consequences, it is essential to recognize sexual violence as a public health and human rights issue that requires systemic rather than fragmented responses.

The conclusion that emerges is that breaking this cycle requires the implementation of intersectoral public policies capable of integrating healthcare, education, social assistance, and the justice system into coordinated strategies for prevention, victim support, and intervention. This includes

measures ranging from training professionals to identify warning signs at an early stage to establishing community-based protection mechanisms and providing long-term psychosocial follow-up. It is also necessary to strengthen the accountability of perpetrators while ensuring compassionate, trauma-informed care for victims, who often experience institutional revictimization when seeking assistance.

In summary, sexual violence against children and adolescents must be understood in all its complexity. The findings of this study reinforce that early victimization, when left unaddressed, undermines psychological development, contributes to trajectories of juvenile delinquency, and deepens psychosocial harm that is difficult to reverse. The challenge facing society, public policymakers, and the scientific community is to transform this reality through sustained, interdisciplinary action committed not only to redress but also to the effective promotion of human dignity and the comprehensive protection guaranteed by the Child and Adolescent Statute (Estatuto da Criança e do Adolescente—ECA).

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INTEGRATION BETWEEN MENTAL HEALTH SERVICES AND PHYSICAL REHABILITATION IN THE MANAGEMENT OF FIBROMYALGIA: INTERFACES AMONG CHRONIC PAIN, PSYCHOLOGICAL DISTRESS, FUNCTIONALITY, QUALITY OF LIFE, AND COMPREHENSIVE CARE

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Abstract

Fibromyalgia is a chronic, multifactorial syndrome characterized by persistent pain, fatigue, emotional disturbances, and functional limitations that significantly compromise the quality of life of affected individuals. Managing this condition requires an integrated approach that considers the interaction among

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physical, psychological, and social factors. This study aimed to analyze scientific evidence on the integration of mental health services and physical rehabilitation in the management of fibromyalgia, considering the relationships among chronic pain, psychological distress, functioning, and comprehensive care. This integrative literature review was conducted in PubMed, Latindex, and Open Journal Systems repositories and included studies published in Portuguese and English between 2021 and 2026. The findings showed that interdisciplinary interventions involving physical rehabilitation, psychological support, mind–body therapies, and self-care strategies contribute to pain reduction, improved functioning, enhanced emotional resilience, and better quality of life. It is concluded that integrating mental health and physical rehabilitation is essential to the provision of comprehensive, humanized care based on the biopsychosocial model.

Keywords: Chronic Pain, Fibromyalgia, Functioning, Mental Health, Quality of Life.

INTRODUCTION

Fibromyalgia is a chronic syndrome characterized by widespread musculoskeletal pain, persistent fatigue, sleep disorders, cognitive changes, and a high prevalence of psychological symptoms, such as anxiety and depression, constituting a complex clinical condition that extends beyond the limits of physical pain. The multifactorial nature of the disease involves central sensitization mechanisms, neurophysiological changes, and psychosocial factors that directly influence pain perception and the functional capacity of affected individuals. In this context, fibromyalgia management requires approaches that integrate different health disciplines while simultaneously considering physical, emotional, and social factors, in accordance with the principles of comprehensive care (Giorgi et al., 2023; Maugars et al., 2021).

In addition to its clinical manifestations, fibromyalgia has significant repercussions for functioning and quality of life, compromising activities of daily living, occupational performance, interpersonal relationships, and social participation. Persistent chronic pain contributes to the

development of psychological distress, reduces autonomy, and intensifies functional disability, creating a cycle in which physical and emotional factors mutually reinforce one another (Alvarez et al., 2022; Benz et al., 2025).

The impact of fibromyalgia on mental health represents one of the primary challenges facing healthcare systems, since symptoms such as depression, anxiety, stress, pain catastrophizing, and emotional difficulties contribute to greater pain intensity, lower treatment adherence, and a poorer clinical prognosis. Recent evidence shows that psychological care, when combined with other interprofessional interventions, promotes the development of coping strategies, improves emotional regulation, and enhances the ability to adapt to the limitations imposed by the disease, thereby reinforcing the importance of integrating mental health services and physical rehabilitation (Luciano et al., 2023; Galvez-Sánchez; Montoro, 2023).

From this perspective, physical rehabilitation programs play a fundamental role in the functional recovery of people with fibromyalgia. Strategies based on supervised physical exercise, health education, physical therapy, and multidisciplinary interventions yield positive results in reducing pain and improving mobility, functional capacity, and quality of life (Mascarenhas et al., 2020; Borze et al., 2025).

In recent years, the understanding of fibromyalgia has expanded to incorporate dimensions related to bodily perception, body awareness, and body image as relevant components of chronic suffering. Changes in these domains directly influence pain-related behavior, self-esteem, emotional functioning, and participation in daily activities (Navarro-Moreno et al., 2026).

Another relevant aspect concerns the repercussions of the COVID-19 pandemic on the follow-up care of individuals with chronic musculoskeletal pain. The interruption or reduced availability of in-person healthcare services hindered the continuity of physical rehabilitation and ongoing psychological support, leading to worsening pain, impaired functioning, and increased emotional distress among many patients (Parsirad et al., 2023).

Although scientific advances have been made in the treatment of fibromyalgia, limitations remain in the coordination between mental health services and physical rehabilitation programs. In many healthcare settings, interventions remain fragmented, prioritizing the control of physical symptoms to the detriment of emotional, psychosocial, and functional factors. This fragmentation compromises comprehensive care and hinders the achievement of sustainable outcomes, particularly among patients with high levels of disability and psychological distress, making the implementation of interdisciplinary models centered on individual needs essential (Giorgi et al., 2023; Luciano et al., 2023).

The literature also demonstrates that multidimensional assessment is essential to understanding the clinical complexity of fibromyalgia, as it enables the simultaneous analysis of pain, functioning, mental health, body composition, quality of life, and psychosocial factors associated with illness. Comprehensive instruments support the development of individualized treatment plans and improve professionals' ability to identify factors that affect patients' clinical progression, thereby strengthening comprehensive and interdisciplinary care (Benz et al., 2025; Úbeda-D'Ocasar et al., 2026). Although studies of other rheumatic diseases also underscore the importance of psychological health in achieving better clinical outcomes, this evidence further supports the need to incorporate this component into the management of chronic pain conditions (Lubrano; Ambrosino; Perrotta, 2025).

Against this background, the present study is justified by the need to gather scientific evidence demonstrating the importance of integrating mental health services and physical rehabilitation in the management of fibromyalgia, considering the interfaces among chronic pain, psychological distress, functioning, quality of life, and comprehensive care. Accordingly, this study aims to analyze the available evidence on the integration of mental health services and physical rehabilitation in fibromyalgia management, highlighting its contribution to pain reduction, improved functioning, the promotion of mental health, and enhanced quality of life through interdisciplinary care centered on patients' needs.

METHODOLOGY

This is an integrative literature review of a descriptive nature and with a qualitative approach, conducted to synthesize and critically analyze scientific evidence on the integration of mental health services and physical rehabilitation in the management of fibromyalgia, focusing on the interfaces among chronic pain, psychological distress, functioning, quality of life, and comprehensive care. The integrative review method was selected because it enables studies with different methodological designs to be brought together, compared, and interpreted, thereby supporting a broad understanding of the current state of scientific knowledge.

The review was guided by the following research question: What scientific evidence is available on the integration of mental health services and physical rehabilitation in the management of fibromyalgia, and what are its effects on chronic pain, psychological distress, functioning, quality of life, and the promotion of comprehensive care?

The literature search was conducted in the PubMed and Latindex databases and supplemented by articles indexed in Open Journal Systems (OJS) repositories, encompassing national and international open-access scientific journals. The search strategy was structured by combining controlled descriptors from the Health Sciences Descriptors (Descritores em Ciências da Saúde—DeCS) and Medical Subject Headings (MeSH), using the Boolean operators AND and OR. The following descriptors were used: “Fibromyalgia,” “Mental Health,” “Physical Rehabilitation,” “Chronic Pain,” “Quality of Life,” “Functionality,” “Comprehensive Health Care,” “Psychological Distress,” “Interdisciplinary Care,” and “Rehabilitation.”

The inclusion criteria were as follows: scientific articles published between 2021 and 2026; full-text availability; publication in Portuguese or English; and original studies, systematic reviews, integrative reviews, meta-analyses, and observational studies addressing the integration of mental health, physical rehabilitation, and fibromyalgia management, as well as research related to chronic pain, functioning, psychological distress, quality of life, and interdisciplinary care. Studies presenting clinically

relevant outcomes for healthcare practice and the organization of comprehensive care were also considered.

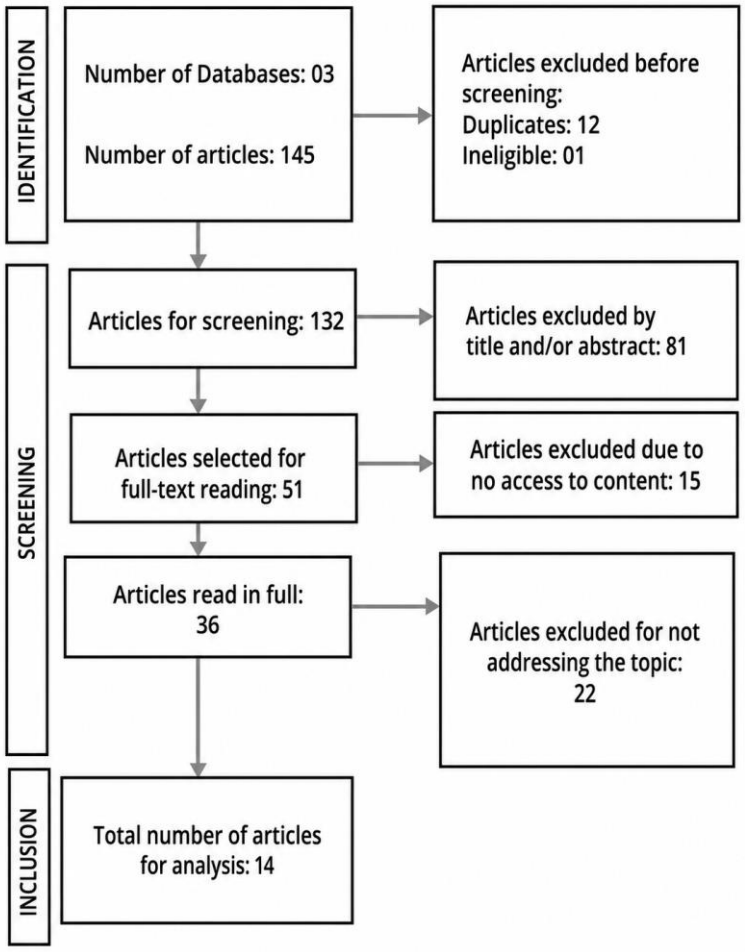
The exclusion criteria comprised articles duplicated across the databases consulted, studies published before 2021, papers in languages other than those previously specified, conference abstracts, editorials, letters to the editor, dissertations, theses, book chapters, research protocols, experience reports, studies without full-text access, and publications that did not address the objective of this review.

The study-selection process occurred in successive stages, comprising the identification of records in electronic databases, removal of duplicates, screening of titles and abstracts, full-text eligibility assessment, and inclusion of studies that met the previously established criteria. Information regarding authors, year of publication, objective, methodological characteristics, main findings, and contributions to the topic under investigation was subsequently extracted, allowing the scientific evidence to be organized and synthesized.

The flowchart showing the stages of study identification, selection, eligibility assessment, and inclusion is presented in Figure 1, which summarizes the methodological process employed in this integrative review.

Figure 1

Flowchart of the study-selection process for the integrative review.



Source: Prepared by the authors (2026).

The selected studies were analyzed using a descriptive and interpretive approach, enabling comparison of the literature's main findings regarding the integration of mental health services and physical rehabilitation in the management of fibromyalgia. The evidence was organized into thematic categories, considering the repercussions for chronic pain, psychological distress, functioning, and quality of life, as well as the contributions of interdisciplinary care to the promotion of comprehensive care.

Because this study is an integrative literature review developed exclusively from secondary data available in publicly accessible scientific publications, review and approval by a Research Ethics Committee are not required under the guidelines of National Health Council Resolution No. 510 of April

7, 2016, as the study involved neither data collection from human participants nor access to personally identifiable information.

RESULTS AND DISCUSSION

The study search and selection strategy resulted in the identification of potentially relevant publications in the databases consulted. After application of the inclusion and exclusion criteria, screening of titles and abstracts, and full-text assessment, 14 studies were selected for the final sample of this integrative review. The publications analyzed, produced between 2021 and 2026, showed that integrating mental health services and physical rehabilitation represents a promising approach to fibromyalgia management, contributing to reduced chronic pain, improved functioning, decreased psychological distress, and enhanced quality of life.

The studies also highlighted the importance of interdisciplinary practice, multidimensional assessment, and the implementation of patient-centered therapeutic strategies that simultaneously address the syndrome's physical, emotional, and psychosocial dimensions.

The distribution of the included studies, together with their principal methodological characteristics and contributions to the topic under investigation, is presented in Table 1.

Table 1

Characteristics of the studies included in the integrative review.

Author/Year	Study objective	Study focus	Main findings
Maurel *et al.* (2021)	To investigate the role of mindfulness and acceptance as mediators between negative affect, functional disability, and emotional distress in individuals with fibromyalgia.	Mental health and functioning	The study showed that mindfulness- and acceptance-based interventions significantly reduce emotional distress and functional disability, promoting greater psychological flexibility, adaptation to the pain condition, and improved functional performance.
Liechti *et al.* (2022)	To identify prognostic factors related to quality of life after interdisciplinary chronic	Interdisciplinary rehabilitation	The study demonstrated that interdisciplinary rehabilitation programs provide sustained quality-of-life benefits, with psychosocial,

	pain rehabilitation programs.		emotional, and functional factors serving as important predictors of clinical response and treatment progression.
Paolucci *et al.* (2022)	To evaluate a telerehabilitation intervention based on mind–body techniques for patients with fibromyalgia.	Telerehabilitation	The study found that telerehabilitation based on mind–body techniques simultaneously improves pain intensity, physical functioning, emotional balance, and quality of life, demonstrating strong applicability as an integrated care strategy.
Climent-Sanz *et al.* (2023)	To synthesize qualitative evidence on the effectiveness of pain management from the perspective of patients with fibromyalgia.	Patient experience	The study found that treatment effectiveness is directly related to interprofessional care, responsiveness to individual needs, skilled therapeutic communication, and continuity of interdisciplinary follow-up.
Hu *et al.* (2023)	To review self-management interventions for chronic widespread pain, including fibromyalgia.	Self-care	The study concluded that structured self-management programs strengthen patient autonomy, support coping with chronic pain, and improve clinical outcomes when combined with continuous interprofessional support.
Nishikawara *et al.* (2023)	To investigate factors that facilitate or hinder access to healthcare services for people with fibromyalgia.	Access to healthcare services	The study showed that symptom validation, attentive listening, and integration among different healthcare professionals increase treatment adherence, strengthen the therapeutic relationship, and improve patients' care experiences.
Jones *et al.* (2024)	To update the evidence on the clinical management of fibromyalgia.	Multidisciplinary management	The study reaffirmed that the best clinical outcomes are obtained through multidisciplinary strategies integrating pharmacological therapies, physical rehabilitation, ongoing psychological support, health education, and self-care interventions.
Mellace *et al.* (2024)	To evaluate the influence of psychological factors on the functional status of individuals with fibromyalgia.	Psychological factors	The study demonstrated that anxiety, depression, and psychological distress independently affect functional limitation, showing that emotional factors are important determinants of fibromyalgia-related disability.
Steen *et al.* (2024)	To evaluate the effectiveness of mind–body therapies in treating fibromyalgia.	Integrative therapies	The study found that mind–body therapies are consistently effective in reducing pain, anxiety, and stress while significantly improving

			functioning, adaptive capacity, and quality of life.
Amzolini *et al.* (2025)	To analyze multimodal nonpharmacological interventions targeting the emotional and cognitive symptoms of fibromyalgia.	Multimodal interventions	The study found that multimodal nonpharmacological approaches provide broad clinical benefits for physical, cognitive, and emotional symptoms, contributing to more comprehensive and patient-centered care.
Patel *et al.* (2025)	To investigate the relationship among hope, optimism, emotional regulation, and pain in patients with fibromyalgia.	Mental health	The study identified a significant association between higher levels of hope and optimism and effective emotional regulation, on the one hand, and lower pain intensity, better psychosocial adaptation, and higher quality-of-life indicators, on the other.
Telli and Akkuş (2025)	To evaluate the relationship among pain, emotional regulation difficulties, and social support in individuals with fibromyalgia.	Pain and psychological distress	The study showed that emotional regulation difficulties combined with limited social support intensify depressive and anxiety symptoms, increase functional disability, and significantly compromise quality of life.
Aavula *et al.* (2026)	To discuss the integration of Mechanical Diagnosis and Therapy into multidisciplinary biopsychosocial care for chronic musculoskeletal pain.	Interdisciplinary care	The study demonstrated that incorporating physical rehabilitation into a multidisciplinary biopsychosocial model improves pain control, supports functional recovery, and strengthens comprehensive care for patients with chronic pain.
Oliva *et al.* (2026)	To analyze the structural relationship between pain and depression in patients with fibromyalgia.	Pain and depression	The study confirmed a strong bidirectional interaction between chronic pain and depression, showing that both factors exacerbate functional limitations and reinforce the need for integrated interventions involving mental health and physical rehabilitation.

Source: Prepared by the authors (2026).

The findings of this review show that fibromyalgia should be understood as a multifactorial clinical condition whose management requires the integration of mental health services and physical rehabilitation. Jones et al. (2024) argue that therapeutic models centered exclusively on analgesia yield limited results because they do not address the emotional, cognitive, and functional components that sustain the persistence of chronic pain. Consistently, Aavula et al. (2026) state that coordination among

different professional disciplines supports more comprehensive interventions capable of addressing the multiple needs of people with fibromyalgia.

Within interdisciplinary care, integration between mental health and rehabilitation professionals broadens the understanding of factors that affect the syndrome's clinical progression. Mellace et al. (2024) demonstrate that psychological variables directly influence functional capacity independently of pain intensity, indicating that emotional factors should be incorporated into treatment planning. Similarly, Oliva et al. (2026) find that pain and depression have a bidirectional relationship in which the worsening of one component negatively affects the other, thereby justifying simultaneous and integrated interventions.

Another relevant aspect concerns the role of emotional regulation in symptom control. Telli and Akkuş (2025) observed that difficulty recognizing and managing emotions, combined with limited social support, significantly increases anxiety, depression, and functional disability. This evidence is corroborated by Patel et al. (2025), who identify an association between hope, optimism, and better adaptation to pain, suggesting that strengthening emotional resources is an important protective factor for patients' quality of life.

The literature also emphasizes that structured psychological strategies produce consistent benefits for functioning. Maurel et al. (2021) show that mindfulness and acceptance promote greater psychological flexibility in responding to persistent pain, reducing emotional distress and functional limitation. Similarly, Steen et al. (2024) demonstrate that mind–body interventions simultaneously reduce pain, anxiety, and stress, indicating that integrative approaches enhance the outcomes achieved through conventional physical rehabilitation programs.

The benefits observed with psychological interventions become even more pronounced when combined with therapeutic exercise. Paolucci et al. (2022) found that telerehabilitation programs based on mind–body techniques produced concurrent improvements in functioning, emotional balance, and pain intensity. These results converge with the observations of Aavula et al. (2026), according to whom

integrated biopsychosocial models enhance functional recovery and promote greater treatment adherence, particularly among individuals with chronic musculoskeletal conditions.

Another point of convergence among the studies concerns the patient's leading role throughout the therapeutic process. Hu et al. (2023) emphasize that self-management programs strengthen autonomy and develop skills for coping with pain in everyday life. Likewise, Jones et al. (2024) argue that health education is an essential component of multidisciplinary treatment, enabling individuals to understand their clinical condition and actively participate in decisions about their own care.

The relationship between professional support and treatment adherence also warrants attention. Nishikawara et al. (2023) demonstrate that patients with fibromyalgia value professionals who acknowledge the legitimacy of their symptoms and communicate empathetically throughout follow-up. This perception is consistent with the findings synthesized by Climent-Sanz et al. (2023), who identify attentive listening, individualized interventions, and continuity of care as fundamental elements in strengthening the therapeutic relationship and improving the care experience.

From another perspective, functioning does not depend exclusively on pain reduction. Mellace et al. (2024) show that emotional disturbances significantly compromise the performance of daily activities even when pain intensity remains relatively stable. This finding broadens the understanding of fibromyalgia by demonstrating that functional recovery requires interventions targeting both physical factors and the psychological and social determinants of illness.

Similarly, interdisciplinary rehabilitation programs have effects that extend beyond motor recovery. Liechti et al. (2022) find that improved quality of life is associated with emotional regulation, adaptive capacity, and the strengthening of psychosocial resources during rehabilitation. These findings reinforce the understanding that therapeutic effectiveness results from integrating physical, psychological, and educational interventions rather than applying specific procedures in isolation.

Another aspect highlighted in the literature is the need to replace fragmented models with coordinated care networks. Jones et al. (2024) argue that contemporary fibromyalgia management should

involve physicians, physical therapists, psychologists, occupational therapists, nurses, and other professionals working in a coordinated manner. Similarly, Aavula et al. (2026) emphasize that integrating different levels of care strengthens continuity, reduces fragmentation, and improves clinical problem-solving capacity.

In addition to their individual benefits, integrated strategies have important implications for healthcare systems. Hu et al. (2023) point out that patients who are better equipped to self-manage tend to demonstrate greater treatment adherence and less dependence on exclusively pharmacological interventions. At the same time, Paolucci et al. (2022) demonstrate that telerehabilitation modalities can expand access to specialized care, supporting continuous follow-up even when healthcare services face geographical or structural limitations.

The results also indicate that psychological distress should not be interpreted solely as a consequence of chronic pain but as an active component of pathophysiology and functional disability. Oliva et al. (2026) show that depressive symptoms intensify pain perception and hinder clinical recovery. In addition, Telli and Akkuş (2025) demonstrate that emotional regulation disturbances exacerbate this process, reinforcing the need for early mental health interventions throughout the therapeutic pathway.

In summary, the studies analyzed converge in demonstrating that effective fibromyalgia management depends on integrating mental health and physical rehabilitation within a biopsychosocial and interdisciplinary framework. The agreement among the authors indicates that interventions focused solely on pain control are insufficient to promote lasting functional recovery. Conversely, care models that coordinate psychological support, physical rehabilitation, health education, strengthened self-care, and interprofessional practice promote better clinical outcomes, greater functioning, reduced psychological distress, and consistent improvements in quality of life, thereby consolidating the principles of comprehensive care.

CONCLUSION

This integrative review made it possible to understand that integrating mental health services and physical rehabilitation is essential to fibromyalgia management, given the clinical complexity of the syndrome and the continuous interaction among chronic pain, psychological distress, functional limitation, and impaired quality of life. The evidence analyzed addressed the proposed objective by demonstrating that interdisciplinary approaches produce more consistent outcomes than interventions focused exclusively on pain control, promoting broader, more humanized care aligned with the principles of comprehensive care.

The included studies consistently showed that combining physical rehabilitation strategies, ongoing psychological support, health education, and strengthened self-care contributes to reducing pain intensity, minimizing anxiety and depressive symptoms, improving functioning, and promoting greater patient participation in daily activities. Thus, the integration of different professionals and levels of care was found to be essential to improving clinical outcomes and the quality of life of people with fibromyalgia.

Another relevant finding is that emotional factors directly influence disease progression, affecting pain perception, functional capacity, and treatment adherence. Accordingly, incorporating mental health as a permanent component of physical rehabilitation programs expands treatment possibilities, strengthens the development of individualized care plans, and contributes to coping with the biopsychosocial repercussions associated with the syndrome.

It was also possible to observe that care models grounded in interdisciplinarity promote greater continuity of care, communication among professionals, and active patient participation in treatment-related decisions. This coordination among different fields of knowledge strengthens comprehensive care and enables interventions to be tailored to physical, emotional, and social needs, promoting greater therapeutic effectiveness and better use of the resources available within healthcare services.

In light of the findings presented, it is concluded that integrating mental health and physical rehabilitation is an indispensable strategy for caring for people with fibromyalgia because it enables more effective interventions, reduces the impact of chronic pain on functioning, and promotes consistent improvements in quality of life. The adoption of interprofessional practices and biopsychosocial models strengthens comprehensive care and contributes to care centered on each patient's individual needs.

For future research, longitudinal studies and multicenter clinical trials are recommended to evaluate the effects of integrated programs involving psychology, physical therapy, occupational therapy, health education, and telehealth technologies, considering clinical, functional, emotional, and quality-of-life indicators. Research adopting this approach may strengthen the available scientific evidence and support the development of more effective care protocols for the comprehensive management of fibromyalgia.

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RETATRUTIDE: REGULATORY CHALLENGES, PATIENT SAFETY, AND THE IMPACT OF THE ILLICIT SALE OF AN INVESTIGATIONAL DRUG FOR THE TREATMENT OF OBESITY

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Abstract

Obesity is one of today's foremost public health challenges, driving the development of new pharmacological therapies for body weight management. This study is a narrative literature review that aimed to analyze the regulatory challenges, patient safety considerations, and impacts arising from the illicit sale of retatrutide, a drug that remains under investigation for the treatment of obesity. The research involved an analysis of scientific articles, documents issued by national and international regulatory agencies, and technical publications addressing the clinical development of retatrutide, its mechanisms of action, preliminary efficacy, safety profile, and the risks associated with its use outside research protocols. The findings showed that, although the drug has yielded promising results in reducing body weight and improving metabolic parameters, obtaining and using it through illicit channels exposes individuals to

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significant risks, including adverse events that are not yet fully understood, counterfeit products, a lack of quality control, and the absence of professional supervision. In addition, illegal sales hinder the work of regulatory authorities, foster misinformation, and increase the risks associated with self-medication. The study concludes that strengthening health surveillance, health education, and regulatory measures is essential to protect the population until the efficacy and safety of retatrutide have been fully established through scientific evidence.

Keywords: Health surveillance, Illicit sale, Obesity, Patient safety, Retatrutide.

INTRODUCTION

Obesity is a chronic, multifactorial, and highly complex disease associated with increased morbidity and mortality and the development of several chronic noncommunicable diseases, including type 2 diabetes mellitus, systemic arterial hypertension, cardiovascular diseases, and certain types of cancer. Its prevalence has risen markedly across various countries in recent decades, making it a major challenge for healthcare systems and for the development of public policies aimed at preventing and treating this condition (World Health Organization, 2024).

In this context, the development of new pharmacological therapies has attracted growing interest from the scientific community, particularly incretin-based drugs. Among these, retatrutide stands out as an investigational molecule that acts as a triple agonist of the glucagon-like peptide-1 (GLP-1), glucose-dependent insulinotropic polypeptide (GIP), and glucagon receptors. Preliminary clinical trial results indicate significant reductions in body weight and improvements in metabolic parameters, reinforcing its therapeutic potential for the treatment of obesity (Jastreboff et al., 2023). However, the drug remains under clinical investigation and has not yet been approved for sale by the leading regulatory agencies.

Despite its investigational status, retatrutide is increasingly being promoted and sold illicitly through digital platforms and informal markets, often accompanied by information that lacks scientific support. This situation encourages the indiscriminate use of a product whose long-term safety,

manufacturing quality, and definitive efficacy remain dependent on the completion of clinical studies and assessment by the competent regulatory authorities. In addition to the risks inherent in using unauthorized drugs, the circulation of products of unknown origin increases the likelihood of counterfeiting, contamination, incorrect dosages, and potentially serious adverse events (Brazilian Health Regulatory Agency - *Agência Nacional de Vigilância Sanitária* 2024).

Against this background, the following research question arises: What are the main regulatory challenges associated with retatrutide, and what impact might the illicit sale of this investigational drug have on patient safety and public health?

The overall objective of this chapter is to analyze the regulatory challenges, patient safety considerations, and impacts arising from the illicit sale of retatrutide as an investigational drug for the treatment of obesity. Its specific objectives are to describe the molecule's mechanism of action and current stage of clinical development; discuss the risks associated with its use outside research protocols; examine the role of regulatory agencies in controlling the circulation of investigational drugs; and consider strategies capable of mitigating the harm caused by self-medication and illegal trade.

The relevance of this study lies in the growing demand for innovative obesity-management therapies and the expanding unauthorized supply of investigational drugs in digital environments, a situation that poses a major challenge to health surveillance authorities, healthcare professionals, and efforts to protect the public. The discussion contributes to a broader understanding of the risks involved in the premature use of therapies that have not yet been approved and reinforces the importance of compliance with regulatory standards as a means of promoting patient safety.

From a theoretical perspective, this chapter draws on recent scientific publications addressing obesity, incretin-based pharmacotherapy, the clinical development of retatrutide, medication safety, and health regulation. Its sources include clinical studies, technical documents issued by regulatory authorities, and specialized literature discussing the ethical and public health challenges associated with the improper availability of investigational drugs.

METHODOLOGY

RESEARCH DESIGN AND APPROACH

The study was conducted as a descriptive narrative literature review using a qualitative approach. This type of research makes it possible to gather, interpret, and discuss scientific publications and institutional documents relating to a particular topic, thereby enabling a contextualized analysis of issues that are still evolving within the scientific field. A narrative review is appropriate when the objective is to examine different theoretical, regulatory, and public health perspectives without being required to follow every stage of a systematic review (Rother, 2007).

This approach was selected because of the subject's current relevance and complexity, which encompasses pharmacological, regulatory, ethical, and patient safety considerations relating to retatrutide. Because it is an investigational drug that remains under clinical evaluation, it was necessary to consider not only the available scientific findings but also health alerts, regulatory information, and technical documents produced by official institutions.

RESEARCH QUESTION

The study was guided by the following question: What are the main regulatory challenges, patient safety risks, and public health impacts associated with the illicit sale of retatrutide as an investigational drug intended for the treatment of obesity?

Defining the research question helped define the scope of the search and organize the discussion around three main themes: the clinical development and mechanism of action of retatrutide; the risks arising from its use without regulatory approval; and the consequences of its illicit sale for health surveillance and public health.

INFORMATION SOURCES AND SEARCH STRATEGY

The literature search was conducted using recognized databases and institutional sources, including PubMed, SciELO, the Virtual Health Library (Biblioteca Virtual em Saúde), and Google Scholar. Technical documents, notices, and information made available by regulatory agencies and health organizations were also consulted, including the Brazilian Health Regulatory Agency (Agência Nacional de Vigilância Sanitária—Anvisa), the Food and Drug Administration (FDA), the European Medicines Agency (EMA), and the World Health Organization (WHO).

The following Portuguese- and English-language descriptors and keywords were used individually and in combination: “retatrutida,” “retatrutide,” “obesidade,” “obesity,” “medicamento experimental,” “investigational drug,” “segurança do paciente,” “patient safety,” “comercialização clandestina,” “illegal drug sale,” “medicamentos falsificados,” and “counterfeit medicines.” The terms were combined using the Boolean operators AND and OR to broaden or narrow the results according to their thematic relevance.

INCLUSION AND EXCLUSION CRITERIA

The review included scientific articles, clinical trials, literature reviews, regulatory documents, health alerts, and technical publications that directly addressed retatrutide, incretin receptor agonists, the pharmacological treatment of obesity, the safety of investigational drugs, or the illegal circulation of products intended for weight loss.

Priority was given to publications in Portuguese and English that were available in full text and addressed the most recent stages of retatrutide’s clinical development. Earlier studies relevant to understanding obesity, pharmacovigilance, drug counterfeiting, and health regulation were also considered.

Duplicate materials, texts without identified authorship, exclusively promotional publications, social media content lacking scientific support, and documents unrelated to the subject of the study were

excluded. Commercial information from unauthorized suppliers was considered solely as part of the contextualization of the problem and was not used as scientific evidence.

SELECTION AND ORGANIZATION OF THE MATERIAL

The titles and abstracts of the identified materials were initially reviewed. Documents considered relevant were then read in full. Selection was based on the relationship between the content identified and the objectives of the study.

Following this review, the information was organized using an instrument developed by the authors that included the following elements: authorship, year of publication, document type, objective, main findings, safety information, regulatory considerations, and contributions to the discussion of the illicit sale of retatrutide.

The sample consisted of publications and documents that met the inclusion criteria and provided sufficient content for analysis. Because this was a narrative review, no fixed number of studies was established in advance. Instead, priority was given to the relevance, currency, and consistency of the selected information.

DATA ANALYSIS

The material was analyzed through critical reading, interpretation, and thematic synthesis. The findings were grouped into categories defined according to the objectives of the study: the pharmacological characteristics and clinical development of retatrutide; efficacy and adverse events identified in clinical trials; challenges relating to approval and regulatory enforcement; risks arising from the acquisition of illicit products; and measures to protect patient safety.

The narrative synthesis made it possible to compare the findings of clinical studies with regulatory requirements and the public health risks associated with the circulation of drugs of unknown origin. According to Snyder (2019), a literature review should go beyond merely describing its sources and

should offer an interpretation capable of identifying areas of convergence, gaps, and practical implications within the field under investigation.

ETHICAL CONSIDERATIONS

Because the study used only data from scientific publications and documents available from public sources, without the direct participation of human subjects or access to personal information, submission to a Research Ethics Committee was not required. Throughout all stages, the principles of academic integrity, fidelity to the information consulted, and proper identification of the sources used were observed.

The discussion was grounded in scientific evidence and institutional documents and avoided making recommendations regarding the use, prescription, or acquisition of retatrutide. Particular consideration was given to its status as an investigational drug, emphasizing that preliminary clinical findings neither constitute regulatory approval nor guarantee safety when the drug is used outside duly authorized studies.

RESULTS AND DISCUSSION

The development of retatrutide represents one of the most recent advances in the pharmacological treatment of obesity. Unlike agonists that act solely on the GLP-1 receptor, the molecule acts simultaneously on the GLP-1, GIP, and glucagon receptors, reducing food intake, increasing energy expenditure, and improving glucose and lipid metabolism. Phase II clinical trial results demonstrated substantial reductions in body weight among individuals with obesity, with some participants losing more than 20% of their body weight after 48 weeks of treatment (Jastreboff et al., 2023). These findings position retatrutide as one of the most promising investigational drugs for obesity management.

Table 1

Main Characteristics of Retatrutide

Characteristic	Description
Pharmacological class	Triple agonist of the GLP-1, GIP, and glucagon receptors
Indications under investigation	Treatment of obesity and metabolic diseases
Regulatory status	Investigational drug under clinical development
Main observed effects	Significant reduction in body weight and improvements in glycemic control and metabolic parameters
Main risks	Gastrointestinal adverse events, long-term safety still under investigation, and illicit use

Source: Adapted from Jastreboff et al. (2023) and Lilly (2025).

Although the clinical findings are considered highly promising, the use of retatrutide remains restricted to authorized clinical research protocols. To date, the leading regulatory agencies have not granted final approval for its sale as a drug intended for the treatment of obesity. According to the Food and Drug Administration (2025), investigational drugs may be made available only after efficacy, safety, and quality have been consistently demonstrated throughout all phases of clinical development. In Brazil, the Brazilian Health Regulatory Agency (Agência Nacional de Vigilância Sanitária—Anvisa, 2024) emphasizes that drugs without marketing authorization must not be sold or used outside the circumstances provided for by law.

Despite these restrictions, the illicit sale of retatrutide through digital platforms, social media, and parallel markets is increasing. This practice constitutes a major public health problem because it facilitates the circulation of products whose origin, storage conditions, composition, and active ingredient concentrations cannot be verified. As emphasized by the World Health Organization (2017), falsified or substandard medical products are a major cause of adverse events, therapeutic failure, and increased morbidity and mortality, particularly when sold without any health oversight.

In addition to the possibility of counterfeiting, another cause for concern is the self-medication encouraged by the dissemination of preliminary clinical study findings. The widespread attention given to the weight loss observed in scientific studies has fostered the mistaken belief that retatrutide is safe and available for routine clinical use. However, several adverse events remain under investigation, including gastrointestinal symptoms, metabolic changes, and potential effects arising from prolonged use

(Jastreboff et al., 2023). The indiscriminate use of the drug before these studies have been completed therefore undermines the principles of patient safety and evidence-based medicine.

From a regulatory perspective, illegal sales directly undermine pharmacovigilance activities. When investigational drugs circulate outside clinical studies, it becomes impossible to monitor adverse events adequately, trace product batches, or ensure minimum quality standards. According to Edwards and Aronson (2000), the continuous monitoring of medication-related risks is an essential component of pharmacovigilance and depends on traceability and the systematic reporting of adverse events.

Another issue identified concerns the role of digital media in increasing demand for weight-loss drugs. The dissemination of content lacking scientific support, combined with easy access to illicit sales platforms, contributes to the spread of false information and the downplaying of the risks associated with the use of investigational drugs. In this context, it is essential to strengthen health education strategies, improve public scientific literacy, and enhance the oversight of online drug sales.

Table 2

Main Impacts of the Illicit Sale of Retatrutide

Area	Observed Impacts
Patient safety	Exposure to products lacking quality control and an increased risk of adverse events
Health surveillance	Difficulties in inspecting and tracing products
Public health	Increased self-medication and circulation of counterfeit drugs
Regulatory compliance	Violations of health regulations and the sale of unregistered products
Scientific research	Impaired interpretation of safety data when the drug is used outside clinical trials

Source: Prepared by the authors based on Anvisa (2024), World Health Organization (2017), Food and Drug Administration (2025), and Jastreboff et al. (2023).

The findings demonstrate that the therapeutic potential of retatrutide must be interpreted with caution, given that its incorporation into clinical practice depends on the completion of phase III studies, rigorous assessment by regulatory authorities, and conclusive evidence establishing its benefit-risk profile. Until these stages have been completed, combating illicit sales and strengthening health

surveillance measures remain essential to protect the population and preserve the credibility of scientific efforts to develop new obesity therapies.

CONCLUSION

This study aimed to analyze the regulatory challenges, patient safety considerations, and impacts of the illicit sale of retatrutide, an investigational drug under development for the treatment of obesity. The review of scientific literature and technical documents issued by regulatory authorities showed that, although clinical trial results indicate substantial therapeutic potential for reducing body weight and improving metabolic parameters, its use remains restricted to research settings and is not recommended outside authorized clinical protocols.

The main findings showed that the illicit sale of retatrutide constitutes a major public health problem because it facilitates access to products whose origin, quality, efficacy, and safety cannot be guaranteed. In addition, the indiscriminate use of this investigational drug may increase the risk of adverse events, hinder pharmacovigilance activities, encourage self-medication, and compromise the work of the regulatory agencies responsible for overseeing the safety of medicines.

This research contributes to the broader discussion of the need to strengthen health surveillance policies, oversight of online drug sales, and health education strategies aimed at promoting the rational use of medicines. It also reinforces the importance of disseminating information grounded in scientific evidence, particularly given the widespread circulation of digital media content concerning new pharmacological therapies for obesity.

Future research should monitor the results of phase III clinical studies of retatrutide and investigate the impact of health misinformation, illegal drug sales, and the influence of social media on the behavior of individuals seeking obesity treatment. Studies evaluating regulatory enforcement strategies and educational initiatives developed by regulatory authorities may also contribute to improving public policies designed to protect population health.

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OFF-LABEL USE OF TIRZEPATIDE (MOUNJARO®) FOR WEIGHT LOSS: HEALTH BENEFITS AND RISKS

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Abstract

The study analyzed the *off-label* use of tirzepatide (Mounjaro®) for weight loss in individuals without formal clinical indication, addressing its benefits, risks, and clinical, ethical, and regulatory implications. The research sought to understand the available scientific evidence regarding the efficacy and safety of this use outside the approved indications. A narrative literature review was conducted, with a structured search in the PubMed database using MeSH descriptors, free terms, and Boolean operators. The strategy identified 32 publications, of which 14 studies were selected after applying eligibility criteria. The analysis showed that tirzepatide has significant potential for reducing body weight and improving metabolic outcomes; however, use without formal indication involves risks related to adverse events, lack of proper monitoring, and limitations of the available evidence. The study contributes to expanding the understanding of the rational use of tirzepatide and reinforces the need for therapeutic decisions based on scientific evidence, patient safety, and individualized assessment.

Keywords: Drug-related side effects and adverse reactions, Incretin receptor agonists, Obesity, Weight loss, *Off-label* use.

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INTRODUCTION

Obesity is one of the foremost challenges facing global public health. Its high prevalence increases the incidence of chronic diseases and reduces the population's quality of life. This situation has driven the search for more effective therapeutic strategies to manage body weight. Among these strategies, pharmacological treatment has gained greater prominence in recent years. Incretin receptor agonists have assumed a leading role because of the results achieved in reducing weight and improving metabolic parameters. Within this context, tirzepatide stands out for its innovative mechanism of action and promising clinical outcomes in individuals with obesity and type 2 diabetes mellitus (Abdelrahman et al., 2025; Rodriguez; Hartmann, 2025).

Tirzepatide is a dual agonist of the glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptors. This characteristic distinguishes it from conventional GLP-1 receptor agonists. Through different physiological mechanisms, the drug improves glycemic control and significantly reduces body weight. These mechanisms include increased satiety, delayed gastric emptying, and reduced food intake. Tirzepatide was initially developed to treat type 2 diabetes mellitus. Subsequently, clinical studies demonstrated consistent benefits in the treatment of obesity, broadening its therapeutic potential (Thiriveedi et al., 2026; Rodriguez; Hartmann, 2025).

The clinical performance of tirzepatide has attracted growing interest among healthcare professionals and patients. This interest has extended beyond officially approved indications. Consequently, its off-label use for weight loss has increased considerably in several countries. Extensive exposure on social media, the sharing of experiences by digital influencers, and the emphasis placed on aesthetic standards have contributed to this phenomenon. In addition, the high demand for the drug has encouraged new forms of access and broadened the debate on the rational use of this therapy (Han et al., 2023; Turnock et al., 2025; Jackson et al., 2026).

Although clinical studies have demonstrated substantial reductions in body weight, the indiscriminate use of tirzepatide raises significant concerns. The literature describes relevant metabolic

benefits, particularly in individuals with overweight or obesity. However, it also reports adverse events that may compromise treatment safety. These complications notably include muscular manifestations, fluid and electrolyte disturbances, and other potentially serious effects. These findings reinforce the need for appropriate clinical monitoring and careful assessment of the risk-benefit balance, particularly when the drug is used outside its approved indications (Rodriguez et al., 2024; Snell-Bergeon et al., 2025; Bodanowitz et al., 2025; Shah et al., 2025).

Despite the increasing number of publications on incretin receptor agonists, gaps remain regarding the off-label use of tirzepatide for weight loss. Most studies focus on the drug's efficacy in populations with a formal clinical indication. By contrast, studies that comprehensively discuss the benefits, risks, ethical considerations, and regulatory implications of its use in individuals without an established indication are less common. This limitation highlights the need to compile and critically analyze the available scientific knowledge to provide a broader understanding of the subject (Abdelrahman et al., 2025; Maqsood et al., 2026).

Against this background, the present study aims to critically analyze the available scientific evidence regarding the off-label use of tirzepatide (Mounjaro®) for weight loss in individuals without a formal clinical indication. It seeks to discuss the pharmacological mechanisms associated with weight loss, clinical benefits, major health risks, limitations reported in the literature, relevant ethical and regulatory considerations, and future prospects for the rational use of this drug. In this way, the study intends to contribute to a critical understanding of the available evidence and support clinical decisions grounded in the best scientific knowledge available.

METHODOLOGY

The present study consisted of a literature review conducted as a narrative review. This design made it possible to compile, analyze, and critically interpret the available scientific evidence on the off-label use of tirzepatide (Mounjaro®) for weight loss. The narrative review approach was selected because

it allows for a broad examination of the subject. This method facilitated the integration of different types of evidence, concepts, clinical applications, pharmacological considerations, limitations, controversies, and future perspectives related to the object of study.

The review was guided by the following research question: What scientific evidence is available regarding the benefits, risks, and implications of the off-label use of tirzepatide for weight loss in individuals without a formal clinical indication? The PICO framework was used to assist in organizing the search strategy. The population consisted of individuals without a formal clinical indication for tirzepatide. The intervention was the off-label use of the drug for weight loss. The comparison included use in accordance with a clinical indication, other pharmacological strategies, or no treatment, when addressed by the selected studies. The outcomes encompassed weight-loss benefits, health risks, adverse events, clinical implications, ethical considerations, and regulatory issues.

The literature survey was conducted through a structured search of the PubMed database. The search strategy used controlled Medical Subject Headings (MeSH), free-text terms searched in the title and abstract fields, synonyms related to the subject, and the Boolean operators AND and OR. Three complementary search strategies were developed. The first prioritized high sensitivity to increase the retrieval of potentially relevant studies. The second prioritized greater specificity. The third combined MeSH terms and free-text terms to maximize the scope and precision of the results.

Predefined inclusion criteria were established. Studies were considered eligible if they addressed the off-label use of tirzepatide for weight loss, its pharmacological mechanisms, clinical applications, benefits, risks, safety, effectiveness, ethical considerations, or regulatory aspects. Publications involving individuals with overweight or obesity, or individuals who used tirzepatide for weight loss regardless of a formal clinical indication, were also included. Different methodological designs were accepted, including cohort, case-control, cross-sectional, and longitudinal studies; clinical trials; observational studies; qualitative research; mixed-methods studies; systematic reviews; meta-analyses; doctoral theses; master’s dissertations; experience reports; and case studies considered relevant to the subject. The time frame

encompassed publications from 2005 to 2025. Only studies available in full text and in the languages specified by the researcher were considered.

Exclusion criteria were also defined. Studies without a direct relationship to the off-label use of tirzepatide for weight loss were excluded. Publications addressing only obesity, diabetes mellitus, or other GLP-1 receptor agonists, without specific discussion of tirzepatide or off-label use relevant to the purpose of this review, were likewise excluded. Exclusively laboratory-based, experimental, or pharmaceutics studies were excluded when they did not present a relevant clinical discussion. Editorials, letters to the editor, commentaries, opinion pieces, conference abstracts, studies duplicated across the databases consulted, publications outside the established period, studies without full-text availability, and works with insufficient methodological descriptions or that did not address the proposed research question were also excluded.

Application of the search strategies initially identified 32 publications. The studies were then assessed against the predefined eligibility criteria. Titles and abstracts were reviewed, followed by the full texts. This stage made it possible to determine the relevance of each publication to the objectives of the review. At the end of the selection process, 14 articles showed the closest alignment with the subject and were included in the analysis.

The studies were analyzed through critical reading and qualitative interpretation of the available evidence. The selected articles were organized according to thematic affinity. The synthesis addressed the pharmacological mechanisms of tirzepatide, clinical benefits, adverse events, limitations of off-label use, ethical and regulatory issues, and gaps identified in the literature. Procedures specific to systematic reviews, such as formal risk-of-bias assessment, meta-analysis, or standardized data extraction, were not performed. The interpretation of the results prioritized the critical integration of evidence in accordance with the methodological principles of a narrative review.

LITERATURE REVIEW

OBESITY AND THE EVOLUTION OF PHARMACOLOGICAL TREATMENT

Obesity is a chronic, multifactorial disease with a high prevalence worldwide. This condition results from the interaction of genetic, metabolic, environmental, and behavioral factors. Excess adipose tissue contributes to the development of several chronic noncommunicable diseases. These notably include type 2 diabetes mellitus, cardiovascular diseases, arterial hypertension, and metabolic dysfunction-associated steatotic liver disease. These conditions increase morbidity and mortality in the population. This situation reinforces the need for therapeutic strategies capable of promoting sustained weight loss and improving the metabolic profile. In recent years, the treatment of obesity has received greater attention because of the consistent increase in its prevalence and the economic impact of its associated complications (Abdelrahman et al., 2025; Rodriguez; Hartmann, 2025).

For many years, obesity treatment was based primarily on lifestyle interventions. Caloric restriction, regular physical activity, and multidisciplinary monitoring constituted the pillars of clinical management. However, many patients experienced difficulty maintaining weight loss over the long term. Partial or complete regain of lost weight frequently occurred after interventions were discontinued. In addition, previously available medications had limited efficacy or an unfavorable safety profile in some patients. These limitations encouraged the development of new pharmacotherapies with greater effectiveness and better clinical tolerability (Rodriguez; Hartmann, 2025).

Advances in knowledge of incretin physiology brought about an important change in the pharmacological treatment of obesity. Glucagon-like peptide-1 receptor agonists assumed a prominent role because of their ability to reduce appetite and promote weight loss. These drugs also improved glycemic control and reduced cardiometabolic risk factors in different patient groups. The results obtained in clinical studies expanded scientific interest in therapies that act on multiple metabolic pathways. This development established incretin receptor agonists as one of the principal pharmacological alternatives for treating obesity and associated metabolic diseases (Abdelrahman et al., 2025).

The development of dual agonists represented a further advance in this therapeutic field. Tirzepatide emerged as the first drug capable of simultaneously activating GIP and GLP-1 receptors. This characteristic broadened the therapeutic potential observed with conventional GLP-1 receptor agonists. Studies demonstrated substantial reductions in body weight, improved glycemic control, and favorable effects on different metabolic parameters. These results strengthened clinical interest in the use of tirzepatide for both type 2 diabetes mellitus and obesity. Consequently, the drug assumed a prominent position in research on next-generation anti-obesity therapies (Thiriveedi et al., 2026).

TIRZEPATIDE: DEVELOPMENT, PHARMACOLOGICAL MECHANISM, AND APPROVED APPLICATIONS

Tirzepatide represents an important advance in the pharmacological treatment of metabolic diseases. The drug was initially developed to improve glycemic control in individuals with type 2 diabetes mellitus. Its development resulted from the search for therapies capable of acting on different physiological mechanisms involved in energy homeostasis. This strategy made it possible to enhance the effects observed with traditional GLP-1 receptor agonists. Clinical studies demonstrated that tirzepatide was highly effective in reducing blood glucose and body weight. These results facilitated its rapid incorporation into the therapeutic options available for treating metabolic diseases (Thiriveedi et al., 2026).

The principal distinguishing feature of tirzepatide is its dual mechanism of action. The drug acts simultaneously on the glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptors. This combined action enhances glucose-dependent insulin secretion and reduces glucagon release. In addition, the drug delays gastric emptying and increases satiety. These effects reduce food intake and promote a negative energy balance. The concurrent activation of these two metabolic pathways partly explains the high efficacy of tirzepatide in reducing body weight observed in clinical studies (Abdelrahman et al., 2025; Thiriveedi et al., 2026).

The metabolic effects of tirzepatide extend beyond weight loss. The drug improves glycemic control by reducing fasting blood glucose and glycated hemoglobin levels. Treatment also improves insulin sensitivity and contributes to a reduction in insulin resistance. Some studies have observed additional benefits in cardiovascular and hepatic parameters, particularly among individuals with obesity and metabolic syndrome. These findings have broadened interest in using tirzepatide for different clinical conditions associated with excess weight. Nevertheless, its indication should remain grounded in the available scientific evidence and current regulatory recommendations (Rodriguez; Hartmann, 2025).

Tirzepatide first received regulatory approval for the treatment of type 2 diabetes mellitus. Subsequently, new clinical trials demonstrated consistent benefits in reducing body weight among individuals with obesity or overweight associated with comorbidities. These results supported the expansion of the drug's therapeutic indications in different countries. Despite this expansion, the use of tirzepatide remains subject to the indications approved by the respective regulatory agencies. Use in circumstances other than those specified in the prescribing information constitutes off-label prescribing and requires individualized clinical assessment (Rodriguez; Hartmann, 2025).

Comparative studies have reinforced tirzepatide's therapeutic potential in the treatment of obesity. Research conducted by Rodriguez et al. (2024) demonstrated that tirzepatide produced a greater reduction in body weight than semaglutide in adults with overweight or obesity. The authors also observed high clinical effectiveness during participant follow-up. These results strengthened scientific interest in the drug and expanded its use in clinical practice. Nevertheless, the findings themselves underscore that therapeutic indications should take into account individual patient characteristics, the available evidence, and appropriate medical monitoring, particularly given the growing interest in using the drug for aesthetic purposes and outside formally approved indications (Rodriguez et al., 2024).

OFF-LABEL MEDICATION USE AND REGULATORY CONSIDERATIONS

Off-label use refers to prescribing a drug under conditions that differ from those approved by regulatory authorities. This practice may involve different therapeutic indications, doses, routes of administration, or populations not covered by the prescribing information. Off-label use does not, in itself, constitute inappropriate or unlawful practice. In several circumstances, it is supported by scientific evidence and accumulated clinical experience. Nevertheless, its adoption requires careful assessment of the risks, benefits, and clinical circumstances of each patient. This decision should also consider the availability of evidence supporting the proposed indication (Maqsood et al., 2026).

Off-label prescribing may represent a therapeutic alternative when no approved treatments exist for a particular clinical condition or when evidence demonstrates relevant benefits in specific circumstances. In such cases, clinical judgment plays a fundamental role in decision-making. Healthcare professionals must carefully assess the relationship among efficacy, safety, and therapeutic need. In addition, patients must receive clear information about the nature of the prescription and the potential limitations of the available evidence. This process strengthens patient autonomy and supports shared decision-making between physicians and medication users (Maqsood et al., 2026).

The growing demand for weight-loss drugs has created new challenges for regulatory authorities and healthcare systems. Increased demand for GLP-1 receptor agonists and tirzepatide has encouraged the emergence of different marketing strategies. These notably include the supply of compounded formulations and direct-to-consumer sales through digital platforms. This situation has heightened concerns regarding quality control, product safety, and the traceability of medications supplied outside conventional distribution channels. These factors reinforce the need for greater regulatory surveillance and appropriate market oversight (DiStefano et al., 2025).

The availability of compounded formulations and products marketed outside official manufacturers also raises concerns about treatment safety. The composition, stability, and quality of these products may vary according to the manufacturing process and the controls adopted by suppliers. These

differences may compromise therapeutic efficacy and increase the risk of adverse events. Furthermore, ease of purchase may facilitate use without appropriate medical supervision. This context highlights the importance of regulatory policies capable of protecting patients and ensuring the rational use of these drugs (DiStefano et al., 2025).

Ethical considerations also occupy a central place in the discussion of the off-label use of tirzepatide for weight loss. The increasing use of the drug for aesthetic purposes intensifies questions concerning the appropriate prioritization of healthcare resources and access to treatment among patients with a formal clinical indication. At the same time, online communities and social networks share information, personal experiences, and usage strategies that are not always supported by scientific evidence. This phenomenon may influence therapeutic decisions and encourage potentially unsafe practices. Accordingly, the off-label use of tirzepatide requires not only careful clinical evaluation but also ongoing ethical and regulatory reflection to ensure patient safety and the responsible use of this therapeutic technology (Turnock et al., 2025; Maqsood et al., 2026).

EXPANSION OF TIRZEPATIDE USE FOR WEIGHT LOSS

The development of tirzepatide generated substantial interest within the scientific community and among the general population. The significant results obtained in clinical studies increased its visibility. This interest intensified following reports of weight loss exceeding that observed with other drugs used to treat obesity. As a result, tirzepatide became widely associated with rapid weight loss. This situation favored the expansion of its use beyond formally approved clinical indications. Growing demand demonstrates that the reported benefits strongly influenced public perceptions of tirzepatide’s therapeutic potential (Han et al., 2023).

Social media and search engines played an important role in this process of popularization. The sharing of personal accounts, content produced by digital influencers, and news about weight loss increased interest in the drug. Han et al. (2023) identified a substantial increase in searches related to the

use of GLP-1 receptor agonists for cosmetic weight loss. Similarly, Jackson et al. (2026) observed growing public interest in using these drugs for weight loss. These findings demonstrate that the dissemination of information in digital environments significantly influenced demand for weight-loss pharmacotherapies.

Increased demand fostered the use of tirzepatide by individuals without a formal clinical indication. In many cases, the primary objective became the achievement of short-term aesthetic results. This behavior changed the traditional profile of users of these medications. Turnock et al. (2025) observed that online communities began sharing information on administration regimens, dose adjustments, and strategies for minimizing adverse effects. The authors emphasized that many of these recommendations were based on personal experience rather than established scientific evidence. This situation increases the risk of inappropriate use and unnecessary exposure to adverse events.

Growing interest in tirzepatide has also changed the epidemiological profile of potential users. Jackson et al. (2026) found an increase in both the use of and intention to use GLP-1 receptor agonists for weight loss among the general population. This phenomenon involved individuals with different clinical characteristics and varying degrees of excess weight. In some cases, the drug was sought by individuals without established obesity or a formal medical indication. These findings demonstrate that the expansion of tirzepatide use extends beyond the strictly clinical context and encompasses social, cultural, and behavioral factors. This situation reinforces the need for professional guidance, health education, and stronger policies promoting the rational use of medicines (Jackson et al., 2026; Turnock et al., 2025).

RESULTS AND DISCUSSION

RESULTS

The literature search strategy initially identified 32 publications potentially relevant to the subject. These studies were assessed against the predefined inclusion and exclusion criteria. The next stage consisted of reviewing the titles, abstracts, and full texts. This process made it possible to determine how

closely each publication aligned with the objectives of the review. At the end of the selection process, 14 articles were found to have the greatest scientific relevance and were included in the critical analysis. These studies formed the basis of the present narrative review.

The selected studies were published between 2023 and 2026. This period demonstrates that scientific production on the subject is recent and rapidly expanding. Most publications were concentrated between 2025 and 2026. This finding reflects the growing clinical and scientific interest in tirzepatide following the publication of studies demonstrating its high efficacy in reducing body weight. The body of publications also reflects increasing debate concerning the off-label use of incretin receptor agonists for weight loss (Han et al., 2023; Rodriguez et al., 2024; Abdelrahman et al., 2025; Maqsood et al., 2026).

The articles employed different methodological designs. The sample included clinical trials, observational studies, effectiveness studies, population analyses, narrative reviews, literature reviews, pharmaceutical policy studies, case reports, and research on user behavior. This methodological diversity broadened the understanding of the phenomenon under investigation. The different designs made it possible to analyze both the clinical efficacy of tirzepatide and considerations related to its safety, off-label use, ethical implications, and regulatory issues (Rodriguez et al., 2024; Turnock et al., 2025; DiStefano et al., 2025; Thiriveedi et al., 2026).

The thematic analysis of the studies identified five major areas of investigation. The first addressed the pharmacological mechanisms and therapeutic potential of tirzepatide. The second focused on its clinical efficacy in reducing body weight. The third comprised studies on adverse events and treatment safety. The fourth discussed the growth of off-label use, its regulatory aspects, and its ethical implications. The fifth highlighted gaps in knowledge and prospects for future research. This organization facilitated an integrated analysis of the evidence and made it possible to understand the subject from different scientific perspectives (Abdelrahman et al., 2025; Rodriguez; Hartmann, 2025; Maqsood et al., 2026).

The distribution of publications also revealed differences in the focus of the studies. Some focused on the efficacy and clinical effectiveness of tirzepatide in individuals with overweight, obesity, or type 2 diabetes mellitus (Rodriguez et al., 2024; Snell-Bergeon et al., 2025). Others prioritized the assessment of rare adverse events and treatment-related complications (Bodanowitz et al., 2025; Shah et al., 2025; Hindi et al., 2026). Part of the literature analyzed user behavior, growing public interest, and the regulatory challenges arising from the expansion of use for aesthetic purposes (Han et al., 2023; Jackson et al., 2026; Turnock et al., 2025; DiStefano et al., 2025). This body of evidence demonstrates that the off-label use of tirzepatide is a multidimensional subject. It encompasses pharmacological, clinical, epidemiological, social, ethical, and regulatory considerations. These results provide the basis for the discussions presented in the following subsections of this review.

DISCUSSION

The literature analyzed demonstrates that tirzepatide represents one of the foremost recent advances in the pharmacological treatment of obesity and metabolic diseases. The studies included in this review presented consistent findings regarding its efficacy in reducing body weight and improving metabolic parameters. However, most of this evidence was produced in individuals with a formal clinical indication for the drug. This limits the direct extrapolation of the results to individuals who use tirzepatide exclusively for aesthetic purposes or without an established medical indication. This distinction must be considered when interpreting the benefits described in the literature (Rodriguez et al., 2024; Rodriguez; Hartmann, 2025; Thiriveedi et al., 2026).

Clinical studies have demonstrated that tirzepatide produces greater weight loss than other incretin receptor agonists. Rodriguez et al. (2024) found a greater reduction in body weight when comparing tirzepatide with semaglutide in adults with overweight or obesity. This result reinforces the therapeutic potential of the dual GIP and GLP-1 receptor agonist. In addition to weight loss, studies have also identified improvements in glycemic control and other metabolic parameters. These findings justify the

growing interest in the drug among healthcare professionals and patients (Rodriguez et al., 2024; Thiriveedi et al., 2026).

The observed benefits can be explained by tirzepatide's pharmacological mechanism. The simultaneous activation of GIP and GLP-1 receptors enhances glucose-dependent insulin secretion. The drug also reduces glucagon secretion, delays gastric emptying, and increases satiety. These effects promote lower food intake and better metabolic control. Abdelrahman et al. (2025) emphasize that this combination of mechanisms distinguishes tirzepatide from conventional GLP-1 receptor agonists. This characteristic may explain its high clinical efficacy in reducing body weight.

Despite the demonstrated benefits, the literature also highlights important treatment-related risks. Gastrointestinal adverse events are among the most common manifestations. However, some studies have reported less common and potentially serious complications. Bodanowitz et al. (2025) described a case of rhabdomyolysis following the initiation of tirzepatide therapy. Shah et al. (2025) reported syndrome of inappropriate antidiuretic hormone secretion associated with seizures. Hindi et al. (2026) also identified psychiatric events and difficulties related to the administration of GLP-1 receptor agonists used for weight loss. These findings demonstrate that treatment safety still requires continuous monitoring.

The risks associated with off-label use become even more relevant when the drug is used without appropriate medical supervision. Maqsood et al. (2026) emphasize that indiscriminate use may increase exposure to adverse events and hinder the early identification of complications. Turnock et al. (2025) observed that many users share usage protocols in online communities without scientific support. This behavior encourages inappropriate administration practices, empirical dose adjustments, and improper discontinuation of treatment. These situations increase the likelihood of unsatisfactory outcomes and compromise patient safety.

Another relevant consideration concerns the influence of social media on the popularization of tirzepatide. Han et al. (2023) identified increased public interest in GLP-1 receptor agonists intended for cosmetic weight loss. Jackson et al. (2026) also found growing intention to use these medications among

the general population. These results suggest that social and cultural factors have begun to influence demand for treatment as much as clinical indications do. This situation heightens the need for health education and guidance based on scientific evidence.

The review also highlights significant regulatory challenges. DiStefano et al. (2025) demonstrated that the growth of the compounded formulation market and direct-to-consumer sales increases concerns about the quality and safety of the products supplied. This phenomenon may facilitate the use of drugs without adequate assurance of their origin or proper health surveillance. Furthermore, high demand may compromise access to treatment for patients with a formal clinical indication. These factors reinforce the importance of strengthening oversight policies and promoting the rational use of medicines.

Another issue concerns the limitations of the evidence currently available. Most studies focus on individuals with obesity or type 2 diabetes mellitus. Few studies specifically address the off-label use of tirzepatide among individuals without a formal clinical indication. Studies assessing long-term safety in this population are also scarce. This limitation reduces the ability to draw definitive conclusions regarding the benefit-risk profile of indiscriminate use of the drug (Maqsood et al., 2026; Thiriveedi et al., 2026).

Overall, the studies analyzed converge on tirzepatide's considerable therapeutic potential. However, they also demonstrate consensus regarding the need for caution when it is used outside approved indications. The efficacy observed in clinical trials does not eliminate the need for individualized patient assessment. Medical monitoring remains indispensable throughout treatment. Further research should clarify long-term effects, establish more precise criteria for clinical indication, and broaden knowledge regarding the safety of off-label use. This information may contribute to safer therapeutic decisions grounded in scientific evidence.

FINAL CONSIDERATIONS

The present narrative review demonstrated that tirzepatide has considerable therapeutic potential for reducing body weight and managing metabolic abnormalities associated with obesity. The studies

analyzed indicated important benefits related to weight loss, improved glycemic control, and modulation of the physiological mechanisms involved in energy balance. These results explain the growing interest in the drug in both clinical practice and the general population. Nevertheless, the use of tirzepatide for weight loss outside approved indications requires careful assessment.

The analysis of the literature showed that the off-label use of tirzepatide is a complex phenomenon. It encompasses pharmacological, clinical, social, ethical, and regulatory considerations. The drug has demonstrated relevant efficacy in populations with an established clinical indication. However, applying these results to individuals without a formal indication remains subject to scientific limitations. The absence of evidence specific to this group reduces the certainty of conclusions concerning indiscriminate use for exclusively aesthetic purposes.

The observed benefits do not eliminate the risks associated with treatment. Tirzepatide may cause adverse events ranging from common manifestations to less frequent and potentially serious complications. Use without professional supervision may increase exposure to these risks. Individualized assessment remains essential to determine whether the drug is genuinely necessary. Rational use must consider clinical characteristics, therapeutic objectives, contraindications, and appropriate monitoring.

The popularization of tirzepatide has also revealed challenges related to access, the dissemination of inaccurate information, and use motivated by aesthetic standards. Social media has increased demand for the drug and influenced consumer decisions. This situation reinforces the importance of health education and responsible scientific communication. Prescribing should remain evidence-based rather than being driven solely by social trends or expectations of rapid results.

The present review had limitations associated with the availability and characteristics of the studies identified. The current literature is more heavily concentrated on patients with obesity or type 2 diabetes mellitus. Studies specifically addressing individuals without a formal clinical indication remain limited. In addition, long-term studies assessing safety, maintenance of results, and the effects of prolonged use outside approved indications are lacking.

Further research should expand knowledge concerning the effectiveness and safety of tirzepatide in different populations. Future studies should evaluate more precise criteria for indication, clinical monitoring, and risk prevention. The production of robust evidence may contribute to safer therapeutic decisions. Tirzepatide may thereby be used responsibly, with due consideration for its proven benefits and the limitations of the scientific evidence.

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MOLECULAR DIAGNOSIS OF GENETIC DISEASES IN THE ERA OF GENOMIC MEDICINE: TECHNICAL CHALLENGES, GENETIC COUNSELING, AND THE (DE)VALUATION OF THE MEDICAL PROFESSIONAL IN THE CONTEMPORARY BRAZILIAN CONTEXT

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Abstract

Over the past two decades, Genomic Medicine has become one of the most transformative pillars of contemporary clinical practice, redefining diagnostic, therapeutic, and preventive paradigms for diseases of genetic origin. This article aims to discuss, in light of current scientific literature, the molecular diagnostic protocols and techniques used to characterize genetic diseases, with emphasis on contemporary molecular biology methods applied to carrier detection, prenatal diagnosis, and genetic counseling. This is a qualitative narrative literature review based on Brazilian and international scientific publications, most of which were published during the past decade. The findings show that, despite major technological advances, such as next-generation sequencing, chromosomal microarrays, and digital PCR platforms, the effectiveness of Genomic Medicine in Brazil remains contingent upon structural, economic, and, above all, human factors. Particularly noteworthy is the growing devaluation of medical professionals,

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especially medical geneticists, whose work is indispensable to translating molecular knowledge into high-quality clinical care. It is concluded that the full integration of genomics into Brazilian public health depends not only on technological improvement but also on effective policies for the recognition, continuing education, and retention of specialized medical professionals. Without such policies, inequities in access to genetic diagnosis and counseling may widen.

Keywords: Genetic Counseling, Genetic Diseases, Genomic Medicine, Molecular Diagnosis, Professional Recognition of Medical Professionals.

INTRODUCTION

The rapid advancement of the omics sciences, including genomics, transcriptomics, proteomics, and metabolomics, has irreversibly reshaped the foundations of contemporary medical practice. In this context, what is known as Genomic Medicine has emerged not as a field isolated from classical genetics, but as an epistemological reformulation of clinical practice as a whole, in which diagnosis, prognosis, and treatment are understood in light of each patient's individual molecular architecture (Green et al., 2020; Manolio et al., 2019).

Since the completion of human genome sequencing in the early 2000s and its subsequent technological democratization through next-generation sequencing (NGS) platforms, there has been an exponential increase in diagnostic capacity for diseases of genetic etiology, which had previously been limited to presumptive clinical diagnoses or low-resolution cytogenetic techniques (Rehm & Green, 2021).

The molecular characterization of genetic diseases is no longer an ancillary tool and has become, in numerous conditions, the only method capable of establishing a definitive diagnosis. This is particularly true of rare diseases, in which phenotypic overlap among different syndromes frequently precludes differentiation based solely on clinical findings (Boycott et al., 2019).

It is estimated that more than seven thousand rare diseases have been described, approximately 80% of which have an identifiable genetic origin and collectively affect between 6% and 8% of the global population (Nguengang Wakap et al., 2020). In Brazil, the National Policy for Comprehensive Care for People with Rare Diseases (Política Nacional de Atenção Integral às Pessoas com Doenças Raras) (Brasil, 2014; Brasil, 2023) formally recognizes the magnitude of this epidemiological burden and reinforces the need to establish specialized healthcare networks, within which Medical Genetics Services play a central role.

Within this context, molecular genetics laboratories affiliated with university hospitals and public referral services perform a strategic function in the continuum of care. They enable not only diagnostic confirmation in clinically suspected cases but also the extension of molecular testing to asymptomatic relatives through carrier detection and to pregnant women at increased reproductive risk through molecular prenatal diagnosis (Skotko & Kishnani, 2022).

These strategies make more accurate genetic counseling possible, based on more precise estimates of recurrence risk, representing a substantial improvement over exclusively probabilistic models based on pedigrees.

However, the integration of these technologies into healthcare practice is neither neutral nor automatic. It depends decisively on the presence of properly trained medical professionals, including clinical geneticists, molecular pathologists, obstetricians trained in fetal medicine, pediatricians, and other specialists, who are capable of interpreting complex molecular findings, correlating them with the clinical presentation, and translating them into therapeutic decisions and ethically responsible guidance for families (Sanderson et al., 2021).

Paradoxically, contemporary Brazil has witnessed a growing process of devaluation of the medical profession, reflected in increasingly precarious employment arrangements, the longstanding inadequacy of the reimbursement rates paid by the Unified Health System (Sistema Único de Saúde—SUS) and supplementary health insurance plans, excessive clinical workloads, and the symbolic erosion of the

profession's standing in public and media discourse (Scheffer et al., 2023; Machado & Oliveira, 2022). This phenomenon is particularly critical in specialties with limited immediate economic visibility, such as medical genetics, which requires lengthy training and a high degree of technical specialization while offering comparatively limited financial returns relative to more procedure-intensive specialties.

Against this backdrop, this article presents an up-to-date and contextualized discussion of the technical foundations of the molecular diagnosis of genetic diseases, critically linking them to the recognition, or devaluation, of medical professionals as indispensable yet frequently overlooked elements in the system that underpins the effectiveness of Genomic Medicine.

It is argued that technology alone cannot produce clinical and social impact without qualified medical mediation. Accordingly, policies intended to strengthen clinical genomics must necessarily incorporate robust strategies for professional recognition, or they risk exacerbating existing inequalities in access to genetic diagnosis in Brazil.

METHODOLOGY

This is a qualitative, exploratory, and descriptive study structured as a narrative literature review, a method widely recognized as appropriate for broad and contextualized discussions of complex, multifaceted topics in which technical and scientific foundations are integrated with critical social, ethical, and organizational reflections (Rother, 2007; Cronin & George, 2023).

This article was developed according to the following methodological stages:

a) Definition of the guiding question: The study sought to address the following central question: How have contemporary advances in the molecular diagnosis of genetic diseases affected the practice of genetic counseling in Brazil, and to what extent does the devaluation of medical professionals compromise the effectiveness and equity of this process?

b) Literature search: Searches were conducted in PubMed/MEDLINE, the Scientific Electronic Library Online (SciELO), Google Scholar, the Virtual Health Library (Biblioteca Virtual em

Saúde—BVS), and institutional journals associated with Brazilian and international medical genetics societies, including the Brazilian Society of Medical Genetics and Genomics (Sociedade Brasileira de Genética Médica e Genômica—SBGM), the American College of Medical Genetics and Genomics (ACMG), and the European Society of Human Genetics (ESHG). Priority was given to publications issued between 2018 and 2024 to ensure that the technical and conceptual discussions presented were current, without precluding the selective inclusion of classic references of structural and historical importance that were essential to understanding the field's development.

c) Inclusion criteria: Original articles, systematic and narrative reviews, clinical guidelines issued by specialty societies, government regulatory documents, and chapters from major reference works in medical and molecular genetics were considered. All materials were written in Portuguese, English, or Spanish and were available in full text.

d) Exclusion criteria: Materials that had not undergone peer review, conference abstracts without sufficient methodological detail, and publications that were redundant or outdated in light of more recent evidence were excluded.

e) Analysis and synthesis: The selected material underwent analytical reading, thematic categorization, and critical synthesis. The content was organized into central thematic axes covering the foundations of Genomic Medicine, molecular diagnostic techniques, genetic counseling, and the human and professional dimensions of clinical genetics. These axes structure the development of this article.

Because this was a narrative literature review rather than research involving human participants, submission to a Research Ethics Committee was not required, in accordance with National Health Council Resolution No. 510/2016 (Brasil, 2016). The study's ethical commitment therefore lies in its faithful interpretation of the sources consulted and the transparency of the methodological and analytical choices adopted.

DEVELOPMENT

GENOMIC MEDICINE: FOUNDATIONS, DEVELOPMENT, AND THE RECONFIGURATION OF CLINICAL PRACTICE

Genomic Medicine may be defined as the field of medical practice that uses information derived from the individual genome, and, more broadly, from its structural, epigenetic, and functional variants, to inform clinical decisions concerning the prevention, diagnosis, and treatment of health conditions (Green et al., 2020).

It differs from traditional medical genetics, which focuses more heavily on the study of individual genes and classical Mendelian disorders, through its systemic and integrative approach. This approach encompasses conditions ranging from rare monogenic variants to the polygenic architecture of common diseases such as diabetes, cardiovascular disease, and various types of cancer (Manolio et al., 2019).

The foundational milestone of this field was the completion of the Human Genome Project in 2003, which enabled the complete mapping of the human genome's nucleotide sequence (Lander, 2011).

However, the routine application of genomics to clinical practice became feasible only with the development and subsequent widespread adoption of next-generation sequencing technologies beginning in the second decade of the twenty-first century, owing to the dramatic reductions in sequencing costs and turnaround times (Rehm & Green, 2021).

According to data from the National Human Genome Research Institute, the cost of sequencing a complete human genome, which exceeded USD 100 million in 2001, had fallen to less than USD 1,000 in large-scale sequencing settings by 2015 and has continued on a downward trajectory (Wetterstrand, 2023).

This reduction in cost enabled the progressive integration of genomics into different levels of healthcare, from primary care to highly specialized services, substantially changing the care model for genetic conditions.

Rehm and Green (2021) identify four major areas of application around which contemporary Genomic Medicine is organized: (i) the molecular diagnosis of Mendelian and rare diseases; (ii) population screening and carrier detection; (iii) pharmacogenomics, involving individualized therapeutic adjustment; and (iv) oncogenomics, involving the molecular characterization of tumors for prognostic and therapeutic purposes.

In Brazil, the integration of Genomic Medicine into the Unified Health System has progressed unevenly and, at times, inadequately. It remains concentrated predominantly in university hospitals and regional referral centers, which serve as hubs for the dissemination of technical knowledge and the provision of specialized care (Horovitz et al., 2022).

The National Policy for Comprehensive Care in Clinical Genetics (Política Nacional de Atenção Integral em Genética Clínica), established by Ordinance No. 199/2014 and reformulated through subsequent regulations (Brasil, 2014; Brasil, 2023), sought to establish a national medical genetics referral network linking services at different levels of complexity.

Nevertheless, recent studies indicate that these services remain geographically concentrated in Brazil's South and Southeast, undermining equitable access to genetic diagnosis in historically underserved regions such as the North and Northeast (Horovitz et al., 2022; Zatz et al., 2021).

CONTEMPORARY TECHNIQUES FOR THE MOLECULAR DIAGNOSIS OF GENETIC DISEASES

The molecular characterization of genetic diseases is based on a diverse set of molecular biology techniques. The technique selected depends on the nature of the clinical suspicion, the type of genetic alteration expected, such as a single-nucleotide variant, deletion, duplication, repeat expansion, or complex structural rearrangement, and the health service's technological and financial resources.

a) Polymerase Chain Reaction (PCR) and its contemporary variants: PCR remains a foundational technique in diagnostic molecular biology and is widely used to amplify specific genomic regions before sequence or fragment analysis.

Contemporary variants, such as real-time quantitative PCR (qPCR) and, more recently, digital PCR (dPCR), offer substantially greater sensitivity and precision. They enable, for example, the absolute quantification of gene copy number and the detection of variants with low allele frequencies, with growing relevance to oncogenomics and noninvasive prenatal testing (Cifuentes et al., 2023).

b) Next-Generation Sequencing (NGS): NGS revolutionized molecular diagnosis by enabling the simultaneous sequencing of multiple genes through multigene panels, the entire exome through Whole-Exome Sequencing (WES), or the entire genome through Whole-Genome Sequencing (WGS), within time and cost parameters compatible with clinical practice (Rehm & Green, 2021).

Recent multicenter studies show that exome or genome sequencing, when used as a first-line diagnostic strategy for rare diseases of undetermined etiology, achieves diagnostic yields between 30% and 50%. These rates are substantially higher than those obtained through traditional sequential, gene-by-gene testing approaches (Clark et al., 2018; Splinter et al., 2018; French et al., 2019).

In Brazil, initiatives such as the Rare Genomes Project (Projeto Genomas Raros) and population sequencing consortia have sought to expand access to these technologies, although their full integration into the SUS remains incipient (Zatz et al., 2021).

c) Chromosomal Microarray Analysis (CMA): Primarily indicated for the investigation of intellectual disability, autism spectrum disorders, and multiple congenital anomalies of undetermined etiology, this technique enables the detection of submicroscopic structural variants, including genomic deletions and duplications known as Copy Number Variants (CNVs), which cannot be identified through conventional karyotyping.

International guidelines, including those issued by the American College of Medical Genetics and Genomics (ACMG), recommend CMA as a first-line test for patients with syndromic or

nonsyndromic intellectual disability of undetermined cause. This has restricted the use of traditional karyotyping to more specific indications, such as suspected classical aneuploidies or balanced rearrangements (Miller et al., 2010; South et al., 2021).

In the prenatal context, CMA has been progressively incorporated into the investigation of fetal anomalies identified by ultrasonography, increasing the diagnostic yield compared with fetal karyotyping alone (Levy & Wapner, 2018).

d) Sanger sequencing: Despite the expansion of NGS, Sanger sequencing remains methodologically relevant as a confirmatory technique, particularly for validating variants identified by high-throughput platforms and for the targeted testing of relatives for variants previously identified in the index case, known as cascade testing. It therefore represents an indispensable stage in the carrier-detection process (Rehm & Green, 2021).

e) Techniques for detecting repeat expansions and epigenetic abnormalities: Disorders such as fragile X syndrome, spinocerebellar ataxias, and Huntington's disease, which are characterized by trinucleotide-repeat expansions, require specific methods, such as flanking-primer PCR and triplet-primed PCR, because conventional short-read NGS platforms have limited sensitivity for these alterations.

Similarly, disorders of epigenetic origin, such as Prader–Willi and Angelman syndromes, require specific methylation-analysis techniques, including Methylation-Specific PCR (MS-PCR) and Methylation-Specific Multiplex Ligation-dependent Probe Amplification (MS-MLPA) (Buiting et al., 2021).

f) Noninvasive Prenatal Testing (NIPT) and fetal biopsies: The identification of circulating cell-free fetal DNA in maternal plasma enabled the development of Noninvasive Prenatal Testing (NIPT), a technique based on massively parallel sequencing that can screen for common fetal aneuploidies with high sensitivity and specificity. It reduces the need for invasive procedures

such as amniocentesis and chorionic villus sampling, which have traditionally been associated with a risk of pregnancy loss (Cifuentes et al., 2023).

It should be emphasized, however, that NIPT is a screening test rather than a definitive diagnostic test. Positive results must therefore be confirmed through invasive methods combined with conventional molecular or cytogenetic techniques (Skotko & Kishnani, 2022).

Taken together, these technologies reveal an increasingly sophisticated technical landscape. Paradoxically, this increases rather than reduces the need for specialized medical mediation, as the proliferation of diagnostic platforms requires professionals to judiciously select the most appropriate test for each clinical context and to competently interpret results that are often ambiguous. These include Variants of Uncertain Significance (VUS), which remain common even with the most advanced platforms (Richards et al., 2015; Rehm & Green, 2021).

CARRIER DETECTION, PRENATAL DIAGNOSIS, AND GENETIC COUNSELING: AN INSEPARABLE TRIAD

The detection of asymptomatic carriers of pathogenic variants is a central pillar of secondary prevention in medical genetics, particularly for autosomal recessive and X-linked disorders, in which heterozygous individuals do not manifest the phenotype but face a significant reproductive risk.

Carrier-screening programs, traditionally directed toward populations at increased risk, such as cystic fibrosis screening in certain ethnic groups or hemoglobinopathy screening in high-prevalence regions, have expanded in the genomic era to include Expanded Carrier Screening (ECS). These approaches can simultaneously screen for hundreds of recessive conditions using NGS multigene panels (Edwards et al., 2015; Sanderson et al., 2021).

In Brazil, a country characterized by extensive population admixture and a high frequency of consanguineous marriage in certain regions, carrier screening has particular epidemiological relevance. This is especially true given the high prevalence of diseases such as sickle cell anemia and other

hemoglobinopathies, screening for which has formed part of the National Newborn Screening Program (Programa Nacional de Triagem Neonatal) since 2001 (Brasil, 2016; Zatz et al., 2021).

However, the extension of such screening to the preconception or prenatal period using broader molecular approaches remains limited outside major urban centers.

Molecular prenatal diagnosis enables the identification of fetal genetic conditions at a point in pregnancy when families can make informed reproductive decisions. These may concern preparing for the birth of a child with special needs, considering fetal therapeutic interventions when available, or evaluating circumstances in which the termination of pregnancy is legally permitted under Brazilian law, notably in cases of anencephaly and other fetal conditions incompatible with extrauterine life (Brasil, STF, ADPF 54, 2012).

It is precisely at this point that genetic counseling proves indispensable. According to the definition established by the National Society of Genetic Counselors, genetic counseling is "the process of helping people understand and adapt to the medical, psychological, and familial implications of genetic contributions to disease" (Resta et al., 2006; updated by Ormond et al., 2018).

This is an inherently relational process that cannot be reduced to the mere communication of laboratory results. It requires the professional, whether a medical geneticist or a genetic counselor when one is part of the team, to possess sophisticated communication skills, ethical sensitivity when addressing complex reproductive decisions, and the ability to translate probabilistic information into terms that families can understand while respecting their autonomy and values (Sanderson et al., 2021; Ormond et al., 2018).

The international literature emphatically shows that the absence of qualified genetic counseling is associated with adverse psychosocial outcomes, including anxiety, guilt, poorly informed reproductive decisions, and distrust of the healthcare system (Skotko & Kishnani, 2022). This reinforces the central argument of this article: no molecular technology, regardless of how advanced it may be, can replace

qualified human and professional mediation. This necessarily leads to a discussion of the recognition afforded to such professionals in Brazil.

THE (DE)VALUATION OF MEDICAL GENETICISTS: A STRUCTURAL BOTTLENECK IN BRAZILIAN GENOMIC MEDICINE

Although the technological developments described in the preceding sections suggest a promising outlook for Brazilian clinical genomics, the sustainability of this model is seriously threatened by a multifaceted process of devaluation affecting the medical profession. This is particularly evident in specialties characterized by relatively few procedures and a high degree of cognitive complexity, such as medical genetics.

Data from Demografia Médica no Brasil 2023 [Medical Demographics in Brazil 2023] (Scheffer et al., 2023) show that medical genetics is among the specialties with the smallest absolute number of professionals in the country. These professionals are heavily concentrated in the states of São Paulo, Rio de Janeiro, and Rio Grande do Sul, with alarming disparities relative to other regions. In several states in the North and Northeast, there are estimated to be fewer than one medical geneticist per 500,000 inhabitants.

This shortage does not result solely from a lack of vocational interest. Rather, it is associated with structural determinants that are well documented in the literature on the medical profession in Brazil (Machado & Oliveira, 2022; Scheffer et al., 2023):

1. Longstanding inadequacy of remuneration: The reference reimbursement rates in the SUS Fee Schedule for clinical genetics consultations and procedures have, for decades, remained disconnected from the technical complexity and clinical time required. A genetic counseling consultation often takes between 60 and 90 minutes, yet is reimbursed at a level incompatible with the time and expertise involved.

2. Precarious employment arrangements and the absence of a structured career path: Most medical geneticists working within the SUS are employed under precarious contractual arrangements, without career plans, opportunities for professional progression, or stability equivalent to that available in other public-service careers. This compromises professional retention, particularly outside major urban centers (Machado & Oliveira, 2022).
3. Excessive workloads and burnout: The shortage of professionals places an excessive burden on the few geneticists in practice. This phenomenon has been widely described in the literature on physician burnout and directly affects the quality of clinical listening and the genetic counseling provided (Scheffer et al., 2023).
4. Symbolic lack of prestige and institutional invisibility: Unlike specialties with high technological and media visibility, medical genetics remains poorly understood by public administrators and society in general. This results in low budgetary priority and insufficient investment in medical residency and continuing education in the field (Horovitz et al., 2022).

This situation creates a structural paradox: Brazil invests, albeit insufficiently, in laboratory infrastructure and technological integration, as exemplified by population genomic sequencing consortia, but fails to ensure the training, retention, and recognition of the medical professionals capable of translating this investment into effective care.

As Sanderson et al. (2021) aptly summarize, “genomic technology without qualified genetic counseling is, at best, incomplete information; at worst, it is a source of psychological and decisional iatrogenic harm.”

The devaluation of medical geneticists should therefore be understood not as a matter of professional self-interest or a demand made by a particular occupational category, but as an issue of public health and social justice. Their scarcity directly exacerbates regional inequities in access to genetic diagnosis and counseling. Populations in Brazil’s North and Northeast, which have historically received

less healthcare coverage, remain those most adversely affected by this gap in care (Horovitz et al., 2022; Zatz et al., 2021).

FINAL CONSIDERATIONS

This review has shown that Genomic Medicine unequivocally represents a paradigmatic revolution in the diagnostic, preventive, and therapeutic approach to genetic diseases. It is supported by an increasingly sophisticated technical arsenal, ranging from next-generation sequencing and chromosomal microarray analysis to the various forms of polymerase chain reaction and noninvasive prenatal testing techniques.

These advances have significantly expanded the capacity to establish definitive diagnoses of rare diseases, detect asymptomatic carriers, and screen for fetal conditions, directly improving the quality and accuracy of the genetic counseling offered to Brazilian families.

However, the critical analysis developed throughout this article supports the conclusion that technological determinism, understood as the belief that advances in molecular platforms alone would be sufficient to guarantee equitable, high-quality care, represents an inadequate and potentially dangerous interpretation of the Brazilian context.

Technology alone cannot interpret variants of uncertain significance, conduct an ethically responsible genetic counseling process, provide support to families facing the distress of an adverse diagnosis, or coordinate the healthcare network required for a patient's longitudinal follow-up. All these functions remain, and must remain, the irreplaceable responsibility of properly trained and adequately valued medical professionals.

The growing devaluation of the medical profession in contemporary Brazil, reflected in inadequate remuneration, precarious employment arrangements, excessive clinical workloads, and symbolic lack of prestige, has a directly harmful effect on the effectiveness of Genomic Medicine when it affects specialties characterized by relatively few procedures and high cognitive complexity, such as

medical genetics. It undermines the field's capacity to translate technological progress into tangible clinical benefits distributed equitably across the population.

It is therefore recommended that public policies aimed at expanding clinical genomics within the Unified Health System inseparably incorporate robust strategies for professional recognition, including revisions to reimbursement schedules, the establishment of structured career paths, an expansion in the number of medical residency positions in genetics, incentives to retain professionals in underserved regions, and stronger institutional and symbolic recognition of the specialty.

Without such measures, Brazil faces a concrete risk of consolidating a two-tier system of Genomic Medicine: cutting-edge genomics, technologically comparable to that available in the world's most advanced centers, accessible to a minority of the population concentrated in major urban centers; and a vast majority of the Brazilian population excluded from this progress, not because of technological limitations, but because of the absence of qualified medical professionals capable of transforming that technology into genuine care.

Future quantitative studies employing longitudinal designs are recommended to measure more precisely the direct effects of the shortage of medical geneticists on clinical and psychosocial outcomes among Brazilian families affected by genetic diseases. Such evidence could provide a robust foundation for the formulation of more effective public policies in this strategically important area of national healthcare.

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THERANOSTICS IN NUCLEAR MEDICINE: INTEGRATING DIAGNOSTIC PRECISION AND PERSONALIZED THERAPY

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Abstract

Theranostics in nuclear medicine is an innovative approach that integrates molecular diagnosis and targeted therapy through the use of specific radiopharmaceuticals, enabling greater precision in disease characterization and more individualized treatment. This study is a descriptive literature review aimed at analyzing the application of theranostics in nuclear medicine, with emphasis on its foundations, main radiopharmaceuticals, clinical indications, benefits, and prospects for personalized medicine. The methodology was based on an analysis of scientific publications concerning the use of theranostic pairs, particularly in prostate cancer and neuroendocrine tumors, with consideration given to molecular imaging methods and radionuclide therapies. The results demonstrate that this approach enables the prior identification of molecular target expression, the selection of patients with a greater likelihood of therapeutic response, the delivery of radionuclides to tumor cells, and the monitoring of treatment effectiveness. The integration of diagnosis and therapy was also found to have the potential to improve therapeutic precision and reduce unnecessary exposure of healthy tissues. It is concluded that theranostics represents a major advance in contemporary nuclear medicine, contributing to more individualized treatments and strengthening precision medicine.

Keywords: Nuclear Medicine, Personalized Therapy, Precision Medicine, Radiopharmaceuticals, Theranostics.

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INTRODUCTION

Nuclear medicine has significantly expanded its role in healthcare, particularly in oncology, by enabling the assessment of biological and molecular processes that cannot always be identified solely through anatomical changes. In this context, theranostics has gained prominence by combining, within a single clinical strategy, two stages traditionally addressed separately: diagnosis and therapy. The term is derived from the combination of therapy and diagnostics and, in nuclear medicine, refers to the use of molecules directed at specific biological targets and labeled with radionuclides suitable for imaging or treatment. Thus, the target identified during the diagnostic stage can serve as a reference for selecting and directing therapy (Herrmann et al., 2020).

This possibility has changed how the role of radiopharmaceuticals in clinical practice is understood. Rather than using them exclusively to locate or characterize abnormalities, the theranostic approach allows information obtained from imaging studies to contribute directly to therapeutic decision-making. Könik et al. (2021) emphasize that integrating quantitative imaging with radionuclide therapy makes it possible to assess the distribution of radiopharmaceuticals in tumors and normal tissues, providing important information for individualized treatment planning. In this way, nuclear medicine is increasingly aligned with the principles of precision medicine, in which the biological characteristics of both the disease and the patient are considered when defining the course of treatment.

Although the use of radionuclides for both diagnosis and treatment is not a recent concept, advances made over the past several decades have substantially strengthened this field. The use of radioiodine in thyroid diseases is considered one of the best-known historical examples of this principle. Today, however, new molecules and biological targets have broadened the potential applications of theranostics, particularly in oncology. Among the strategies that have achieved the greatest clinical development are those directed at somatostatin receptors, which are present in certain neuroendocrine tumors, and at prostate-specific membrane antigen (PSMA), which is used in the management of prostate cancer (Solnes et al., 2020).

The rationale underlying these applications can be understood through the prior identification of a molecular target. In neuroendocrine tumors, for example, somatostatin receptor expression can be assessed using molecular imaging with specific radiopharmaceuticals. When sufficient target expression is demonstrated, radionuclide therapy directed at the same receptor may be considered. Similarly, in prostate cancer, PSMA-targeted molecular imaging can help identify patients who are more likely to benefit from radioligand therapies. This model contributes to treatment selection based on the characteristics demonstrated by the disease in each patient, rather than relying exclusively on the tumor's anatomical or histological classification (Virgolini et al., 2018).

Lutetium-177 is among the radionuclides that have gained prominence in this context and is used in therapies directed at different molecular targets. The expansion of therapies using ^177Lu combined with specific ligands represents one of the most significant examples of the incorporation of theranostics into contemporary oncology. In metastatic castration-resistant prostate cancer, for example, PSMA-targeted therapy has become an important area of clinical development. Sartor and Herrmann (2022) emphasize the growing importance of ^177Lu-PSMA-617 following the results of phase III clinical trials, thereby strengthening the role of theranostic strategies in the treatment of advanced prostate cancer.

Despite these promising results, the incorporation of theranostics also involves issues that must be carefully examined. Appropriate patient selection, the availability of radiopharmaceuticals and radionuclides, nuclear medicine service infrastructure, the training of multidisciplinary teams, the evaluation of treatment response, and the determination of therapeutic activity are important considerations for its safe and effective use. Challenges also remain regarding the standardization of protocols and follow-up criteria, particularly as new targets and radiopharmaceuticals are incorporated into clinical practice. Herrmann et al. (2020) note that the development of radiotheranostics requires not only scientific innovation but also appropriate organizational structures to support the sustainable incorporation of these technologies into healthcare systems.

In view of this context, the following question was established as the guiding research problem of this study: How does the integration of molecular diagnosis and targeted therapy provided by theranostics contribute to increasing diagnostic precision and promoting treatment personalization in nuclear medicine? This discussion is relevant because identifying the therapeutic target in advance can help select patients with a greater likelihood of benefiting from treatment while also enabling treatment response to be monitored. According to Solnes et al. (2020), advances in theranostics have the potential to significantly change the management of different malignancies by strengthening the relationship between molecular imaging, patient selection, and targeted therapies.

The general objective of this chapter is to analyze the application of theranostics in nuclear medicine and its contribution to the integration of diagnostic precision and personalized therapy. Specifically, it seeks to explain the foundations of the theranostic approach; describe the role of radiopharmaceuticals and the main radionuclides used in diagnosis and treatment; discuss relevant clinical applications, particularly in neuroendocrine tumors and prostate cancer; analyze the benefits of selecting patients through molecular imaging; and identify the challenges and prospects associated with the expansion of this strategy in precision medicine.

This study is justified by the growing importance of personalized medicine in the care of patients with complex diseases, particularly in oncology. Theranostics has one especially relevant characteristic: before a particular radionuclide therapy is administered, it is possible to investigate whether the molecular target is sufficiently present in that patient's disease. This association tends to support better-informed therapeutic decisions and may prevent unsuitable interventions in individuals whose target expression is insufficient. In addition, molecular imaging can be used to monitor radiopharmaceutical distribution and evaluate therapeutic response, expanding the possibilities for monitoring throughout treatment (Könik et al., 2021).

Studying theranostics therefore entails discussing an important change in the role of nuclear medicine itself. The field is no longer associated predominantly with diagnostic imaging and is assuming

an increasingly prominent position in the selection, delivery, and monitoring of targeted therapies. Advances involving targets such as somatostatin receptors and PSMA demonstrate that diagnosis and treatment can form part of a single strategy based on the molecular characteristics of the disease. At the same time, expansion to new targets and radionuclides indicates that theranostics is likely to remain one of the areas of greatest interest in the development of nuclear medicine and precision oncology in the coming years (Weber et al., 2020).

METHODOLOGY

This study is a descriptive and exploratory literature review with a qualitative approach, conducted to gather and discuss scientific knowledge related to theranostics as applied to nuclear medicine. This research design was selected because of the need to understand the foundations of the integration between molecular diagnosis and radionuclide therapy, as well as its main clinical applications, benefits, limitations, and prospects in the context of precision medicine.

According to Gil (2022), bibliographic research is based on previously published materials and allows researchers to analyze the various existing contributions concerning a particular problem. Accordingly, the methodological process was organized to provide a well-founded analysis of the literature without restricting the discussion to a single radiopharmaceutical, radionuclide, or type of malignancy.

RESEARCH TYPE AND DESIGN

This is a narrative literature review of a descriptive and exploratory nature. This type of review is appropriate when the aim is to present a broad understanding of a particular subject by integrating conceptual aspects and evidence produced by different types of studies. Unlike systematic reviews, narrative reviews allow for a more comprehensive discussion of the development and applications of a

field of knowledge and are particularly useful for subjects characterized by rapid technological development and diverse clinical approaches.

The research was descriptive because it sought to present the characteristics of theranostics, the mechanisms involved in the use of radiopharmaceuticals, and their main applications. Its exploratory component concerned the investigation of recent advances, limitations, and prospects associated with this approach. The qualitative analysis focused on interpreting and integrating information found in the literature while considering its contribution to understanding the relationship among diagnosis, patient selection, and personalized therapy.

SEARCH STRATEGY AND INFORMATION SOURCES

The literature search focused on the PubMed/MEDLINE, Scopus, Web of Science, and SciELO databases and was supplemented with technical documents and publications issued by recognized scientific organizations in the field of nuclear medicine. Priority was given to peer-reviewed scientific articles, reviews, clinical trials, and consensus documents concerning the clinical use of theranostics.

To locate publications, descriptors and terms related to the subject were used in Portuguese and English, including “teranóstica,” “theranostics,” “medicina nuclear,” “nuclear medicine,” “radiofármacos,” “radiopharmaceuticals,” “radionuclide therapy,” “molecular imaging,” “precision medicine,” “personalized medicine,” “PSMA,” and “neuroendocrine tumors.” The terms were used both individually and in combination to address the general foundations and specific applications of theranostics.

The search also included publications concerning diagnostic and therapeutic pairs used in clinical practice, particularly those targeting prostate-specific membrane antigen, or PSMA, and somatostatin receptors. These two applications received particular attention because they are important examples of the consolidation of the theranostic approach in contemporary oncology (Herrmann et al., 2020; Solnes et al., 2020).

INCLUSION AND EXCLUSION CRITERIA

Scientific articles, reviews, and clinical studies published preferably between 2015 and 2026 in Portuguese or English were considered eligible if they were directly related to the use of theranostics in nuclear medicine. Publications predating this period were retained when considered relevant to the historical or conceptual contextualization of the subject.

The inclusion criteria encompassed studies addressing the foundations of theranostics; the use of radiopharmaceuticals for diagnosis and therapy; molecular imaging applied to patient selection; radionuclide therapy; neuroendocrine tumors; prostate cancer and PSMA; dosimetry; therapeutic response assessment; safety; limitations; and prospects for personalized nuclear medicine.

Publications that were not directly related to the study objective, duplicate studies, texts containing insufficient information to support the discussion, and studies that addressed diagnostic techniques exclusively without establishing a relationship with the theranostic principle were excluded.

SELECTION AND ORGANIZATION OF THE MATERIAL

Following the initial search, titles and abstracts were reviewed to identify the publications most closely aligned with the established objectives. The available full texts of potentially relevant studies were examined, with particular attention to the research purpose, study population, radiopharmaceuticals used, molecular target, imaging modality, therapeutic radionuclide, clinical outcomes, adverse effects, and conclusions presented by the authors.

To organize the information, an analysis matrix was adopted that included the author and year of publication, study design, clinical application, molecular target, radiopharmaceutical or radionuclide used, key findings, and contribution to theranostics. This procedure made it possible to compare different publications and identify recurring themes in the literature.

The analysis was not intended to perform a meta-analysis or calculate a pooled effect because the study was designed as a narrative review. The bibliographic sample therefore consisted of the set of

publications selected after the eligibility criteria had been applied, based on their relevance to answering the research problem and meeting the proposed objectives.

DATA ANALYSIS AND DISCUSSION

The extracted information underwent qualitative analysis and was organized according to thematic similarities. The discussion was structured around four main themes: the foundations of theranostics and its relationship with precision medicine; radiopharmaceuticals and theranostic pairs; applications in neuroendocrine tumors and prostate cancer; and the benefits, limitations, and prospects of personalized radionuclide therapy.

The interpretation of the studies considered that theranostics is not limited to combining an examination with a treatment but involves identifying a molecular target capable of guiding patient selection and subsequent therapeutic intervention. Herrmann et al. (2020) emphasize that radiotheranostics occupies an important position in the expansion of personalized medicine, particularly because information obtained through molecular imaging can be used to direct specific treatments.

In the field of neuroendocrine tumors, evidence concerning the identification of somatostatin receptors and targeted radionuclide therapy was analyzed. For prostate cancer, the analysis focused primarily on PSMA-based applications, as PSMA expression can be assessed by molecular imaging and subsequently exploited for therapeutic purposes. This strategy became particularly relevant with the development of lutetium-177-labeled radioligands, which expanded therapeutic possibilities for patients with advanced disease (Sartor; Herrmann, 2022).

The discussion also considered the results of major clinical trials. In the VISION trial, Sartor et al. (2021) demonstrated the clinical benefits of treatment with ^177Lu-PSMA-617 in addition to standard care in selected patients with metastatic castration-resistant prostate cancer. In neuroendocrine tumors, Strosberg et al. (2017), in the NETTER-1 trial, demonstrated significant results for therapy with ^177Lu-DOTATATE in patients with advanced midgut neuroendocrine tumors.

A joint analysis of this evidence made it possible to discuss how the prior identification of molecular targets can contribute to patient selection, guide treatment choice, and support the monitoring of treatment response. Aspects related to toxicity, dosimetry, radiopharmaceutical availability, required infrastructure, and the need for specialized teams were also considered. The aim was therefore to develop a balanced discussion addressing not only the benefits of theranostics but also the barriers that continue to hinder its broader incorporation into clinical practice.

ETHICAL CONSIDERATIONS

Because this literature review was based exclusively on information from scientific publications and documents available in the literature, it involved no direct participation by human subjects and no collection of individual or identifiable data. Submission to a Research Ethics Committee was therefore unnecessary. Nevertheless, the principles of academic integrity were observed by acknowledging the sources used and respecting the authorship of the scientific works on which the research was based.

RESULTS AND DISCUSSION

The literature analysis demonstrated that theranostics occupies an increasingly important position in nuclear medicine, particularly because it establishes a direct link between identifying molecular targets and selecting treatment. The studies analyzed indicate that this strategy is currently most firmly established in the management of neuroendocrine tumors and prostate cancer, although new applications are being investigated. Overall, the evidence reveals an important shift in the approach to patient care: molecular imaging no longer performs a diagnostic function alone but also provides information for patient selection, treatment planning, and outcome monitoring.

Solnes et al. (2020) regard theranostics as one of the fields reshaping nuclear medicine within precision medicine. According to the authors, the ability to identify particular tumor targets in advance and subsequently direct a therapeutic agent toward those same targets creates conditions for a more

individualized approach. This characteristic helps explain the growing interest in the field because not all patients with the same histological diagnosis exhibit identical molecular behavior or similar expression of the targets used by radiopharmaceuticals.

INTEGRATION OF DIAGNOSIS AND THERAPY

One of the key findings of the literature review was the importance of integrating the diagnostic and therapeutic phases. In the conventional approach, imaging examinations help locate and characterize the disease and determine its extent. In theranostics, however, the information obtained through molecular imaging also assists in assessing the presence of the target to which radionuclide therapy may subsequently be delivered.

This characteristic is particularly important because it enables a form of biological selection before treatment. Rather than considering only the presence of a particular malignancy, the aim is to determine whether its cells possess molecular characteristics compatible with the proposed therapeutic agent. Marin et al. (2020) emphasize that theranostics integrates imaging and treatment within precision oncology by using disease-specific molecular characteristics to guide the clinical approach.

In practice, this integration may involve the use of the same molecule, or molecules with similar biological behavior, combined with radionuclides intended for imaging or treatment. This rationale is present, for example, in systems targeting somatostatin receptors and PSMA. The review findings therefore indicate that the main conceptual contribution of theranostics lies not only in the availability of new radiopharmaceuticals but also in the ability to connect diagnosis, patient selection, treatment, and monitoring within a single care strategy.

Box 1

Key Features of the Theranostic Approach in Nuclear Medicine

Stage	Purpose	Clinical contribution
Molecular target identification	Determine the presence and distribution of the target	Assists in patient selection
Molecular imaging	Visualize radiopharmaceutical distribution	Characterizes the disease and its extent
Treatment selection	Assess the feasibility of targeted therapy	Promotes individualized treatment
Radionuclide therapy	Deliver radiation to the tissue expressing the target	Provides targeted therapeutic action
Post-therapy assessment	Monitor distribution and response	Assists in treatment monitoring

Source: Prepared by the authors based on Solnes et al. (2020) and Marin et al. (2020).

THERANOSTICS IN NEUROENDOCRINE TUMORS

Among the applications identified in the literature, neuroendocrine tumors represent one of the most firmly established examples of the clinical use of theranostics. Many of these malignancies express somatostatin receptors, a characteristic that can be exploited for both imaging and treatment.

The clinical relevance of this strategy was clearly demonstrated by the NETTER-1 trial. Strosberg et al. (2017) evaluated 229 patients with advanced, progressive, somatostatin receptor-positive midgut neuroendocrine tumors. A total of 116 patients treated with ^177Lu-DOTATATE were compared with 113 patients in the control group, who received high-dose long-acting repeatable octreotide (octreotide LAR). At 20 months, the estimated progression-free survival rate was 65.2% in the ^177Lu-DOTATATE group and 10.8% in the control group. The objective response rate also differed, reaching 18% in the ^177Lu-DOTATATE group and 3% in the control group.

Table 1

Key findings of the NETTER-1 trial

Indicator	^177Lu-DOTATATE	Control group
Number of patients	116	113
Estimated progression-free survival at 20 months	65,2%	10,8%
Objective response rate	18%	3%
Progression or death events in the primary analysis	23	68

Source: Prepared by the authors based on Strosberg et al. (2017).

These data are relevant because they demonstrate that the theranostic principle extends beyond the theoretical domain and produces measurable clinical effects. In the primary analysis, the study found a 79% reduction in the risk of disease progression or death in the treatment group compared with the control group. In this case, somatostatin receptor expression serves not only as a tumor characteristic identified through imaging but also as a factor that enables the therapy to be directed toward the target.

This result reinforces one of the central aspects identified in this review: the effectiveness of theranostics depends on the presence of a target that is sufficiently expressed by tumor cells and accessible to the radiopharmaceutical. Molecular imaging therefore helps identify in advance those patients for whom the therapy has a biological rationale.

APPLICATION IN PROSTATE CANCER AND PSMA TARGETING

Another relevant finding was the expansion of strategies targeting prostate-specific membrane antigen, or PSMA. The high expression of this protein in a substantial proportion of prostate cancer cells, particularly in certain advanced disease settings, has made PSMA an important target for developing agents used in both positron emission tomography/computed tomography (PET/CT) and radioligand therapies

The results of the VISION trial made a decisive contribution to consolidating this application. Sartor et al. (2021) investigated ^177Lu-PSMA-617 in previously treated patients with metastatic castration-resistant prostate cancer. In the population used for the imaging-based progression-free survival analysis, median progression-free survival was 8.7 months among patients who received ^177Lu-PSMA-617 in addition to standard care, compared with 3.4 months in the control group, corresponding to a hazard ratio for progression or death of 0.40.

Table 2

Summary of theranostic applications discussed in the literature

Clinical condition	Main target	Diagnostic application	Therapeutic application
Neuroendocrine tumors	Somatostatin receptors	Somatostatin receptor imaging	^177Lu-DOTATATE
Prostate cancer	PSMA	PSMA-targeted PET	^177Lu-PSMA-617
Differentiated thyroid diseases	Iodine metabolism/uptake	Radioiodine for functional assessment	^131I

Source: Prepared by the authors based on Solnes et al. (2020), Marin et al. (2020), Strosberg et al. (2017), and Sartor et al. (2021).

The case of PSMA also demonstrates why the diagnostic stage is essential. Target expression may vary among patients and among different lesions in the same individual. Consequently, a diagnosis of prostate cancer does not automatically mean that a patient has the characteristics required for a particular PSMA-targeted treatment. The experience from the VISION trial itself demonstrates the importance of imaging-based selection before therapy, reinforcing the genuinely personalized nature of the strategy.

CLINICAL BENEFITS AND CONTRIBUTION TO PERSONALIZED MEDICINE

The literature analyzed identified the key benefits of theranostics as more rigorous patient selection, the delivery of radiation to target-expressing tissue, the possibility of monitoring, and the closer integration of diagnosis and therapeutic decision-making. Collectively, these characteristics bring nuclear medicine closer to the concept of personalized medicine.

Therapeutic radiopharmaceuticals transport radionuclides to specific molecular structures. This does not mean that normal tissues are not exposed, because certain organs may also exhibit physiological uptake or participate in the elimination of these agents. For this reason, individualization should not be regarded as synonymous with toxicity-free treatment. The benefit lies in the possibility of achieving more specific biological targeting and selecting in advance those individuals who are more likely to exhibit adequate tumor uptake.

The results of the NETTER-1 and VISION trials provide concrete examples of this contribution. The former demonstrated a substantial benefit from ^177Lu-DOTATATE in selected patients with somatostatin receptor-positive neuroendocrine tumors, while the latter showed improvements in relevant outcomes with ^177Lu-PSMA-617 in selected patients with advanced prostate cancer.

SAFETY, LIMITATIONS, AND CHALLENGES

Despite favorable results, the studies also demonstrate that theranostics should not be understood as a risk-free approach or one that can be applied indiscriminately to all patients. In NETTER-1, for example, grade 3 or 4 hematologic adverse events, including neutropenia, thrombocytopenia, and lymphopenia, were reported in small proportions of patients treated with ^177Lu-DOTATATE. These results demonstrate the need for appropriate clinical and laboratory evaluation before and during treatment.

Another challenge concerns tumor heterogeneity. A patient may have lesions with different levels of expression of a particular molecular target, which affects both image interpretation and the expected therapeutic response. This issue is particularly important in the case of PSMA because the absence or insufficient expression of the target in certain lesions may limit the effectiveness of targeted therapy.

Structural considerations must also be taken into account. Implementing theranostic programs requires the availability of radionuclides and radiopharmaceuticals, suitable infrastructure, radiation protection protocols, and trained professionals. Solnes et al. (2020) draw attention to the need to prepare nuclear medicine services and specialists to incorporate these therapies safely and effectively.

PROSPECTS FOR THERANOSTICS IN NUCLEAR MEDICINE

The findings analyzed suggest that the theranostic field is likely to continue expanding. The success achieved with somatostatin receptors and PSMA has stimulated research into other molecular targets, new ligands, and different radionuclides. Marin et al. (2020) describe the field as part of the

evolution of precision oncology, in which advances in molecular imaging and targeted therapies are expected to expand opportunities for more individualized treatment.

In this regard, the development of theranostics depends not only on discovering new radiopharmaceuticals. Improvements in dosimetry, biomarker identification, an understanding of tumor heterogeneity, and the establishment of more precise criteria for patient selection and follow-up are also important to the advancement of the field.

Overall, the results of this review indicate that the main contribution of theranostics lies in changing the relationship between diagnosis and treatment. The two processes are no longer entirely independent stages but instead constitute a sequence guided by the molecular behavior of the disease. The clinical results obtained with ^177Lu-DOTATATE and ^177Lu-PSMA-617 demonstrate the potential of this strategy, while limitations related to target expression, toxicity, infrastructure, and access indicate that its expansion must be accompanied by careful evaluation and the continuous production of scientific evidence. Theranostics is thus becoming established not only as a technological innovation but also as an approach capable of expanding the role of nuclear medicine in the development of more individualized treatments.

CONCLUSION

This study aimed to analyze the application of theranostics in nuclear medicine, considering its contribution to the integration of diagnostic precision and personalized therapy. The literature reviewed made it possible to understand the foundations of this approach, its main clinical applications, the role of radiopharmaceuticals and radionuclides, and the benefits and limitations associated with incorporating this model into precision medicine.

The results demonstrated that theranostics represents an important change in the use of nuclear medicine because it brings together stages that were traditionally conducted separately. The prior identification of molecular targets through imaging makes it possible not only to characterize the disease

but also to select patients whose characteristics are compatible with a particular radionuclide therapy. In this regard, neuroendocrine tumors and prostate cancer are relevant examples of the clinical application of this principle.

Among the evidence analyzed, particular attention was given to the results concerning ^177Lu-DOTATATE in somatostatin receptor-positive neuroendocrine tumors and ^177Lu-PSMA-617 in metastatic castration-resistant prostate cancer. These advances demonstrate that patient selection based on the molecular characteristics of the disease can promote more targeted treatments and contribute to better clinical outcomes. At the same time, the approach does not eliminate the possibility of adverse events and requires individualized assessment, clinical monitoring, and appropriate infrastructure.

Another aspect highlighted was that theranostics should not be understood merely as the combination of a diagnostic examination and a treatment. Its importance lies in establishing a care pathway in which the molecular information initially obtained contributes to therapeutic decision-making and can continue to be used to monitor response. Nuclear medicine therefore assumes a broader role in patient care by bringing diagnosis, treatment planning, and monitoring closer together.

As a contribution, this study gathers and organizes important knowledge concerning a rapidly expanding field, highlighting its clinical potential without overlooking challenges such as tumor heterogeneity, toxicity, dosimetry, radiopharmaceutical availability, specialized infrastructure, and unequal access to new technologies. The consolidation of theranostics will depend not only on the development of new agents but also on the capacity of healthcare services to incorporate them safely, on a sound evidentiary basis, and in an accessible manner.

It is therefore concluded that theranostics has the potential to strengthen personalized medicine by enabling certain therapeutic decisions to be guided by the molecular characteristics demonstrated in the individual patient. The results already observed in certain malignancies indicate that this integration can provide relevant clinical benefits, although some issues still require further clarification. Future research

should investigate new molecular targets and radionuclide combinations, improve individualized dosimetry strategies, and evaluate long-term outcomes, safety, quality of life, and cost-effectiveness.

Studies addressing access to and implementation of these technologies in different healthcare systems, including the Brazilian context, are also necessary so that scientific advances can be effectively incorporated into healthcare delivery.

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KNOWLEDGE OF POSTPARTUM WOMEN RECEIVING PRIMARY HEALTH CARE REGARDING OBSTETRIC VIOLENCE IN A MUNICIPALITY IN PARAÍBA, BRAZIL

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Abstract

This study aimed to analyze knowledge about obstetric violence and its forms of manifestation among postpartum women receiving Primary Health Care in a municipality in the state of Paraíba, Brazil. This is an analytical study with a qualitative approach, conducted with 13 postpartum women who were users of Family Basic Health Units in Alagoinha, Paraíba, in October 2023. Data were collected through semi-structured interviews with audio recording and subjected to thematic content analysis, as proposed by Bardin. The results showed that most postpartum women did not receive adequate guidance during prenatal consultations regarding obstetric violence, which hindered the recognition of situations characterized as violence during labor and childbirth. It is concluded that the identified knowledge gaps reinforce the need to incorporate the topic of obstetric violence into health education activities developed during prenatal care. The importance of using specific educational strategies to increase pregnant women's knowledge about their rights and the different forms of obstetric violence is also highlighted, contributing to its prevention and to the recognition of possible situations of violence.

Keywords: Obstetrics, Obstetric Violence, Parturition, Postpartum Period, Pregnancy.

INTRODUCTION

Obstetric violence (violência obstétrica, OV) is understood as actions involving restrictions on the presence of a companion, the performance of medical procedures without consent, violations of privacy, refusal to administer analgesics, and violence in its various forms. The most common situations include neglect, physical violence, verbal violence, and psychological violence (Marinho et al., 2021).

Neglect occurs when a health professional fails to participate in family and reproductive planning, refuses to provide care, performs unnecessary procedures during labor, or prevents a pregnant woman from being accompanied by her partner or family members (Hakimi et al., 2025). Such conduct constitutes noncompliance with Federal Law No. 11,108/2005, which guarantees pregnant women the right to have a companion during labor and the postpartum period (Brasil, 2005).

In obstetric studies, physical violence refers to unnecessary interventions performed without the pregnant woman's consent. Practices contraindicated by the World Health Organization (WHO) include the administration of intravenous oxytocin, restrictions on fluid and food intake, excessive vaginal examinations, enemas, artificial rupture of the amniotic sac, pubic shaving, the imposition of birthing positions without considering the parturient woman's preference, denial of pain-relief methods, episiotomies, the use of forceps without clinical indication, limb immobilization, and application of the Kristeller maneuver (Brasil, 2017).

Within this context, a cesarean section may also constitute OV when performed without clinical indication or the woman's consent, as well as when her choice is denied, thereby preventing her from deciding how she will give birth. According to the WHO, Brazil has the second-highest percentage of cesarean births worldwide. Whereas the WHO recommends an ideal rate of between 25% and 30%, 55.6% of births in Brazil are performed by cesarean section. The percentage is even higher in private health services, where 85.5% of births are cesarean sections, according to data from the National Supplementary Health Agency (Marinho et al., 2021).

Furthermore, embarrassing, abusive, or derogatory comments about a pregnant woman that make her feel inferior because of her race, age, educational attainment, religion, beliefs, sexual orientation, socioeconomic status, number of children, or marital status, as well as sarcastic comments about her choice of birthplace, are associated with verbal obstetric violence (Menezes, 2022). Psychological violence, in turn, encompasses any word or action that makes a woman feel inferior, vulnerable, abandoned, frightened, emotionally unstable, or unsafe (Tordiman, 2022).

According to the study conducted by Lansky (2019), 12.7% of the pregnant women interviewed reported having experienced some form of OV, such as an episiotomy without clinical indication, the use of nonpharmacological methods, childbirth in a forced lithotomy position, prohibition of a companion during labor, and application of the Kristeller maneuver. This finding demonstrates that these women had

not received sufficient information to recognize that the situations they experienced could be characterized as OV.

In response to this lack of information, the Ministry of Health (Ministério da Saúde, MS) implemented the Prenatal and Birth Humanization Program (Programa de Humanização no Pré-Natal e Nascimento, PHPN) in 2000. The program was intended to develop health promotion and prevention activities to support obstetric and neonatal care, as well as the organization and regulation of such care within the Unified Health System (Sistema Único de Saúde, SUS). The PHPN seeks to systematize good practices in the care of pregnant women, eliminate disrespect, and safeguard women's rights in obstetric care (Brasil, 2002).

Policies were therefore established to safeguard women's rights, including the Comprehensive Women's Health Care Program (Programa de Assistência Integral à Saúde da Mulher, PAISM), which proposed a comprehensive approach to women's health that encompassed family and reproductive planning services, as well as other health-related needs (Freitas et al., 2023).

The Stork Network (Rede Cegonha) was subsequently established by GM/MS Ordinance No. 1,459 of June 24, 2011, to ensure that women received comprehensive and humanized care during pregnancy, childbirth, and the postpartum period (Brasil, 2011). In 2022, this network was replaced by the Maternal and Child Health Care Network (Rede de Atenção Materna e Infantil, RAMI), established by GM/MS Ordinance No. 715 of April 4, 2022 (Brasil, 2022). The Stork Network was later reinstated in 2023 and restructured as the Alyne Network (Rede Alyne) in 2024 through GM/MS Ordinance No. 5,350 of September 12, 2024, which is currently in force (Brasil, 2024). The new structure seeks to improve maternal and child health care, strengthen comprehensive and humanized care, and promote equity, including by safeguarding women's autonomy and rights throughout the pregnancy-postpartum cycle.

Health professionals play a vital role in preventing obstetric violence by informing pregnant women about their rights during prenatal care so that they know how to respond if they encounter a situation involving OV (Silva et al., 2024).

The importance of the Primary Health Care (Atenção Primária à Saúde, PHC) team in prenatal care must therefore be emphasized, as it plays an essential role in health promotion and prevention throughout the pregnancy-postpartum cycle. During care, health professionals may identify signs of postpartum depression and other problems that could adversely affect both the postpartum woman and the newborn. It is therefore essential that the multidisciplinary PHC team recognize such risks and provide pregnant women with guidance on the progression of pregnancy and the childbirth process, thereby ensuring safe and health-promoting care (Ferreira et al., 2024).

Accordingly, this study aims to analyze knowledge of obstetric violence and its forms of manifestation among postpartum women receiving Primary Health Care in a municipality in Paraíba, Brazil.

METHODOLOGY

STUDY TYPE, SETTING, AND PERIOD

This was an analytical study with a qualitative approach. The research was conducted in October 2023 in the municipality of Alagoinha, Paraíba.

STUDY POPULATION AND ELIGIBILITY CRITERIA

The study population consisted of postpartum women who used the Family Health Basic Units (Unidades Básicas de Saúde da Família, UBSF) in the aforementioned municipality. The municipality has seven units, six of which are located in the urban area: 1) Manoel de Souza e Silva UBSF; 2) Miguel Severino Monteiro UBSF; 3) Dr. Antônio Ciraulo Barroso UBSF; 4) Flávio Gomes de Araújo UBSF; 5) José Borges Gondim UBSF; and 6) Gonçalo Joaquim de Andrade Silveira UBSF. One unit is located in the rural area: 7) Berenice Tibúrcio da Silva UBSF. Postpartum women aged 18 years or older who had received prenatal care at the municipality's UBSFs and remained actively registered with these units during the data-collection period were considered eligible and invited to participate.

For this part of the study, the semi-structured interview guide was administered to 13 postpartum women. This number was determined according to the criterion of theoretical saturation, which was reached when the information obtained during the interviews began to recur and no new elements relevant to the subject under investigation emerged. Data collection was preceded by technical training for the lead researcher, conducted under the supervision of the study advisor, to ensure standardized procedures and the reliability of the information collected.

DATA-COLLECTION INSTRUMENTS AND PROCEDURES

Data were collected through audio-recorded interviews conducted using a semi-structured guide. Before each interview, sociodemographic information was collected through a questionnaire, including race, educational attainment, marital status, place of residence, number of pregnancies, number of prenatal consultations, number of children, mode of delivery, and place of delivery.

Before the study was conducted, a meeting was held with the municipal health secretary to present the study objectives and procedures. The municipal health department subsequently informed the nurses at the UBSFs about the study involving postpartum women affiliated with each unit. Together with the Community Health Workers (Agentes Comunitários de Saúde, ACS), the nurses determined the number of registered postpartum women and their respective catchment areas. With support from the ACS, the postpartum women were invited to participate and asked whether they were available to be interviewed in their homes.

After each participant had confirmed her participation, a schedule was prepared containing the date and time of the interviews. On the scheduled dates and at the appointed times, the researcher traveled to the respective UBSFs and, with support from the ACS, proceeded to the participants' homes. At each home, the researcher introduced herself and explained the study objectives. This was followed by the reading and signing of the Informed Consent Form (Termo de Consentimento Livre e Esclarecido, TCLE) and the Voice Recording Authorization Form (Termo de Autorização para Gravação de Voz, TAGV).

Once this stage had been completed, the sociodemographic questionnaire was administered, followed by the semi-structured interview.

DATA ANALYSIS

The data collected were organized and tabulated using Microsoft Office Excel and were subsequently analyzed and presented in tables to report the results and structure the discussion. Bardin's content analysis, using thematic categorization, was employed to analyze the content of the participants' statements.

ETHICAL CONSIDERATIONS

The study was approved by the Research Ethics Committee (Comitê de Ética em Pesquisa, CEP) of UNIFACISA University Center under approval No. 6,453,034. The postpartum women's participation was preceded by the signing of the TCLE and TAGV, both of which were presented and read in full by the lead researcher before data collection, in compliance with the ethical criteria governing research involving human participants established by Resolution No. 466/2012.

RESULTS

Thirteen postpartum women participated in the study, of whom 62% (n = 8) were multiparous and 38% (n = 5) were experiencing the postpartum period for the first time. Of these women, 38% (n = 5) had experienced only one pregnancy, 31% had experienced more than four pregnancies (n = 4), and 23% had experienced two pregnancies (n = 3). Regarding prenatal consultations, 84% (n = 11) reported attending more than seven consultations during pregnancy, whereas 8% (n = 1) attended six consultations and 8% (n = 1) attended four. It was found that 31% (n = 4) of the interviewees had more than four children, 31% (n = 4) had two children, 31% (n = 4) had one child, and 7% (n = 1) had three children. Regarding mode of delivery, most participants' most recent birth was vaginal, 46% (n = 6); 39% (n = 5) underwent an

emergency cesarean section; and 15% (n = 2) underwent a planned cesarean section. All postpartum women reported giving birth in a public hospital, 100% (n = 13) (Table 1).

Table 1

Obstetric characteristics of postpartum women. Alagoinha, Paraíba, Brazil, 2026.

Variable	Frequency (n)	Percentage (%)
First childbirth		
Yes	5	38
No	8	62
Number of pregnancies		
None	0	0
1	5	38
2	3	23
3	1	8
More than 4 pregnancies	4	31
Number of prenatal appointments attended		
None	0	0
1	0	0
2	0	0
3	0	0
4	1	8
5	0	0
6	1	8
More than 7 appointments	11	84
Number of children		
None	0	0
1	4	31
2	4	31
3	1	7
More than 4 children	4	31
Mode of delivery		
Vaginal birth	6	46
Forceps-assisted vaginal birth	0	0
Planned cesarean section	2	15
Emergency cesarean section	5	39
Place of delivery		
Public hospital	13	100
Private hospital	0	0
Other location	0	0
Total	**13**	**100**

Source: Prepared by the authors.

Analysis of the interviewees' statements led to the creation of four thematic categories: 1) Lack of information about obstetric violence, childbirth, and labor; 2) The concept of obstetric violence as perceived by postpartum women; 3) Failure to recognize obstetric violence during one's own labor; and 4) Consequences of obstetric violence. These categories are presented below.

CATEGORY 1: LACK OF INFORMATION ABOUT OBSTETRIC VIOLENCE, CHILDBIRTH, AND LABOR

When asked whether they had received information during prenatal care about the different modes of delivery and the differences between them, the postpartum women made it clear that the health care teams had not provided them with guidance on this subject. They also reported that they had not been informed of their rights during labor, as illustrated by the following statements:

> "No, I wasn't given any guidance." (P1)
> "No, no one told me about that." (P5)
> "No, no, they didn't tell me anything, you understand!?" (P13)
> "No, I wasn't informed about this subject." (P10)

The lack of information and guidance places women in a vulnerable position because they do not understand the labor process, the childbirth options to which they are entitled, or the forms of social, emotional, and psychological support available to them. This situation is consistent with the absence of guidance concerning the phenomenon of obstetric violence. The participants' statements also indicate that the postpartum women were not informed about the meaning of OV by the health professionals who cared for them during their prenatal consultations.

CATEGORY 2: THE CONCEPT OF OBSTETRIC VIOLENCE AS PERCEIVED BY POSTPARTUM WOMEN

When asked about the concept of OV, some postpartum women mentioned aspects of direct physical or psychological violence. One woman specifically mentioned episiotomy as a manifestation of obstetric violence, as shown in the excerpts below:

> "It means when the doctor climbs on top of the woman's belly. To me, that is violence." (P2)
> "It's beating someone!" (P5)
> "To me, obstetric violence is when you aren't treated well and they make you suffer." (P1)
> "To me, there are several types, even the way they speak to you, the way they treat the patient as a whole. That is obstetric violence, right? The laceration, which is the cut, I think that's absurd, but we know that many women go through it." (P4)

Other postpartum women described OV as the absence of choice regarding the mode of delivery, a lack of information, and the suffering associated with the imposition of a particular mode of delivery or other care processes, as illustrated below:

> "To me, it's when we can't give birth normally, but they force us to keep trying even though there isn't enough room for the baby to pass. They don't perform a cesarean right away. They let the person suffer a great deal and only then perform the cesarean, when the baby is already at the end of its strength, right?!" (P3)
> "It's everything the professionals do to you without explaining what they're doing. They do everything, how can I put it? Everything they want, and the person doesn't know what is happening at the time." (P13)
> "In my mind, the only thing I knew about obstetric violence was that it happened when we couldn't decide what kind of birth it would be, right? Whether it would be vaginal or cesarean. That's all I know about it." (P10)

In addition to these accounts, some postpartum women did not know what obstetric violence was, as revealed by the following statements:

> "I don't know." (P6)
> "I don't even know what that is." (P7)
> "I don't even know what that is." (P9)

CATEGORY 3: FAILURE TO RECOGNIZE OBSTETRIC VIOLENCE DURING ONE'S OWN LABOR

Despite describing OV as involving disrespect and the absence of choice, some postpartum women denied having experienced violence when asked whether they had been victims of this phenomenon or had encountered any form of disrespect. This finding shows that although these

postpartum women understood the meaning of obstetric violence, they did not identify themselves as victims, as demonstrated by the following responses to the question of whether they had experienced OV:

> "No, I don't think I experienced it." (P6)
> "No, I didn't experience any violence. Besides, when I gave birth and was there in labor, my mother was with me the entire time." (P1)

Conversely, other women stated that they had not experienced OV because of the way the health care team had treated them, as illustrated by the following statement:

> "No, I didn't experience any type of violence, because I received very good care, right? From the moment I entered the hospital until I left, the team was very humane and respectful. They were incredibly attentive to me and my son, so I have nothing negative to report about anything or anyone. It truly was a blessing." (P4)

CATEGORY 4: CONSEQUENCES OF OBSTETRIC VIOLENCE

Analyzing the consequences of OV remains challenging. In this study, one postpartum woman identified factors that may have been influenced by experiences of violence, as shown in the account below:

> "Regarding breastfeeding him, the staff from the human milk bank would come by, and one person would say that I really wasn't producing milk, while another would come and say that I did have milk. So your mind is left wondering: 'Why can't I breastfeed my child? Why can't I do it?'" (P10)

DISCUSSION

OV is regarded as an obstacle to women's health and is complex to analyze, as it encompasses far more than medical practices. It also includes the cultural and social dimensions surrounding childbirth care and may affect groups of women who differ in several respects. Nevertheless, it appears to be particularly prevalent among women experiencing multiple vulnerabilities, such as those living in

poverty, those with low educational attainment, and those belonging to ethnic minority groups (Ralli et al., 2021).

The study found that most postpartum women identified as brown or mixed race, a characteristic that may be understood in light of Brazil's racial and cultural diversity resulting from racial admixture. In most cases, these women have less access to information and high-quality health services, making them more vulnerable to violent practices during childbirth because of multiple factors, including social inequalities, which are compounded by incomplete primary education (Farias et al., 2021).

This factor warrants analysis because educational attainment may directly influence the knowledge acquired by these postpartum women. Compared with women who have attained higher levels of education, the latter appear more likely to seek information on various topics involving pregnancy, childbirth, and the postpartum period and therefore possess a broader body of knowledge. Seeking such knowledge provides greater autonomy when planning and making decisions involving labor, helps create a humanized environment, reduces unnecessary interventions, and promotes respect for the mother's decisions (Lacerda; Mariano; Passos, 2022).

A lack of information leads postpartum women to believe that all procedures to which they are subjected during labor are simply hospital routines intended to facilitate the birth of their child (Annborn; Finnbogadóttir, 2022).

Limited understanding of OV practices therefore leads to the regrettable situation in which women are treated as mere objects during obstetric procedures, including episiotomy, forceps use, excessive medication, the imposition of inappropriate birthing positions, and even cesarean sections performed without consent. Such practices constitute disrespect toward these women (Mena-Tudela et al., 2021).

From this perspective, intervention is needed to address the dehumanization of childbirth. This may be achieved through guidance provided by PHC professionals, who should also undergo training to continuously learn new health care approaches outside a model that fails to recognize women as the protagonists and coordinators of their own childbirth. One such strategy is to develop a birth plan jointly

with the team responsible for the woman's prenatal care. This plan takes her wishes into account during this significant event and carries legal weight in supporting those wishes and serving as a standard against which noncompliance resulting in any characteristic of OV may be assessed (Silva et al., 2023).

Women should also be advised that they may report the abuse they have experienced, without fear of retaliation, to the health authorities responsible for the facility where they received care. They may do so through a reporting hotline or by initiating proceedings with the Public Prosecutor's Office against the institution, thereby demonstrating that their wishes were disregarded even though the team was aware of the plan that had been developed (Silva et al., 2023).

Within this context, many women are unaware that they have experienced obstetric violence, a problem that particularly affects Black and low-income women. It is important to emphasize that this form of violence may result in physical and psychological complications, including postpartum depression and emotional trauma (Silva et al., 2023).

It is essential to underscore that OV not only compromises women's physical health but also profoundly affects their emotional and psychological health, potentially resulting in trauma and reduced self-esteem, self-confidence, and connection with their bodies and the experience of motherhood. Negative effects on breastfeeding and the establishment of the emotional bond between mother and infant are also evident (Agrawal; Mehendale; Malhotra, 2022).

OV has lasting consequences for maternal and child health because such traumatic experiences may trigger emotional disorders and negatively affect breastfeeding and the bond between mother and infant. Furthermore, the unnecessary use of medical interventions during childbirth may increase the risk of complications. It is therefore essential to address this issue professionally, ensuring awareness and protecting the health of everyone involved (Moreira et al., 2022).

In light of the foregoing, health professionals must take care to provide pregnant women with appropriate guidance about their rights during health care consultations throughout pregnancy. They must explain what constitutes OV and the settings and practices in which it may occur, with a view to

safeguarding women in the event of any undesirable occurrence and fostering their autonomy throughout the pregnancy-postpartum cycle (Mena-Tudela et al., 2023).

FINAL CONSIDERATIONS

It became evident that most postpartum women interviewed had not received adequate guidance during prenatal consultations regarding the meaning of obstetric violence and the different forms it may assume. This lack of guidance made it difficult for them to recognize whether they had experienced any form of obstetric violence during labor.

In this regard, PHC professionals play a crucial role in disseminating information during prenatal care, not only by fulfilling their expected professional and technical responsibilities but also by acting as health educators. The lack of knowledge about OV underscores the importance of these professionals in guiding pregnant women and preparing them for a humanized childbirth experience by informing them of their rights and decision-making autonomy, given that these professionals form part of a longitudinal care network grounded in an ongoing relationship with patients.

Health professionals must also work with pregnant women to prepare a birth plan, a tool that may help prevent abusive and unnecessary procedures. This situation highlights the need to provide health professionals with continuing education on obstetric violence and on developing birth plans in accordance with individualized therapeutic plans. Such measures can ensure high-quality, comprehensive care for women and, consequently, serve as a preventive instrument for combating this phenomenon.

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FACTORS ASSOCIATED WITH THE RISK OF FALLS IN OLDER ADULTS: A CROSS-SECTIONAL STUDY

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Abstract

This study aimed to identify the risk of falls among older adults receiving care at a Primary Health Care Unit in the municipality of Campina Grande, Paraíba, Brazil. This was an observational, cross-sectional, descriptive, and analytical study with a quantitative approach, conducted in October 2023. The sample consisted of 99 participants. Three instruments were used for data collection: 1) a questionnaire for sample characterization; 2) the *Berg Balance Scale (BBS)*; and 3) the *Timed Up and Go Test (TUGT)*. Data were entered into *Microsoft Excel*® and exported to the *Statistical Package for the Social Sciences*. Fisher's exact test was applied. Categorical variables were presented as absolute and relative frequencies. A statistically significant association was observed between age group and fall-risk classification according to the TUGT ($p<0.001$) and BBS ($p=0.003$), as well as between income and fall risk according to the BBS ($p=0.006$). Among self-reported health conditions, diabetes *mellitus* was associated with fall-risk classification according to the TUGT ($p=0.041$), whereas low back pain was associated with fall-risk classification according to the BBS ($p<0.001$). Other health conditions were also associated with the TUGT ($p=0.025$) and BBS ($p=0.014$). It was concluded that sociodemographic characteristics and health conditions were associated with fall risk, reinforcing the importance of multidimensional assessment and preventive strategies targeting older adults in Primary Health Care.

Keywords: Accidental Falls, Aged, Risk Factors.

INTRODUCTION

Aging is a progressive process marked by biological, physical, psychological, social, and cultural changes (WHO, 2010). In Brazil, the demographic transition has brought about changes in the population's age structure, driven primarily by declining fertility and mortality rates. This process is evidenced by the 2022 Demographic Census, which recorded 32.1 million people aged 60 years or older, representing a 56.0% increase compared with 2010 (IBGE, 2023).

As people age, their care needs may intensify, particularly among those who develop some degree of functional dependence or disability. Several tools are available to assist professionals in conducting multidimensional assessments of older adults. These assessments make it possible to analyze factors that affect older adults' health and routine functional activities and that may compromise their mood, behavior, communication, cognition, and mobility (Mallmann et al., 2012).

Within this context, particularly regarding older adults' mobility, mobility impairment has become one of the main conditions leading to falls in old age. A fall is characterized by the unintentional displacement of the body to the ground, an event commonly described by older adults as "losing one's balance." For health professionals, however, the definition is broader because it encompasses specific internal and external factors (Montero-Odasso et al., 2022).

Intrinsic factors are related to conditions inherent to the individual, such as clinical diseases, cognitive changes, visual impairments, muscle weakness, and gait impairments, among others (Soares et al., 2014). Extrinsic factors, in turn, are associated with environmental conditions and situations of neglect involving the physical structure or safety of the spaces frequented by older adults, such as stairs without handrails, inappropriate footwear, the absence of non-slip flooring, wet surfaces, uneven surfaces, and steps. Although these factors may appear relatively unimportant to the general population, they may pose significant obstacles to older adults, substantially increasing the risk of falls and potentially serious or fatal consequences (Moraes et al., 2017; Paraná, 2017).

When falls do not result in death, they may cause several complications, including fractures of the upper and lower limbs, abrasions, urinary tract infection (UTI), traumatic brain injury, worsening osteoporosis, psychological changes, accumulation of pulmonary secretions, and stroke, among others (Mallmann et al., 2012; Paraná, 2017; Couto et al., 2012).

Most falls occur at home because older adults spend more time in this environment and place their trust in family members and caregivers. However, attention focused predominantly on older adults' individual needs may lead to the neglect of matters related to safety and the suitability of the home's

physical structure. The presence of obstacles and inadequate environmental conditions therefore contributes to falls at home, which are among the most recurrent events in this population (Mallmann et al., 2012; Moraes et al., 2017; Couto et al., 2012).

The Brazilian Society of Geriatrics and Gerontology (Sociedade Brasileira de Geriatria e Gerontologia—SBGG) emphasizes that approximately 30% to 40% of people over 65 years of age experience falls each year, and this figure is increasing. This prevalence therefore represents a public health problem (SBGG, 2021).

Accordingly, the importance of implementing interventions aimed at preventing and reducing falls among older adults is evident. These strategies contribute not only to improving postural stability and strengthening muscles, but also to increasing self-confidence, autonomy, and perceptions of safety in the different environments in which older adults live (SBGG, 2021; INTO, 2015).

Considering that falls among older adults are a public health problem, investigating the risk of their occurrence through specific assessment tools is essential. Accordingly, this study aimed to identify the risk of falls among older adults receiving care at a Primary Health Care Unit in the municipality of Campina Grande, Paraíba, Brazil.

METHODOLOGY

STUDY DESIGN

This was an observational, cross-sectional, descriptive, and analytical study with a quantitative approach. This approach enables the organization, quantification, and statistical analysis of the information collected, thereby facilitating the objective identification and description of the characteristics of the phenomenon under investigation (Vieira; Hossne, 2021).

RESEARCH SETTING

The study was conducted at the Maria de Lourdes Leôncio Primary Health Care Unit (Unidade Básica de Saúde—UBS), located in the municipality of Campina Grande, state of Paraíba, Brazil, in October 2023.

POPULATION, SAMPLE, AND ELIGIBILITY CRITERIA

The target population consisted of people aged 60 years or older who were registered within the designated catchment area of the unit under investigation. Nonprobability convenience sampling was adopted, and 100 participants were recruited. After data completeness was verified, one record was excluded because it contained incomplete information, resulting in a final analytical sample of 99 participants.

Individuals of both sexes who lived in Campina Grande, Paraíba, and were registered with the service were eligible. Those with cognitive impairment that prevented them from understanding and adequately responding to the data-collection instruments were excluded.

DATA-COLLECTION INSTRUMENTS

Three instruments were used for data collection: (1) a sociodemographic and clinical characterization questionnaire designed to obtain information on age, sex, occupation, marital status, educational attainment, individual income, the presence of morbidities, and household composition; (2) the Berg Balance Scale (BBS), used to assess functional balance; and (3) the Timed Up and Go Test (TUG), used to assess functional mobility.

The Berg Balance Scale (BBS) was used to assess functional balance through performance on 14 tasks involving different postural demands, including transfers, maintaining positions, functional reach, turning, and single-leg stance. Each item is scored on an ordinal scale from zero to four points according to specific performance criteria, yielding a total score ranging from zero to 56 points. Higher scores

indicate better functional balance performance, whereas scores below 21 points indicate a high risk of falls (Souza; Santos, 2012).

The Timed Up and Go Test (TUG) was used to assess functional mobility by measuring the time required for the participant to stand up from a chair, walk a distance of three meters, turn 180°, return to the starting point, and sit down again. Performance was measured in seconds, with shorter times indicating better functional mobility. For interpretation of the results, times below 10 seconds were considered compatible with preserved functional performance; times between 10 and 19 seconds indicated the need for monitoring and clinical assessment; and times equal to or greater than 20 seconds suggested greater functional mobility impairment and the need for a more comprehensive assessment. In addition, a cutoff point greater than 12.4 seconds was adopted as indicative of an increased risk of falls.

DATA-COLLECTION PROCEDURES

Data were collected on the premises of the aforementioned health care unit. Potential participants were initially approached in the waiting room, where they received information about the study's objectives, procedures, and relevance. This information was supplemented by educational material on fall prevention developed jointly by nursing and social work professionals.

Individuals who expressed an interest in participating were taken individually to a private setting to ensure privacy during the procedures. After the relevant explanations had been provided and consent had been formalized through the signing of an Informed Consent Form (Termo de Consentimento Livre e Esclarecido—TCLE), the sociodemographic and clinical characterization questionnaire was administered. The functional balance and mobility assessment instruments were then administered, namely the Berg Balance Scale (BBS) and the Timed Up and Go Test (TUG), respectively.

STATISTICAL ANALYSES

Data were initially entered into Microsoft Excel® and subsequently exported to the Statistical Package for the Social Sciences (SPSS) for processing and analysis. Categorical variables were presented as absolute and relative frequencies. Fall-risk classifications obtained using the Timed Up and Go Test (TUGT) and the Berg Balance Scale (BBS) were associated with sociodemographic characteristics and self-reported health conditions. Fisher's exact test was used to assess associations between categorical variables. A significance level of 5% (α=0.05) was adopted, and p-values <0.05 were considered statistically significant.

ETHICAL CONSIDERATIONS

The study was conducted following authorization from the Campina Grande Municipal Health Department and consent from the participating unit. It was subsequently submitted for review to the Research Ethics Committee (Comitê de Ética em Pesquisa—CEP) of the UNIFACISA University Center and approved under approval No. 6,325,225. The confidentiality of participants' information, anonymity, and privacy were ensured by coding the data and replacing identifying information with numerical codes.

RESULTS

Among the 99 participants, women predominated (n=53; 53.5%), as did retirees (n=97; 98.0%), individuals with incomplete elementary education (n=70; 70.7%), and those with an income of one minimum wage (n=74; 74.7%). Regarding marital status, married participants accounted for the largest proportion (n=41; 41.4%), whereas, in terms of household composition, living with a spouse was the most common arrangement (n=35; 35.4%) (Table 1).

Table 1

Sociodemographic characteristics of the study participants (n=99). Campina Grande, Paraíba, Brazil, 2023.

Variables	N	%
Sex		
Female	53	53,5
Male	46	46,5
Total	99	100,0
Occupation		
Retired	97	98,0
Grocery store owner	2	2,0
Total	99	100,0
Marital status		
Married	41	41,4
Widowed	20	20,2
Single	16	16,2
Divorced	13	13,1
In a relationship	9	9,1
Total	99	100,0
Educational attainment		
Complete elementary education	27	27,3
Incomplete elementary education	70	70,7
Incomplete secondary education	1	1,0
Higher education	1	1,0
Total	99	100,0
Income		
One minimum wage	74	74,7
One and a half minimum wages	24	24,2
Two minimum wages	1	1,0
Total	99	100,0
Household composition		
Missing/not reported	19	19,2
Spouse	35	35,4
Spouse and children	12	12,1
Spouse and relatives	8	8,1
Child	8	8,1
Relatives	17	17,2
Total	99	100,0

Source: Study data.

Among the health conditions investigated, 38.4% (n=38) of the participants reported systemic arterial hypertension (SAH), 6.1% (n=6) osteoarthritis, 23.2% (n=23) low back pain, and 46.5% (n=46) diabetes mellitus (DM). In addition, 14.1% (n=14) reported other health conditions (Table 2).

Table 2

Self-reported health conditions of the study participants (n=99). Campina Grande, Paraíba, Brazil, 2023.

Variables	n	%
Systemic arterial hypertension		
Yes	38	38,4
No	61	61,6
Osteoarthritis		
Yes	6	6,1
No	93	93,9
Low back pain		
Yes	23	23,2
No	76	76,8
Diabetes *mellitus*		
Yes	46	46,5
No	53	53,5
Other conditions		
Yes	14	14,1
No	85	85,9

Source: Study data.

Analysis of the sociodemographic characteristics revealed a statistically significant association between age group and fall-risk classification according to the TUGT (p<0.000) and the BBS (p=0.003). According to the TUGT, participants aged 75 years or older had a higher proportion of high risk (21.4%) than those aged 60 to 74 years (3.5%). According to the BBS, a higher proportion of high risk was also observed among participants aged 75 years or older (14.3%), whereas no participant aged 60 to 74 years was classified in this category. Income was also significantly associated with risk classification according to the BBS (p=0.006) (Table 3).

Table 3

Association between sociodemographic characteristics and fall-risk classification according to the TUGT and BBS. Campina Grande, Paraíba, Brazil, 2023.

Variables	TUGT			EEB		
	Low Risk	High Risk	Moderate Risk	Low Risk	High Risk	Moderate Risk
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Age						
60 to 74 years	10 (17,5)	2 (3,5)	45 (78,9)	35 (61,4)	0 (0,0)	22 (38,6)
75 years or older	0 (0,0)	9 (21,4)	33 (78,6)	16 (38,1)	6 (14,3)	20 (47,6)
p-value		**0,000***			**0,003***	

Sex						
Female	6 (11,3)	3 (11,3)	41 (77,4)	25 (47,2)	3 (5,7)	25 (47,2)
Male	4 (8,7)	5 (10,9)	37 (80,4)	26 (56,5)	3 (6,5)	17 (37,0)
p-value		0,936*			0,650*	
Occupation						
Retired	9 (9,3)	11 (11,3)	77 (79,4)	50 (51,5)	6 (6,2)	41 (42,3)
Grocery store owner	1 (50,0)	0 (0,0)	1 (50,0)	1 (50,0)	0 (0,0)	1 (50,0)
p-value		0,200*			0,873*	
Marital status						
Married	3 (7,3)	3 (7,3)	35 (85,4)	22 (53,7)	1 (2,4)	18 (43,9)
Widowed	4 (20,0)	2 (10,0)	14 (70,0)	12 (60,0)	3 (15,0)	5 (25,0)
Single	3 (18,8)	2 (12,5)	11 (68,8)	8 (50,0)	1 (6,3)	7 (43,8)
Divorced	0 (0,0)	2 (15,4)	11 (84,6)	5 (38,5)	1 (7,7)	7 (53,8)
In a relationship	0 (0,0)	2 (22,2)	7 (77,8)	4 (44,4)	0 (0,0)	5 (55,6)
p-value		0,396*			0,494*	
Educational attainment						
Complete elementary education	1 (3,7)	2 (7,4)	24 (88,9)	13 (48,1)	2 (7,4)	12 (44,4)
Incomplete elementary education	9 (12,9)	0 (12,9)	52 (74,3)	37 (52,9)	4 (5,7)	29 (41,4)
Incomplete secondary education	0 (0,0)	0 (0,0)	1 (100,0)	0 (0,0)	0 (0,0)	1 (100,0)
Higher education	0 (0,0)	0 (0,0)	1 (100,0)	1 (100,0)	0 (0,0)	1 (100,)
p-value		0,577*			0,846*	
Income						
One minimum wage	5 (6,8)	8 (10,8)	61 (82,4)	36 (48,6)	2 (2,7)	36 (48,6)
One and a half minimum wages	5 (20,8)	3 (12,5)	16 (66,7)	15 (62,5)	3 (12,5)	6 (25,0)
Two minimum wages	0 (0,0)	0 (0,0)	1 (100,0)	0 (0,0)	1 (100,0)	0 (0,0)
p-value		0,326*			**0,006***	
Household composition						
Did not respond	3 (15,8)	1 (5,3)	15 (78,9)	10 (52,6)	1 (5,3)	8 (42,1)
Spouse	3 (8,6)	5 (14,3)	27 (77,1)	19 (54,3)	1 (2,9)	15 (42,9)
Spouse and children	0 (0,0)	0 (0,0)	12 (100,0)	7 (58,3)	0 (0,0)	5 (41,7)
Spouse and relatives	0 (0,0)	2 (25,0)	6 (75,0)	3 (37,5)	2 (25,0)	3 (37,5)
Child	0 (0,0)	2 (25,0)	6 (75,0)	4 (50,0)	2 (25,0)	2 (25,0)
Relatives	4 (23,5)	1 (5,9)	12 (70,6)	8 (47,1)	0 (0,0)	9 (52,9)
p-value		0,292*			0,371*	

Source: Study data. Note: * Fisher's exact test.

Analysis of the self-reported health conditions revealed a statistically significant association between fall-risk classification according to the TUGT and the presence of DM (p=0.041) and other health conditions (p=0.025). Among participants with DM, a higher proportion were classified as being

at high risk (19.6%) compared with those without the condition (3.8%). Regarding the BBS, statistically significant associations were identified with the presence of low back pain (p<0.000) and other health conditions (p=0.014). Among participants with low back pain, 69.6% were at moderate risk, whereas the corresponding proportion among those without the condition was 34.2% (Table 4).

Table 4

Association between self-reported health conditions and fall-risk classification according to the TUGT and BBS. Campina Grande, Paraíba, Brazil, 2023.

Variables	TUGT			EEB		
	Low Risk	High Risk	Moderate Risk	Low Risk	High Risk	Moderate Risk
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
SAH						
No	6 (15,8)	2 (5,3)	30 (78,9)	23 (60,5)	1 (2,6)	14 (36,8)
Yes	4 (6,6)	9 (14,8)	48 (78,7)	28 (45,9)	5 (8,2)	28 (45,9)
p-value		0,178*			0,299*	
Osteoarthritis						
No	10 (10,8)	11 (11,8)	72 (77,4)	50 (53,8)	6 (6,5)	37 (39,8)
Yes	0 (0,0)	0 (0,0)	1 (100,0)	1 (16,7)	0 (0,0)	5 (83,3)
p-value		0,427 *			0,149*	
Low back pain						
No	10 (13,2)	7 (9,2)	59 (77,6)	47 (61,8)	3 (3,9)	26 (34,2)
Yes	0 (0,0)	4 (17,4)	19 (82,6)	4 (17,4)	3 (13,0)	16 (69,6)
p-value		0,101*			**0,000***	
Diabetes *mellitus*						
No	6 (11,3)	2 (3,8)	45 (84,9)	32 (60,4)	1 (1,9)	20 (37,7)
Yes	4 (8,7)	9 (19,6)	33 (71,7)	19 (41,3)	5 (10,9)	22 (47,8)
p-value		**0,041***			0,071*	
Other						
No	6 (7,1)	11 (12,9)	68 (80,0)	39 (45,9)	5 (5,9)	41 (48,2)
Yes	4 (28,6)	0 (0,0)	10 (71,4)	12 (85,7)	1 (7,1)	1 (7,1)
p-value		**0,025***			**0,014***	

Source: Study data. Note: * Fisher's exact test.

DISCUSSION

The results of this study demonstrated associations between fall-risk classification and age group, the presence of DM, and low back pain. Older adults aged 75 years or older had a higher proportion of high fall risk according to both instruments. In addition, diabetes mellitus was associated with risk

classification according to the TUGT, whereas low back pain was associated with classification according to the BBS.

Consistent with these findings, mobility-related changes are important factors associated with falls among older adults. Recent evidence shows that impairments in balance, gait, physical function, and strength, as well as abnormalities identified through clinical tests of balance and functional performance, are consistently associated with falls in this population. These findings reinforce the importance of multidimensional assessment of mobility and functioning to identify older adults who are more vulnerable to falls (Saunders et al., 2025).

In addition to the physiological changes resulting from aging, psychosocial factors may also affect older adults' functioning. Reduced social participation may intensify feelings of vulnerability, fear, and insecurity, with possible repercussions for the performance of daily activities. Within this context, emotional and functional changes may contribute to mobility limitations and consequently increase vulnerability to falls (Bezerra et al., 2021).

Although the literature describes differences between men and women in the occurrence of falls among older adults, no statistically significant association was observed in the present study between sex and fall-risk classification according to either the TUGT ($p=0.936$) or the BBS ($p=0.650$). Descriptively, the proportion of high risk according to the TUGT was similar among women (11.3%) and men (10.9%). According to the BBS, high risk accounted for 5.7% of women and 6.5% of men.

Although sex- and gender-related differences are frequently described in the literature regarding the risk factors, occurrence, and consequences of falls among older adults, the results of the present study do not support the conclusion that vulnerability to falls is greater on the basis of sex (Sebastiani et al., 2024).

Among the health conditions investigated, DM was significantly associated with fall-risk classification according to the TUGT ($p=0.041$), whereas low back pain was associated with classification according to the BBS ($p<0.001$). Among participants with DM, 19.6% were classified as being at high

risk according to the TUGT, compared with 3.8% of those without the condition. These findings reinforce the importance of considering chronic conditions when assessing fall risk among older adults.

Moreover, DM may be associated with several factors that contribute to greater vulnerability to falls among older adults. Evidence shows that older adults with type 2 DM are at greater risk of falls than those without the disease, with this risk being particularly high among those who use insulin (Freire et al., 2024). In addition, gait abnormalities, balance difficulties, reduced grip strength, impaired visual function, diabetic retinopathy, hypoglycemia, and diabetic peripheral neuropathy have been significantly associated with falls in this population (Liu et al., 2026).

In addition to the clinical conditions identified in the present study, the use of certain medications is another factor that should be considered when assessing fall risk among older adults. Evidence indicates a high prevalence of potentially inappropriate prescribing among individuals who have experienced falls. Sedatives/hypnotics, opioids, diuretics, and antidepressants are among the medications associated with fall risk (O'Reilly et al., 2025). In older adults with DM, factors such as impaired visual function, diabetic retinopathy, hypoglycemia, peripheral neuropathy, gait abnormalities, and balance difficulties have also been associated with falls. The coexistence of these factors reinforces the need for a multidimensional assessment of fall risk in this population (Liu et al., 2026).

The presence of low back pain was also significantly associated with fall-risk classification according to the BBS ($p<0.001$). Among participants with this condition, 69.6% were classified as being at moderate risk, a proportion higher than the 34.2% observed among those without low back pain. This finding may be related to the effects of pain on functioning and postural control, because older adults with low back pain may have poorer balance performance than those without the condition. Such changes may compromise postural stability and contribute to greater vulnerability to falls (Ge et al., 2021).

Considering that limitations resulting from aging may restrict the performance of daily activities and foster functional dependence, it is important to adopt strategies designed to preserve autonomy and prevent falls. Within this context, physical exercise interventions constitute an important preventive

strategy for older adults. Recent evidence demonstrates the benefits of exercise programs in preventing falls, particularly supervised, long-term programs focused on balance and resistance training, as well as modalities such as Tai Chi (Pillay et al., 2024).

Fall-prevention strategies include interventions aimed at strengthening muscles, training balance, and maintaining mobility, as well as periodically reviewing medications and identifying potentially modifiable environmental factors. In the home environment, measures such as adequate lighting, the removal of obstacles from circulation areas, and the adaptation of surfaces may contribute to greater safety. Exercises targeting balance and strength, including modalities such as Tai Chi Chuan, may also be incorporated into fall-prevention programs according to the older adult's clinical and functional condition (Paraná, 2017; INTO, 2015).

The findings demonstrate that fall risk among older adults should be understood as a multifactorial phenomenon arising from the interaction among sociodemographic characteristics, clinical conditions, and functional factors. Accordingly, periodic assessments of functioning, mobility, balance, and health conditions are important for the early recognition of situations of vulnerability. Preventive strategies aimed at preserving autonomy, promoting physical activity, ensuring environmental safety, and appropriately managing chronic conditions may help prevent falls and their repercussions for older adults' independence and quality of life (Guirguis-Blake et al., 2024; Suen et al., 2023).

FINAL CONSIDERATIONS

The results of this study demonstrated associations between fall-risk classification and sociodemographic and clinical factors among the older adults investigated. Age group was associated with risk classification according to the TUGT and the BBS, with a higher proportion of high risk among participants aged 75 years or older. Among the health conditions investigated, diabetes mellitus was associated with risk classification according to the TUGT, whereas low back pain was associated with

classification according to the BBS. These findings reinforce the importance of considering sociodemographic, clinical, and functional characteristics when assessing fall risk among older adults.

Therefore, the early identification of these factors in health care settings is important for supporting preventive measures and individualized interventions aimed at preserving older adults' functioning, autonomy, and quality of life.

The findings of this study may therefore help guide health education initiatives targeting older adults and their families, facilitating the recognition of factors associated with fall risk and the adoption of individualized prevention strategies, including safety measures in the home environment and encouragement to preserve functioning.

A limitation of the study was that the investigation was conducted at a single Primary Health Care Unit and within a particular socio-territorial context, which may limit the generalizability of the findings. Furthermore, because this was a cross-sectional study, causal relationships between the factors identified and fall risk cannot be established. Longitudinal studies are therefore required to gain a better understanding of these relationships.

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