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About the journal

Interdisciplinary Journal of Nursing and Health (IJNH) is a continuation of *Infermieristica Journal* (eISSN 2785-7018). IJNH is an international, peer-reviewed, open-access scientific journal dedicated to advancing rigorous and globally relevant scholarship in nursing and health sciences. *Interdisciplinary Journal of Nursing and Health (IJNH)* promotes the development, integration, and exchange of knowledge that informs nursing research, clinical practice, and health policy. The journal supports evidence-based practice and fosters critical debate on contemporary issues related to the art and science of nursing. IJNH particularly welcomes studies that seek to evaluate and understand complex health care interventions, health systems, and health policies, using the most rigorous and appropriate research designs. The journal also aims to strengthen the methodological quality of health research by publishing high-quality methodological papers that introduce or refine analytic approaches, measurements, or research methods. All submissions undergo double-anonymized peer review, and IJNH publishes original contributions of relevance to the international health care community. IJNH is a fully open-access journal, accessible to readers worldwide without subscription or publication fees. The journal is published in English.

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Advanced Nursing Education in Italy and Master's Degrees: Thirty Years of Progress in Light and Shade

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Over the past thirty years, nursing education in Italy has undergone a profound and irreversible transformation. In 1996, nurse education moved into the university system. This shift did more than relocate teaching: it aimed to foster high-level critical thinking and academic standards, consolidating nursing as an autonomous profession rather than as an auxiliary occupation. Nurses came to be regarded as accountable practitioners expected to exercise professional judgement within a defined scope of practice. However, this model had a significant limitation: the assumption that a three-year university qualification was sufficient to fully prepare a nurse for independent practice across all clinical contexts and levels of complexity. This assumption effectively hampered the development of post-registration clinical education, entrenching a divergence from other disciplinary and professional fields, where education continues beyond the bachelor's degree through recognised specializations and doctoral study.

A major opportunity to align with a standard higher-education framework—similar to those traditionally followed by other professions in Italy—arose in 1999 with the creation of the European Higher Education Area, through an

intergovernmental agreement among forty-eight European countries aimed at harmonising higher education systems. As one of the promoters of the Bologna Process, Italy introduced a three-cycle higher education system: bachelor's degree (*Laurea Triennale*), master's degree (*Laurea Specialistica/Magistrale*), and doctoral degree (*Dottorato di Ricerca*). The inclusion of healthcare professions in this framework offered the opportunity to fit within the standard higher-education structure rather than leaving them confined to sector- or university-specific diplomas. Nursing thus had the opportunity to take a significant leap forward in scientific, academic, and professional terms.

With the introduction of master's degrees (*Laurea Specialistica/Magistrale*) for all healthcare professions, a second-cycle programme was created to develop advanced competencies. These programmes were designed to prepare professionals for roles in management, education, and research, including leadership and executive positions, thereby strengthening the profession's recognition within the healthcare system. From the outset, however, a major issue emerged: the absence of advanced clinical education linked to formally recognised professional

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roles within the Italian National Health Service, and the lack of a clear definition of levels of responsibility and professional decision-making autonomy. In practice, these programmes left advanced clinical practice outside master's-level education, thereby deepening the divide between clinical and managerial nursing—a divide that is less pronounced across other allied health professions in Italy and in many other European countries, and that is also less evident in non-health fields.

In an attempt to fill this gap, post-registration diplomas (*Master di I° livello*) (usually lasting one year) helped to develop advanced clinical competencies, often representing the only formal educational opportunity for advancing clinical practice. However, they did not guarantee genuine professional advancement, as Italian post-registration diplomas do not carry the same legal status as a master's degree. A related issue concerns access to doctoral programmes. While the development of PhD programmes strengthened the scientific foundations of the discipline, nursing doctoral candidates typically enter with a master's degree focused on managerial, educational, and methodological content (*Laurea Specialistica/Magistrale in Scienze Infermieristiche e Ostetriche*), rather than on advanced clinical competencies—creating a discontinuity between doctoral preparation and the development of higher-level clinical expertise.

Compared with professions such as medicine, psychology, biology, architecture, and engineering—where master's-level education is strongly practice-based and supports clearly defined clinical or technical career progression—nursing in Italy has channelled advanced education chiefly into organisational, educational, and partly research roles, leaving clinically focused career pathways relatively underdeveloped. Accordingly, the introduction of clinically oriented master's degrees (*Lauree magistrali a indirizzo clinico*) represents an opportunity to correct an unbalanced trajectory. These programmes finally recognise advanced clinical practice as a necessary educational requirement for assuming full clinical responsibility, including legal authorisation to prescribe nursing treatments and devices, thereby bringing the Italian model closer to advanced practice frameworks in other countries.

Although the master's qualification may open

access to senior management roles, a formally recognised clinical leadership role for nurses is still lacking, as the system has historically prioritised organisational governance over clinical leadership. Recognising the clinical leadership developed through such programmes would require a redefinition of roles and responsibilities within nursing and across other professions, particularly medicine. The earlier decision to develop master's degrees focused primarily on management, education, and research reflected political choices that, at the time, facilitated nurses' access to senior management roles. In practice, it created distinct career routes into management. Today, however, it is time to revisit this approach by adding master's programs designed to develop advanced clinical expertise. In this light, it is reasonable to question whether managerial and educational competencies might be better developed through postgraduate diplomas undertaken after clinically oriented master's degrees.

To ensure that clinically oriented master's degrees do not become yet another unfulfilled promise, coordinated action among universities, policymakers, and healthcare organisations is essential. Their impact will depend on the system's ability to define advanced clinical roles, set clear levels of responsibility, secure contractual and legal recognition (including legal authorisation to prescribe nursing treatments), and integrate these roles into care delivery models.

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Urinary Incontinence: Lived Experience of Adult Women. A Phenomenological Study Protocol

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Abstract

Introduction. Urinary incontinence is a common yet underreported condition among women, affecting up to 69% but often hidden due to stigma. While various treatments exist, women's help-seeking and self-management are shaped by personal beliefs, emotions, and cultural context. In Italy, access to services, informal networks and the sensitivity of intimate health topics may influence how women perceive, talk about, and manage urinary incontinence.

Objective. Explore, within an Italian context, the lived experience of adult women with urinary incontinence, focusing on how they interpret and make meaning of their condition, their daily coping strategies, emotional responses, and the complex factors shaping their engagement with care.

Methods and Analysis. This qualitative phenomenological study will use Interpretative Phenomenological Analysis (IPA). Participants attending pelvic floor rehabilitation at an outpatient clinic in Northern Italy will be purposively sampled. Data will be collected through semi-structured interviews and socio-demographic questionnaires until interpretative sufficiency is reached. Audio recordings will be transcribed verbatim and analysed by the researchers, both manually and with NVivo. Reflexivity, double coding, triangulation, and an audit trail will be employed to ensure trustworthiness. Ethical approval has been obtained, and informed consent will be

secured from all participants.

Expected Results. The study will highlight psychosocial aspects often overlooked in care, informing person-centered, flexible interventions to improve patient engagement and adherence. It will support efforts to reduce stigma, promote timely help-seeking, and enhance healthcare professionals' empathy and communication skills. Limitations include exclusion of women not engaged in rehabilitation and the sensitive nature of the topic, which may affect participant openness.

Keywords: Coping Skills, Life Change Events, Qualitative Research, Urinary Incontinence, Women

Introduction

The International Continence Society defines urinary incontinence (UI) as “the complaint of any involuntary loss of urine” and classifies it as urge, stress, or mixed incontinence (Abrams et al., 2003). Unlike other chronic conditions such as type 2 diabetes or hypertension – which are widely acknowledged and openly discussed (Saklayen, 2018) – UI remains largely underestimated and underreported (Cardozo et al., 2023).

Although UI can also affect men, epidemiological evidence consistently shows a higher prevalence in women, with rates ranging from 25% to 45% and peaking at 69% (Cardozo et al., 2023). In addition, female UI, mediated by biological and life-course events such as pregnancy, vaginal childbirth, menopause, and gynecological surgeries including hysterectomy, contributes significantly to the construction and lived experience of female identity. Many perceive it as a threat to bodily integrity and femininity, with implications for self-image, self-esteem and sexual wellbeing (Yilmaz & Erkal Aksoy, 2023). The intimate nature of UI generates stigma and embarrassment, which in turn contributes to its invisibility (Elenskaia et al., 2011). In fact, many women avoid disclosing symptoms or seeking help, often perceiving UI as an inevitable and irreversible aspect of ageing (Dugan et al., 2001).

Although various management options are available – from physical and behavioural interventions to pharmacological or surgical treatments – women's motivation to adhere to such treatments is often influenced by their beliefs, emotions, and cultural background (Wójtowicz et al., 2014).

Women may adopt self-management strategies such as using sanitary pads, reducing fluid intake, or avoiding physical and social activities, which in some cases lead to social withdrawal (Delarmelindo R De et al., 2013; Park et al., 2017). While the literature demonstrates the negative impact of UI on women's physical, psychological, and social well-being (Pizzol et al., 2021), few studies have explored how women make sense of their emotional experiences and cultural perceptions when living with UI, and how these meanings shape their daily self-management and interactions with treatment pathways (Yilmaz & Erkal Aksoy, 2023).

International studies are increasingly addressing these aspects, but there is still a lack of research conducted in the Italian context, where cultural norms and local healthcare structures may play a key role in shaping women's experiences. In Italy, traditional gender roles and family-centred cultural norms may shape how women perceive their bodies and communicate about intimate or reproductive health concerns (Pandolfi, 1990). Topics related to female sexual wellbeing or intimate health are often considered sensitive, which may limit open discussion and awareness (WHO, 2015).

Family and informal networks continue to play a crucial role in providing emotional sustenance and active coping assistance (Thoits, 2011); however, they may also exert social control and reinforce traditional norms, which can discourage individuals from seeking formal sources of help (Pescosolido, 1992). At the same time, middle-aged women who already experience urinary symptoms during menopause are nonetheless expected to remain socially and professionally active, while balancing work, family responsibilities, and their own wellbeing

(Lai et al., 2025). Nevertheless, UI often disrupts everyday rhythms and embodied routines which can be especially challenging in sociocultural contexts that valorize women's uninterrupted productivity, multitasking, and caregiving roles (Mendes et al., 2017).

Understanding female UI experiences is therefore both a clinical and social priority, as it calls for an integrated and phenomenological perspective that illuminates how women live through and make sense of this condition, linking its bodily and physiological determinants with the gendered meanings, identity processes, and everyday practices through which they negotiate control, vulnerability, and belonging in their lifeworld.

Although the Italian healthcare system is universalistic, the organisation and accessibility of specialised services for women's health can vary significantly both across and within regions (Cicchetti & Gasbarrini, 2016). These cultural and systemic factors highlight the need for context-specific research to better understand women's experiences of UI within the Italian setting. Without understanding how adult women interpret and live UI – how they make sense of symptoms, negotiate care pathways and enact self-management in light of their cultural context – healthcare services may fail to offer interventions that are meaningful, acceptable and effective (Mendes et al., 2017).

Therefore, this study aims to explore, within a Northern Italian context, how adult women experience and make sense of living with UI. In particular, it seeks to gain an in-depth understanding of how they perceive and navigate this condition in their everyday lives, the emotional and behavioural responses they develop, and how these experiences shape their attitudes towards seeking care and engaging with available treatment options, especially conservative approaches such as pelvic floor rehabilitation.

Methods and Analysis

Qualitative Approach and Research Paradigm

This study will be conducted using a qualitative phenomenological approach, adopting the Interpretative Phenomenological Analysis (IPA) methodology (Smith et al., 2022). Grounded in

phenomenology, hermeneutics, and idiography, IPA aims to explore in depth how individuals make sense of their major life experiences, focusing on the lived experience and the meanings attributed within personal and social contexts. IPA involves a double hermeneutic, whereby participants make sense of their experiences while researchers interpret that sense-making.

This process requires deep engagement with the data and reflexive awareness of the researcher's preconceptions, which are critically examined rather than bracketed. The study adopts an interpretative-constructivist epistemological stance, recognizing that knowledge is co-constructed between researcher and participant. The analysis privileges participants' subjective accounts and seeks to illuminate their meanings and interpretations, rather than pursuing objective generalizations (Kacprzak, 2017).

All methodological choices, including data collection, sampling, and analysis, will be explicitly documented to enhance transparency. Quality standards for qualitative research (Tong et al., 2007) and Standards for Reporting Qualitative Research (SRQR) guidelines (O'Brien et al., 2014) will be strictly followed to ensure rigor.

Researcher characteristics, reflexivity and trustworthiness

The research team will comprise female nurses and midwives with clinical expertise in pelvic floor rehabilitation and formal training in qualitative research methods. Researchers' clinical background, assumptions, beliefs and prior experiences regarding UI will be explicitly acknowledged and continuously reflected upon throughout the research process. No prior personal relationship with participants is foreseen, although professional proximity may influence interaction.

Reflexivity will be maintained through reflective diaries, peer discussions, and team debriefings; these strategies will help identify and minimise potential bias. The credibility of the findings will be further enhanced through triangulation, which will involve the use of multiple data collection methods (interviews, field notes, and questionnaires) and the participation of several researchers in the analytic process, thereby minimizing the risk of subjective interpretation.

However, qualitative research acknowledges that researchers cannot completely separate their own experiences and biases from the research process (Johnson-Bailey & Ray, 2008), as knowledge is inherently subjective and co-constructed (Love et al., 2020).

To strengthen the analytical rigor, two researchers will independently analyze the data before engaging in a critical comparison of their interpretations, allowing for the identification of convergences and discrepancies. The emerging themes will then be compared with existing literature to assess their relevance and consistency with current evidence and theoretical frameworks.

An audit trail will be carefully maintained throughout the study, providing detailed documentation of each stage of the analytical process to ensure transparency, traceability, and methodological integrity (Finlay, 2002; Smith et al., 2022).

Context

The study will be conducted in an outpatient pelvic floor rehabilitation clinic within a Northern Italian hospital. This specialised setting provides multidisciplinary care to women with pelvic floor dysfunctions. The context is chosen to ensure participants have direct experience of both the suffering associated with the phenomenon under investigation and the rehabilitative process, ensuring the collection of rich, meaningful and relevant data.

The clinic operates with a multidisciplinary team including uro-gynecologists, nurses, and midwives, providing integrated care tailored to each patient's needs. Generally, the rehabilitation cycle involves 8 to 10 sessions, each lasting approximately 45 minutes, held on a weekly basis. The services offered include counselling and pelvic floor rehabilitation through pelvic-perineal kinesitherapy, biofeedback, functional electrical stimulation, posterior tibial nerve neuromodulation, and electromagnetic wave therapy.

Sampling strategy

Participants will be selected through purposive sampling (Smith et al., 2022), with the aim of selecting information-rich cases relevant to the

research question. Eligible participants will include women aged 18 years or older with a clinical diagnosis of UI, who have attended at least two rehabilitation sessions. Participants must have sufficient understanding of the Italian language to provide informed consent and participate in interviews.

Exclusion criteria will include: male individuals, women under the age of 18, those currently pregnant, women in the puerperium period (defined as the first 40 days following childbirth), individuals with cognitive impairments or neurological conditions that may compromise the ability to provide reliable narratives, and those who do not provide informed consent.

Recruitment will take place through the researchers' professional networks. Potential participants will first be invited to an informal conversation to establish trust and clarify the purpose of the study. They will then receive study information and consent forms via email and will provide verbal consent at the beginning of each interview, after being reminded of their right to withdraw from the study at any time.

Sampling will continue until conceptual depth, information power, and theoretical sufficiency are achieved, defined respectively as the richness of data, the quality and relevance of data, and the robustness of support for the study's claims (Sims & Cilliers, 2025). This strategy aims to capture a wide range of perspectives relevant to the study objectives.

Ethical considerations

Ethical approval was obtained from the Territorial Ethics Committee Lombardia 1 (Approval Number: CET 207-2024). Written informed consent will be collected from all participants prior to data collection. It will be explained that participation in the study is voluntary, and the benefits, data confidentiality management, and the right to withdraw from the study at any time will also be clarified. The autonomy of participants will be respected by providing information that ensures a free and informed choice (National Health and Medical Research Council, 2007).

Participants will be guaranteed that all personal data will be securely stored and treated confidentially. During transcription, any potentially identifying information will be removed and pseudonyms will be used

instead of real names, in compliance with EU Regulation 2016/679 (GDPR). In the verification and publication phases, data and citations from interviews will be reported only in anonymized form, ensuring that individual participants cannot be identified (Holloway & Wheeler, 2013). The study complies with the Declaration of Helsinki and applicable national guidelines.

Data collection methods

Data will be collected through semi-structured individual interviews and socio-demographic questionnaires. The setting will ensure privacy, comfort, and an atmosphere conducive to open sharing. Interviews will be audio- and video-recorded with participants' consent through Microsoft Teams, selected for its secure professional infrastructure that ensures data confidentiality and institutional ownership of all recordings.

Given that UI may deeply affect women's sense of identity, body image, and emotional well-being, the research team recognizes the sensitive nature of the topic and the potential psychological discomfort associated with the interviews and their video-recording. To mitigate this, interviews will be conducted by trained female researchers in an empathetic and respectful manner, consistent with phenomenological interviewing principles, to foster openness and trust between researcher and participant. Participants will be explicitly informed that they may disable the camera, opt for audio-only recording, pause, skip any question, or interrupt the interview at any time should they feel uncomfortable, without any consequence. Additionally, participants will be assured that they can request the review or deletion of any part of the recording, ensuring full control over their participation. If emotional distress arises, participants will be offered the opportunity to discuss it with a qualified healthcare professional within the clinical unit.

Data collection and data analysis will proceed concurrently to support iterative refinement of questions and emerging interpretations, consistent with the interpretative phenomenological approach. Triangulation of sources and field notes will be employed to strengthen the credibility of the findings.

Data collection instruments

The main data collection tool will be a semi-structured interview guide exploring experiences of UI ("lived experience"), its impact on daily life, and perceptions of rehabilitation. In this type of interview, the content of the questions is not rigidly pre-established; rather, the structure is flexible and can be adapted to each participant's narrative flow and emotional state. The interview will be guided by a schedule of "screwdriver questions" – open-ended prompts that introduce the topic of UI while allowing participants to respond in a way that is personally meaningful and contextually grounded (Riessman, 1993).

The interview schedule was developed following a "funneling technique", which progresses from broad, open topics to increasingly specific themes (Smith et al., 2022). This approach ensures a coherent structure across interviews while allowing flexibility for participants to express their experiences freely and for rich, nuanced data to emerge. In line with the hermeneutic and idiographic orientation of IPA, "hermeneutic sensitivity" and researcher discretion will be exercised in deciding whether and how to introduce additional questions ("probes") not contemplated in the preliminary phase of the research, in order to deepen the exploration of emerging meanings (Rubin & Rubin, 2000).

The "screwdriver" questions (reported in a hypothetical interview scheme in Supplementary File 1) were formulated starting from scientific literature (Hägglund & Ahlström, 2007; Million et al., 2021; Peroni et al., 2022) and subsequently discussed in a focus group composed of a urogynecologist, two midwives, a nurse, and an expert in qualitative methodology. The final screwdriver questions resulting from the focus group were tested on a small group of women. Feedback from this pilot phase was used to make minor linguistic and conceptual adjustments, leading to the final version of the interview guide that will be used in the study.

Participants will also complete a socio-demographic and clinical questionnaire, developed based on scientific literature (Park et al., 2017; Yilmaz & Erkal Aksoy, 2023), to provide a descriptive overview of the study sample (Supplementary File 2). The questionnaire will collect information such as age, parity, time since delivery, type and duration of UI, treatment

history, and relevant comorbidities. In addition, it will include the ICIQ-UI SF (International Consultation on Incontinence Questionnaire – Urinary Incontinence Short Form) to assess the severity of urinary symptoms (Tubaro et al., 2006). Although the study adopts a qualitative design, the inclusion of this standardized measure will allow for a contextual characterization of participants' experiences and facilitate a more nuanced interpretation of narratives in relation to the clinical profile of each woman.

Units of study

Approximately 20 women experiencing UI will be included in the study. The number of participants is not predetermined a priori but guided by the principles of conceptual depth, information power, and theoretical sufficiency, which will be continuously evaluated during the iterative process of data collection and analysis, as it is only at this stage that a researcher can determine whether the sampling, data collection, and analysis are sufficient (Sims & Cilliers, 2025).

Beyond thematic redundancy, the narrative depth and emotional resonance of the accounts will be used as additional indicators of data adequacy, ensuring that the dataset provides a comprehensive understanding of the lived experience under study.

The number and relevant characteristics of participants, as well as the communication openness and engagement observed during interviews, will be reported in the Results section. These elements will help to contextualize the interpretative process and provide transparency

regarding the sample composition and the quality of participants' contributions.

Data processing

Audio recordings will be transcribed verbatim and anonymized to ensure participant confidentiality. The accuracy and completeness of the transcripts will be verified by comparing it with the original audio file.

An initial manual coding will be conducted in Microsoft Word to allow close familiarization with the data and to begin identifying preliminary meaning units. The coded material will then be imported into NVivo for further organization, refinements of codes and development of emerging themes through iterative comparison and clustering. Socio-demographic information will be managed using Microsoft Excel and linked to qualitative data for contextual interpretation.

Data security will be ensured through encrypted storage and restricted access to the research team only. An audit trail will be maintained throughout the study to document analytic decisions, coding iterations, and interpretative steps, ensuring transparency and dependability of the analytical process.

Data analysis

Data will be analysed using Interpretative Phenomenological Analysis (IPA), following the multi-step process described by Smith et al. (2022), as illustrated in Figure 1. This approach supports an in-depth exploration of how

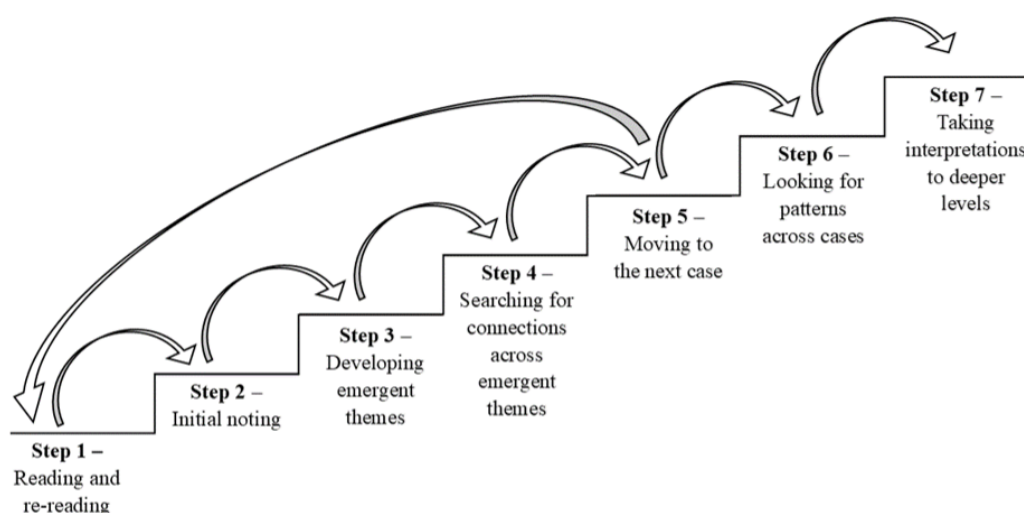


Figure 1. Steps of the Interpretative Phenomenological Analysis.

participants make sense of their experiences and meanings.

Each transcript will be read multiple times with care, and the corresponding audio recordings will be listened to in full to allow the researchers to become deeply familiar with the data and to capture all nuances in the participants' accounts.

Transcripts will be then annotated focusing on different layers of meaning: particular attention will be paid to the linguistic aspects to understand how language will be used to convey experience, to the descriptive content to identify what will be described, and to the conceptual dimension to explore underlying meanings (Treweek et al., 2019).

Based on these initial notes and selected the quotations – brief narrative excerpts that capture participants' own words (Eldh et al., 2020) – similar concepts will be grouped under codes or labels, and connections and recurring ideas will facilitate the gradual abstraction of these labels into broader categories, which will be then organised into overarching themes with semantic coherence.

Emergent themes will be examined in relation to one another to identify patterns, relationships and clusters, forming thematic code groups; this iterative and recursive process will help identify themes grounded in the lived experiences of participants. Each subsequent case will be analysed idiographically, applying the same depth of engagement and openness, to respect the uniqueness of each participant's narrative.

Cross-case analysis will be then conducted to identify shared patterns and meanings across all interviews while recognising individual variability and nuance. In the final phase, interpretations will be critically examined and refined through team discussions to reach deeper, more nuanced understandings of the themes and to consider the broader implications of the findings.

Two researchers independently will code the transcripts and compare their interpretations; differences will be discussed within the research team and resolved by consensus. To facilitate interpretative depth, memos will be used throughout the coding process to document analytic reflections, conceptual links, and evolving interpretations.

Discussion

This study will offer an in-depth exploration of the lived experience of adult women with UI, with a particular focus on the emotional, social, and practical implications of managing the condition. By giving voice to patients' experiences, the research will contribute to a deeper understanding of how UI affects various dimensions of everyday life—beyond its clinical manifestations. The narratives collected will help to trace how cultural expectations, personal beliefs, and emotional burdens intersect with the practical challenges of managing involuntary urination (Panesar et al., 2025).

The findings may help to highlight gaps in current pathways of care that often overlook the psychosocial dimensions of the condition. In the context of Northern Italy, gaining insight into how women interpret and navigate UI is essential to designing interventions that truly reflect their everyday realities. By revealing how feelings of stigma, embarrassment, and the quiet struggle to maintain bodily control influence decisions about seeking help and continuing treatment, this study may offer useful directions for rethinking current care services (Lamerton et al., 2010). Making support interventions more responsive could also mean exploring more discreet and flexible ways for women to access support, helping to reduce barriers and encourage engagement (Åström et al., 2021; Wessels et al., 2021).

The emphasis on person-centred care is especially relevant in this context (Freeman, 2007): incorporating the psychosocial dimensions of illness into treatment planning may foster greater patient active involvement, improve therapeutic adherence, and ultimately enhance rehabilitation outcomes.

Beyond individual care, the study holds broader implications for public health. Making women's experiences visible may act as a catalyst for educational campaigns that challenge misconceptions and normalise open discussion of UI (Franzén et al., 200). This visibility could encourage earlier disclosure and timely access to treatment, counteracting the tendency to accept UI as an inevitable part of ageing (Baum et al., 1991).

The women's narratives may also prove valuable for training healthcare professionals. By highlighting how knowledge, attitudes,

beliefs and practices shape the management of UI, these accounts can help deepen practitioners' understanding of the emotional and cultural dimensions that influence care (van Vuuren et al., 2021). In turn, this awareness may strengthen communication skills and empathy — qualities essential for supporting women living with a condition often burdened by stigma and silence.

However, certain limitations must be acknowledged. The qualitative, phenomenological design does not allow for statistical generalisation. Focusing on women who have already undertaken pelvic floor rehabilitation means the voices of those who remain outside formal care — or who have discontinued it — may be underrepresented. Moreover, despite efforts to build trust, the sensitive nature of the topic might limit how openly some participants share their experiences. Finally, the reliance on interpretative sufficiency, while methodologically appropriate for qualitative inquiry, could mean that less common yet meaningful perspectives remain unheard.

Despite these boundaries, this study seeks to bring women's realities with UI into clearer view — within families, communities, and healthcare settings. In doing so, it contributes to a cultural shift: from silence and resignation towards awareness and more responsive forms of care.

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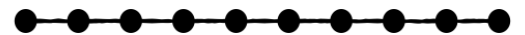
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Supplementary File 1. LEI Interview guide.

Objective	Open-ended questions
A. Understanding the emotions and daily lives of women with urinary incontinence	- Thinking about your experience, how would you describe urinary incontinence? - How would you define it yourself? What does it represent for you? - How does incontinence affect your life and your daily activities? - Would you like to share a specific episode in which you particularly felt the impact of incontinence? - How do you perceive the changes in your body as a result of urine leakage? - How did you feel when you realized you were experiencing urine leakage? What emotions did you feel? - And now, how do you feel when you notice urine leakage? What emotions do you experience? - Who did you confide in or discuss with when you had the first episodes of incontinence? <i>[Was it with experts, friends, family members, confidants, or perhaps peers?]</i> - Who do you talk to about it today? - What strategies have been suggested to you for dealing with incontinence? - Have you ever talked to anyone about any sexual issues related to incontinence? Who did you talk to? - What kind of discomfort do you experience in this regard, and how do you feel about it? <i>[If applicable]</i> - How have these discomforts affected your sexual desire, initiative, or relationship life? - How does your [cultural or social] context influence the way you perceive, cope with, or talk about incontinence?
B. Understanding the behavioral strategies implemented to cope with the problem	- Can you tell me how you cope with the problem of urinary incontinence? <i>[To bring out strategies, treatments, behaviors, or tools]</i> - Due to urinary leakage, are there any activities, moments in life, or situations you have had to give up for a certain period? - Have you had to make any permanent sacrifices? Would you like to share what they are? - How do you feel when you do physical activity or are at an event with other people? - What do you think about the information you have gathered on urinary incontinence? - How has this information influenced the way you approach the issue? - What do you think about the sources of information you have used? - Are there any treatments or solutions you have received information about that you would like to try personally?
C. Collecting women's perceptions regarding their experience with urinary incontinence care	- What made you decide to contact the pelvic floor rehabilitation clinic? - Can you tell me if there was a moment, situation, or person who suggested or encouraged you to seek help? - What sensations do you experience while undergoing treatment for your condition? <i>[To bring out the emotions felt during the care process]</i> - How do you perceive your current health? - What do you hope for the future regarding your health? <i>[perineal health]</i> - Is there anything we, as healthcare professionals, could do to improve or change what we do for you?

Supplementary File 2. Socio-demographic questionnaire.

1. Year of birth	
2. Nationality	☐ Italian ☐ Other
3. Marital status	☐ Married / Co-habiting ☐ Single ☐ Separated / Divorced ☐ Widow
4. Level of education	☐ None / Primary school (elementary) ☐ Lower secondary school (middle school) ☐ Upper secondary school (high school diploma) ☐ Bachelor's degree / Master's degree / PhD
5. Weight (kg)	
6. Height (cm)	
7. Number of children	☐ 0 ☐ 1 ☐ 2 ☐ 3 or more
8. Year of birth of the youngest child	
9. Type of delivery	☐ Vaginal delivery ☐ Cesarean section ☐ Both
10. Menopause	☐ Yes ☐ No
11. Do you suffer from pelvic organ prolapse?	☐ Yes ☐ No
12. Have you undergone any gynecological/urological surgery?	☐ Yes ☐ No
13. If you answered 'Yes' to the previous question, please specify the type of surgery and the year it was performed	• Surgery/ies • Year.....
14. Do you suffer from any other conditions?	☐ Yes ☐ No
15. If you answered 'Yes' to the previous question, please specify which conditions	
16. Period of onset of symptoms	☐ 6 months ago or less ☐ Between 6 and 12 months ago ☐ From 2 to 5 years ago ☐ From 6 to 10 years ago ☐ More than 10 years ago
17. Frequency of urinary incontinence episodes	☐ Once a week or less [1] ☐ Two to three times a week [2] ☐ About once a day [3] ☐ Several times a day [4] ☐ Continuously [5]
18. Amount of urinary leakage	☐ Small (a few drops) [2] ☐ Moderate (wet panty liners or absorbents) [4] ☐ Significant (soaked panty liners or absorbents) [6]
19. Circumstance of urinary leakage (More than one answer possible)	☐ I experience urinary leakage before reaching the bathroom ☐ I experience urinary leakage when coughing or sneezing ☐ I experience urinary leakage while I am asleep ☐ I experience urinary leakage when I am moving and during physical activity ☐ I experience urinary leakage after I have finished urinating and got dressed ☐ I experience urinary leakage without any particular reason ☐ I experience urinary leakage continuously
20. From 1 (very little) to 10 (very much), how well-informed do you consider yourself on the topic of urinary incontinence?	 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

21. What resources or professionals have you consulted to address your questions about urinary incontinence? (More than one answer possible)	☐ Internet ☐ Television ☐ Social media ☐ Friends ☐ Relatives (please specify.....) ☐ Health professionals (please specify.....) ☐ Other (please specify.....) ☐ None
22. Among people close to you (friends/family), have you had experience with others who have urinary incontinence?	☐ Yes ☐ No
23. From 1 (very little) to 10 (very much), to what extent has urinary leakage interfered with your daily life?	
24. Has your symptomatology affected your sexual life?	☐ Not at all ☐ Very little ☐ A little ☐ A lot
25. Have your urinary leakages led to absenteeism or reduced productivity at work?	☐ No ☐ Yes, rarely ☐ Yes, sometimes ☐ Yes, often
26. Could you provide an estimate of your weekly expenditure on hygiene products specifically for urinary leakage (pads, cleaners, etc.)?	☐ I do not purchase any specific products for urinary leakage ☐ I spend less than 3 euros per week ☐ I spend less than 5 euros per week ☐ I spend between 6 and 10 euros per week ☐ I spend more than 10 euros a week
27. What expenses are you incurring for visits and treatments at the Pelvic Floor Rehabilitation Clinic, and how many are there?	
28. How long have you been receiving care at the Pelvic Floor Rehabilitation Clinic?	
29. How many rehabilitation sessions have you completed so far?	

Note. Questions 17, 18, 19 and 20 constitute the ICIQ-UI SF, and the total score is calculated by summing the scores from questions 17, 18 and 20 [scores provided in square brackets].

Clinical Nursing Care for Pediatric Patients with Myelomeningocele: A Scoping Review Protocol

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Abstract

Introduction. Myelomeningocele (MMC) is an open spinal dysraphism characterized by a neural tube defect in which the spinal cord, nerves and meninges protrude through a skin defect, predominantly in the lumbosacral region. Nursing care is essential in the early management of affected newborns, encompassing monitoring, prevention of complications, family support, and interdisciplinary coordination to ensure continuous care.

Objective. This scoping review aims to systematically map the available literature on hospital-based nursing care for pediatric patients with MMC and identify knowledge gaps in order to provide an up-to-date overview of the state of the art and to suggest areas for future research.

Methods and Analysis. This protocol follows the PRISMA-ScR guidelines. The review will include primary research studies, clinical guidelines, and expert opinions published in English and Italian, without time restrictions. We will search PubMed/MEDLINE, CINAHL, Web of Science, Scopus, Cochrane Library, OpenGrey, and Google Scholar. Two independent reviewers will conduct screening and data extraction using Rayyan. Data will be synthesized thematically and presented in tabular and narrative formats.

Expected Results. Preliminary evidence highlights three

main pillars in the management of myelomeningocele: prevention of complications, optimization of functionality, and enhancement of patient well-being. A multidisciplinary approach is essential to address the complex needs of neonates with MMC, with nurses playing a key role in coordinating care, ensuring continuity, and monitoring clinical status. Current recommendations emphasize specific nursing interventions for early care, including protective positioning, sterile dressing techniques, and allergen avoidance. However, despite the presence of some guidance, perioperative nursing practices remain underexplored in the literature. This review aims to identify, map, and summarize existing evidence to support and improve clinical nursing care for pediatric patients with MMC.

Ethics and Dissemination. Ethical approval is not required for this review. Findings will be submitted for publication in a peer-reviewed journal and disseminated through academic conferences and institutional training.

Protocol Registration. osf.io/rnc9u

Keywords: Myelomeningocele, Spina Bifida, Pediatric Nursing, Nursing Care, Patient Care Management, Open Spinal Dysraphism, Open Spina Bifida, Pediatric Care

Introduction

Myelomeningocele (MMC) is the most severe form of spina bifida, an open spinal dysraphism characterized by the failure to close the spinal column during embryonic development in which the spinal cord, nerves and meninges protrude through a skin defect, predominantly in the lumbosacral region.

The prognosis depends on the site and extent of the lesion, as well as the presence of comorbidities such as hydrocephalus and Chiari malformation II. The main clinical complications include paralysis, urinary and faecal incontinence, and cognitive disorders. (Cartwright & Wallace, 2017; Chellathurai et al., 2022)

Since the 1960s, the approach to myelomeningocele has undergone a significant transformation with the introduction of neonatal surgery and, later, fetal surgery. The latter emerged as a result of the “two-hit” theory, according to which prolonged exposure of the spinal cord to amniotic fluid during gestation contributes to further neurological damage. Although many children are born with significant neurological deficits, a significant percentage have normal intelligence and good

prospects for independent life. Functional and cognitive outcomes are influenced by the level of the lesion, the presence of hydrocephalus, central nervous system infections, and the ability to ambulate and control sphincter functions. In particular, mobility and continence are central to autonomy and social inclusion. (Zerah & Kulkarni, 2013; Bowman & McLone, 2010)

The clinical management of myelomeningocele is complex and requires a multidisciplinary approach. In this context, nursing care plays a key role throughout the care pathway from birth to adulthood, including aspects of health education, management of complications, family support and promotion of autonomy. However, the available literature on the specific contribution of the nurse in the care of the patient with myelomeningocele appears fragmented and not systematically mapped. (Bowman & McLone, 2010; Brand, 2006; Rosen & Angert, 2018)

Objectives

This scoping review aims to map the existing literature on hospital nursing care for pediatric patients with MMC, identify research gaps, and inform clinical practice and future studies.

Primary Research Questions:

1. What nursing interventions are reported in the hospital care of pediatric patients with MMC?
2. What are the main goals and outcomes associated with nursing care in this population?
3. What are the gaps in the literature regarding hospital nursing care for MMC?

Secondary Question:

- What is the role of the nurse within the multidisciplinary team in the management of MMC in hospital settings?

Eligibility Criteria**Inclusion Criteria:**

- Population: Pediatric patients (0–18 years) diagnosed with MMC.
- Concept: Hospital-based nursing care (e.g., wound care, positioning, monitoring, family support, interdisciplinary collaboration).
- Context: Inpatient care settings (e.g., PICU, NICU, pediatric surgical units).
- Types of evidence sources: Primary research (qualitative, quantitative, and mixed-methods studies), clinical guidelines, and expert opinions will be included. Secondary studies will be considered to explore how existing evidence has been synthesized and applied, to describe the available evidence base, and to better identify knowledge gaps and priorities for future research. Data extraction, however, will be restricted to primary data from original studies.
- Language: English or Italian.
- Time restrictions: None.

Exclusion Criteria:

- Studies focused exclusively on surgical techniques or outpatient care
- Non-nursing interventions or adult populations
- Studies not available in full text or conference abstracts with insufficient data
- Studies focused on community-based or

Methods and Analysis

This scoping review will be conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews and reported following PRISMA-ScR. (Aromataris et al., 2024; Tricco et al., 2018). The study protocol was registered and is available at the following link: osf.io/rnc9u.

Search Strategy

The following databases will be searched: PubMed/MEDLINE (via PubMed), CINAHL (via EBSCO), Scopus, Web of Science, Cochrane Library, OpenGrey and Google Scholar for grey literature

Search string (PubMed):

((Meningomyelocele[mh] OR Spina Bifida Cystica[mh] OR meningomyelocele*[tiab] OR myelomeningocele*[tiab] OR myelocele*[tiab] OR "spina bifida aperta"[tiab] OR "open spina bifida"[tiab] OR Spina Bifida Cystica[tiab])) AND ((Nursing care[mh] OR patient care management[mh] OR pediatric nursing[mh] OR ((pediatric[tiab]) AND (care[tiab] OR nursing[tiab] OR management[tiab])))

The search string will be adapted for the additional databases to be consulted.

The search strategy has been validated with the support of a medical librarian. Additionally, reference and citation tracking will be performed using Zotero.

Study Selection

All references will be imported into Rayyan. Duplicates will be removed. Two reviewers will independently screen titles and abstracts against the inclusion criteria. Full texts will then be reviewed for eligibility. A third reviewer will resolve disagreements.

Data Extraction

A data charting form will be developed and piloted. Data items to be extracted include:

- Author(s), year
- Country of study

- Study design
- Population characteristics
- Nursing interventions
- Outcomes reported (clinical, educational, family-related, and professional training outcomes, where applicable)
- Role of the nurse
- Main findings and conclusions

Data will be extracted independently by two reviewers and discussed for consistency.

Outcomes will be extracted as reported in the included studies and may include clinical outcomes (such as pre-operative management, infection prevention, post-operative wound care, prevention of pressure injuries, and maintenance of stable vital parameters), as well as educational and family-related outcomes, including family involvement throughout the care process. Where available, outcomes related to the training and preparation of healthcare professionals involved in the care of this patient population will also be considered.

The extraction of outcomes will support the mapping of how nursing interventions and roles have been described in relation to patient, family, and professional-related outcomes, in line with the exploratory aims of this scoping review.

Data Synthesis

Extracted data will be synthesized using a descriptive and thematic approach. Results will be presented in tables, with categories such as:

- Preoperative and postoperative nursing care
- Monitoring and complication prevention
- Family education and support
- Role in multidisciplinary teams

A PRISMA-ScR flow diagram will illustrate the selection process.

Ethics and Dissemination

Ethics approval is not required for this review as it involves only published and publicly available data. Results will be disseminated through peer-reviewed publication, presentations at pediatric or nursing conferences, internal workshops for nursing staff.

Limitations

Potential limitations include the exclusion of non-English/Italian studies, possible publication bias, and heterogeneity in study designs that may affect data synthesis. Due to the exploratory nature of this review, critical appraisal of study quality and risk of bias will not be conducted.

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Learning Through Adversity: An Interpretative Phenomenological Study on Nursing Students' Experiences in Intensive Care Units

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Abstract

Introduction. Large-scale healthcare emergencies have profoundly reshaped nursing education, particularly its experiential and clinical components. The reorganization of clinical placements and the integration of nursing students into Intensive Care Units (ICUs) dedicated to COVID-19 patients exposed students to highly complex, technologically advanced, and emotionally demanding care environments. Understanding how students experienced these placements is essential to inform educational strategies that ensure both learning and well-being in crisis contexts.

Methods. A qualitative study was conducted using an Interpretative Phenomenological Analysis (IPA) approach to explore nursing students' lived experiences during ICU placements in a large-scale healthcare emergency. Eight third-year undergraduate nursing students who had completed

at least 15 days of internship in medical or surgical ICUs participated in semi-structured, in-depth interviews. Data were analysed following the IPA methodological framework, allowing for an in-depth exploration of shared meanings and individual sense-making processes.

Results. Four interconnected themes emerged from the analysis: (1) Evolution of Feelings and Emotions, describing an initial phase of fear, uncertainty, and emotional strain; (2) Challenging Reality, reflecting exposure to critically ill patients and high-intensity care; (3) Going on Side by Side, highlighting the central role of relational support from clinical tutors, healthcare teams, and family members; and (4) Deep Growth, representing the development of professional confidence, resilience, and reflective capacity. Over time, students reframed distressing experiences into meaningful learning opportunities.

Discussion. Despite the psychological and emotional challenges associated with ICU placements during a healthcare emergency, students reported substantial personal and professional growth when adequate support was present. These findings underscore the importance of structured mentorship, emotional support, and reflective spaces within clinical education. Integrating such elements into nursing curricula may better prepare students to navigate high-pressure clinical environments while safeguarding their well-being and fostering professional identity development.

Keywords: Covid-19 Unit, Interpretative Phenomenological Analysis, Nursing Students, Professional Development

Introduction

Academic education, particularly in the health professions, underwent a profound transformation during the COVID-19 pandemic, which required the immediate reorganization of teaching, assessment, and internship systems (Canet-Vélez et al., 2021). The abrupt onset of this acute situation forced universities to rethink their pedagogical models and training strategies to ensure both safety and educational continuity (Hernández-Martínez et al., 2025). Although these changes were initially conceived as temporary solutions, many of the reflections and innovations developed during that period continue to influence how healthcare education is organized today. Teaching activities were rapidly transferred to telematic platforms, using synchronous and asynchronous modalities, while examinations were conducted remotely (Martin-Delgado et al., 2021). Tutoring and mentoring activities were adapted to virtual

formats to sustain the learning process of nursing students, and administrative services were provided mainly online or by appointment only when strictly necessary (Canet-Vélez et al., 2021; Hernández-Martínez et al., 2025; Martin-Delgado et al., 2021).

These transformations deeply affected nursing education, particularly its experiential dimension, which constitutes the core of professional development (Casafont et al., 2021; Hernández-Martínez et al., 2025). To comply with safety regulations and protect students' well-being, internships were suspended and experiential learning temporarily replaced by online traineeships. Nursing faculties had to reorganize their internship programmes to face an exceptional situation (Ulenaers et al., 2021), raising questions about the pedagogical value and limits of remote clinical learning. Nursing education relies on the continuous integration between theory and practice. Practical learning enables students to develop clinical reasoning,

technical skills, and professional identity, providing opportunities to apply knowledge, test competencies, and refine judgement in authentic contexts (Mahmoud, 2014; McHugh & Lake, 2010). The suspension of internships therefore limited an irreplaceable component of training, reducing students' exposure to complex clinical realities and direct patient care (Barisone et al., 2022).

The importance of maintaining practical learning in health professions education triggered an international debate among policymakers, educators, and professional bodies on how to balance safety and educational quality. In the later phases of the emergency, several countries gradually reinstated internships for healthcare students through different organizational models. In Spain, for instance, final-year nursing students were temporarily recruited to support the national healthcare system (Barisone et al., 2022); in the United Kingdom and Australia, students were integrated into care teams to assist qualified nurses in managing increased workloads (Dickel, 2021). In Italy, some universities reintroduced internships, allowing nursing students to provide care within dedicated Intensive Care Units (ICUs) (Barisone et al., 2022). These experiences, developed within a highly demanding and uncertain context, confronted nursing students with new professional and emotional challenges (Casafont et al., 2021). Students frequently reported stress and anxiety due to uncertainty about their competence (Martin-Delgado et al., 2021), fear of exposure and of transmitting infection to relatives (Fowler & Wholeben, 2020), and feelings of guilt for potentially becoming a burden to professional nurses (Hernández-Martínez et al., 2025). At the same time, they expressed pride and gratitude for being part of the healthcare response, perceiving the internship in the ICU as a meaningful learning opportunity and a chance to contribute actively to patient care (Canet-Vélez et al., 2021). They also faced emotionally distressing situations, such as caring for patients isolated from their loved ones, that generated empathy, sadness, and moral tension (Casafont et al., 2021).

In the Italian context, only one qualitative study has explored nursing students' experiences of clinical placements in ICUs. Barisone and colleagues (2022) identified three main themes – learning which surpasses technicalities, confronting dignity issues, and feeling treated as

an equal in the workspace – after interviewing twenty-one second- and third-year students (Barisone et al., 2022). These findings suggest that an unpredictable large-scale health emergency can provide meaningful learning opportunities, fostering both professional and personal growth among nursing students.

Despite these contributions, limited evidence still exists regarding how students experience and make sense of clinical learning in extraordinary circumstances. A deeper understanding of these processes could support nursing educators and clinical tutors in helping students process the emotional and ethical implications of practice in critical contexts, promoting resilience, reflective learning, and the consolidation of a strong professional identity. Therefore, this study aimed to explore the lived experiences of nursing students caring for COVID-19 patients during their internships in ICUs throughout the COVID-19 pandemic, focusing on how they perceived challenges, emotions, and opportunities for growth within a highly critical learning environment.

Methods

Design, Study Population, and Data Collection

A qualitative study was conducted using the Interpretative Phenomenological Analysis (IPA) approach (Smith et al., 2021). By exploring lived experiences, IPA enables the identification of significant themes that emerge from the subjective interpretation of participants' accounts (Smith et al., 2021). A purposive sampling strategy was adopted to capture a range of experiences according to the following inclusion criteria: a) nursing students attending the 3rd year of the bachelor's degree programme; b) nursing students with an internship experience in medical or surgical ICUs; c) internship experience in an ICU lasting at least 15 days; d) willingness to participate in the study; and e) fluency in Italian.

Eligible participants were identified through the head of the hospital research office where the internships were conducted, who provided them with information about the study and invited their participation. Researchers then contacted students via email to schedule either face-to-face or online interviews. After confirming participation, students completed an online

demographic questionnaire and informed consent form. All participants were interviewed approximately two weeks after completing their internship experience in a medical or surgical ICU dedicated to the care of COVID-19 patients, during the third academic year of their nursing degree. Consistent with IPA methodology (Smith et al., 2021), data were collected through semi-structured, in-depth interviews designed to elicit reflection and capture the nuances of personal meaning-making.

Interviews were conducted between January and April 2021 by two authors (FD and TN),

both experienced in qualitative interviewing. Owing to restrictions related to the critical healthcare emergency, all eight interviews were carried out via videoconference. Each interview began with a broad, open-ended question to encourage reflection on the participants' learning experience: "Please, can you describe your learning experience during your internship in the Intensive Care Unit?" Further prompts were used to explore emotions, perceptions, and learning processes related to the experience. Examples of the guiding questions are provided in Table 1.

Table 1. Interview guide for nursing students with internship experience in Intensive Care Units (ICUs)

1.	Please, can you describe your learning experience during your internship in an Intensive Care Unit dedicated to COVID-19 patients?
2.	Can you describe a situation you found particularly difficult or challenging?
3.	What aspects of this experience did you perceive as the most rewarding or satisfying?
4.	Looking back, what do you think you learned from this experience? Did you recognize any personal or professional growth?
5.	If you had to identify different stages in the evolution of your learning during the internship, how would you describe them?
6.	How did the people around you (for example, your clinical tutor, academic tutor, classmates, or family members) support you throughout this experience?
7.	If you could go back, what would you change in your training path to optimize learning? What would you keep the same or improve further?

An empathetic interviewing attitude was maintained throughout to ensure that nursing students felt comfortable and free to share their experiences. At the end of each interview, participants were invited to add any further comments. In line with IPA methodology, the sample size was intentionally small to allow an in-depth exploration of participants' lived experiences. Data collection stopped when the research team observed that no new relevant themes were emerging and that the interviews provided sufficient depth to understand the phenomenon (Corbin & Strauss, 2014). Interviews lasted between 47 and 80 minutes and were transcribed verbatim by the research team. Reporting followed the Standards for Reporting Qualitative Research (O'Brien et al., 2014).

Data Analysis and Rigor

Data were analyzed following the IPA methodological framework (Smith et al., 2021). Before starting the analysis, researchers performed bracketing to suspend preconceptions and preserve the authenticity of participants'

perspectives. According to Smith's IPA procedure (Smith et al., 2021), analysis was conducted independently by two authors (FD and TN), who carried out a detailed, case-by-case qualitative examination through complete immersion in the data. The analytic process involved several stages:

1. initial descriptive, linguistic, and conceptual commenting;
2. transformation of comments into emerging themes summarizing essential meanings;
3. development of connections among themes to identify overarching patterns across cases.

A third researcher (LG) reviewed the coding and thematic structure to ensure consistency and interpretive validity. Redundant or overlapping themes were refined or merged, leading to a final set of master and subordinate themes. Rigor was achieved through established criteria of credibility, transferability, and dependability (Crowe et al., 2015). Transparency and coherence were strengthened by producing individual summaries for each case, later shared with two study participants for member checking to confirm accuracy and completeness

(Sandelowski, 2000). To ensure linguistic and conceptual fidelity, the final results were translated from Italian to English and reviewed by a bilingual expert (Van Nes et al., 2010).

Ethical Considerations

The study was approved by the Institutional Review Board of the hospital where the internships were conducted. All participants received detailed information regarding the study's purpose and procedures, which were carried out in accordance with the Declaration of Helsinki. Participation was voluntary, and students could withdraw at any time without consequences. To ensure confidentiality, an alphanumeric code was assigned to each participant, guaranteeing anonymity and the secure management of personal data.

Results

Eight nursing students participated in the study, all of whom completed their internship in medical or surgical ICUs dedicated to the care of COVID-19 patients. The sample consisted of Seven females and one male, with a median age of 22 years (range 21–25), all attending the 3rd year of the bachelor's degree in nursing. At the time of data collection, six students had completed their internship in a medical ICU and two in a surgical CU. The internship lasted a median of 24 days (range 15–30). From the interpretative analysis of the interviews, four main themes emerged, describing the lived experience of nursing students providing care in ICUs during a large-scale healthcare emergency: a) Evolution of Feelings and Emotions; b) Challenging Reality; c) Going on Side by Side, and d) Deep Growth.

Themes and subthemes are summarized in Table 2.

Table 2. Summary of themes, subthemes, and illustrative quotations from nursing students' experiences in Intensive Care Units (ICUs)

Main Theme	Subthemes	Illustrative Quotations	Interpretative Meaning
1. Evolution of Feelings and Emotions	a) Fear and anguish b) Strong psychological impact c) Gratitude and acceptance	"When I was there, I felt as locked in a cage... it made me feel scared... I was afraid of bringing something dangerous to my home mates." (NS_2) "There were tough moments... such as a patient's death... but it made me grow." (NS_6)	Emotional adaptation: from initial fear and uncertainty to awareness, acceptance, and growth.
2. Challenging Reality	a) Wearing protective equipment b) Demonstrating skills c) Being in the ICUs	"It wasn't easy being with the mask all the time... after seven hours my face was marked." (NS_2) "Day after day, I succeeded in conquering my independence... showing my abilities." (NS_1)	The demanding environment challenged students' endurance and competence, fostering autonomy and self-efficacy.
3. Going on Side by Side	a) Clinical tutor relationship b) Family and relational support	"My clinical tutor helped me not only with patient care but also from a human point of view." (NS_3) "My family was worried at first, but then they understood how important this experience was for me." (NS_6)	Supportive relationships acted as emotional anchors and learning catalysts, enabling students to find meaning and balance.
4. Deep Growth	a) Professional growth b) Personal growth	"It was a positive experience... I recognized personal growth, independently from the evaluation." (NS_1) "Now I feel surer of myself and my capabilities... I'm another person." (NS_2)	The ICU experience became a transformative learning process, reinforcing confidence, identity, and reflective practice.

Theme One: Evolution of Feelings and Emotions

Caring for patients in ICU brought out deep and intense emotions among nursing students, ranging from fear and disorientation to gratitude

and fulfilment. The findings revealed an evolution of these feelings: participants described how initial negative emotions gradually transformed into positive ones as they adapted to the clinical environment and gained confidence. The subthemes identified were: a) Fear and anguish,

b) Strong psychological impact, and c) Grateful and acceptance.

Students frequently referred to their initial fear of exposure to risk and concern for their own and others' safety: *'When I was there, I felt as locked in a cage... it made me feel scared... I was afraid of getting infected and to bring this virus to my home mates... it wasn't easy at all...'* (NS_2). They also described the uncertainty and sense of chaos experienced during their first days in the ICU: *'I was scared it was too hard for me to face this difficulty... I don't know... I was scared... it was chaotic... before that... I didn't know how the unit was, which patients I could find there...'* (NS_5). Despite these challenges, the experience ultimately became a source of psychological strength and self-awareness: *'I have to say that... for the psychological aspect... there were tough moments... such as a patient's death... and I was sad after that because it was very hard to face it...'* (NS_6). Several students expressed gratitude for the opportunity, acknowledging it as a highly formative and transformative experience: *'If they told me again to go there to do an internship, I would gladly do it ... a positive experience in short...'* (NS_6)

Theme Two: Challenging Reality

Internships in ICUs were perceived as highly demanding, both physically and emotionally. Nursing students described the care environment as challenging but crucial for developing resilience and competence. Three subthemes were identified: a) Wearing DPI, b) Demonstrating skills, and c) Being in ICU.

Participants reported difficulties in wearing personal protective equipment for prolonged periods: *'(...), but it wasn't easy being with the mask all the time... because after 7 hours my face was marked... it hurt... it was as nurses in TV or on social network... it was like being in another world...'* (NS_2). The protective gear reduced dexterity and made technical tasks more difficult: *'We had two pairs of gloves, and it wasn't easy at all doing blood sampling... so at the beginning, I had some difficulties because I said: And now how can I do? and then I said: No, I must do it... and then you get used to it...'* (NS_3). These experiences pushed students to demonstrate their skills and gain autonomy: *'Day after Day... I succeeded in conquering my independence... because I succeeded in... letting them know me... my skills... and how I could face that situation autonomously'* (NS_1).

Theme Three: Going on side by side

In such a demanding and constantly changing environment, nursing students highlighted the importance of not being alone. Support from clinical tutors, mentors, and family members was essential to facing difficulties and developing confidence. Subthemes identified are a) Clinical tutor relationship and b) Family and relational support.

Students described their tutors as crucial sources of both technical and emotional guidance: *'Fortunately, I had a clinical tutor who followed me in the entire learning process in ICU, for learning taking care of COVID-19 patients but in particular for us... from the human point of view'* (NS_3). *'... She was also very patient, and I didn't see her having difficulty managing the entire ICU... I was afraid of being another part of her difficulty... as the burden of her work in such difficult scenario... but she was so nice not to feel me as a burden, she was attentive to the student who had to follow...'* (NS_4). *'I think to the clinical tutor ... who was always by my side... because I was afraid to manage the situation ... he was always with me... he could leave you to do something on your own...yeah it was possible ... but he was accommodating if you needed... if he saw you insecure about something if you needed help... anyway he was always there... he just took me by the hand and took me into the world of COVID-19...'* (NS_7)

Family support also played a pivotal role: *'Well... when I told my family I was in ICU... they were worried because... they know me... but after the first glance, they understood I wanted to learn in ICU... and how much it was important this learning opportunity for me... this because it was a precious learning possibility and unique... I hope so...'* (NS_6).

Theme Four: Deep growth

Despite difficulties, nursing students recognized the internship as a key moment for personal and professional development. We identified two subthemes: a) Professional growth and b) Personal growth.

Students acknowledged the experience as transformative: *'Well... it was a positive experience for me... I recognized personal growth... independently from the evaluation of the internship from the clinical tutor'* (NS_1). *'Well... now I feel*

surer of myself and my capabilities, as I had never done before... because... this was the first time I had the chance to demonstrate my capabilities, but... now I'm another person. I'm surer about myself and confident.' (NS_2).

The relationship with the nursing team was also central to their professional growth: *'Yes, it was an important growth because... despite difficulties... overcoming them allowed me to feel grateful of my capabilities... and so this was a fundamental personal and professional growth'* (NS_8). Students underlined how theoretical and practical learning were deeply intertwined in shaping their professional identity: *'How can I say? Well... I think it is a professional growth because the practical aspect is hardly connected with the theoretical one'* (NS_5).

Discussion

Nursing students faced numerous challenges during their internships in ICUs, and overcoming these challenges promoted both personal and professional growth. It is important to emphasize that these findings emerged from nursing students' experiences in ICUs dedicated to COVID-19 patients, a context characterized by high clinical uncertainty, infection risk, and emotional strain (Barisone et al., 2022). Our results deepen the understanding of nursing students' lived experiences in caring for patients during an acute healthcare emergency, revealing four main themes: (a) Evolution of Feelings and Emotions, (b) Challenging Reality, (c) Going on Side by Side, and (d) Deep Growth. Overall, the interviews revealed that despite the adversity of the clinical context, students experienced significant learning and transformation. In line with Barisone and colleagues (Barisone et al., 2022), findings suggest that even within highly demanding and emotionally charged situations, students can acquire profound insights and develop competencies that go beyond technical learning. The personal and professional growth achieved through ICU internships appeared richer and more meaningful than in less critical or routine clinical environments.

This is a key message of our study: exposure to critical and unpredictable clinical scenarios can serve as a powerful catalyst for reflective learning, resilience, and professional identity development. The experience of facing uncertainty, emotional intensity, and

moral tension, when supported by adequate supervision, can transform a difficult situation into a meaningful learning opportunity. This perspective offers a valuable lesson for universities and educators in health professions: to design training models that both prepare and support students in navigating complex, high-stress contexts while safeguarding their psychological well-being and educational growth. It is important to underline that the experiences described were not free from strain or discomfort. As reported in another study (Nabavian et al., 2021), participants described psychological stress, fear, inner conflict, and occasional feelings of isolation. Nevertheless, our results emphasize students' ability to overcome such difficulties through adaptive mechanisms and relational support. Coping strategies, motivation, and the perception of contributing meaningfully to care appear to have sustained their engagement and learning (McClelland, 1965; Nabavian et al., 2021).

Two main factors emerged from the interviews as facilitators of development: (a) facing reality with courage and acceptance, and (b) not being alone. The third theme, Going on Side by Side, captures this second dimension particularly well. The nursing students recognized that relational support, from clinical tutors, peers, and families, was crucial in helping them process emotions, find meaning, and sustain motivation. These findings resonate with the literature highlighting how social connectedness and mentoring relationships are protective factors for learning and psychological adaptation during crises (Casafont et al., 2021; Eweida et al., 2020; Grande et al., 2021; Nabavian et al., 2021). The experience also reinforces the importance of relational and emotional components in clinical education. Human connection, empathy, and shared reflection enable students to transform emotionally challenging experiences into opportunities for professional and moral growth. As noted in previous literature, social isolation negatively affects well-being (Kim & Park, 2021), while supportive relationships fulfil essential human needs (Baumeister & Leary, 1995; Darwin, 2008; Mortari, 2019; Zhu et al., 2021) and act as a buffer against stress and distress in complex learning environments.

Our study also presents some limitations. Despite the efforts to recruit a homogeneous sample consistent with IPA methodology, most participants were female and completed

internships in medical ICUs. Being male or having an experience in surgical CUs could represent different perspectives shaping the findings. Furthermore, all participants belonged to a single national context, which may limit transferability. Future qualitative studies should therefore include more diverse samples and explore interprofessional perspectives to enrich understanding of experiential learning in emergency contexts.

Conclusions

Our findings highlight that nursing students achieved significant personal and professional growth despite the difficulties and emotional challenges faced during internships in ICUs. This experience represented a fundamental learning opportunity, enabling them to strengthen their professional identity and develop reflective awareness of what it means to care for vulnerable patients in complex and high-pressure environments. The lessons derived from this experience extend beyond the specific emergency that originated it. The insights gained can guide educators, tutors, and clinical institutions in structuring educational pathways that foster resilience, ethical awareness, and emotional competence in students. Understanding what nursing students faced and how they made sense of their experiences provides a foundation for rethinking clinical education models that prepare future nurses to act competently, compassionately, and consciously in times of crisis. Finally, this study opens new directions for research. Further investigations could explore the long-term impact of experiential learning in critical contexts and identify effective educational strategies to support nursing students during future emergencies or other highly demanding care scenarios.

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Oral Mucositis in Patients Undergoing Haematopoietic Stem Cell Transplantation: A Retrospective Analysis

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Abstract

Introduction. Oral mucositis (OM) is a prevalent and debilitating complication in patients undergoing haematopoietic stem cell transplantation (HSCT), particularly following high-dose chemotherapy and total body irradiation. Despite its clinical significance, observational data on OM incidence, severity, and associated factors in HSCT recipients remain limited. This study aimed to evaluate the clinical presentation of OM, its severity, and related outcomes during hospitalisation.

Methods. A retrospective observational study was conducted at La Maddalena Cancer Center, Palermo, Italy, including 211 patients who underwent HSCT between January 2018 and December 2020. OM severity was assessed using the World Health Organization Oral Toxicity Scale. Data on demographic and clinical characteristics, total parenteral nutrition (TPN), hospital stay, and oral care protocols were systematically extracted. Associations between OM severity and relevant variables were analysed using non-parametric tests and Spearman's correlation.

Results. Post-transplantation, nearly all patients developed OM, with a median severity grade of 2.0 (IQR: 2.0–3.0). Male patients experienced significantly more severe OM than females ($p = 0.01$). Mucositis severity correlated modestly with hospital stay duration ($\rho = 0.15$, $p = 0.03$), and strongly

with the number of TPN days ($\rho = 0.50$, $p < 0.001$). A significant association was also observed between OM and nausea severity ($\rho = 0.20$, $p = 0.003$). No significant correlations were found with age or educational level.

Discussion. OM remains a high-impact complication in HSCT, associated with nutritional impairment and pro-longed hospitalisation. These findings highlight the importance of comprehensive oral care protocols and underscore the need for targeted, sex-sensitive interventions and prospective multicentre research.

Keywords: Oral Mucositis, Haematopoietic Stem Cell Transplantation, Supportive Care, Retrospective Study

Introduction

Oral mucositis (OM) is a frequent and clinically significant complication observed in patients undergoing cancer treatment, particularly among those receiving high-dose chemotherapy as part of haematopoietic stem cell transplantation (HSCT) protocols (Biala, 2022; Nakagaki et al., 2022). OM is characterised by acute inflammation and ulceration of the oral mucosa, with clinical manifestations ranging from erythema and oedema to the formation of pseudomembranes and deep ulcerations exposing the submucosal tissue (Fitzpatrick et al., 2019). The pathogenesis of OM involves epithelial injury triggered by cytotoxic agents, followed by inflammatory amplification and mucosal breakdown (Sonis et al., 2004).

Histopathologically, OM extends beyond superficial epithelial damage, compromising mucosal integrity and increasing susceptibility to infection, particularly in immunocompromised patients. This disruption of the mucosal barrier renders the oral cavity susceptible to colonisation by pathogenic microflora and microbial translocation, heightening the risk of systemic infections such as bacteraemia and sepsis, especially in immunocompromised individuals (Cheong et al., 2017; Ellonen et al., 2023).

The prevalence of OM varies according to treatment intensity and patient-related factors. OM affects approximately 40%–80% of oncology patients receiving conventional chemotherapy, whereas in HSCT recipients, particularly those undergoing myeloablative conditioning (MAC) regimens, the prevalence may reach 75%–100% (Nakagaki et al., 2022). European multicentre data have reported similarly high incidence

rates among HSCT recipients, confirming the consistency of OM prevalence across transplant centres (Vagliano et al., 2011). Although national Italian registry data specifically focusing on OM are limited, reports from tertiary oncology settings suggest comparable clinical patterns in Italian HSCT populations.

Agents such as cyclophosphamide, melphalan, and busulfan, especially when combined with total body irradiation (TBI), are strongly associated with OM onset. Methotrexate, commonly used for graft-versus-host disease (GVHD) prophylaxis, is also recognised as a mucotoxic agent (Deeg et al., 1991; Kennedy et al., 2025).

Clinically, oral mucositis (OM) imposes a substantial burden by impairing oral intake and communication and by jeopardising adherence to anticancer treatment. When severe, OM may necessitate opioid analgesia, intravenous hydration and/or nutritional support (including parenteral nutrition), with consequent prolongation of hospital stay and increased healthcare costs (Elad et al., 2022; McCann et al., 2009). OM may also become dose-limiting, leading to treatment delays or dose reductions that can compromise therapeutic effectiveness and adversely influence survival (Chaudhry et al., 2016; Nakagaki et al., 2022).

In Italy, a large nurse-led study conducted across 19 GITMO centres ($n = 1841$) reported OM in 71% of HSCT recipients and severe OM in 21.6% (WHO scale), underscoring the magnitude of this complication in routine transplant practice (Vagliano et al., 2011). Comparable burdens have been documented in other European cohorts, such as a retrospective analysis of 496 HSCT recipients reported OM in 63.3% overall,

with marked differences by transplant and conditioning intensity (Radochová et al., 2021).

Among HSCT recipients, OM is a particularly prevalent and distressing adverse effect. Both autologous and allogeneic transplant recipients are affected, although the incidence and severity tend to be higher in allogeneic cases due to more aggressive conditioning and immunosuppressive regimens (Kara et al., 2024). The clinical picture is dominated by severe pain—often described as burning or stabbing—with substantial impairment in swallowing and speech and deterioration in quality of life. Sleep disturbance, anxiety and depressive symptoms are also reported and may be exacerbated by inadequate pain control and the adverse effects of opioid therapy (Hodgson et al., 2012; Schiavone et al., 2012).

Despite the prevalence and clinical impact of OM, observational studies that longitudinally characterise its clinical course and associated pain burden in HSCT patients are sparse (Sanz et al., 2024). Much of the existing literature is focused on preventive strategies or interventional approaches, leaving a gap in our understanding of the natural history of OM during the post-transplant period. This study aims to describe the incidence, severity and clinical presentation of OM and mucositis-related events in hospitalized patients undergoing HSCT.

Methods and Materials

This retrospective observational study was conducted at La Maddalena Cancer Center, a tertiary oncology hospital located in Palermo, Italy. This retrospective observational study was conducted at La Maddalena Cancer Centre, a tertiary oncology hospital in Palermo, Italy. The Centre includes a dedicated unit for haematopoietic stem cell transplantation (HSCT) and manages a high annual volume of haematological oncology admissions. A total of 212 medical records were reviewed, corresponding to all HSCT procedures performed at the Centre between January 2018 and December 2020.

The years 2021 and 2022 were deliberately excluded from the analysis, as the organisation and delivery of care during the COVID-19 pandemic, particularly in its acute phases, were substantially altered due to emergency protocols and constraints, making them not directly

comparable to pre-pandemic conditions. Eligible patients were aged 18 years or older and had been admitted for transplantation due to haematological malignancies. All data were anonymised prior to analysis in accordance with ethical and data protection standards.

Clinically, OM manifests as erythema, edema, ulceration, and pseudomembrane formation, typically appearing 5-7 days post-conditioning and resolving within 2-3 weeks (Elad et al., 2022; Sonis et al., 2004).

Data collection Procedures

Data were retrospectively collected from both digital records and archived paper-based files by a trained re-researcher between March and December 2023. Clinical information was retrieved through systematic screening of the hospital's information systems and physical documentation. Data collected included sociodemographic characteristics, clinical diagnosis, smoking status, and detailed OM classification. OM severity was assessed at two time points: baseline (pre-transplant) and the phase of maximum mucositis post-transplant. Nursing records and treatment protocols were also reviewed to capture oral care practices and supportive therapies applied during hospitalization.

The clinical pathway of HSCT patients and oral mucositis monitoring is illustrated in Figure 1.

Instruments and Measures

The WHO Oral Toxicity Scale was utilised to assess the severity of OM. This internationally validated scale classifies OM into five grades from Grade 0 (no symptoms) to Grade 4 (severe ulceration and inability to eat or drink). Grade 1 includes erythema and mild discomfort; Grade 2 allows solid food intake; Grade 3 restricts intake to liquids only; and Grade 4 denotes complete functional impairment due to oral lesions (Hong et al., 2019; Peterson et al., 2011; Vagliano et al., 2011; Yamagata et al., 2012). Moreover, a form, developed by the research team, was used to gather data related to patient demographics, medical history, comorbidities, and therapeutic regimens.

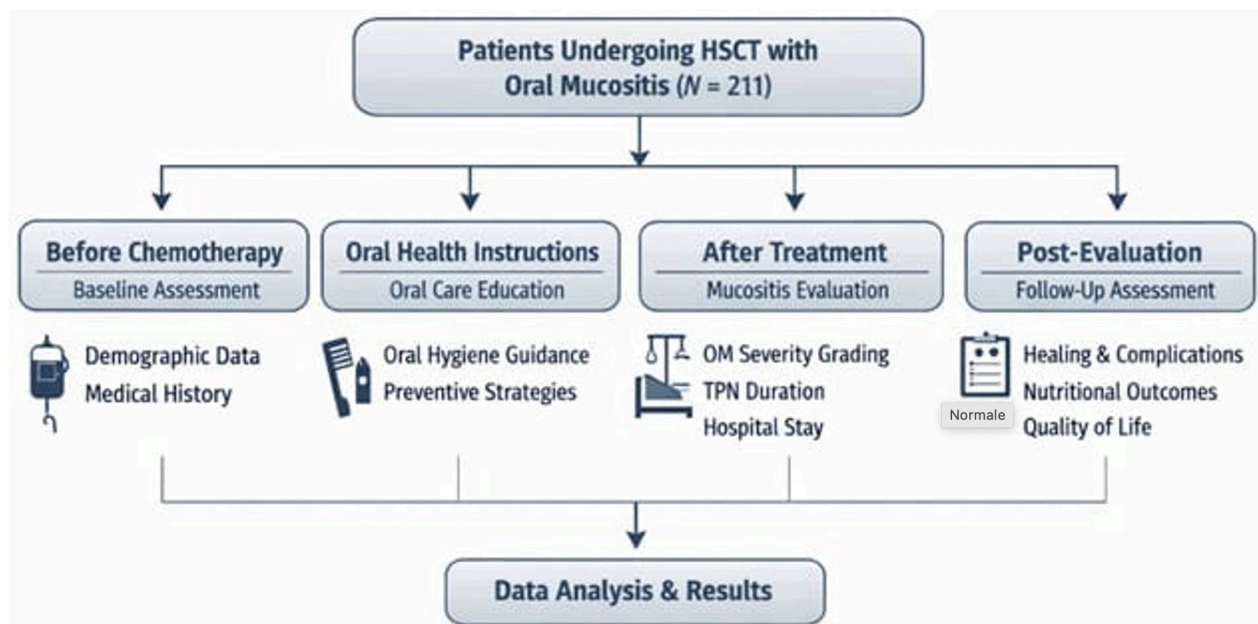


Figure 1. Clinical pathway for oral mucositis monitoring and management in patients undergoing HSCT.

Oral Mucositis Management Protocol

In accordance with the institutional guidelines of the La Maddalena Oncology Center and current evidence-based recommendations from the Multinational Association of Supportive Care in Cancer (MASCC) and the International Society of Oral Oncology (ISOO), a comprehensive OM prevention and management protocol was implemented for all patients undergoing HSCT (Elad et al., 2020, 2022; Miranda-Silva et al., 2021).

Prior to admission, patients received structured education on oral hygiene, including both verbal and written instructions on the prevention, early recognition, and self-monitoring of oral complications. Dietary counselling was also provided, with tailored recommendations to preserve mucosal integrity. Patients were strongly encouraged to promptly report any oral changes to enable early and appropriate clinical intervention.

A multidisciplinary team consisting of haematologists, oncology nurses, dentists, and clinical nutrition specialists was responsible for the application and dynamic adjustment of the oral care plan throughout the transplant period. Before HSCT, each patient underwent a comprehensive dental and mucosal evaluation to address any pre-existing conditions. Upon admission, a baseline assessment of oral mucosal status, including erythema, ulceration, denture-related trauma, and hygiene, was performed. A

standardised oral care protocol was then initiated and subsequently adapted based on the severity of mucositis and the patient's clinical status. Regular reassessments allowed for continuous refinement of the care plan according to OM grading.

Interdental cleaning was promoted in patients without bleeding risk, and removable dentures were to be cleaned with soap and water at least twice daily and ideally removed at night to prevent mucosal trauma. Special attention was given to patients receiving oxygen therapy or xerogenic medications (e.g., opioids, corticosteroids, antihistamines), with intensified monitoring to prevent xerostomia-related complications.

Core elements of the oral hygiene regimen included adequate hydration, which supported both oral cleansing and symptomatic relief; the use of non-alcoholic, pH-neutral chlorhexidine mouthwashes as prophylactic antiseptics to reduce microbial colonization and mitigate infection risk during neutropenia; and a protective oral solution containing hyaluronic acid and verbascoside, aimed at minimizing mucosal irritation and exerting anti-inflammatory effects (Al-Maweri et al., 2021; Tavakoli Ardakani et al., 2016). Although the MASCC/ISOO guidelines do not specifically recommend chlorhexidine for the prevention of oral mucositis, they acknowledge its value in infection control and maintaining oral hygiene in patients undergoing treatment for hematologic malignancies (Hong et al.,

2019). MASCC/ISOO guidelines were followed regarding structured patient education, base-line mucosal assessment, and standardized mucositis grading. The additional use of chlorhexidine and hyaluronic acid-verbascoside rinses reflected institutional protocols and served as supportive adjuncts beyond the formal recommendations provided by MASCC/ISOO (Colella et al., 2010; Elad et al., 2020; Nigro et al., 2020; Sorensen et al., 2008; Xia et al., 2025).

The protocol followed a graded, patient-centred approach to OM management. This integrative and severity-adapted management protocol aimed to reduce the incidence and progression of severe oral mucositis, mitigate the risk of secondary infections, support treatment continuity, and ultimately enhance the quality of life of patients undergoing haematopoietic stem cell transplantation.

Statistically Analyses

All statistical analyses were performed using R Studio (v4.3.3) and standard libraries for scientific computing. Descriptive statistics were calculated for all variables. Categorical variables were summarized as frequencies and percentages, while continuous variables were reported as mean and standard deviation (SD) or median and interquartile range (IQR), depending on the distribution.

The severity of OM was treated as an ordinal outcome variable. The association between mucositis severity and various clinical and demographic variables were examined. Correlations between mucositis grade and continuous clinical variables (e.g., age, length of hospital stay, number of days on total parenteral nutrition, nausea score) were assessed using Spearman's rank correlation coefficient (ρ). The associations between mucositis grade and categorical predictors (e.g., sex, smoking status, diagnosis, educational level) were tested using the Mann-Whitney U test for two-group comparisons and the Kruskal-Wallis test for comparisons across more than two groups. Post hoc pairwise comparisons were performed using Mann-Whitney U tests with Bonferroni correction. Statistical significance was set at $p < .05$ (two-tailed). Bonferroni-adjusted significance levels were applied for multiple comparisons where appropriate.

Ethical Considerations

Data were collected and managed in accordance with national regulations and institutional policies concerning retrospective observational studies. As the research involved the analysis of anonymised data from medical records without direct patient contact, the requirement for individual informed consent was waived. All procedures conformed to the principles outlined in the Declaration of Helsinki.

Results

Sociodemographic Characteristics

The sample included 211 patients who underwent hematopoietic stem cell transplantation (HSCT) and had complete documentation regarding OM grading. The mean age was 59.4 years (SD = 6.4), and the gender distribution was relatively balanced, with 52.6% male and 47.4% female participants. Additional sociodemographic data are presented in Table 1.

Table 1. Sociodemographic characteristics of the sample (N = 211 patients).

Variable	N (%)
Sex	
Male	111 (52.6%)
Female	100 (47.4%)
Educational Level	
Bachelor	17 (8.1%)
High School	55 (26.1%)
Middle School	87 (41.2%)
Primary School	48 (22.7%)
Illiterate	4 (1.9%)
Diagnosis	
Multiple Myeloma	111 (52.6%)
Lymphoma	61 (28.9%)
Leukemia	39 (18.5%)
Smoker	
No	146 (69.2%)
Yes	65 (30.8%)

Clinical Characteristics

Before transplantation, nearly all patients (99.1%) had no clinical evidence of oral mucositis. Post-transplantation assessments revealed a median mucositis grade of 2.0 (IQR:

2.0–3.0), while the median grade for nausea was 2.0 (IQR: 1.0–3.0), as detailed in Table 2. The average duration of total parenteral nutrition (TPN) was 5.7 days (SD = 9.0), and the mean length of hospitalization was 24.7 days (SD = 8.1). Nausea was frequently reported, with an average severity score of 2.5 (SD = 0.7) assessed using the WHO Oral Toxicity Scale.

Table 2. Clinical characteristics related to oral mucositis and supportive care (N = 211 patients undergoing HSCT).

Variable	
Mucositis (WHO) Me (IQR)	2.0 (2.0-3.0)
Nausea Me (IQR)	2.0 (1.0-3.0)
Pre-HSCT mucositis-free patients, n (%)	209 (99.1%)
Post-HSCT mucositis-free patients, n (%)	2 (0.9%)

Legend. WHO=World Health Organization; Me (IQR)= Median Interquartil Range; HSCT= Hematopoietic Stem Cell Transplantation.

The most frequently affected sites included the buccal mucosa, lateral tongue, floor of the mouth, and soft palate, consistent with established HSCT literature (See Table 3 and Figure 2).

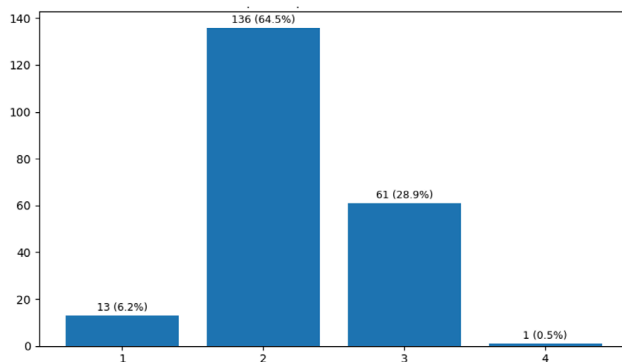


Figure 2. Frequency distribution of OM grades among patients undergoing HSCT (N = 211 events with recorded mucositis grade).

Table 3. Oral mucositis grade and frequency of the sample (N = 211 patients undergoing HSCT).

Mucositis grade	Frequency	% of total
1	13	6.2%
2	136	64.5%
3	61	28.9%
4	1	0.5%

Association Between Mucositis Severity and Clinical or Demographic Variables

No significant correlation was observed

between mucositis grade and age ($r_s = 0.07$; $p = 0.33$), educational level ($\chi^2(5) = 8.07$, $p = 0.15$), or smoking status. However, a significant association was found with sex, as male patients exhibited higher mucositis scores than female patients ($U = 6503.50$, $p = 0.01$). The median mucositis grade was 3.0 (IQR = 2.0–3.0) in male patients, compared to 2.0 (IQR = 2.0–3.0) in female patients. These findings are consistent with recent evidence indicating sex-related differences in mucositis severity among adult HSCT recipients (Dahrouge et al., 2014). Several clinical variables showed significant associations with mucositis severity. A weak but statistically significant correlation was found between length of hospital stay and mucositis grade ($r_s = 0.15$, $p = 9.03$). The number of days on TPN was strongly correlated with mucositis severity ($r_s = 0.50$, $p < 0.001$). Moreover, nausea severity was significantly associated with mucositis grade ($r_s = 0.20$, $p = 0.003$).

Discussion

This retrospective study provides a comprehensive evaluation of OM in patients undergoing HSCT, focusing on its incidence, severity, and associations with key clinical and demographic variables. Despite the adoption of a robust oral hygiene protocol, our findings confirm that OM remains a highly prevalent and clinically burdensome complication within the HSCT setting.

Consistent with previous literature, the overall incidence of OM in our sample was remarkably high, with nearly all patients developing some degree of mucosal injury following transplantation (Chaudhry et al., 2016; Elad et al., 2020; Miranda-Silva et al., 2021; Pereira et al., 2025). While this reflects the well-documented mucotoxic effects of conditioning regimens, the predominance of moderate-grade mucositis (Grade 2) suggests that early detection and supportive care measures may have effectively mitigated progression to more severe stages (Bell & Kasi, 2025; Gem et al., 2024). These findings align with those reported by Kara et al. (2024) who observed a reduction in severe OM rates in centres implementing structured oral care protocols (Kara et al., 2024; Lorini et al., 2019).

While some studies have failed to identify sex-based differences (Ferreira et al., 2020),

our results are in agreement with those in the literature who hypothesised that hormonal, anatomical, or behavioural factors, including potential differences in oral hygiene adherence, may influence susceptibility (Owlia et al., 2012).

A modest yet statistically significant correlation was observed between mucositis severity and length of hospital stay ($r_s = 0.15$, $p = 0.03$). This underscores the clinical and organisational impact of OM, as patients with more severe mucosal lesions often require prolonged hospitalisation for symptom management, nutritional support, and prevention of secondary complications. Previous research has demonstrated that OM is associated with increased healthcare resource utilisation and extended recovery times, reinforcing its role as a key contributor to the therapeutic burden in oncology (Al-Maweri et al., 2021; Lima et al., 2021; Piredda et al., 2017).

The association between OM severity and the number of days of TPN was particularly pronounced ($r_s = 0.50$, $p < 0.001$), highlighting the functional implications of oral mucosal damage. Severe OM frequently precludes adequate oral intake, necessitating parenteral nutritional support (Senesse et al., 2015; Strączek et al., 2023). This correlation is strongly supported by studies showing that OM contributes to significant alterations in nutritional status, with re-percussions for immune function, wound healing, and overall treatment tolerance (Hong et al., 2019; Staudenmaier et al., 2018).

Furthermore, a statistically significant association was found between the severity of nausea and OM grade ($r_s = 0.20$, $p = 0.003$). This relationship may reflect overlapping pathophysiological pathways triggered by high-dose chemotherapy conditioning regimens. Cytotoxic agents induce widespread epithelial injury and activate pro-inflammatory cascades mediated by reactive oxygen species (ROS), nuclear factor kappa B (NF- κ B), and cytokines such as TNF- α and IL-6, which contribute not only to oral mucosal breakdown but also to gastrointestinal mucosal toxicity. The disruption of mucosal barrier integrity along the gastrointestinal tract may enhance vagal afferent stimulation and central emetic pathway activation, thereby increasing nausea severity.

Moreover, severe oral mucositis itself may exacerbate nausea through indirect mechanisms, including pain-induced

sympathetic activation, reduced oral intake, altered salivary composition, and heightened sensory sensitivity within the oral cavity. The coexistence of mucosal inflammation and gastrointestinal dysregulation likely amplifies the overall symptom burden in HSCT recipients, reinforcing the need for integrated supportive care strategies targeting both oral toxicity and chemotherapy-induced nausea and vomiting (CINV). These findings highlight the importance of considering OM not only as a localized oral complication but as part of a broader mucosal toxicity syndrome affecting multiple epithelial surfaces.

The co-occurrence of moderate OM and nausea further illustrates the complex symptom burden experienced by HSCT recipients and highlights the need for integrated symptom management strategies (Peterson et al., 2011).

Notably, no significant associations were found between OM severity and patient age or educational level. However, the observed trend towards higher mucositis scores among patients with lower educational attainment may suggest a potential role for health literacy in influencing adherence to oral hygiene practices and early symptom reporting. In this context, patients' preferences and beliefs, including the use of complementary and alternative medicines, may also modulate self-care behaviours and engagement with conventional supportive care strategies, as reported in palliative cancer populations (Cerqueira et al., 2025; Mercadante et al., 2022). Previous literature has identified health literacy as a determinant of self-management capacity and clinical outcomes in oncology indicating that this variable warrants further exploration in future prospective designs. Moreover, the increasing role of patient empowerment in decision-making highlights the importance of shared management strategies that respect individual autonomy, symptom control, and continuity of care.

Limitations, Strengths and Future Prospects

This study has several limitations that should be considered when interpreting the results. First, its monocentric design restricts generalizability. Conducted in a single tertiary cancer center, the findings reflect institutional-specific protocols, staff expertise, and organizational practices, particularly in oral hygiene management, which

may not be representative of other settings, especially those operating within different healthcare systems or with varying resource availability. Second, the retrospective design introduces potential selection and information bias. Although data extraction was performed systematically, the accuracy and completeness of clinical records—especially regarding nursing interventions, symptom documentation, and adherence to oral care protocols—could not be fully verified. Protocol adherence itself was not systematically assessed, limiting the ability to evaluate its impact on mucositis outcomes.

A further limitation related to the retrospective nature and reliance on medical documentation was the absence of patient-reported outcome measures (PROMs), such as pain severity, functional impairment, and quality of life. PROMs are essential for capturing the patient perspective and should be included in future prospective studies (Staudenmaier et al., 2018). Additionally, the study did not examine biological, microbiological, or genetic factors that may influence mucositis severity, such as oral microbiota composition, cytokine profiles, or nutritional and inflammatory biomarkers (Gem et al., 2024; Mittal et al., 2014). While basic demographic and clinical variables (e.g., sex, education level, length of hospitalization) were included, key confounders—such as these comorbidities, genetic predispositions, and the use of supportive pharmacological therapies—were not comprehensively assessed. Moreover, although transplant type and chemotherapy conditioning regimens were identified as relevant methodological factors, stratified analyses based on conditioning intensity or specific agents were not feasible due to insufficient data. As conditioning regimens are well-established determinants of oral mucositis risk and severity, this limitation constrains interpretative depth and highlights a critical direction for future research. Additionally, although conditioning regimen type and intensity are recognised predictors of oral mucositis risk (Chaudhry et al., 2016; Nakagaki et al., 2022), stratified analyses by specific agents or conditioning intensity were not feasible in this study due to incomplete documentation in the available medical records. This limitation reduced the capacity to explore regimen-specific effects and underscores the need for future prospective multicentre studies with standardised collection of conditioning regimen details.

These gaps underscore the need for multicenter, prospective studies integrating biomolecular and longitudinal data (Berger et al., 2018). Finally, photobiomodulation therapy (low-level laser therapy), recommended by recent MASCC/ISOO guidelines as an effective preventive and therapeutic measure for oral mucositis in adult HSCT patients, was not available at our center during the study period (Biala, 2022).

Despite these limitations, the study offers several strengths. To our knowledge, it is among the few recent investigations to systematically evaluate the incidence, severity, and clinical implications of OM in a large cohort of Italian HSCT recipients. The sample size was substantial, and data collection was conducted with methodological rigor, using validated instruments such as the WHO Oral Toxicity Scale. The study also integrated both clinical and demographic variables and explored multiple associations with relevant outcomes, including parenteral nutrition and hospital stay, thereby providing a multifaceted understanding of OM in real-world settings.

Looking forward, future research should aim to address these limitations by adopting multicentre, prospective designs that enhance heterogeneity and external validity. Incorporating PROMs, biomolecular analyses, and longitudinal follow-up would enable a more comprehensive characterisation of the natural history and patient experience of OM. It would also be valuable to investigate the effectiveness of individual components of oral care protocols and their relationship with health literacy, particularly in vulnerable subgroups. Finally, the development of predictive models integrating clinical, biological, and behavioural variables could improve risk stratification and support the personalization of preventive strategies for patients undergoing HSCT.

Conclusion

This study reinforces OM as a multifactorial and clinically impactful complication of haematopoietic stem cell transplantation, shaped by both clinical and demographic determinants. The findings support the implementation of comprehensive, protocol-driven oral hygiene interventions and highlight the relevance of addressing sex-related differences in mucositis

severity. Although limited by its retrospective and single-centre design, this study provides clinically meaningful insights that may inform future prospective, multicenter investigations aimed at optimising mucositis prevention and management in HSCT populations.

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Psychometric Properties and Measurement Invariance of the Parental Health Locus of Control Scale in an Italian Population

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Abstract

Introduction. Parents play a pivotal role in shaping children's health behaviors, preventive practices, and adherence to medical recommendations. The Parental Health Locus of Control (PHLOC) scale measures parental beliefs about the sources of control over child health outcomes. Although an Italian version exists, its psychometric properties had not yet been comprehensively evaluated. This study aimed to validate the Italian version of the PHLOC by assessing its factorial structure, internal consistency reliability, convergent validity with health literacy and vaccine hesitancy measures, and measurement invariance across healthcare professionals and non-healthcare professionals.

Methods. A cross-sectional psychometric study was conducted among 308 Italian parents of children aged 0–18 years using EUSurvey®. Confirmatory factor analysis (CFA) tested the six-factor structure of the PHLOC (Parent, Child, Professionals, Media, Divine, Fate), and internal consistency was assessed with McDonald's omega. Convergent validity was examined through correlations with health literacy (HLS-EU-Q6) and vaccine hesitancy (PACV-5). Measurement invariance by professional status was evaluated using a Multiple Indicators Multiple Causes (MIMIC) model.

Results. CFA supported the six-factor model with good fit indices (CFI=0.954; TLI=0.949; RMSEA=0.068; SRMR=0.070). Internal consistency was satisfactory across subscales

($\omega=0.67-0.95$). Correlations were consistent with theoretical expectations: higher health literacy and lower vaccine hesitancy were associated with lower endorsement of external attributions (Divine, Fate). The hierarchical second-order model (Internal, External-Powerful Others, External-Chance) yielded inadmissible solutions.

Discussion. The Italian PHLOC demonstrated sound psychometric properties, supporting its validity, reliability, and measurement invariance. Future studies should further investigate higher-order structures and temporal stability to strengthen the scale's theoretical and practical applications in research and clinical contexts.

Keywords: Parental Health Locus of Control, Vaccine Hesitancy, Health Literacy, Health Behavior, Parents, Measurement Invariance, Psychometrics, Surveys, Questionnaires, Psychometric Validation

Introduction

Children's health outcomes are profoundly shaped by parental attitudes, behaviors, and decision-making (Maia et al., 2025). As primary agents of health promotion, disease prevention, and treatment adherence, parents act as role models whose lifestyles and behaviors influence children's health habits and psychological well-being (Chen et al., 2019; Drenowatz et al., 2014), with potential long-term effects on morbidity and mortality (Demakakos et al., 2016). Understanding the psychological and social factors of parental engagement is crucial for improving pediatric outcomes and reducing preventable health risks. In Italy, several pediatric health indicators highlight the central role of parental decision-making in children's health, including childhood obesity, the management of chronic conditions, and the uptake of preventive programs such as vaccination. Previous research has highlighted the role of parental cognitions, such as beliefs about control, trust in healthcare professionals, and perceived self-efficacy, in shaping adherence to preventive care, vaccination decisions, and management of chronic diseases (Magi, Buccione, et al., 2025; Magi et al., 2026).

The Health Locus of Control (HLOC) framework, derived from Rotter's (1966) social learning theory, explains how individuals attribute health outcomes either to their own actions (internal control) or to external factors such as powerful others or chance (external control). Within the parental context, these

dimensions reflect how and to what extent mothers and fathers perceive their influence over their children's health. Studies consistently show that an internal parental locus of control is associated with better child health outcomes, including higher vaccination compliance (Amit Aharon et al., 2018; Moreland et al., 2016) and fewer behavioral child problems (Moreland et al., 2016). Conversely, an external parental orientation has been associated with increased obesity risk in adolescents (Golding et al., 2019), and reduced psychological well-being among both parents and children (Nowicki et al., 2017). Accordingly, the assessment of parental HLOC (PHLOC) is pivotal for identifying modifiable psychological factors to promote children's and adolescents' physical and mental health.

The PHLOC scale, developed by DeVellis et al., (1993), is a 28-item self-report questionnaire assessing parents' beliefs about the sources of control over their child's health and comprising the six subscales of Parents, Children, Health Care Professionals (HCPs), Mass Media, Fate, and God. The PHLOC is based on a reflective measurement model and has been widely applied to parents of children under 18 years of age, both in community and clinical settings. Since its initial validation, the PHLOC has demonstrated good internal consistency across several studies and has been used to investigate parental health beliefs related to preventive behaviors (Mozafari et al., 2024), and vaccination (Amit Aharon et al., 2018).

The PHLOC has been translated and validated

in Norwegian (Kraft & Loeb, 1996), while in Italy, Bonichini et al., (2009) conducted a preliminary validation among mothers of infants aged 0–3 years. Internal consistency was acceptable; however, confirmatory factor analysis, convergent validity, and measurement-invariance testing were not conducted, which limits use of this scale in the Italian context. Therefore, a culturally adapted and psychometrically robust Italian version of the PHLOC is essential to ensure valid measurement of PHLOC within the Italian sociocultural and healthcare context. In Italy, where family-centered care and parental involvement are pivotal in both pediatric and preventive health services, reliable tools to assess these beliefs are particularly valuable for research and for guiding educational and clinical interventions.

Guided by the COnsensus-based Standards for the selection of Health Measurement INstruments (COSMIN) framework (Mokkink et al., 2018), the present study aimed to evaluate the psychometric properties of the Italian PHLOC scale. Specifically, we examined the structural validity of the six-factor model using confirmatory factor analysis, assessed internal consistency reliability, tested convergent validity with theoretically related constructs, and measurement invariance across groups of healthcare (HCP) and non-healthcare professionals (non-HCP).

Methods

Study Design

This was a cross-sectional psychometric study conducted between October 2024 and February 2025 as part of a broader observational project on parental vaccine hesitancy. The study adhered to the COSMIN guidelines for Patient-Reported Outcome Measures (PROMs) (Mokkink et al., 2018) and was preregistered on the Open Science Framework (<https://doi.org/10.17605/OSF.IO/38NQG>).

Participants and PROM administration

A convenience sample of parents or legal guardians of at least one child aged 0–18 years and residing in Italy was recruited through an anonymous online survey disseminated via social

media and parenting networks. Participation was voluntary, and respondents provided informed consent prior to accessing the questionnaire. Data for the PHLOC were extracted from a larger dataset collected for the overarching project and used for the present psychometric analysis.

Data collection procedures

Data were collected using a structured, self-administered questionnaire created on the EUSurvey® platform. The online questionnaire included sociodemographic variables (age, gender, education, occupation, healthcare background, and number of children) and the Italian versions of the PHLOC (Bonichini et al., 2009), the European Health Literacy Survey Questionnaire (HLS-EU-Q6) (Lorini et al., 2019) and the Parent Attitudes about Childhood Vaccines survey (PACV-5) (Magi, El Aoufy, et al., 2025). All tools were used with permission.

Parental Health Locus of Control

The PHLOC is a 28-item self-report scale assessing parents' beliefs about control over their child's health across six subscales: Parents, Children, Health Care Professional, Mass Media, Fate, and God. Items are rated on a 6-point Likert scale ("strongly disagree" to "strongly agree"), with higher scores indicating greater health locus of control in each dimension. Internal consistency was good ($\alpha > 0.70$) and test-retest reliability adequate ($r > 0.80$), indicating satisfactory stability (Bonichini et al., 2009). Before data collection, the PHLOC underwent cognitive pretesting with ten parents using the think-aloud method to assess clarity, comprehensibility, and cultural relevance (Mokkink et al., 2018). Each interview lasted approximately 30 minutes, and no substantial modifications were required, confirming the suitability of the Italian version for the present population. The final version used in this study is presented in Table S1. The PHLOC served as the target measure for validation, with convergent validity assessed against health literacy and vaccine hesitancy measures.

European Health Literacy Survey Questionnaire

The HLS-EU-Q6 is a 6-item short form

assessing individuals' perceived ability to access, understand, appraise, and apply health information, rated on a 4-point Likert scale ("very difficult" to "very easy"), with higher scores indicating greater health literacy. The Italian version showed good reliability ($\alpha=0.67$) and construct validity (Lorini et al., 2019). It was used to test convergent validity, with higher health literacy expected to correlate with higher scores on the Parent, Child, Professional, and Media subscales, and lower scores on the Fate and Divine subscales.

Parent Attitudes about Childhood Vaccines

The PACV-5 is a 5-item scale evaluating parental confidence and attitudes toward childhood vaccination. Items are rated on a 5-point Likert scale ("strongly agree" to "strongly disagree") and dichotomous responses ("not at all hesitant" to "very hesitant"), with higher scores indicating greater hesitancy. The Italian version showed good internal consistency ($\omega=0.81$, $\alpha=0.80$) (Magi, El Aoufy, et al., 2025). It was used to examine convergent validity, with higher vaccine hesitancy hypothesized to align with stronger external (Fate, Divine) and weaker internal (Parent, Child) control beliefs. It was used to assess convergent validity, with higher vaccine hesitancy hypothesized to be associated with higher Fate and Divine subscale scores and lower Parent, Child, Professional and Media subscale scores.

Sample size calculation

Following established psychometric recommendations (De Vet et al., 2011), a minimum ratio of 5-10 participants per item was considered appropriate for factor analyses. Given the 28-item structure of the PHLOC, the target sample size ranged from 140 to 280 participants. To ensure adequate statistical power and compensate for potential data exclusions or missing data, this target was increased by 10%, yielding a final analytic sample of 308 complete responses.

Statistical analysis

Descriptive analyses were conducted for all sociodemographic and clinical variables, which

were summarized as frequencies and percentages for categorical variables, and as means and standard deviations for continuous variables. Floor and ceiling effects were explored for each item, considering values above 15% as indicative of potential issues with score distribution (Klapproth et al., 2023). The factorial structure of the scale was examined through confirmatory factor analysis using Mplus version 8.9 (Muthén & Muthén, 2009). Given the 6-point Likert format of the items, all variables were treated as ordinal and estimated with the Weighted Least Squares Mean and Variance adjusted (WLSMV) estimator, applying the THETA parameterization (Li, 2016) to ensure more stable residual variances with ordinal indicators. Consistent with the theoretical conceptualization of the PHLOC (DeVellis et al., 1993), we tested a confirmatory factor analysis with six first-order latent factors (*Parent, Child, Professionals, Media, Divine, Fate*). We also specified a second-order confirmatory factor analysis where these first-order factors were indicators of three second-order dimensions: (i) Internal (*Parent, Child*), (ii) External – Powerful Others (*Professionals, Media*), and (iii) External – Chance (*Divine, Fate*). This step was exploratory and aimed to evaluate the broader internal-external theoretical framework (Wallston et al., 1978).

Model fit was evaluated using multiple indices: (i) χ^2 and degrees of freedom, acknowledging its sensitivity to sample size; (ii) Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI), with values ≥ 0.95 indicating good fit; (iii) Root Mean Square Error of Approximation (RMSEA) with its 90% confidence interval, with values ≤ 0.06 considered acceptable; (iv) Standardized Root Mean Square Residual (SRMR), with values ≤ 0.08 considered acceptable (Hu & Bentler, 1999). Internal consistency reliability was assessed using McDonald's omega coefficient (ω), with values ≥ 0.70 considered satisfactory (Hayes & Coutts, 2020). Omega was preferred over Cronbach's alpha because it provides a more accurate estimate of reliability when items have heterogeneous factor loadings and when the scale is multidimensional, as in the case of the PHLOC (Dunn et al., 2014). Convergent validity was examined through Pearson's r correlations between the scale scores and selected external variables, including demographic characteristics, health literacy, and other clinically relevant indicators. Standardized factor loadings were reported, along with item R^2 values as indicators

of the proportion of variance explained by the latent factor. Model diagnostics included the inspection of standardized residuals and modification indices to detect possible sources of misfit. To examine measurement invariance by professional status, we estimated a multiple indicators multiple causes (MIMIC) model (Wang & Shih, 2010). In the baseline model, healthcare professional status (HCP vs non-HCP) was regressed onto the six latent PHLOC factors (Fate, Professionals, Media, Parent, Child, Divine) to test for group differences at the latent level. Subsequently, direct effects of HCP status on individual items were added one at a time to test for differential item functioning (DIF). Items with significant direct effects were retained in the model, indicating potential non-invariance, while items without evidence of DIF were treated as anchors (Wang & Yeh, 2003). Standardized regression coefficients (STDYX) and p-values were used to evaluate significance.

Ethical considerations

This study was approved by the Research Ethics Board of the University of Parma (Approval No. 119-2024-N). Informed consent was obtained electronically before participation in the survey. Data confidentiality and anonymity were ensured throughout the study.

Results

Descriptive statistics and distributional properties

Sociodemographic and clinical characteristics of the participants are summarized in Table 1. The sample (n=308) had a mean age of 43.6 years (SD=8.3), 20.5% were male, and the majority were married or partnered (85.1%). Almost half of the participants were healthcare professionals (48.7%), and 81.2% had a university degree or higher. Most participants reported having more than one child (57.4%). The mean health literacy score (HLS-EUQ6) was 2.54 (SD=0.60), indicating limited but sufficient health literacy on average. Item-level analyses (Table 2) showed that response distributions were skewed, with several items demonstrating floor or ceiling effects exceeding 15% of responses. This pattern justified the use of a categorical estimator in subsequent confirmatory factor analyses. More

than 54-59% of participants endorsed the top response categories (scores 5-6) of items i1, i2, and i3, with mean scores above 5.0. Similarly, most participants (56-69%) selected the lowest categories (scores 1-2) of items i11, i16, i18, i21, and i28, with mean scores consistently below 2.0.

Table 1. Sociodemographic and clinical characteristics of the Sample (n = 308).

Characteristic	n (%) or Mean (SD)
Age (years)	43.55 (8.3)
Gender (male)	63 (20.5)
Marital status	
Married/partnered	262 (85.1)
Single/divorced/widowed	46 (14.9)
Occupation	
Unoccupied	21 (5.5)
Employed/other	287 (94.5)
Educational attainment	
University degree or higher	250 (81.2)
≤ High school	58 (18.8)
Healthcare professional	150 (48.7)
Number of children	
1	131 (42.5)
>1	177 (57.5)
Health literacy (HLS-EU-Q6, 1-4)	2.54 (0.60)
PACV-5	
PHLOC subscales (1-6)	
Parent	3.84 (0.85)
Fate	1.69 (0.92)
Divine	1.40 (1.05)
Child	2.54 (0.95)
Professional	4.01 (1.00)
Media	3.29 (1.49)

Note. SD = standard deviation; HLS-EU-Q6: European Health Literacy Survey Questionnaire short-short form; PHLOC: Parental Health Locus of Control; PACV-5: Parent Attitudes about Childhood Vaccines.

Internal consistency reliability

McDonald's omega values supported the internal consistency of the PHLOC subscales: Fate ($\omega=0.86$), Divine ($\omega=0.95$), Professionals ($\omega=0.67$), Media ($\omega=0.78$), Parent ($\omega=0.82$), Child ($\omega=0.79$). The total PHLOC score also showed good reliability ($\omega=0.86$).

Confirmatory factor analyses

The hypothesized six-factor model of the

Table 2. Distribution of responses for each PHLOC item (n = 308).

Item	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree	Mean (SD)
1. Health professionals keep my child from getting sick.	17 (5.5%)	6 (1.9%)	24 (7.8%)	40 (13.0%)	53 (17.2%)	168 (54.5%)	5.09 (1.33)
2. I have the ability to influence my child's well-being	10 (3.2%)	11 (3.6%)	19 (6.2%)	47 (15.3%)	54 (17.5%)	167 (54.2%)	5.02 (1.29)
3. My child can avoid illness with regular professional care.	10 (3.2%)	5 (1.6%)	25 (8.1%)	33 (10.7%)	52 (16.9%)	183 (59.4%)	5.09 (1.26)
4. My child is in control of his/her own health.	151 (49.0%)	56 (18.2%)	48 (15.6%)	20 (6.5%)	11 (3.6%)	22 (7.1%)	1.95 (1.35)
5. Having regular contact with a physician is the best way for my child to avoid illness.	48 (15.6%)	35 (11.4%)	62 (20.1%)	50 (16.2%)	36 (11.7%)	77 (25.0%)	3.42 (1.72)
6. What my child sees in T.V. commercials can affect my child's health.	76 (24.7%)	21 (6.8%)	54 (17.5%)	48 (15.6%)	33 (10.7%)	76 (24.7%)	3.45 (1.84)
7. Whether my child avoids injury is just a matter of luck.	132 (42.9%)	57 (18.5%)	52 (16.9%)	30 (9.7%)	13 (4.2%)	24 (7.8%)	2.23 (1.38)
8. Some of the comic books around today can affect my child's health.	122 (39.6%)	35 (11.4%)	53 (17.2%)	42 (13.6%)	18 (5.8%)	38 (12.3%)	2.68 (1.67)
9. My child is the one who determines his/her own well being.	77 (25.0%)	40 (13.0%)	71 (23.1%)	55 (17.9%)	21 (6.8%)	44 (14.3%)	3.16 (1.66)
10. Only trained health professionals can influence my child's health	72 (23.4%)	48 (15.6%)	63 (20.5%)	62 (20.1%)	20 (6.5%)	43 (14.0%)	3.11 (1.65)
11. God will decide what will happen to my child's health.	212 (68.8%)	26 (8.4%)	29 (9.4%)	15 (4.9%)	7 (2.3%)	19 (6.2%)	1.73 (1.25)
12. Luck plays a big part in determining how healthy my child is.	142 (46.1%)	67 (21.8%)	44 (14.3%)	33 (10.7%)	4 (1.3%)	18 (5.8%)	2.02 (1.35)
13. I can do a lot to prevent my child from getting hurt.	35 (11.4%)	29 (9.4%)	88 (28.6%)	65 (21.1%)	35 (11.4%)	56 (18.2%)	3.51 (1.58)
14. What my child sees in T.V. programs can affect my child's health.	51 (16.6%)	37 (12.0%)	61 (19.8%)	55 (17.9%)	41 (13.3%)	63 (20.5%)	3.58 (1.66)
15. My child's safety depends mostly on what my child does.	40 (13.0%)	44 (14.3%)	91 (29.5%)	71 (23.1%)	28 (9.1%)	34 (11.0%)	3.36 (1.44)
16. My child's well being is in God's hands.	192 (62.3%)	45 (14.6%)	28 (9.1%)	12 (3.9%)	7 (2.3%)	24 (7.8%)	1.85 (1.37)
17. I can do a lot to prevent my child from getting sick.	22 (7.1%)	18 (5.8%)	67 (21.8%)	91 (29.5%)	44 (14.3%)	66 (21.4%)	3.88 (1.44)
18. Whether my child avoids sickness is just a matter of luck.	178 (57.8%)	61 (19.8%)	41 (13.3%)	13 (4.2%)	4 (1.3%)	11 (3.6%)	1.78 (1.13)
19. The things I do at home with my child are an important part of my child's well being.	7 (2.3%)	9 (2.9%)	30 (9.7%)	60 (19.5%)	76 (24.7%)	126 (40.9%)	4.83 (1.29)
20. Health professionals control my child's well being.	51 (16.6%)	56 (18.2%)	87 (28.2%)	70 (22.7%)	22 (7.1%)	22 (7.1%)	3.24 (1.44)
21. God will keep my child safe.	194 (63.0%)	46 (14.9%)	27 (8.8%)	18 (5.8%)	5 (1.6%)	18 (5.8%)	1.92 (1.32)
22. My child's safety depends on me.	20 (6.5%)	21 (6.8%)	71 (23.1%)	87 (28.2%)	53 (17.2%)	56 (18.2%)	3.77 (1.45)
23. My child can do a lot to avoid getting sick.	45 (14.6%)	59 (19.2%)	82 (26.6%)	55 (17.9%)	24 (7.8%)	43 (14.0%)	3.25 (1.57)
24. I can do a lot to help my child stay well.	7 (2.3%)	11 (3.6%)	50 (16.2%)	77 (25.0%)	58 (18.8%)	105 (34.1%)	4.55 (1.29)
25. My child's good health is largely a matter of good fortune.	173 (56.2%)	65 (21.1%)	37 (12.0%)	20 (6.5%)	3 (1.0%)	10 (3.2%)	1.84 (1.09)
26. To a large degree my child can determine his/her own health.	51 (16.6%)	53 (17.2%)	66 (21.4%)	67 (21.8%)	29 (9.4%)	42 (13.6%)	3.25 (1.57)
27. I can do a lot to help my child be strong and healthy.	8 (2.6%)	14 (4.5%)	40 (13.0%)	75 (24.4%)	69 (22.4%)	102 (33.1%)	4.43 (1.27)
28. Whether my child stays healthy or gets sick is just a matter of fate.	179 (58.1%)	47 (15.3%)	46 (14.9%)	17 (5.5%)	3 (1.0%)	16 (5.2%)	1.84 (1.24)

Note. SD = standard deviation.

PHLOC demonstrated an overall good fit to the data: $\chi^2(335)=812.05$, $p < 0.001$; CFI=0.954; TLI=0.949; RMSEA=0.068, 90% CI [0.062–0.074]; SRMR=0.070 (Figure 1; Table 3). Although the chi-square test was significant, the alternative indices indicated an acceptable model fit. Standardized factor loadings were generally high, ranging from 0.45 (i2) to 0.98 (i16), with the majority exceeding the 0.60 threshold. The Divine factor showed the strongest loadings (0.95–0.98), followed by Fate (0.61–0.90), Parent (0.45–0.85), Child (0.50–0.82), Media (0.77–0.84), and Professional (0.45–0.72). Item-level R^2 values indicated that the latent factors explained between 20% (i10) and 97% (i16) of the variance in individual items. Latent factor correlations were consistent with theoretical expectations. Fate was strongly correlated with Divine ($r=0.64$, $p<0.001$) and Child ($r=0.56$, $p<0.001$), while Parent showed moderate correlations with Professional ($r=0.42$, $p<0.001$) and Media ($r=0.37$, $p<0.001$). Lower but significant associations were observed between Professional and Fate ($r=0.18$, $p=0.005$), as well as between Professional and Divine ($r=0.17$, $p=0.011$).

A theory-driven second-order confirmatory factor analysis (Internal, Powerful Others, Chance) showed acceptable global fit ($\chi^2(342)=857.14$, $p<0.001$; CFI=0.951; TLI=0.946; RMSEA=0.070 [0.064–0.076]; SRMR=0.078) but yielded inadmissible solutions. Specifically, the second-order latent covariance matrix was not positive definite due to a Heywood case, with an over-unity correlation between the Internal and Powerful Others factors ($r>1$) and a near-zero variance estimate for Powerful Others. Moreover, the first-order factor Fate exhibited a residual variance of zero under Chance. Given these identification/collinearity issues—likely exacerbated by the weak definition of

Powerful Others with only two indicators and by the dominance of Fate within Chance—the hierarchical specification was not retained.

Convergent validity

Pearson correlations between PHLOC subscales and external variables provided preliminary evidence of convergent validity (Table 4). Higher health literacy scores were inversely associated with Fate ($r=-0.18$, $p<0.01$), Divine ($r=-0.16$, $p<0.01$), Child ($r=-0.12$, $p<0.05$), and Media ($r=-0.14$, $p<0.05$), suggesting that greater functional health literacy is linked to lower endorsement of external attributions of control. PACV-5 vaccine hesitancy was negatively correlated with Parent ($r=-0.12$, $p<0.05$) and Professional ($r=-0.14$, $p<0.05$), while showing positive associations with Fate ($r=0.19$, $p<0.01$) and Divine ($r=0.11$, $p<0.05$), indicating that stronger external health beliefs were linked to greater hesitancy. Demographic patterns also emerged. Women scored significantly higher on Parent ($r=-0.09$, ns but in expected direction) and Professional ($r=-0.21$, $p<0.01$), while men tended to endorse Child beliefs less strongly ($r=-0.15$, $p<0.01$). Age was positively correlated with Child ($r=0.24$, $p<0.01$), indicating that older participants were more likely to ascribe health outcomes to children's actions. Education showed small but consistent effects: participants with a university degree reported lower reliance on Fate ($r=-0.12$, $p<0.05$) and Professional ($r=-0.11$, $p<0.05$). Compared to non-HCPs, HCPs showed lower endorsement of Professional ($r=-0.18$, $p<0.01$) and Fate ($r=-0.11$, $p<0.05$). Together, these patterns supported the construct validity of the PHLOC, linking external attributions to lower health literacy and higher vaccine hesitancy, and revealing

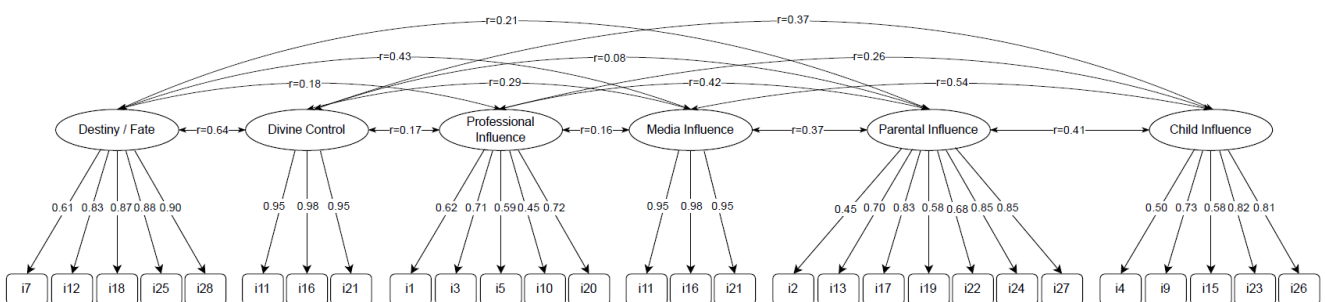


Figure 1. Confirmatory factor analysis model of the Parental Health Locus of Control Scale (PHLOC).

Note. Standardized factor loadings are shown on the paths from latent factors to observed items, and latent factor correlations are displayed on the double-headed arrows. All parameters are standardized and statistically significant at $p < .001$ unless otherwise specified. The model was estimated using the WLSMV estimator, which treats item responses as ordinal.

Table 2. Distribution of responses for each PHLOC item (n = 308).

Subscale / Item	λ	SE	p-value	R ²
Parent				
2. I have the ability to influence my child's well-being.	0.45	0.05	<.001	0.20
13. I can do a lot to prevent my child from getting hurt.	0.70	0.03	<.001	0.49
17. I can do a lot to prevent my child from getting sick.	0.83	0.02	<.001	0.69
19. The things I do at home with my child are an important part of his/her well-being.	0.58	0.04	<.001	0.33
22. My child's safety depends on me.	0.68	0.03	<.001	0.46
24. I can do a lot to help my child stay well.	0.84	0.02	<.001	0.71
27. I can do a lot to help my child be strong and healthy.	0.85	0.02	<.001	0.72
Child				
4. My child is in control of his/her own health.	0.50	0.05	<.001	0.25
9. My child is the one who determines his/her own well-being.	0.73	0.03	<.001	0.53
15. My child's safety depends mostly on what my child does.	0.58	0.04	<.001	0.33
23. My child can do a lot to avoid getting sick.	0.82	0.03	<.001	0.68
26. To a large degree my child can determine his/her own health.	0.81	0.03	<.001	0.66
Divine				
11. God will decide what will happen to my child's health.	0.95	0.01	<.001	0.91
16. My child's well-being is in God's hands.	0.98	0.01	<.001	0.97
21. God will keep my child safe.	0.95	0.01	<.001	0.90
Fate				
7. Whether my child avoids injury is just a matter of luck.	0.61	0.04	<.001	0.37
12. Luck plays a big part in determining how healthy my child is.	0.83	0.02	<.001	0.69
18. Whether my child avoids sickness is just a matter of luck.	0.87	0.02	<.001	0.76
25. My child's good health is largely a matter of good fortune.	0.88	0.02	<.001	0.78
28. Whether my child stays healthy or gets sick is just a matter of fate.	0.90	0.02	<.001	0.81
Professional				
1. Health professionals keep my child from getting sick.	0.62	0.05	<.001	0.38
3. My child can avoid illness with regular professional care.	0.70	0.05	<.001	0.50
5. Having regular contact with a physician is the best way for my child to avoid illness.	0.59	0.05	<.001	0.35
10. Only trained health professionals can influence my child's health.	0.45	0.05	<.001	0.20
20. Health professionals control my child's well-being.	0.72	0.06	<.001	0.52
Media				
6. What my child sees in TV commercials can affect my child's health.	0.77	0.03	<.001	0.59
8. Some of the comic books around today can affect my child's health.	0.84	0.03	<.001	0.71
14. What my child sees in TV programs can affect my child's health.	0.77	0.04	<.001	0.60

Note. λ = standardized factor loading; SE = standard error; R² = proportion of variance explained by the factor. All loadings are standardized (STDYX). p-values refer to the significance of the loading different from zero.

Table 4. Correlations between PHLOC subscales and external variables (n = 308).

PHLOC subscale	Health literacy	PACV-5	Gender	Age	Education (>8y)	Health profession
Parent	-0.02 (ns)	-0.12*	-0.09 (ns)	-0.02 (ns)	-0.03 (ns)	0.08 (ns)
Fate	-0.18**	0.19**	-0.11 (ns)	-0.05 (ns)	-0.12*	-0.11*
Divine	-0.16**	0.11*	0.03 (ns)	-0.06 (ns)	-0.03 (ns)	-0.08 (ns)
Child	-0.12*	0.09 (ns)	-0.15**	0.24**	-0.09 (ns)	0.06 (ns)
Professional	-0.04 (ns)	-0.14*	-0.21**	0.09 (ns)	-0.11*	-0.18**
Media	-0.14*	0.07 (ns)	-0.11 (ns)	-0.02 (ns)	0.01 (ns)	0.09 (ns)

Note. *p < .05, **p < .01; ns = not significant; PACV-5, Parent Attitudes about Childhood Vaccines Survey. Health literacy and PACV-5 scores were treated as continuous. Gender was coded 0 = female, and 1 = male. Age was treated as continuous. Education was coded as 0 = ≤ 8 and 1 = > 8 years. Health profession was coded as 0 = non healthcare professional, and 1 = healthcare professional.

sociodemographic gradients across subscales.

MIMIC model results

In the baseline MIMIC model, healthcare professional status significantly predicted lower latent scores on the Professional factor (Estimate=-0.25, SE=0.10, $p=0.010$), indicating that HCPs were less likely to attribute health control to professionals compared with non-HCPs. At the item level, none of the five indicators (i1, i3, i5, i10, i20) showed significant direct effects of HCP status (all $p>0.10$), suggesting the absence of DIF. These findings support measurement invariance of the Professional domain, confirming that the observed group difference reflects a true latent effect rather than item-level bias.

Discussion

This study examined the psychometric properties and measurement invariance of the Italian version of the PHLOC among parents of children aged 0-18 years. Overall, the findings support the validity and reliability of the instrument in this cultural context. The six-factor model proposed DeVellis et al., (1993) showed good fit and strong item loadings; internal consistency was satisfactory across all subscales, and measurement invariance was demonstrated across HCPs and non-HCPs, indicating comparable interpretation of the items across these groups.

The PHLOC assesses the extent to which parents believe that health outcomes depend on their own actions, their children, or external influences. Validating this scale in Italian parents is important because parental cognitions are key determinants of preventive behaviors, adherence to medical recommendations, and communication with healthcare providers (Feinberg et al., 2022). Understanding these belief patterns can help tailor interventions to enhance parental engagement and shared decision-making in pediatric and public health contexts.

Item-level analyses revealed some ceiling and floor effects for several items, particularly within the Divine and Fate subscales, suggesting that these external attributions are less frequently endorsed among Italian parents (Di Battista et al., 2018). In contrast, high scores in the Parent and

Child subscales reflect a strong sense of personal and familial responsibility for child health, consistent with the increasing individualistic and participatory parenting culture in Italian parents, who perceive health management as a shared responsibility within the family rather than an externally controlled process (Feinberg et al., 2022; Kone et al., 2022).

Confirmatory factor analysis supported the six-factor structure, with excellent comparative fit indices. Although the RMSEA value slightly exceeded the conventional 0.06 threshold, this deviation is common in cross-cultural validations and likely reflects minor response pattern variations rather than model misspecification (Zhao et al., 2024). In fact, factor loadings were robust across domains, indicating that each subscale effectively captured its intended construct. The alternative second-order model based on Rotter's internal-external dichotomy did not yield admissible solutions, reinforcing the notion that a multidimensional structure provides a more accurate representation of parental control beliefs in this cultural context. These results mirror findings from the Norwegian validation (Kraft & Loeb, 1996) and are consistent with the theoretical assumption that PHLOC encompasses distinct but interrelated sources of influence rather than a single continuum of internal versus external orientation.

Convergent validity was supported by associations in the expected directions. Parents with higher health literacy exhibited lower endorsement of external control attributions (Divine, Fate, Media), whereas greater internal control orientation (Parent subscale) was correlated with lower vaccine hesitancy. From a health education perspective, parents with limited health literacy may rely more on external or transcendent explanations, suggesting that empowerment strategies should integrate both informational and motivational components (Truong & Fenton, 2022). These findings reinforce previous evidence linking internal control to parental self-efficacy and adherence to preventive practices (Amit Aharon et al., 2018; Moreland et al., 2016). Similarly, a previous Italian study conducted among parents of both term and preterm infants highlighted a correlation between higher educational levels and lower influence of media information on their child's health. The study also found that younger parents with higher education were more likely to engage in healthy preventive

behaviors (Mornioli et al., 2022).

Internal consistency was satisfactory for all subscales, exceeding the threshold of 0.70 for most domains, which was comparable to those reported in the original US validation (α ranging from 0.70 to 0.92) and in the Norwegian version (α ranging from 0.69 to 0.90), confirming the internal coherence of the Italian PHLOC version. In this study, reliability was assessed using McDonald's omega rather than Cronbach's alpha, as omega provides a more accurate and robust estimate when factor loadings are heterogeneous and the scale is multidimensional (Dunn et al., 2014; Hayes & Coutts, 2020). This methodological choice further supports the strength of the reliability evidence for the Italian version. The slightly lower reliability of the Professional subscale may reflect the pluralistic nature of the Italian healthcare system, where pediatric and preventive services are often shared among multiple professionals (Corsello et al., 2016). However, this does not compromise the interpretability of the domain, as all items displayed satisfactory loadings and theoretical coherence with the construct.

The MIMIC analysis confirmed measurement invariance across HCP and non-HCP participants. HCPs reported significantly lower scores on the Professional factor, indicating that they attribute less control to medical staff compared with non-HCPs meaning that greater health knowledge and self-efficacy reduce external attribution to medical staff. This difference reflects their higher health literacy and self-efficacy, which enables them to perceive greater personal and familial responsibility for health outcomes. Conversely, non-HCPs tended to view professionals as the main agents of control, emphasizing dependence on expert guidance for child health management. The absence of differential item functioning further indicates that these differences reflect genuine latent variations rather than measurement bias.

Strengths and limitations

This study offers several strengths. First, the procedures followed the COSMIN framework (Mokkink et al., 2018) for evaluating patient-reported outcome measures, including adequate sample size for robust factor analysis, and adoption of cognitive pretesting to ensure semantic and cultural equivalence. The inclusion

of both HCP and non-HCP participants allowed assessment of invariance across professional backgrounds. However, some limitations must be acknowledged. The use of a convenience sample, characterized by a predominance of well-educated parents, a notably high proportion of healthcare professionals, and female participants, may limit the representativeness of the sample and the generalizability of the findings. The cross-sectional design prevented assessment of test-retest reliability and predictive validity. The second-order factorial model could not be confirmed, suggesting the need for further investigation in larger and more diverse samples.

Implications for clinical practice and research

The Italian PHLOC represents a reliable and culturally appropriate tool for assessing parental beliefs about control over child health. In clinical and public health contexts, this scale may support the identification of parents who predominantly attribute health outcomes externally and may therefore exhibit lower adherence to preventive behaviors. Integrating PHLOC assessment into health education and counselling programs could support tailored interventions aimed at strengthening parental self-efficacy, health literacy and autonomy (Náfrádi et al., 2017). Future studies should examine temporal stability and responsiveness to interventions.

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Table S1. Italian version of PHLOC..

1	I medici possono prevenire peggioramenti della salute del mio bambino.
2	Io ho la capacità di influenzare il benessere di mio figlio.
3	Il mio bambino può evitare di peggiorare il suo stato di salute attraverso un controllo medico regolare/frequente.
4	Mio figlio è in grado di gestire ciò che riguarda la sua salute.
5	Visite mediche eseguite regolarmente sono il modo migliore per evitare di ammalarsi.
6	Quello che mio figlio vede nelle pubblicità televisive può incidere sulla sua salute.
7	Se mio figlio evita di farsi male è solo questione di fortuna.
8	Alcuni dei giornalini a fumetti che circolano oggi giorno potrebbero influenzare la salute di mio figlio.
9	È mio figlio che può influenzare il suo stare meglio o peggio.
10	Solo professionisti della salute, come medici, infermieri o psicologi, possono incidere sulla salute di mio figlio.
11	Solo Dio può decidere cosa succederà alla salute del mio bambino.
12	La fortuna ha un ruolo importante nel determinare la salute del mio bambino.
13	Sento di poter fare molto per evitare che mio figlio si faccia male.
14	Quello che mio figlio vede in Tv può influenzare il suo benessere.
15	La sicurezza di mio figlio dipende prevalentemente da quello che fa.
16	La salute di mio figlio è nelle mani di Dio.
17	Sento di poter fare molto per evitare che lo stato di salute di mio figlio peggiori.
18	Il fatto che lo stato di salute di mio figlio non peggiori è solo una questione di fortuna.
19	Le cose che faccio a casa con mio figlio sono un aspetto importante del suo benessere.
20	I medici hanno il controllo sul benessere del mio bambino.
21	Dio aiuterà mio figlio a stare meglio.
22	La sicurezza di mio figlio dipende da me.
23	Mio figlio può fare molto per evitare di stare male.
24	Posso fare molto per aiutare mio figlio a stare bene.
25	La salute di mio figlio è principalmente una questione di buona sorte.
26	Mio figlio può, in larga parte, influenzare la sua stessa salute.
27	Posso fare molto per aiutare mio figlio ad essere forte e sano.
28	È il destino che decide sulla salute di mio figlio.

Note. The Italian version of the PHLOC was originally translated and validated by the research team of Bonichini et al., (2009), from whom the version was obtained.

The Objective Structured Clinical Examination as an Assessment Tool in the Bachelor's Degree Courses for Health-Care Professions: A Scoping Review

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Abstract

Introduction. The increasing complexity of healthcare requires health professionals to achieve high levels of competence. Universities are therefore called to adopt assessment methods that effectively support the development of clinical abilities. The aim is to describe the use of the Objective Structured Clinical Examination (OSCE) as an assessment method within bachelor's degree programmes in the health professions.

Methods. A literature search was carried out in PubMed/MEDLINE, Scopus, CINAHL and grey literature (December 2024–October 2025) following Joanna Briggs Institute (JBI) methodology.

Results. Nineteen studies, published between 2000 and 2025, were included from 4,926 identified records. The OSCE is reported as a valid and reliable method for assessing clinical, communicative and relational competencies, with a strong perceived educational impact across undergraduate health professions programmes. Advantages over traditional assessment methods include greater fairness, transparency and objectivity. Reported limitations, often associated with students' anxiety and stress, include inadequate planning and insufficient preparation.

Discussion. The OSCE is a reliable and fair tool for the structured assessment of clinical competencies. Students perceive it as an educational, motivating and realistic experience. Further studies are needed to explore its application in other health

professions and to document implementation processes in programmes where the OSCE is already in use.

Keywords: Assessment Methods, Clinical Skills, Education, Healthcare Professions Students, OSCE, Scoping Review

Introduction

In an increasingly complex and demanding healthcare environment, training competent healthcare professionals is important. Theoretical knowledge must be paired with proficiency in clinical skills to ensure safe and effective healthcare.

As teaching and evaluation methods continue to develop, it is essential to improve the quality of assessment (Vijayalakshmi & Revathi, 2024). Assessment plays a vital role in the learning process, helping students to acquire clinical practice competencies effectively (Al-Osaimi, 2022; Ribeiro et al., 2019).

In 1990, George Miller proposed that competence involves multiple levels: 'knowing', 'knowing how', 'showing', and 'doing', each requiring different assessment tools. For example, multiple-choice tests are effective in evaluating the 'knowing' and 'knowing how' levels but have limitations in assessing 'showing' and 'doing'.

Supporting Miller's framework, Lee et al. (2017) emphasised that 'competence' includes a range of behaviours integrating knowledge, skills, attitudes, abilities, and motivation. To be considered effective, an assessment tool must be valid, reliable, and effective. Its success also depends on the extent of learning and the degree of acceptance it receives from both educators and students (Norcini et al., 2011; Van Der Vleuten et al., 2017). Traditional assessment methods, still widely used today, present significant limitations. Their lack of structure and objectivity can compromise the fairness and accuracy of students' evaluations. Furthermore, practical skills cannot be adequately assessed through written and oral tests, as these do not involve structured, objective observation of procedures. As a result, this raises concerns about fairness and potential examiner bias.

An innovative method that addresses these limitations is the Objective Structured Clinical Examination (OSCE). First introduced in 1975 by Ronald Harden and Ian Gleeson in Scotland, the

OSCE is designed to address the shortcomings of traditional assessment approaches (Bdair, 2021; Cobo-Mejía et al., 2022; Delavar et al., 2013; Divya et al., 2019; Vijayalakshmi & Revathi, 2024).

It assesses not only clinical knowledge but also procedural and practical skills (Bdair, 2021; Divya et al., 2019; Kolivand et al., 2020; Marshall & Harris, 2000), communication and decision-making skills (Castro-Yuste et al., 2020; Chabrera et al., 2023; Ribeiro et al., 2019), and clinical reasoning skills (Cobo-Mejía et al., 2022).

The OSCE consists of a series of stations simulating different clinical scenarios (Castro-Yuste et al., 2020). These stations are equipped with mannequins, 3D models, and clinical documentation.

Students are evaluated fairly and objectively by trained observers at each station using standardised assessment checklists. A signal is used to indicate when to move to the next station. The method is highly structured: each student performs the same task within a fixed timeframe (Jelly & Sharma, 2017).

Although originally developed for medical students, the OSCE has proven effective in the education and assessment of various healthcare professions. It has been well-received in the evaluation of nursing, midwifery, physiotherapy, dietetics, and imaging and radiotherapy techniques students (Alizadeh et al., 2024; Bdair, 2021; Castro-Yuste et al., 2020; Chabrera et al., 2023; Cobo-Mejía et al., 2022; Delavar et al., 2013; Divya et al., 2019; Farahat et al., 2015, 2016; Haufiku et al., 2019; Hawker & Walker, 2010; Jay, 2007; Kolivand et al., 2020; Marshall & Harris, 2000; Mitchell et al., 2009; Rennie & Main, 2006; Ribeiro et al., 2019; Vijayalakshmi & Revathi, 2024).

Despite the use of the OSCE across healthcare professions programmes (Castro-Yuste et al., 2020; Chabrera et al., 2023; Cobo-Mejía et al., 2022; Delavar et al., 2013; Kolivand et al., 2020; Ribeiro et al., 2019), evidence on how it is designed, implemented, and evaluated in undergraduate programmes remains fragmented. Most existing studies focus on single disciplines or institutional experiences, while comparative analyses across

nursing, midwifery, physiotherapy, and other healthcare professions are limited.

Therefore, a scoping review was conducted to map the existing evidence on the use of OSCEs in undergraduate healthcare professions programmes, describing how OSCEs are structured and assessed, and highlighting opportunities and gaps for future research and implementation.

Objectives

The objectives are to explore, map, and synthesise the existing literature on the use of the OSCE as an assessment tool in healthcare professions education. This includes the students' perceptions, satisfaction, and experiences who have undergone the OSCE examination, as well as its reliability and validity compared with other assessment methods.

Methods

This review is based on the Joanna Briggs Institute (JBI) methodology for scoping reviews (Peters et al., 2020) and follows the Preferred Reporting Items for Systematic Reviews extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

The research question for this scoping review arises from the authors' reflection on educational assessment methods and their interest in applying these within healthcare training settings. The research question is: *'Is the OSCE method valid and reliable in assessing students enrolled in bachelor's degree programmes in the healthcare professions, compared with traditional assessment methods?'*

The formulation of the research question was guided by the Population-Concept-Context (PCC) framework (Peters et al., 2020), as follows:

- **Population:** Undergraduate students in healthcare professions programmes
- **Concept:** Objective Structured Clinical Examination (OSCE) as an assessment method
- **Context:** Higher education settings within healthcare professions programmes

Table 1 illustrates the three components of the framework.

Table 1. Description of the three components that make up the PCC framework.

Population	Undergraduate students in healthcare professions programmes
Concept	Objective Structured Clinical Examination (OSCE) as an assessment method
Context	Higher education settings within healthcare professions programmes

Eligibility criteria

Studies published within the past 25 years were included to provide a comprehensive overview of the development and implementation of the OSCE in undergraduate healthcare professions programmes. Both peer-reviewed articles and grey literature were considered to capture a broad range of evidence, including emerging and non-traditional research outputs. No restrictions were applied regarding study types or country of publication. Papers in English and Italian were considered eligible.

The inclusion and exclusion criteria for each PCC component are outlined below and summarised in Table 2.

- **Population:** this review considered studies involving undergraduate students enrolled in healthcare professions programmes. Nursing, midwifery, physiotherapy, dietetics, imaging and radiotherapy techniques, and biomedical laboratory science students were included. Studies involved students from other healthcare professions – such as medicine, dentistry, or pharmacy – , graduates of healthcare professions, and teachers or tutors of these bachelor's degree programmes were excluded.
- **Concept:** this scoping review examined the use of the OSCE as a method for assessing students' clinical competencies. Studies addressing its validity, reliability, and effectiveness, including comparison with traditional assessment methods and students' lived experience, were included. The OSCE was described in relation to the number and duration of stations, the activities assessed, and the checklists used by the evaluators.
- **Context:** all higher education settings within healthcare professions programmes were considered. Studies exploring the use of the OSCE in resource-limited settings, during the COVID-19 pandemic, or within virtual reality

or telemedicine environments were excluded.

Non-relevant records and records not meeting the inclusion criteria were excluded.

Table 2. Description of the three components that make up the PCC framework.

Inclusion criteria	Exclusion criteria
Study published in English or Italian between 2000 (2002 for Scopus) and 2025	Studies involving students from other healthcare professions, such as medicine, dentistry, and pharmacy
Nursing, midwifery, physiotherapy, dietetics, imaging and radiotherapy techniques, and biomedical laboratory science students were included	Studies involving graduates of healthcare professions
Full text available studies	Studies involving teachers or tutors of these bachelor's degree programmes
Studies that examined the use of the OSCE as a method for assessing students' clinical competencies	Studies that investigated the use of the OSCE in resource-limited settings
Studies that described the OSCE in relation to the number and duration of stations, the activities assessed, and the checklists used by the evaluators	
Studies that examined the validity, reliability, and effectiveness of the OSCE	Studies that examined the use of the OSCE during the COVID- 19 pandemic
Studies that examined the use of the OSCE in comparison with traditional assessment methods	Studies that investigated the use of the OSCE in virtual reality or telemedicine environments
Studies that examined students' perceptions, satisfaction, and experiences	

Protocol and registration

The protocol for this scoping review was registered retrospectively on the Open Science Framework (OSF) under the DOI 10.17605/OSF.IO/FJHMT.

During the review process, several methodological refinements were introduced to better align with JBI guidance (e.g., adjustments to eligibility criteria, search strategy expansion, data extraction fields). All modifications were documented and are reported in the manuscript to ensure transparency.

Information sources

A comprehensive search was conducted

across PubMed/MEDLINE, Scopus, and CINAHL (Cumulative Index to Nursing and Allied Health Literature) from December 2024 up to October 2025, following the JBI framework (Peters et al., 2020). To ensure broad evidence mapping consistent with JBI standards for scoping reviews, grey literature was also included.

The following platforms were consulted to identify unpublished, institutional, and non-indexed studies:

- Google Scholar
- OpenAIRE
- ProQuest Dissertations & Theses
- Semantic Scholar

The last database search was carried out on 19/10/2025, while the grey literature search was completed on 25/10/2025.

Search strategy

An initial search for individual keywords and MeSH terms, using the Boolean operators “OR” and “AND”, was carried out in PubMed.

The search strategy applied in Pubmed was: (nursing students [Mesh Terms] OR "physiotherapy students" OR "midwifery students" OR "dietetics students" OR "radiology technician students" OR "laboratory technician students") AND ("OSCE" OR "Objective Structured Clinical Examination") AND (clinical skills [Mesh Terms] OR medical education [Mesh Terms] OR educational measurement [Mesh Terms] OR "clinical education").

The search strategy was then adapted for use in CINAHL and Scopus: (“nursing students” OR "physiotherapy students" OR "midwifery students" OR "dietetics students" OR "radiology technician students" OR "laboratory technician students") AND ("OSCE" OR "Objective Structured Clinical Examination") AND (“clinical skills” OR “medical education” OR “educational measurement” OR "clinical education").

Applied limits included a 25-year publication window, English-language records, and full-text availability.

Where earlier coverage was constrained by Scopus indexing, the search period for that database commenced in 2002.

To ensure a more comprehensive and inclusive exploration of the topic, grey literature was included. The research sources consulted

were Google Scholar, OpenAIRE, ProQuest Dissertations & Theses, and Semantic Scholar.

The screening process was conducted in two phases. In the first phase, articles were screened by title and abstract to identify studies relevant to the review and to exclude those that were not. Based on the abstract alone, studies were categorised as included, excluded, or not assessable. The absence of any single inclusion criterion resulted in exclusion.

In the second phase, full-text screening was performed for all articles that met the inclusion criteria or could not be assessed based on the abstract alone.

The study selection process is illustrated in the flowchart in Figure 2, in accordance with PRISMA guidelines for scoping reviews (Tricco et al., 2018).

Selection of evidence sources

Duplicates identified across the databases were manually removed before the screening phase. During the initial screening, studies that did not address the OSCE or were not aligned with the research objectives were excluded. Articles deemed potentially relevant but not fully assessable based on the abstract were retrieved and reviewed in full.

Access to full texts not readily available was obtained through the library system of the Alma Mater Studiorum – University of Bologna. The process was conducted independently by two researchers (ES and AP). Any uncertainties arising during the study selection process were resolved with the support of a third reviewer (SQ).

The search strategy in the main databases is summarised in Table 3, together with the methodological approach of the included studies.

Table 3. Search strategies.

Database	Search Strategy	Limits	Relevant articles
PubMed	(nursing students [Mesh Terms] OR "physiotherapy students" OR "midwifery students" OR "dietetics students" OR "radiology technician students" OR "laboratory technician students") AND ("OSCE" OR "Objective Structured Clinical Examination") AND (clinical skills [Mesh Terms] OR medical education [Mesh Terms] OR educational measurement [Mesh Terms] OR "clinical education")	Publication date: 25 years English language Full text	9
CINAHL	("nursing students" OR "physiotherapy students" OR midwifery students" OR "dietetics students" OR "radiology technician students" OR "laboratory technician students") AND (OSCE OR "Objective Structured Clinical Examination") AND ("clinical skills" OR "medical education" OR "educational measurement" OR "clinical education")	Publication date: 25 years English language Full text	5
Scopus	("nursing students" OR "physiotherapy students" OR midwifery students" OR "dietetics students" OR "radiology technician students" OR "laboratory technician students") AND (OSCE OR "Objective Structured Clinical Examination") AND ("clinical skills" OR "medical education" OR "educational measurement" OR "clinical education")	English language Full text	2

Data extraction

Data were extracted from the included articles using standardised extraction tools, as indicated in the JBI Manual of Evidence Synthesis (Peters et al., 2020) and the Preferred Reporting Items for Scoping Reviews Extension (PRISMA-ScR) (Tricco et al., 2018).

Two researchers (ES and AP) independently conducted the extraction process, and any disagreements were resolved through the intervention of a third researcher (SQ) to ensure reliability and accuracy. The standard

data extraction table was piloted before the full extraction process. The JBI version was modified due to the large amount of information contained within the individual articles. Therefore, two data extraction tables were created in Microsoft Word. In Table 4, the studies were classified according to their study objective, while in Table 5, the remaining information was reported. Metadata, including author(s), year of publication, country, title, and study design, were extracted using Zotero. In the additional five columns, the PCC framework was used to organise information relating to the study

population, context, and concept. In this table, the concept refers to the study findings. Because numerous articles reported details on the OSCE structure and its comparison with traditional assessment methods, dedicated columns were added to summarise these aspects. The column on the OSCE structure was divided into two subcolumns: number of stations and duration per station. To provide a more complete description of the methodology used in each study, the data collection instrument was also specified. In the case of missing data, the unavailability of the information was indicated using the symbol (/).

Data analysis

A narrative synthesis was conducted, together with a descriptive frequency mapping based on the publication year of the included studies and their geographical context (Figure 1).

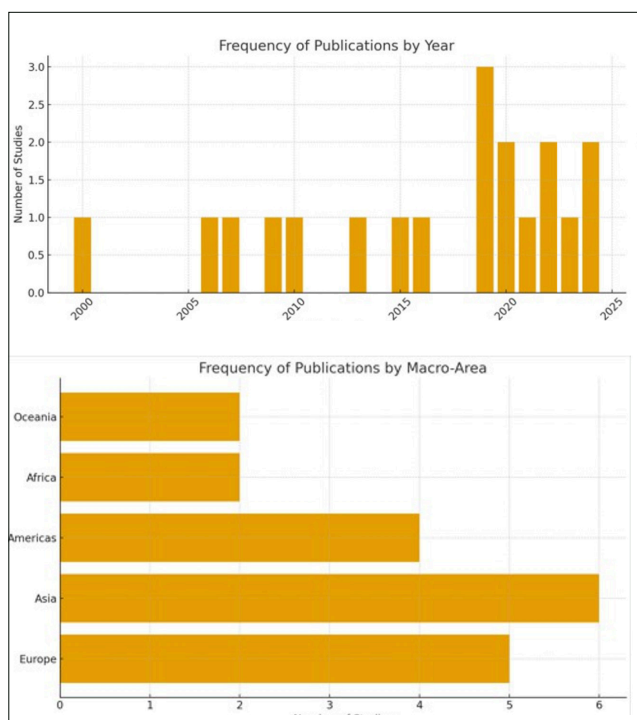


Figure 1. Publication year of included studies and geographical context of publication

The data were organised into two charting. The analytical categories were developed using a combined deductive-inductive approach. Initially, the categories were defined deductively from the review question. During data extraction, additional themes were identified inductively through the reading of the texts.

Table 4 groups the studies according to the type of outcome (OSCE vs Traditional Clinical/

Practical Examination; validity and reliability of the OSCE method; Effectiveness of the OSCE in assessing clinical competencies; Students' perceptions, satisfaction, and experiences with the OSCE.

Table 5 organises the information according to author(s), publication years, country of publication, study title, study design, population and context, data collection methods, structure of the OSCE (number of stations and duration per station), comparison with Traditional Clinical Examination (TCE), and the main concept addressed.

Critical Appraisal of Individual Sources of Evidence

Critical appraisal of individual sources of evidence, as directed by the JBI Manual for Evidence Synthesis (Peters et al., 2020) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018), has not been performed.

Results

Selection of sources of evidence

The selection process for the sources of evidence followed the PRISMA 2020 Flow Diagram (Tricco et al., 2018), as shown in Figure 2.

A total of 573 records were identified across the three databases: 141 from PubMed, 192 from CINAHL, and 240 from Scopus.

An additional 4,353 records were identified through other sources: 185 from Google Scholar, five from OpenAIRE, 23 from ProQuest Dissertations & Theses, and 4,140 from Semantic Scholar.

As illustrated in the PRISMA flow diagram, after the removal of duplicates ($n = 392$), 4,534 records were screened by title and abstract according to the inclusion and exclusion criteria, resulting in 78 records whose full texts were assessed for eligibility. A total of 59 records were excluded: 35 were not relevant, and 24 did not meet the inclusion criteria.

Ultimately, 19 records were included in the scoping review.

Of these 19 articles, nine came from PubMed,

five from CINAHL, two from Scopus, and three from grey literature (journal articles not indexed

or from peer-reviewed journals retrieved through non-indexed archives).

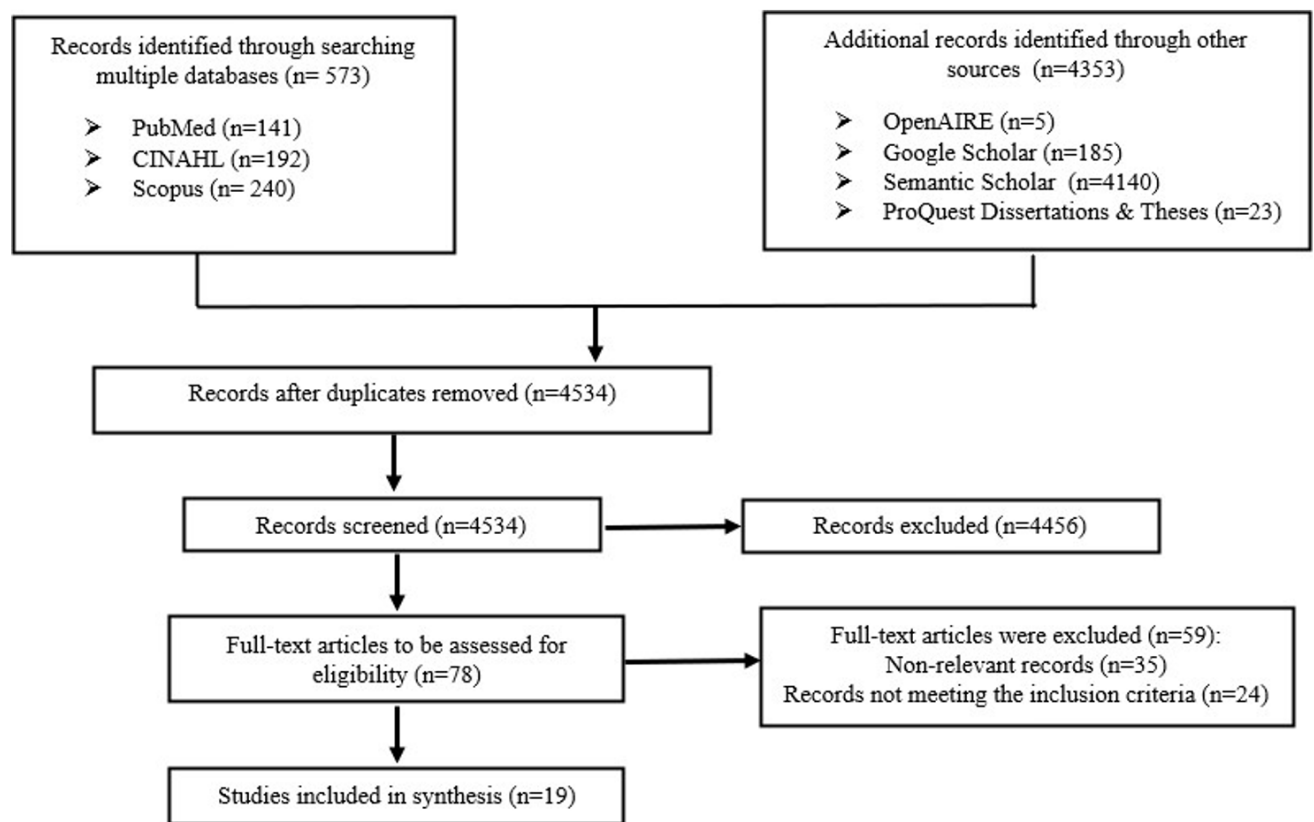


Figure 2. PRISMA flow chart.

Characteristics of Sources of Evidence

The 19 records were classified according to their study objectives, as reported in Table 4.

The table showed that most studies address more than one objective. The most frequently investigated objective concerned students' perceptions, satisfaction and experience (13/19). Objectives related to validity/reliability and clinical efficacy were moderately represented. The comparison between OSCE and traditional clinical/practical examinations appeared in five studies.

The characteristics of the included studies were presented in detail in Table 5.

- **Publication year:** most of the included studies were published between 2019 and 2024.
- **Country of publication:** the data showed five studies from Europe (two from Spain, two from the UK and one from Scotland), six from Asia (three from Iran, one from India, one

from Saudi Arabia and one from Oman), four from the Americas (one from Colombia, one from Brazil and two from the USA), two from Africa (South Africa) and two from Oceania (Australia).

- **Study design:** seven qualitative studies that gathered and interpreted students' perceptions, satisfaction, and experiences; six quantitative observational studies (cross-sectional/correlational/descriptive) that observed and measured the OSCE method; two experimental/quasi-experimental studies that evaluated the effects of an intervention; one literature review; and three methodological/validation studies that developed instruments, scales and procedures.
- **Type of students:** nursing, midwifery, physiotherapy, imaging and radiotherapy techniques, and nutrition and dietetics students, with a predominance of studies involving nursing and midwifery students.
- **University context:** information included the

Table 4. Studies classified according to study objective.

STUDIES	OBJECTIVE STUDY			
	OSCE VS Traditional Clinical/Practical Examination	Validity and reliability of the OSCE method	Effectiveness of the OSCE in assessing clinical competencies	Students' perceptions, satisfaction, and experiences with the OSCE
Alizadeh et al., 2024		X		X
Vijayalakshmi & Revathi, 2024	X			X
Chabrera et al., 2023		X		
Andrea et al., 2022		X		
Anyanwn et al., 2022	X			X
Bdair, 2021	X			X
Castro-Yuste et al., 2020		X	X	
Kolivand et al., 2020		X		
Haufiku et al., 2019		X		X
Ribeiro et al., 2019		X	X	
Y et al., 2019	X			X
Farahat et al., 2016			X	X
Farahat et al., 2015				X
Delavar et al., 2013	X	X	X	X
J & K, 2010			X	
Mitchell et al., 2009		X		X
Jay, 2007				X
R&M, 2006				X
Marshall & Harris, 2000			X	X

year of study, whether students were assessed before or after beginning their clinical placement, and whether they had any prior experience with the OSCE.

- **Data collection:** methods included semi-structured interviews, rating scales on satisfaction with evaluation methods, analytical checklists and descriptive rubrics for each station, validated questionnaires, questionnaires on perceptions and opinions, performance checklists, and focus groups. For interviews and questionnaires, the duration and type of questions were specified. For rating scales and checklists, the authors, the number of items, the Likert scale, and reliability indices were provided. For focus groups, thematic analysis was reported.
- **Description of the OSCE structure:** number of stations, duration of each station, and activities assessed. The number of stations ranged from a minimum of three to a maximum of 17, with most studies reporting OSCEs with four or seven stations. Each station was generally allocated 10 minutes.
- **Comparison with Traditional Clinical Assessment (TCE):** number of hours and type of examination (written, oral, and multiple-choice tests).
- **Concepts representing the study findings:** such as “the students’ perceptions, satisfaction and experiences”, “Validity and reliability”, and “Comparison with traditional methods”. The titles of the results sections were derived from these categories.

Table 5. Studies classified according to study objective.

Author(s), Year, Country	Study Design	Population e Context	Data Collection	
Alizadeh et al., 2024, Maragheh, Iran	Descriptive qualitative study	2 final-year nursing students with direct OSCE experience	Semi-structured interviews (mean duration: 35–45 minutes)	
Vijayalakshmi & Revathi, 2024, Chennai, Sud India	Randomised cross-over comparative study	84 third-year nursing students (42 per group)	Rating Scale on Satisfaction of Evaluation Methods (OSCE and TPE), adapted from De Lisle (2001), 22 items, 5-point Likert scale ($\alpha = 0.93$)	
Chabrera et al., 2023, Barcellona, Spagna	Pilot study for development and validation	116 first-year nursing students	Analytical checklists and descriptive rubrics for each station (Likert 0–4)	
Andrea et al., 2022, Colombia	Instrumental validation study	Physiotherapy students (number not specified) participating in the project “Simulated Practice in Physiotherapy Students for Decision Making in Clinical Skills”	Not specified	
Anyanwn et al., 2022, Anambra, Nigeria	Prospective cross-sectional quantitative study	124 fifth-year radiology students	Validated questionnaire (40 items, 7 sections, 1–4 Likert scale; $\alpha = 0.724$)	
Bdair, 2021, Arabia Saudita	Descriptive cross-sectional and correlational study	429 nursing students	Questionnaire on perception and opinions by Pierre et al. (2004)	
Castro-Yuste et al., 2020, Cadice, Spagna	Methodological study based on expert consensus (Delphi method and consensus conference)	164 first-year nursing students who underwent the OSCE	Procedure conducted in three phases: selection of priority activities; development of clinical cases; definition of OSCE stations	
Kolivand et al., 2020, Kermanshah, Iran	Descriptive correlational study	32 midwifery students in the 6th semester prior to clinical placement, with no previous OSCE experience	Performance checklist with scores ranging from 0 (fail) to 4 (excellent)	
Haufiku et al., 2019, Namibia, Africa	Exploratory, descriptive, and retrospective qualitative study	20 radiography students from the 2nd, 3rd and 4th years	Four focus group discussions (FGDs) with thematic analysis based on the Lincoln & Guba (1985) model	
Ribeiro et al., 2019, Porto Alegre, Brasile	Systematic literature review	7 studies including physiotherapy students as the main participants	Two independent reviewers used the McMaster Critical Review Form (score 0–14) and classified the level of evidence according to the Oxford Centre for Evidence-Based Medicine	
Y et al., 2019, Oman, Asia	Qualitative study with a descriptive approach	39 nursing students who had already experienced an OSCE	Pierre et al.’s OSCE Evaluation Questionnaire (2004), 30 items divided into four areas ($\alpha = 0.82$)	
Farahat et al., 2016, Loma Linda, California	Phenomenological qualitative study	11 students from the nutrition and dietetics programme	Three focus groups (2–6 participants each) conducted within one week after the tests; thematic analysis using Interpretative Phenomenological Analysis (IPA)	
Farahat et al., 2015, California, USA	Quasi-experimental pre-post study	37 students from the nutrition and dietetics programme	Perceived Readiness for Dietetic Practice Questionnaire (PRDP)	
Delavar et al., 2013, Babol, Iran	Comparative cross-sectional study	52 midwifery students divided into two groups: traditional exam (n=20) and OSCE (n=32)	Structured checklists (α between 0.67 and 0.86) and perception questionnaire ($\alpha = 0.81$)	
J & K, 2010, Melbourne, Australia	Descriptive and observational study	32 third-year nutrition and dietetics students before starting clinical placement	Standard checklist and feedback questionnaire (5 closed-ended questions + open comments)	
Mitchell et al., 2009, Queensland, Australia	Cross-sectional descriptive study	98 nursing students from the 2nd and 3rd years	Anonymous structured post-OSCE questionnaire collecting qualitative and quantitative data	
Jay, 2007, United Kingdom	Phenomenological qualitative study	10 final-year midwifery students	Semi-structured interviews (12 open-ended questions)	
R&M, 2006, Aberdeen, Scozia	Exploratory qualitative study	9 second-year midwifery students	Focus group	
Marshall & Harris, 2000, Lancaster, United Kingdom	Exploratory qualitative study	44 third-year radiology students divided into two cohorts	Two OSCE sessions, each lasting 60 minutes	

	Structure of the OSCE		Traditional Clinical Examination (TCE)	Concept
	Number of stations (N)	Duration of stations (min)		
	/	/	/	A well-implemented OSCE enhances practical learning and professional confidence. The OSCE is a valid tool for the assessment of clinical competencies.
	17 stations	6 minutes	4 hours	OSCE showed higher student satisfaction than the Traditional Practical Examination (TPE); students recognised it as reflecting essential skills and valuable learning opportunities, although some reported stress.
	8 stations	10 minutes	/	The OSCE demonstrated strong validity and reliability, high internal consistency and inter-rater agreement, and effectively assessed communication and technical skills.
	7 stations	/	/	The OSCE proved to be a valid and reliable tool for assessing clinical reasoning in physiotherapy students.
	/	/	TCE	Most students perceived the OSCE as well organised, fair, objective, and effective in evaluating essential clinical competencies, and many preferred it to the TCE.
	/	/	Written, oral, and multiple-choice tests	The OSCE was considered a useful and practical learning experience and superior to traditional assessment methods.
	4 stations	10 minutes	/	The OSCE design based on expert consensus improved content validity and enabled simultaneous assessment of technical and communication skills.
	7 stations	5 minutes	/	The OSCE demonstrated satisfactory validity and reliability and correlated with clinical training programmes, although some stations showed weaker internal consistency.
	/	/	/	Students recognised the educational value of the OSCE for stimulating critical thinking, but highlighted the need for good planning, preparation, and feedback.
	/	/	/	The OSCE allows assessment of relational and communication skills in addition to technical competencies and evaluates aspects not measured in traditional examinations.
	4 stations	12 minutes	Written exam	Many students preferred the OSCE to written exams and considered it useful for identifying learning needs and covering a wide range of clinical skills.
	/	/	/	The OSCE was perceived as a realistic bridge to clinical practice and a valuable learning tool, particularly when combined with debriefing.
	7 stations	Variable duration depending on activity (15–40 minutes)	/	The OSCE improved students' perceived readiness for clinical placement and was considered realistic and educational by most participants.
	16 stations	6 minutes	Oral and practical exam (short and long cases)	Students showed higher satisfaction with the OSCE than with traditional exams, although some considered it stressful and requested more time and preparation.
	3 stations	20 minutes	/	The OSCE can identify students at risk of difficulties during clinical placement and was considered a fair and objective assessment method.
	Between 6 and 10 stations	Approximately 8–10 minutes	/	The OSCE promoted active preparation, critical thinking, and was perceived as a valid, realistic, fair, and standardised method of assessing clinical competence.
	/	/	/	Students perceived the OSCE as fair, relevant to clinical practice, and useful for improving understanding and retention of procedures, despite anxiety associated with the exam.
	/	/	/	The OSCE promotes deeper and more lasting learning but requires adequate preparation, organisation, and post-exam debriefing.
	/	/	/	The OSCE was positively evaluated, feasible to implement, and its scores correlated with practical modules and final academic performance.

From the study results, the nursing, midwifery, physiotherapy, and imaging and radiotherapy techniques students' perceptions regarding the OSCE were that it promoted critical thinking and clinical reasoning. It was a method capable of assessing not only technical skills but also relational and communication skills (Castro-Yuste et al., 2020; Cobo-Mejía et al., 2022; Ribeiro et al., 2019).

However, its educational potential was limited by inadequate planning and preparation. The factors that contributed to a suboptimal environment included poor lighting, limited space, technical problems, background noise, excessive waiting times, insufficient station duration, and the lack of immediate feedback (Haufiku et al., 2019; Mitchell et al., 2009; Rennie & Main, 2006).

In the study by Delaver et al. (2013), 53.8% of midwifery students considered the OSCE a stressful examination due to insufficient time to complete the stations and inadequate preparation, while 40% regarded it as "fair and objective".

High levels of anxiety were also identified in the studies by Mitchell et al. (2009) and Jay (2007), although in both cases, the anxiety was considered "motivating".

Most studies identified post-exam debriefing as the phase with the greatest educational value (Farahat et al., 2015, 2016; Haufiku et al., 2019; Mitchell et al., 2009; Rennie & Main, 2006).

In contrast to these findings, the study by Marshall and Harris (2000) reported that the implementation of the OSCE in a university setting to assess the competencies of imaging and radiotherapy techniques students was feasible and did not present any substantial logistical difficulties.

In the study by Farahat et al. (2015), nutrition and dietetics students undertook a seven-station OSCE that was perceived as realistic (92%) and educational (81%). Furthermore, the results showed that the OSCE improved its clinical preparedness ($p = 0.03$) in nutritional assessment, intervention planning, diagnosis, and leadership. For these reasons, it could become an integral part of professional licensing examinations for dietitians.

Consistent with these findings, in the study by Farahat et al. (2015, 2016) and in the study by Bdair (2021), nutrition and dietetics students' perceptions were positive, as well as nursing students, regarding the usefulness of the OSCE, which facilitated the transition to clinical practice and provided genuine learning opportunities.

In contrast with the study by Farahat (2015), in the results of the study by Jay (2007), students perceived the OSCE as an artificial and not very realistic simulation.

Validity, reliability, and effectiveness of the OSCE

The studies confirmed the fairness, validity, and objectivity of the OSCE as a method for assessing clinical competencies (Alizadeh et al., 2024; Hawker & Walker, 2010; Jay, 2007; Mitchell et al., 2009; Rennie & Main, 2006).

In the study by Chabrera et al. (2023), an eight-station OSCE, with each station lasting 10 minutes and assessing technical, communication, and decision-making skills, demonstrated excellent internal consistency ($\alpha = 0.88$) and high inter-rater reliability ($ICC = 0.87$). The results of this study showed that 94% of nursing students rated the OSCE as "useful and realistic", and 82% reported feeling "more prepared for clinical practice".

The findings of Castro-Yuste et al. (2020), Chabrera et al. (2023) and Ribeiro et al. (2019) highlighted that the OSCE assessed not only technical skills but also relational and communication skills. Notably, in the factor analysis conducted by Chabrera et al. (2023), communication skills obtained higher scores than the other dimensions investigated.

In the study conducted by Cobo-Mejía et al. (2022), a seven-station OSCE based on the American Physical Therapy Association (APTA) model proved to be a valid and reliable tool for measuring clinical reasoning ($\alpha = 0.98$; ICC ranging from 0.55 to 1.00) among physiotherapy students.

The results of several studies demonstrated that an OSCE was considered valid and reliable when its methodology was based on expert consensus (Castro-Yuste et al., 2020; Kolivand et al., 2020). The OSCE designed by Castro-Yuste et al. (2020) to assess nursing students was content-validated through the consensus of 31 experts. The methodology was structured

into three phases: (1) selection of priority activities; (2) development of clinical cases; (3) definition of the OSCE stations. The activities that obtained the highest expert consensus included: assessing basic physical conditions and monitoring vital signs, evaluating hygiene and skin condition, developing care plans, managing safety principles in drug administration, and administering oral medications. Based on these activities, 20 clinical cases were developed, from which an OSCE with four stations was designed, each lasting ten minutes: (1) cardiovascular assessment; (2) nursing process; (3) oral drug administration in type 2 diabetes; (4) hygiene and skin care.

The OSCE designed by Kolivand et al. (2020) assessed midwifery students and was validated by four experts, demonstrating a Cronbach's $\alpha > 0.7$ and significant internal consistency in five of the seven stations (only the communication and childbirth stations were not significantly correlated with the total exam score). Each station, lasting five minutes, was based on course topics, midwifery reference texts, and clinical skills requirements, assessed the following activities: establishing intravenous access, administering infusion therapy and measuring blood pressure, using resuscitation equipment, communicating and collecting medical history, assisting childbirth, performing episiotomy, conducting speculum and bimanual examinations, and answering visual questions on clinical cases.

The study results showed that the OSCE method enhanced practical learning and professional confidence (Hawker & Walker, 2010; Kolivand et al., 2020; Marshall & Harris, 2000). The significant correlation between OSCE scores and performance in clinical placement ($\beta = 0.66$; 95% CI: 0.46–0.86; $p < 0.0001$) allowed for the early identification of students at risk of difficulties during clinical training (Hawker & Walker, 2010).

Kolivand et al. (2020) reported a significant correlation between the OSCE and the clinical programmes on normal and abnormal labour ($r = 0.399$, $p = 0.024$) and with clinical programmes in gynaecology ($r = 0.419$, $p = 0.017$), while no correlation emerged with theoretical programmes ($r = 0.23$, $p = 0.20$).

Similarly, Marshall and Harris (2000) demonstrated positive and significant correlations (ρ between 0.5 and 0.8; $p < 0.01$) with practical clinical modules, while no correlation

emerged with the theoretical module "Evaluating Imaging Techniques".

Comparison with traditional methods

In the study by Bdaire (2021), the OSCE method was compared with traditional assessment methods for nursing students. The results showed a higher overall score for OSCEs (69.08 ± 9.93) compared with that obtained in multiple-choice questions (63.70 ± 10.53), oral examinations (66.44 ± 8.08), and written examinations (63.14 ± 9.09). Nevertheless, 46% of students reported concerns regarding insufficient time per station and the lack of immediate feedback.

In the study by Vijayalakshmi and Revathi (2024), a significant difference ($p < 0.001$) was found in favour of the 17-station OSCE, with each station lasting six minutes (98.26 ± 6.44), compared with a traditional practical examination (TPE) lasting four hours (89.82 ± 7.27). Furthermore, nursing students agreed on the quality of the skills assessed (85%), on the clarity of the instructions received (73%), and on the learning opportunities offered (81%). Comparable findings emerged in the study by Divya et al. (2019), in which 56% of students preferred the OSCE to a written assessment, as it was able to cover a wide range of clinical skills (77%), was considered practical and useful (62%), and offered opportunities for improvement and self-learning (67%).

In the study by Anyanwu et al. (2022), 80% of imaging and radiotherapy techniques students preferred the OSCE over the Traditional Clinical Examination (TCE) for its fairness and objectivity. Eighty-four per cent of students believed that it reduced personal or gender bias. Only one quarter of students considered the OSCE more stressful than the TCE. Most students also perceived it as well organised, clear, and valid for assessing essential clinical competencies. The main issue identified was the time allowed to complete the stations, which 75% of students considered insufficient (Cobo-Mejía et al., 2022).

In the study by Delavar et al. (2013), the OSCE (49.8 ± 18.3) achieved a higher level of satisfaction among midwifery students compared with the traditional examination (25.3 ± 18.1). It provided greater credibility ($p = 0.0001$), consistency/reliability ($p = 0.001$), improvement in educational level ($p = 0.011$), and relevance to course objectives ($p = 0.008$).

Discussion

The mapping of the data shows that the OSCE is employed in the standardised assessment of clinical competencies within undergraduate healthcare professions programmes (Castro-Yuste et al., 2020; Delavar et al., 2013; Hawker & Walker, 2010; Jay, 2007; Kolivand et al., 2020).

Across the different studies, the OSCE is described as a method that promotes reflective learning, professional confidence, and improvement in self-assessment. It is used to obtain a holistic view of the patient and to develop communication skills, clinical reasoning, decision-making autonomy, interprofessional collaboration, and motivation (Chabrera et al., 2023; Cobo-Mejía et al., 2022; Farahat et al., 2015, 2016; Marshall & Harris, 2000; Rennie & Main, 2006).

The studies report advantages of the OSCE over traditional assessment methods, highlighting elements of fairness, transparency, and objectivity (Delavar et al., 2013). According to the included studies, the OSCE is employed to assess communication and behavioural skills, which are often overlooked in traditional examinations (Ribeiro et al., 2019).

It is used to identify individual areas for improvement and to bring students closer to real clinical practice (Divya et al., 2019; Marshall & Harris, 2000; Ribeiro et al., 2019). The studies report a reduction in the effectiveness of the method when optimal organisation is lacking (Alizadeh et al., 2024; Castro-Yuste et al., 2020; Cobo-Mejía et al., 2022; Delavar et al., 2013; Haufiku et al., 2019; Jay, 2007; Kolivand et al., 2020; Marshall & Harris, 2000).

A recurring pattern concerns students' stress associated with insufficient time per station, perceived inadequate preparation, suboptimal environmental conditions, and lack of immediate feedback (Cobo-Mejía et al., 2022; Delavar et al., 2013; Divya et al., 2019; Farahat et al., 2015; Haufiku et al., 2019; Vijayalakshmi & Revathi, 2024).

In some studies, anxiety is described as “motivating” (Jay, 2007; Mitchell et al., 2009), whereas in others it is associated with poorer performance, in connection with the need for more accurate logistical planning and greater emotional support for students (Bdair, 2021).

From a methodological perspective, accurate OSCE design is considered essential for the validity and reliability of the instrument. Key factors include the definition of stations and

the time allocated to them; the selection of the competencies to be assessed, which must be aligned with the educational objectives; progressive preparation through practical workshops, briefings, and high-fidelity simulations; the standardisation of assessment tools; and the selection of clinical cases based on faculty consensus. The studies indicate the relevance of adequate resource availability and the implementation of immediate and continuous post-exam debriefings (Farahat et al., 2015; Hawker & Walker, 2010; Jay, 2007; Kolivand et al., 2020; Marshall & Harris, 2000; Mitchell et al., 2009; Rennie & Main, 2006).

The involvement of academic and clinical experts in the design of the OSCE is associated with greater validity of the instrument. The significant correlation between OSCE performance and practical programmes is described as indicative of its capacity to assess practical skills, whereas the lack of correlation with theoretical programmes suggests the need to integrate it with other assessment methods more appropriate for theoretical content (Hawker & Walker, 2010; Kolivand et al., 2020).

Several studies report organisational and educational elements that may contribute to better OSCE implementation, including the standardisation of procedures, the training of academic staff and students, the adequacy of simulation environments, and the implementation of structured feedback systems. These aspects are described as being associated both with the reliability of the method and with the reduction of anxiety and stress (Bdair, 2021; Farahat et al., 2016; Haufiku et al., 2019; Hawker & Walker, 2010; Mitchell et al., 2009; Rennie & Main, 2006).

A further relevant gap concerns the limited application of the OSCE in certain healthcare professions. Its use in physiotherapy remains limited (Ribeiro et al., 2019); few studies have explored its use in dietetics and imaging and radiotherapy techniques programmes, and none have involved biomedical laboratory science students. Future research should investigate the feasibility of the OSCE across all healthcare professions and strengthen its methodological rigour, for which the conduct of a systematic review is recommended. The OSCE represents a widely used method for assessing clinical competencies, and its educational value is documented across various disciplines. The studies indicate the presence of logistical,

pedagogical, and emotional barriers relevant to its implementation; they also report that systemic support, adequate infrastructural resources, and continuous research activity are considered significant elements for improving the application of the method.

Limitations

The main limitation of this review lies in the fact that the protocol was registered retrospectively. Consequently, some deviations from the original plan were required, including the extension of the search period and the inclusion of grey literature sources. However, all modifications have been transparently documented and recorded on OSF through the most recent protocol updates.

Compared with the original protocol, the research period was extended from 2000 to 2025. Grey literature was included, and the inclusion and exclusion criteria were revised.

The research focused exclusively on undergraduate programmes in the selected healthcare professions: nursing, midwifery, physiotherapy, dietetics, imaging and radiotherapy techniques, and biomedical laboratory science. Accordingly, the findings do not extend to other healthcare professions or to degree programs in medicine, dentistry, or pharmacy. They also do not address the use of the OSCE method within those fields.

Moreover, the research did not involve teachers, examiners, or tutors. No studies were identified that explored the application of the OSCE method in the education of biomedical laboratory science. Only articles published in English and Italian were considered.

Educational implications

The results support the OSCE as a pedagogically valid tool that promotes structured feedback, students' reflection, and clinical reasoning. Educators should prioritise faculty training and structured students' preparation. They should also promote the integration of OSCEs within competency-based curricula. Institutions should invest in simulation resources and standardised assessment systems to ensure reliability and fairness.

The use of the OSCE enhances the quality of education by strengthening clinical safety and

professionalism. Integrating the OSCE into university curricula should be encouraged, as it reinforces the connection between theory and practice.

The implementation of post-exam debriefing sessions would further enhance students' critical thinking, self-assessment, and professional development. Feedback would also help improve the design and organisation of future OSCEs.

Furthermore, extending the use of the OSCE to assess the clinical skills of practising healthcare professionals would be valuable. It would help maintain and improve clinical competencies throughout their careers.

Conclusion

This review mapped current evidence on OSCE implementation in undergraduate education for the healthcare professions, highlighting strong perceived educational value and structured skill assessment.

Although the OSCE requires careful design and planning, its effectiveness has been well established in undergraduate programmes in nursing, midwifery, physiotherapy, dietetics, and imaging and radiotherapy techniques. In these contexts, it has proven to be a valid, reliable, and fair tool for the structured and objective assessment of clinical competencies. It overcomes the limitations of written, oral, and multiple-choice tests, enables the integration of theory and practice, and helps identify learning gaps. Students perceive it as an educational, motivating, and realistic experience.

Key areas for development include standardisation, assessor preparation, validity evidence reporting, resource evaluation, and immediate and continuous debriefing sessions. Future studies should explore OSCE application across other healthcare professions and document the implementation processes in the programmes where it is already in use. They should also evaluate feasibility and outcomes through robust methodological frameworks.

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Nursing-Led Interventions to Enhance Post-Bariatric Quality of Life: A Literature Review

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Abstract

Introduction. Bariatric surgery is a critical intervention for morbid obesity, yet 30-day hospital readmission rates remain a significant challenge for patient's quality of life and healthcare sustainability. Despite its relevance, a scientific gap remains regarding the synthesis of nursing-led management models. This review aims to identify and categorize clinical and psychosocial predictors and causes of readmission and describe nursing-led interventions and organizational strategies designed to reduce the healthcare burden.

Methods and Materials. A structured narrative review was conducted following SANRA guidelines. Based on a PICO framework, a search was performed across MEDLINE, Embase, and CINAHL databases between February - October 2024, with an integrative update conducted in December 2025. The review included studies published from January 2014 to December 2025. Inclusion criteria focused on studies describing specialized nursing interventions and outcomes like readmission or reoperation. Two independent reviewers performed the screening, resolving discrepancies via third party consensus.

Results. A total of 32 articles were included. Major predictors for readmission include a preoperative BMI >45 kg/m², surgical technique and low socioeconomic status. The most frequent clinical causes are often preventable, including abdominal pain, nausea, vomiting, and dehydration. Major nursing strategies include structured patient education, specialized bariatric nursing, and digital health tools for proactive monitoring. Nurse case management emerged as a core strategy for coordinating multidisciplinary care.

Discussion. Preventing readmissions requires an analytical shift toward nursing-led risk stratification and proactive surveillance. Specialized nurses and case managers act as strategic bridges to healthcare equity, overcoming

socioeconomic and geographical barriers. Implementing autonomous nursing roles is essential for the long-term sustainability of bariatric programs, ensuring both clinical excellence and equitable care distribution, optimizing outcomes, improving patients' quality of life and reducing hospital readmission rates.

Keywords: Bariatric Surgery, Patient Readmission, Quality of Life, Obesity, Nursing-led Interventions

Introduction

Morbid obesity presents a growing global health challenge, affecting over 890 million adults worldwide and significantly impacting individuals and healthcare systems (World Health Organization, 2025; Chong et al., 2023; Murray et al., 2020; Rubino et al., 2023). Bariatric surgery is a widely used therapeutic option, intended to improve quality of life in individuals with obesity and to reduce mortality and obesity-related medical risk factors, yet it requires a holistic approach to optimize patient care (Collazo-Clavell & Shah, 2020; Eisenberg et al., 2022). Despite advancements in safety and technique, these procedures can cause metabolic, nutritional, and psychological challenges, increasing the risk of complications such as gastrointestinal disorders, dietary adaptation issues, and mental health concerns (Palermo & Nedelcu, 2021; Schulman & Thompson, 2017; Skelton et al., 2025).

Postoperative complications often lead to hospital readmissions, emergency visits, and additional procedures, raising healthcare costs and affecting patients' quality of life (Accardi, Fave, et al., 2017; Accardi, Lattuada, et al., 2017; Firat et al., 2024; Istituto Superiore della Sanità, 2023; Neil & Roberson, 2015; Schulman & Thompson, 2017). It is reported that readmission rates after bariatric procedures, ranging from 3% to 11% within 30 days, remain a critical concern for healthcare quality and sustainability (Altieri et al., 2018; Dang et al., 2020).

Complications associated with this type of surgical intervention may negatively affect quality of life. Nevertheless, obesity per se is frequently complicated by psychiatric comorbidities, such as depression, which contribute to diminished self-efficacy, body image dissatisfaction, social stigmatization, negative affect, and stress related to prejudice and hostile behaviors toward affected individuals (Neil & Roberson, 2015).

Team-based primary care models highlight the instrumental role of nurses in chronic disease management and prevention through nurse-led clinics, standardized protocols, and patient education (Griffin, 2017). Within this context, the nursing role is fundamental because they are often the primary point of contact for identifying early warning signs and managing the transition from hospital to home (Griffin, 2017; Piwowarczyk et al., 2024).

Effective management in post-intervention procedure requires structured follow-ups, early complication detection, and patient education to promote long-term health and self-care (Eisenberg et al., 2022; Istituto Superiore della Sanità, 2023). A multidisciplinary approach is reported to enhance surgical outcomes by integrating medical, nutritional, and psychological support (Graham et al., 2019). While surgical techniques have advanced, a significant gap remains in identifying a standardized, evidence-based synthesis that integrates clinical risk factors with specific nursing-led management models.

Therefore, this narrative review aims to identify and categorize the key clinical and psychosocial risk factors for hospital readmission and describe nursing-led interventions and organizational strategies designed to mitigate these risks and reduce the healthcare burden.

Methods and Materials

To address the objective of this study, a narrative literature review was developed following the SANRA guidelines (Baethge et al., 2019), while the PRISMA flow diagram (Page et al., 2021) was utilized to ensure transparency in the selection process. The research question was structured using the PICO framework:

- Population: Adult patients undergoing

bariatric surgery who experience complications such as hospital readmissions, emergency department visits, and reoperations.

- Intervention: Specialized nursing-led care models, interventions or organizational strategies aimed at post-discharge management.
- Comparison: Standard postoperative care (where applicable in the included studies)

- Outcome: Reduction in hospital readmissions, emergency visits, and avoidable reoperations, with the broader aim of lowering healthcare costs and improving patients' quality of life.

Relevant literature was identified between February 2024 and October 2024 using the MEDLINE, EMBASE, and CINAHL databases. A further supplementary search was carried out in December 2025. Search queries used for each biomedical database are detailed in Table 1.

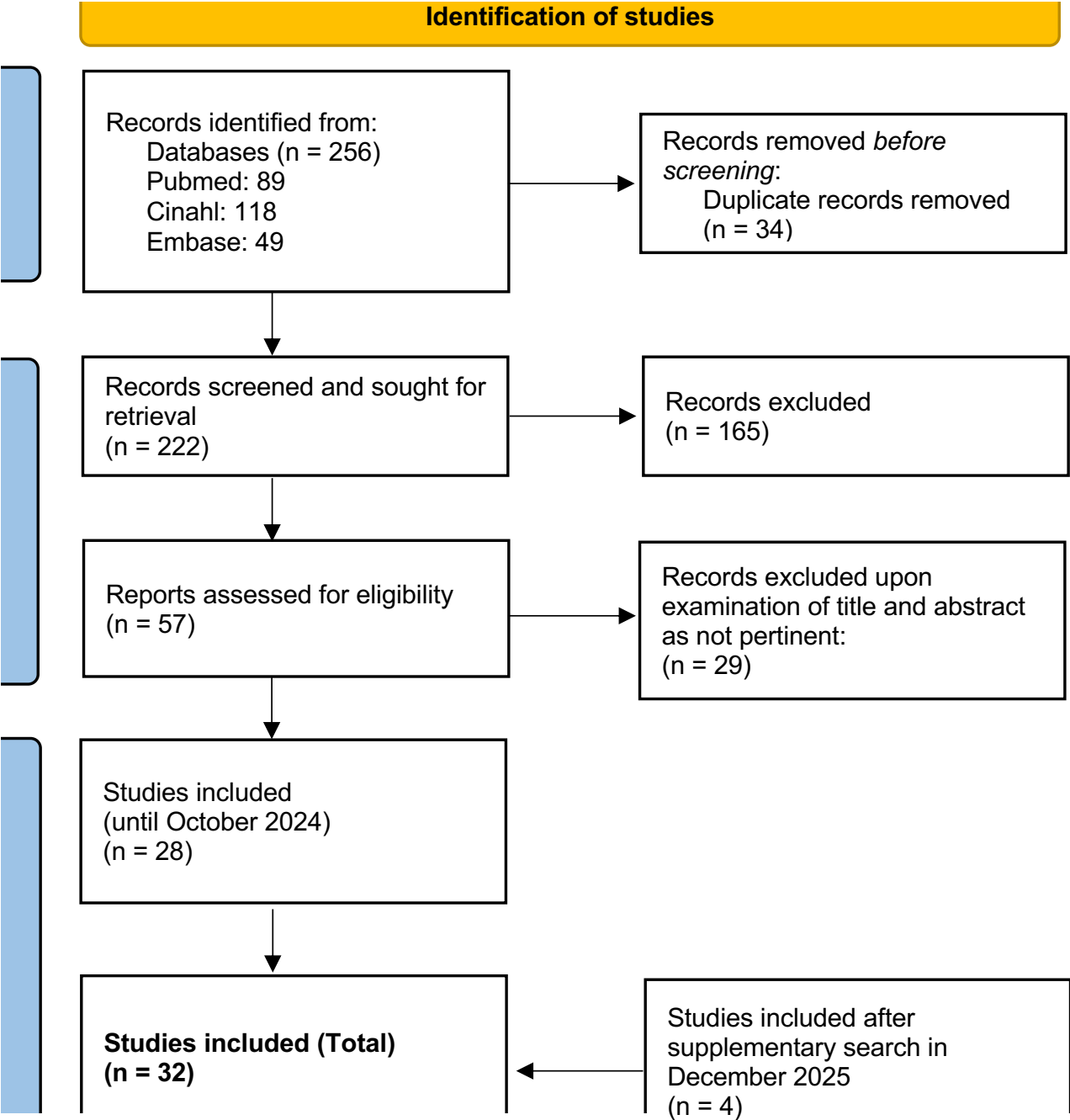


Figure 1. PRISMA Flow Diagram

Table 1. Queries.

Database	Search Queries
MEDLINE	((("Bariatric Surgery"[Mesh] OR ((gastric[tiab] OR stomach[tiab]) AND (bypass[tiab] OR banding[tiab])) OR ((obes*[tiab] OR weight[tiab]) AND (surg*[tiab] OR operat*[tiab])))) AND ("Nursing"[Mesh] OR "Nursing Care"[Mesh] OR "Nurses"[Mesh] OR "Nurse-Patient Relations"[Mesh]))
EMBASE	'bariatric surgery'/exp AND 'nurse'/exp AND 'hospital readmission'/exp
CINAHL	((MM "Bariatric Surgery") OR TI (bariatr* or ((gastric or stomach) n3 (bypass or banding*)) or ((obes* or weight) n3 (surg* or operat*)))) AND (((MH "Nursing Care+") OR (MH "Nurses+") OR (MH "Nurse-Patient Relations") OR (MH "Nursing Role") OR (MH "Nurse Attitudes")) OR (MW "NU") OR (TI nurs* OR AB nurs*))

To minimize selection bias, two authors (CC and JL) independently screened the titles and abstracts of the retrieved records. Discrepancies regarding study eligibility were resolved through discussion and consensus with a third reviewer (RA). A total of 32 studies were ultimately included in this review, 28 from the initial search and 4 from the 2025 update.

Inclusion criteria comprised studies published between 2014 and 2025, focused on adult bariatric surgery patients, and explicitly describing nursing-led interventions. Studies were included if they addressed outcomes such as readmission, rehospitalization, reoperation, or complications related to bariatric surgery.

Exclusion criteria applied to studies involving pediatric populations and to publications that did not examine the role of nursing support during the follow-up phase.

Results

A total of 32 studies were included and reflects a variety of methodological approaches, including retrospective cohort studies, qualitative investigations, and interventional reports. Several common variables were identified, presented in the attached Table 2. To ensure conceptual clarity and hierarchy, variables were categorized as "Major" if they were reported in ≥ 4 included studies, and "Minor" if reported in fewer than 4 studies. This distinction addresses the need for a clearer synthesis of the most frequent predictors and outcomes. *Predictors of*

Table 2. Variables.

Category characteristics	Variable	N° of articles
Risk Factors	Major	
	Body Mass Index (BMI)	6
	Type of surgery	5
	Hospitalization duration	4
	Procedure duration	4
	Socio-economic status	4
	Home location	8
	Comorbidities	5
	Minor	
	Ethnicity	3
	Age	3
	ASA risk class III or IV	2
	Depression	2
	History of alcohol or cannabis abuse	2
	Discharge to rehabilitation	2
	Gender	2
	Psychiatric illness	1
Causes	Major	
	Abdominal Pain	11
	Nausea / Vomiting	9
	Dehydration	6
	Hemorrhage	4
	Anastomotic leak	7
	Surgical site infection	7
	Nutritional deficiencies	5
	Minor	
	Deep vein thrombosis	3
	Gallstone disease	3
	Sepsis	1
	Acute renal failure	1
	Weight issues (regain/loss)	1
	Incisional hernia	1
	Sleeve stenosis	1
	Gastroesophageal reflux	1
	Peritonitis	1
Strategies	Major	
	Patient education	8
	eHealth / Telemedicine	6
	Specialized nurses	10
	Case management	4
	Minor	
	Service access coordination	2
	Timely follow-up access	1
	Medication management	1
	Discharge care planning	1

Note. Variables were categorized as "Major" if they were reported in 4 or more included studies, and "Minor" if reported in fewer than 4 studies, based on an inductive frequency based threshold.

Readmission

Major Predictors: Obesity severity significantly correlates with readmission risk, with a preoperative BMI > 40 or 45 kg/m² being a key factor (Argueta et al., 2022; De Luca, 2017; Rashdan et al., 2024). Higher BMIs (> 50 or 60 kg/m²) further increase the risk, as does a BMI rise between the postoperative period and emergency visits (Garg et al., 2016; Kim et al., 2023; Rashdan et al., 2024; Tayne et al., 2014). The type of surgery is a critical predictor; readmission rates are higher for Mini Gastric Bypass, Sleeve Gastrectomy, and Roux-en-Y Gastric Bypass (De Luca, 2017; Ferreira-Santos et al., 2024; Kim et al., 2023). Laparotomy Roux-en-Y presents higher risks than laparoscopic or adjustable gastric banding (Rashdan et al., 2024), while adjustable gastric banding shows more readmissions than sleeve gastrectomy or Roux-en-Y (Ahmed et al., 2017).

Other major predictors include hospitalization duration (3 - 4 days) and procedure times over 120 minutes (Argueta et al., 2022; Garg et al., 2016; Kim et al., 2023; Tayne et al., 2014). Regarding socioeconomic factors, low income, disability, or government insurance increase readmission risk (Argueta et al., 2022; Kim et al., 2023; Tayne et al., 2014; Telem et al., 2016). Finally, pre-existing comorbidities as hypertension or diabetes, and a Charlson Comorbidity Index ≥ 3 predict readmissions (Ahmed et al., 2017; Dreifuss et al., 2022; Garg et al., 2016; Kim et al., 2023; Nijland et al., 2020), a home location with greater distance from healthcare facilities are confirmed major risk factors (Accardi, Fave, et al., 2017; Ahmed et al., 2017; Cooley, 2017; Dreifuss et al., 2022; Garg et al., 2016; Kim et al., 2023; Nijland et al., 2020; Telem et al., 2016).

Minor Predictors: Factors reported in fewer than 4 studies include advancing age (Ahmed et al., 2017; Argueta et al., 2022; Telem et al., 2016), ASA risk class III or IV (Argueta et al., 2022; Dreifuss et al., 2022), and ethnicity that also affects readmission rates, with African-Americans having a higher risk compared to Caucasians (Dreifuss et al., 2022; Garg et al., 2016; Telem et al., 2016). Psychological factors such as depression (Rashdan et al., 2024; Telem et al., 2016) or general psychiatric illness (Rocha et al., 2024) also influence outcomes. Additional minor predictors include a history of alcohol or cannabis abuse (Argueta et al., 2022; Kim et al.,

2023), discharge to rehabilitation centers (Telem et al., 2016). Gender differences in readmission rates remain inconclusive (Argueta et al., 2022; Dreifuss et al., 2022).

Clinical Causes of Readmission

Major Causes: The most frequent clinical cause of readmission is abdominal pain (Ahmed et al., 2017; Argueta et al., 2022; De Luca, 2017; Dreifuss et al., 2022; Garg et al., 2016; Hernández et al., 2023; Nijland et al., 2020; Patil & Melander, 2015; Rashdan et al., 2024; Tayne et al., 2014; Telem et al., 2016). This is often associated with nausea and vomiting (Ahmed et al., 2017; Argueta et al., 2022; Cooley, 2017; Dreifuss et al., 2022; Garg et al., 2016; Kim et al., 2023; Nijland et al., 2020; Rashdan et al., 2024, 2024; Telem et al., 2016), frequently leading to dehydration (Argueta et al., 2022; Dreifuss et al., 2022; Hernández et al., 2023; Rashdan et al., 2024; Tayne et al., 2014; Telem et al., 2016).

Other major drivers include gastrointestinal hemorrhages (Ahmed et al., 2017; Kim et al., 2023; Nijland et al., 2020) and anastomotic leakage (Ahmed et al., 2017; De Luca, 2017; Dreifuss et al., 2022; Garg et al., 2016; Hernández et al., 2023; Kim et al., 2023; Nijland et al., 2020). Surgical site infections and nutritional deficiencies are also categorized as major causes (Ahmed et al., 2017; Argueta et al., 2022; Cooley, 2017; Dreifuss et al., 2022; Garg et al., 2016; Hernández et al., 2023; Tayne et al., 2014).

Minor Causes: Although associated with high mortality, deep vein thrombosis is reported less frequently in this specific context (Argueta et al., 2022; Dreifuss et al., 2022; Tayne et al., 2014). Other minor causes include gallstone disease (Cooley, 2017; Hernández et al., 2023; Rashdan et al., 2024), nephrolithiasis (Collazo-Clavell & Shah, 2020), renal failure, peritonitis and sepsis (Argueta et al., 2022). Reoperation is typically triggered by minor-frequency causes such as incisional hernia, weight regain, sleeve stenosis, or gastroesophageal reflux (Hernández et al., 2023).

Nursing and Management Strategies

Major Strategies: Structured patient education and multidisciplinary programs are essential for promoting self-care and long-term health

(Finkelstein et al., 2025; Güven & Akyolcu, 2020; Huang et al., 2023; Li et al., 2024; Mendes et al., 2023; Pfeil, 2014; Williams & Derouin, 2025; Yıldız & Karagözoğlu, 2023). Digital health tools, including e-Health and telemedicine, provide critical home support and monitoring of clinical parameters (Arnaert et al., 2022; Huang et al., 2023; Maqueda-Martínez et al., 2024; Mendes et al., 2023; Pfeil, 2014; Yıldız & Karagözoğlu, 2023). Furthermore, specialized bariatric nurses significantly reduce readmissions and improve quality of life (Arnaert et al., 2022; Cheng et al., 2021; Coleman et al., 2016; Ferreira-Santos et al., 2024; Güven & Akyolcu, 2020; Huang et al., 2023; Maqueda-Martínez et al., 2024; Mendes et al., 2024; Mohammed et al., 2025; Yang et al., 2024). Nurse case management, also emerges as a major strategy, showing high effectiveness in coordinating multidisciplinary care (Li et al., 2024; Mendes et al., 2023, 2024; Williams & Derouin, 2025)

Minor Strategies: Other minor strategies include discharge care planning, ensuring timely follow-up access (Güven & Akyolcu, 2020), medication management, and service access coordination (Mendes et al., 2023, 2024).

Discussion

This review highlights that hospital readmission after bariatric surgery is a multifactorial phenomenon requiring a systematic and personalized nursing approach. A structured hierarchy of risk factors and clinical causes has been identified, which nursing-led models should prioritize to improve long-term recovery and patient wellbeing.

The findings draw a distinction between predictors, which identify the patient profiles most at risk of readmission, and clinical causes, which elucidate the specific reasons for their return to care. The identification of body mass index and the type of surgery as major predictors (Argueta et al., 2022; De Luca, 2017; Hernández et al., 2023; Rashdan et al., 2024; Semlitsch et al., 2019) suggests that patients' preoperative stratification is essential. Furthermore, the significance of socioeconomic status as a major risk factor, complemented by the influence of ethnicity and geographical distance from healthcare facilities (Dreifuss et al., 2022; Telem et al., 2016) highlights a critical gap in healthcare equity. Patients with lower income or those

living far from specialized centers require more intensive surveillance during the transition from hospital to home (Cooley, 2017).

Regarding clinical causes, the high frequency of abdominal pain, nausea, and vomiting leading to dehydration is particularly noteworthy as these conditions are often preventable through early intervention and patient education, they represent the primary target for nursing-led management models (Hernández et al., 2023). The presence of dehydration and abdominal pain as leading clinical causes of readmission reveals a critical vulnerability in the post-discharge transition phase rather than a failure of the surgical procedure itself.

These symptoms represent 'soft' complications that are inherently preventable through high-quality patient self-efficacy and literacy. Unlike late complications like gallstones, these early clinical drivers can be mitigated through proactive monitoring (Argueta et al., 2022; Rashdan et al., 2024). The classification of factors like psychological distress as "Minor" should not imply clinical insignificance but rather prioritize these areas for future research efforts.

The nurse case manager emerged as a major strategy in this review, playing a pivotal role in ensuring continuity of care and coordinating the treatment pathway. As part of a multidisciplinary team, it provides support throughout the entire continuum, from preoperative preparation to long-term follow-up, using care models grounded in holistic management (Cheng et al., 2021; Williams & Derouin, 2025).

This approach is not only clinical but also behavioral. Obesity management must extend beyond the surgical procedure to include psychological and relational support, addressing comorbidities like type 2 diabetes and psychiatric disorders (Mendes et al., 2023; Rubino et al., 2023). Furthermore, nursing interventions should consider aesthetic outcomes alongside metabolic parameters, as these significantly influence the patient's self-image and quality of life (Accardi, Fave, et al., 2017; Accardi, Lattuada, et al., 2017; Rocha et al., 2024).

One of the strongest findings of this review is the effectiveness of Digital Health interventions in reducing readmissions. These tools facilitate nurses' patient education, remote monitoring of wounds and symptoms, allowing nurses to resolve minor issues before they escalate into emergency department visits (Arnaert et al.,

2022; Maqueda-Martínez et al., 2024; Rocha et al., 2024). Combining face-to-face consultations with digital support, promotes greater postoperative therapeutic adherence and reduces dropout rates (Piwowarczyk et al., 2024; Semlitsch et al., 2019).

Therefore, nurse's role is not merely supportive but serves as a clinical safeguard and mitigate the primary drivers of readmission. This interpretation positions nursing education not just as a complementary task, but as a core clinical intervention that directly influences the success of bariatric outcomes.

Nursing interventions acts as a strategic bridge between clinical excellence and healthcare equity, reducing the impact of social determinants such as socioeconomic status and geographical distance. By integrating Digital Health tools into a case management model, specialized nurses ensure continuous, personalized coordination that overcomes systemic barriers for marginalized populations, enhancing patient-centered care and cost-effectiveness through proactive care coordination (Cheng et al., 2021; Griffin, 2017; Pfeil, 2014).

Consequently, the autonomous nursing role improves clinical outcomes and higher satisfaction levels for both patients and healthcare providers, ensuring the long-term sustainability of bariatric programs and optimal postoperative management (Skelton et al., 2025).

Despite the growing evidence, this review highlights a significant scientific gap, particularly within the Italian context (Accardi et al., 2019; Accardi, Lattuada, et al., 2017; De Luca, 2017), where studies examining the autonomous role of bariatric nurses are lacking. Further research is needed to evaluate the impact of specialized nursing-led interventions or nursing case management models to optimize resource allocation and support sustainable, high-quality bariatric postoperative management.

Limitations

The narrative design itself and the inherent heterogeneity of the included studies, ranging from retrospective cohorts to qualitative reports. Additionally, despite the additional search update in December 2025, a degree of selection bias may exist. Finally, the variability in how readmission is defined across different healthcare systems may affect the generalizability of the categorized

predictors and causes.

Conclusions

In conclusion, this review underscores the need for an integrated and multidisciplinary approach in managing bariatric patients, with the active involvement of specialized healthcare professionals. It has been reported that while clinical predictors as preoperative BMI and surgical technique and major causes as dehydration and abdominal pain are well-documented, their management requires structured nursing-led interventions.

The nurse case manager or specialized nurses emerge as central and well supported professionals in coordinating care, enhancing treatment adherence, and supporting patients across the care continuum. Implementing patient-centered care models with designated professionals is essential to improving quality of life, reducing avoidable readmissions, and ensuring the sustainability of bariatric programs. However, the lack of specific training and structured systems in many settings remains a challenge, highlighting the urgent need for professional recognition and further research into autonomous nursing roles in bariatric surgery.

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