

Facilitators and barriers to Oral Care by ICU Healthcare Providers: A qualitative Meta-synthesis

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Research Article

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Abstract

Background: The oral care practices for critically ill patients in clinical settings, both in the domestic and international contexts, are diverse and lack unified standards. Additionally, a systematic management framework has not yet been established, with various influencing factors at play.

Methods: A computer-based search in Chinese and English databases (PubMed, Web of Science, Embase, CINAHL, Cochrane Library, China National Knowledge Infrastructure, Wan-fang Database, VIP database, and China Biology Medicine disc) was conducted from the databases' inception to August 1, 2025, to identify qualitative studies on facilitators and barriers to oral care by ICU healthcare providers. Two researchers assessed the literature quality using the Joanna Briggs Institute Critical Appraisal Checklist for Qualitative Research (2016), and a synthesis method was used to integrate the results.

Results: A total of 10 studies were included, yielding 44 research findings. These findings were categorized into 10 groups and integrated into 2 main results. Facilitating factors include nurses' positive attitudes, patient understanding and cooperation, and effective quality control and feedback mechanisms. In contrast, barrier factors are insufficient human resources, inadequate system support, oral - space and hygiene limitations, lack of education and training, discrepancies between clinical practices and protocols, and lack of specialized oral care tools.

Conclusion: The oral care by ICU healthcare workers is affected by various factors. It's crucial to improve their awareness of oral care importance for ICU patients and help them overcome psychological barriers. Also, it's important to enhance human and material resources, strengthen education and training, and establish a comprehensive support system. Moreover, developing oral care plans according to clinical practices can reduce healthcare workers' workload.

1. Introduction

Oral endotracheal intubation and mechanical ventilation are widely used methods of support in the intensive care unit (ICU) for patients experiencing acute or severe chronic respiratory failure^[1]. Various factors, such as traumatic mechanical intubation, patient-ventilator asynchrony, and non-physiological respiratory movements, can lead to several potential complications^[2]. These complications may include pharyngeal pain, coughing, laryngitis, laryngeal edema, subcutaneous emphysema, airway obstruction, and atelectasis^[3]. Among these issues, the most serious complication is ventilator-associated pneumonia. The incidence of ventilator-associated pneumonia (VAP) in the ICU varies between 2.5% and 40.0%, with a mortality rate between 13.0% and 25.2%^[4].

The 2022 guidelines on "Expert Consensus on Oral Care in Adult Intensive Care Units" indicate that proper oral care can significantly reduce the incidence of oral complications and VAP^[5]. With ongoing advancements in medical technology, the survival time of patients in ICU has been effectively extended.

Many nurses find oral care to be a difficult and unpleasant task, expressing a need for improved methods and updated knowledge to implement it effectively^[6].

This study aims to understand the facilitators and barriers to oral care for ICU patients from the perspective of healthcare providers. Qualitative research can offer deeper insights and identify relevant factors, providing a comprehensive understanding of healthcare providers' perceptions and experiences. Many qualitative studies have investigated the factors affecting oral care among ICU healthcare providers, both nationally and internationally. However, no individual study can fully represent the facilitators and barriers to oral care practices within this population. The insights gained will inform the development and implementation of strategies that promote high levels of engagement and compliance for effective interventions.

This study uses a synthesizing integrative approach to systematically summarize and combine the facilitators and barriers to oral care among ICU healthcare providers from various cultural backgrounds. The goal is to offer valuable insights for improving the implementation of oral care in clinical practice.

2. Methods

2.1 Research Design

Results will be reported in accordance with the guidelines for enhancing transparency in reporting the synthesis of qualitative research. Using a synthesis-based integration approach to analyze the data, the researchers collected research findings such as themes, implicit meanings, and classifications, while considering various qualitative research philosophies and methodologies. Through repeated reading, comprehension, analysis, and interpretation of the relationships and meanings of each research finding, the researchers further integrated and summarized the findings. They grouped similar results into new categories and analyzed the internal and external connections between the results within each category. These new categories were then synthesized into integrated results, ultimately generating new concepts or interpretations.

2.2 Search Strategy

A comprehensive systematic search was conducted across several relevant databases, including PubMed, Web of Science, Embase, CINAHL, Cochrane Library, China National Knowledge Infrastructure (CNKI), Wanfang Database, VIP Information Network, and the Chinese Biomedical Literature Database. The search encompassed publications from the inception of these databases through August 1, 2025. Both subject terms and free-text keywords were employed in the search strategy. The keywords included "ICU/intensive care/intensive care unit/critical care medicine department/special care unit/critical care monitoring", "oral care/oral health/oral hygiene/oral literacy", and "promotion/barriers/factors", and the part of qualitative research in mixed research, using research methods such as grounded theory, phenomenology and ethnography.

Formulate the inclusion criteria for the literature based on the PICoS principles recommended by Australian Joanna Briggs Institute (JBI) Center. Inclusion Criteria: (1) The study population consists of ICU healthcare professionals; (2) The focus of the study is on factors influencing oral care practices among ICU staff; (3) The study design is qualitative or mixed-methods research. Exclusion Criteria: (1) Duplicate publications; (2) Non-English and Chinese language articles; (3) Studies with unavailable full-text articles; (4) Studies with low-quality assessments, Studies graded as C were excluded due to high risk of bias.

2.3 Study Selection and Data Extraction

Two investigators independently performed literature screening and data extraction following evidence-based research protocols. Initially, titles and abstracts were evaluated for relevance, with non-conforming records excluded. Potentially eligible studies then underwent full-text assessment to determine final inclusion. The investigators cross-verified their selections, resolving discrepancies through discussion or, when necessary, arbitration by a third reviewer.

2.4 Appraisal of Methodological Quality

Two reviewers independently assessed study quality using the Joanna Briggs Institute's Qualitative Research Quality Assessment Criteria for Evidence-Based Health Care (2016)^[7]. Disagreements were resolved through discussion or by a third reviewer when necessary. Each study was evaluated against 10 criteria, with responses recorded as "yes," "no," "unclear," or "not applicable." Quality grading was assigned as follows: Grade A: Full compliance with quality standards (low risk of bias); Grade B: Partial compliance (moderate risk of bias); Grade C: Non-compliance (high risk of bias). For inclusion in the analysis, only studies meeting Grade A or B standards were considered.

3. Results

3.1 Search outcomes

An initial search yielded 1,759 relevant documents. After duplicate checking, initial screening, re-screening, and quality evaluation, 10 documents were included. The literature screening process is detailed in Figure 1.

3.2 Basic characteristics of the included literature and results of quality assessment

The basic characteristics of the 10 included studies are summarized in Table 1. Four studies^[10,11,13,15] were evaluated as grade A in terms of quality, while the remaining studies were assigned grade B. Among the included studies, six provided an analysis of the researcher’s own context, reflecting cultural background and values^[10-15]. One study^[17] did not address the potential influence of the researcher on the research or the impact of the study on the researcher. Three studies^[8,13,17] did not receive approval from an Ethics Committee. Additionally, one study^[14] failed to clarify whether the subject of the research was representative and whether the study adequately captured the subject’s perspective (see Table 2 for appraisal results).

Table 1 The characteristics of the included studies

Author/Time	Country	Method	Participants	Sample size	Phenomenon of interest	Major findings
Harmon /2019 ^[8]	Canada	Institutional ethnography	ICU nurses and interprofessional clinicians	24	Technical and contextual barriers to oral care	<p>Four themes were identified</p> <ul style="list-style-type: none"> Participants' knowledge experiences Standardised delivery of care Technical barriers Contextual workarounds
Craig /2019 ^[9]	Canada	Qualitative description	nursing, medicine, dentistry and allied health professionals	18	Exploration of difficulty accessing the mouths of intubated and mechanically ventilated adults for oral care	<p>Three themes were identified</p> <ul style="list-style-type: none"> Procedural pain, Oral health deterioration Lack of interprofessional team problem-solving.
Büs /2024 ^[10]	Turkey	Phenomenology design	ICU nurses	7	Experiences of nurses working in intensive care units regarding oral care	<p>Three themes were identified:</p> <ul style="list-style-type: none"> Barriers and challenges to oral care Consequences of ineffective oral care Reasons for unmet/ineffective oral care
Li /2024 ^[11]	China	Qualitative study	nursing assistants	11	Perceptions, barriers, and challenges of oral care among nursing assistants in the intensive care unit	<p>Eight themes were identified:</p> <ul style="list-style-type: none"> The target audience, frequency, and importance; Role; Evaluation; Patient-related factors; Oral care tools; Psychology of NAs; Lack of education and training; Lack of team support
Dale /2016	Canada	Institutional ethnography	ICUnurses and interprofessional	24	To explore intensive care nurses'	Two themes were identified:

[12]					knowledge of and experiences	<ul style="list-style-type: none"> Technical barriers Contextual impediments
Li /2025 [13]	China	Qualitative descriptive	ICU Junior Nurses, Clinical Nurse Specialists, Charge Nurses and the Director of Nursing	14	To explore the challenges ICU nurses face in providing oral care to mechanically ventilated patients and identify their specific educational needs	<p>Three key themes were identified:</p> <ul style="list-style-type: none"> Logistical challenges in providing ICU oral care; The need for more education and better resource allocation; The importance of ethical communication in nursing
Maria /2019 [14]	Sweden	Mixed-methods study	ICU nurses	38	How do intensive care nurses understand oral care	<p>Ten key themes were identified:</p> <ul style="list-style-type: none"> Awareness, knowledge, and accurate beliefs Positive attitudes Competence in oral care skills Workload and workflow Interdisciplinary collaboration Protocols, care plans and guidelines in place Available equipment and supplies Organisational support Documentation
Ka /2010 [15]	China	Qualitative design	ICU nurses	10	the factors that affect Hong Kong intensive care unit nurses in providing oral care.	<p>Four key themes were identified:</p> <ul style="list-style-type: none"> Perceptions of the purpose of oral care; Fears about providing oral care; The priority of oral care; Inadequate support for oral care.
Tang /2017 [16]	China	Qualitative design	head nurses in nursing of intensive care unit	10	To explore the oral care experience of head nurses in	<p>Four key themes were identified:</p> <ul style="list-style-type: none"> Operational standards are not targeted and

					nursing of intensive care unit	out of touch with clinical practice
					patients with endotracheal intubation	☒ There is no systematic assessment, evaluation and training system for oral care ☒ Lack of practicality of nursing tools ☒ Inadequate staffing and heavy workload of first-line ICU nursing personnel
You /2022 [17]	China	Phenomenology design	ICU nurses	10	To understand the knowledge, attitudes, and behaviors of ICU nurses regarding oral care of nasogastric patients.	Four key themes were identified: ☒ Lack of knowledge of new developments in oral care ☒ Lack of relevant training ☒ Positive attitude towards oral care ☒ Emphasis on comprehensive assessment of the oral cavity

Table 2 Critical appraisal results for included qualitative studies using the JBI-qualitative critical appraisal checklist.

Study	1	2	3	4	5	6	7	8	9	10	Quality level
Harmon/2019 ^[8]	Y	Y	Y	Y	Y	U	Y	Y	U	Y	B
Craig/2019 ^[9]	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	B
Büs/2024 ^[10]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A
Li/2024 ^[11]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A
Dale /2016 ^[12]	Y	Y	Y	Y	Y	Y	Y	Y	U	Y	B
Li/2025 ^[13]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A
Maria /2019 ^[14]	Y	Y	Y	U	Y	Y	Y	U	Y	Y	B
Ka /2010 ^[15]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	A
Tang/2017 ^[16]	Y	Y	Y	Y	Y	U	Y	Y	U	Y	B
You/2022 ^[17]	Y	Y	Y	Y	Y	U	U	Y	Y	Y	B

Note.Y = Yes ; N = No ; U = Unclear.

3.3 Meta integration results

The researchers repeatedly reviewed and analyzed the literature, extracting 44 findings. Using a meta-synthesis approach, they grouped similar findings into two new categories and ultimately synthesized them into two integrated outcomes.

3.3.1 Integrating Outcome 1: Facilitators of Oral Care Implementation by ICU Healthcare Providers

Theme 1 Positive attitudes of nurses

Nurses' perceptions of oral care have shifted and they have positive attitudes toward oral care. Nurses initially overlooked the significance of oral care, but over time, they became more aware of its seriousness. *"Oral assessment is fundamental, many nasal feeding patients are orotracheal intubated, post tracheotomy, before each oral care, use a small pupil pen to observe the oral mucosa, tongue, tooth looseness...."*^[17]. As nurses gain more experience, they increasingly understand the significance of providing oral care. *"Four years ago, in a hospital where I worked, a neck infection developed as result of ineffective oral care, and that was the first time I saw it, the patient's neck was swollen two to three times in size. At that time, I did not know the importance of oral care so much"*^[10]. Clinical nurses' understanding of oral care has changed. *"Patient's mouths are clean and freshly cared for and the nurses are quite proud of them when they turn in for their shifts"*^[16].

Theme 2 Patient's understanding and cooperation

The nurse communicates in advance, explains to the patient what is to be done, and gains the patient's understanding and cooperation. *"Manoeuvring instruments through the closequarters of a patient's mouth, accidental contact with sensitive or inflamed tissue can inadvertently provoke discomfort"*^[13]. *"Explain what you're going to do. So it's not like they're sleeping and all of a sudden something gets shoved into their mouth. So you prepare them"*^[9]. Emphasize comprehensive assessment of the oral cavity. *"A thorough oral evaluation is paramount, not only to look at the oral condition, but also to look at the patient's condition and awareness and level of cooperation"*^[10].

Theme 3 Quality control and feedback mechanism

Managers should stress the significance of implementing and documenting practices to ensure proper oral care. *"I have instituted a requirement for tangible evidence following care, such as updating electronic records or capturing a video record"*^[13]. Under the influence of external factors, the quality of oral care is gradually being emphasized. *"Nurses are gradually taking it more seriously and becoming more responsible, and with the nurse manager and colleagues urging each other on, the quality of oral care is improving"*^[16] *"... if the ward does not allow you to try other practices... in case any problem arises... no one would support you..."*^[15].

3.3.2 Integrating Outcome 2: Barriers of Oral Care Implementation by ICU Healthcare Providers

Theme 4 Insufficient human resources

Nurses' working environment is extremely busy, requiring nursing staff to multitask and respond to urgent situations effectively. *"The finding of 'contextual workarounds' highlighted the complexity of nursing care for high acuity patients and resulted in the provision of oral care being allocated a lower priority by the nurses"*^[8]. Under this high-intensity work pace, nursing staff find it difficult to allocate sufficient time to provide comprehensive and meticulous oral care for each patient. *"Patients can be so complex, and the workload is already high... it's hard to consistently apply these oral care policies"*^[13]. Emergency rescue tasks take precedence over oral care, and there is a shortage of nursing staff during the night shift. *"During the night shift, we personally provide oral care for all patients. Sometimes, when all the beds are full, it's impossible to complete the process within an hour if we follow the textbook procedure, so we have to speed*

up”^[11]. Writing nursing documentation also requires a certain amount of time. *“Moreover, when we need to care for the patient, we cannot allocate the time needed for care due to paperwork. In 24-hour shifts, there is not enough time for all care”*^[11].

Theme 5 Lack of systemic support

The complexity of rotating staff schedules is also a considerable obstacle. *“It’s tricky, finding that one size fits all time slot for team training...everyone’s spinning on a different cycle”*^[6]. The shortage of human resources also makes it difficult to implement oral care. *“However, when they needed support and assistance from dental hygienists for patients with severe oral health, the dental hygienists were seldom available”*^[14]. Doctors also do not place enough emphasis on oral health issues. *“Doctors generally do not pay attention to oral care unless there is some damage, and then they will pay attention to it.”*^[11]. Team members also lack a clear understanding of the specific oral care duties of nurses. *“I don’t know what [oral care] the nurses do on a regular...on a routine basis.”* An ICU administrator commented^[12].

Theme 6 Oral space limitations and hygiene issues

Technical barriers that nurses experienced in the provision of oral care included the size of equipment used to gain access and difficulties met when patients became resistant to care. Further barriers included other equipment within the oral cavity such as oral gastric tubes, temperature probes, and the endotracheal tube. *“There isn’t really a ton of access to the mouth which is I think posing the biggest problem. It’s crowded...It’s hard to get around these tubes”*^[9]. Many ICU patients may be in a comatose, sedated, or confused state, making it difficult for them to actively cooperate with care, which increases the complexity of nursing procedures. *“...The patient is irritable, he resists you, and you cannot even use a tongue depressor because he keeps moving and cannot put it in his mouth”*^[11]. Long-term neglect of oral health issues can lead to dryness of the lips and tongue, bleeding, and other related problems. *“I see dried cracked lips. I see bloody red upper gums. And a lot of coating on the tongue with chunks of dried debris. That is going to hurt during oral care”*^[9]. Inadequate or harsh handling can lead to the patient’s resistance and negative emotional reactions. *“You could clearly tell that the person was distressed. They would have a high behavioral pain score”*^[9]. *“Some patients are restless and will bite my cotton ball”*^[11].

Theme 7 Education and training inadequacy

There is a significant gap in dental care education, particularly the lack of corresponding clinical practice in nursing programs. *“...when we start working due to the deficiencies in practice, in-service trainings are held in the hospital, but trainings on oral care are not at the required level”*^[10]. *“Another issue is that I had problems in observing patients due to the lack of practice, it was difficult for me to identify the needs of the patient in the first years of my profession”*^[10]. Along with insufficient training and experience, there are issues with the educational environment and facilities. *“In nursing education, our classes were very crowded, it was very difficult for teachers to deal with each student individually and to make them practice, so we experienced deficiencies in oral care practice”*^[10]. In addition, the quality of training should also be better controlled. *“It’s about knowing how to manage common oral issues—swelling, sores, dryness—not just going through the motions without enough knowledge behind it”*^[13].

Theme 8 The gap between clinical practice and guidelines

Due to the lack of corresponding oral care training, it is crucial for experienced nurses to pass on their knowledge. *“You know, in a classroom or anything like that. But just at the bedside observing other nurses, I definitely learned from experienced staff”*^[12]. There is often a gap between clinical practice and guidelines. *“Notably, certain prescribed methods, solutions, and frequency requirements in the existing protocols failed to adequately address the practical needs of clinical care”*^[16]. Nurses experience certain pressures during practical operations. *“The care of these patients is very high and I experience stress during the applications where there is never a possibility of a wrong application”*^[10].

Theme 9 The limitations of oral care tools

The clinical implementation of improved oral care methods and equipment faces multiple challenges. "... *sometimes we may have difficulties in continuing this practice continuously due to lack of materials*"^[10]. Potential safety hazards exist in current oral care devices. "*Disposable forceps fail to securely grip cotton balls, posing significant safety risks, particularly for patients with impaired consciousness or those who bite the endotracheal tube*". While disposable plastic oral care tools lower costs, their inferior quality complicates clinical operations and may diminish the effectiveness of care. "*Standard toothbrushes are cumbersome to use and lack suction capabilities, necessitating assistance from an additional nurse for oral secretion management*"^[16].

4. Discussion

The literature included in this study provides detailed explanations of the research questions, methods, data collection, analysis techniques, and results. However, many researchers did not clearly articulate how their values and cultural backgrounds influence their work and the research outcomes. In some studies, it remains unclear whether the subjects represent the broader population, which may impact the interpretation of the overall results. It is recommended that future researchers pay special attention to and thoroughly address these aspects when conducting qualitative research. This study reviewed 10 articles from various countries, involving ICU nurses, doctors, and specialized oral health professionals, which can provide diverse perspectives to enhance the ICU oral care management plan in China.

Meta integration results reveal that ICU nurses have conflicting attitudes toward oral care. They acknowledge its importance but often express skepticism about whether its implementation can meet expectations. Concerns about complications, such as accidental extubation, contribute to negative attitudes and act as barriers to effective oral care. Conversely, a solid understanding of the knowledge and benefits associated with oral care, along with positive expectations for outcomes, promotes its practice. One significant issue is the inadequate understanding of oral care and its connection to preventing ventilator-associated pneumonia. This lack of knowledge leads to decreased confidence among nurses, causing them to feel unable to complete tasks on time. Additionally, insufficient understanding of the benefits and safety of oral care fosters unnecessary worries and fears. Research indicates that ICU nurses' attitudes toward oral care for intubated patients vary. However, as knowledge of the subject is increasingly disseminated and deepened, clinical nurses' sense of responsibility for performing oral care tasks gradually strengthens^[17].

To enhance oral care among ICU nursing staff, targeted educational training should be implemented to address the external factors and subsequent influences affecting their practices. Zhang et al. developed an oral care protocol specifically for mechanically ventilated (MV) patients, based on established group standards. Following the knowledge translation model, these standards were gradually integrated into clinical practice, creating a comprehensive knowledge translation process. The effectiveness of this protocol was evaluated at the system, nursing, and patient levels^[18]. As a result, the protocol improved the quality of oral care for MV patients, reduced the incidence of ventilator-associated pneumonia (VAP), and increased nurses' knowledge, confidence, and competence in providing oral care for these patients. Samim et al. designed a checklist to evaluate nurses' oral care abilities, addressing all stages of care: before, during, and after the procedure^[19]. A learning curve analysis revealed that newly hired ICU nurses could meet the qualification standards after completing six care practices. This approach helps standardize clinical practices, optimize the frequency of skills training, and enhance the quality of oral care education.

It is essential for hospitals and departments to collaborate by organizing a variety of online and offline training activities. Clinical teaching and training should utilize case management models, create platforms to improve research and operational skills, and provide a structured approach to learning professional oral care knowledge^[20].

Due to the complex condition of critically ill patients, they often experience varying degrees of pain, such as pain from trauma, postoperative recovery, and discomfort caused by ventilator intubation. Pain may prevent patients from cooperating with oral care and may even lead to psychological rejection.

In this regard, good nurse-patient cooperation is particularly important. Oral care for patients with endotracheal intubation is a complex and meticulous task that requires close collaboration between the nursing staff and the patient. Since most intubated patients are often unconscious or unable to cooperate independently during treatment, the nursing staff must ensure that oral care is carried out smoothly through effective communication skills and proficient nursing techniques.

A research has demonstrated that a communication support system utilizing an app for ICU patients on mechanical ventilation can significantly reduce communication barriers. This approach helps alleviate anxiety and depression, leading to improved patient satisfaction during their stay in the ICU. Additionally, patients have exhibited a positive acceptance of this technology^[21].

For patients who are not intubated, nursing staff should encourage simple oral care activities, such as gargling or phonation exercises, to maintain oral cleanliness and comfort. For patients who are completely unable to cooperate, professional equipment and techniques, like suction devices, should be utilized to effectively clear secretions and prevent pulmonary infections caused by aspiration. The professional competence and operational skills of the nursing staff are essential for ensuring high-quality oral care for patients.

The ICU is a high-intensity, high-pressure medical environment where nurses often need to focus on the conditions and nursing needs of multiple critically ill patients at the same time. Due to the heavy workload, nurses may find it challenging to dedicate sufficient time and energy to oral care, especially when patients are critically ill or require constant monitoring. To address this issue, it is recommended to establish a dedicated role for an ICU oral care specialist, staffed by experienced nurses or oral care experts. This specialist would be responsible for managing complex cases, overseeing quality assurance, and providing training to the team, which would help improve the standardization of procedures. Additionally, oral care needs assessment tools can be implemented. Cheng et.al adapted the ICOCFAS scale based on the Brislin model, which has been validated for its reliability and validity. This scale assesses nine oral characteristics and the medication history of patients and can be completed in just 3–5 minutes. It provides ICU nurses with personalized guidance on oral care frequency without increasing their workload.^[22]

The effectiveness of oral care should rely on objective evaluation tools rather than solely on nurses' observations and subjective assessments. Quinton et al developed a novel Oral Health Score (OHS) to quantify the oral health risks of patients in trauma intensive care units. This score assesses various indicators, including gum health, mucosal condition, dental plaque, tongue coating, dental condition, and oral secretions^[23]. The findings indicated that the OHS score was significantly associated with complications such as VAP. This suggests that early oral care interventions are crucial for improving patient outcomes. In a separate study, Xia et al utilized 16S rDNA technology to analyze the oral microbiota of patients on MV. This approach provides a molecular biology basis for developing personalized oral care plans^[24]. The technology can quickly identify pathogenic bacterial profiles, guiding targeted interventions and promoting the application of genomic nursing in clinical practice. This offers new strategies for optimizing nursing care.

ICU nursing relies heavily on a wide array of medical equipment and support systems for tasks such as patient monitoring, medication administration, and nutritional support. However, the equipment specifically required for oral care is more limited and may not be prioritized as highly as other treatment tools. This includes oral care tools, oral cleansers, and humidifying devices. The oral care tools currently available are typically disposable plastic products, which help reduce costs but often compromise quality. Their design can make them difficult to use, potentially affecting the effectiveness of oral care provided to patients. Wang et al. conducted a study that introduced a nested endotracheal tube designed to significantly reduce the occurrence of mucosal pressure injuries and dental plaque formation in the oral cavity^[25]. This

innovation facilitates better oral hygiene care for patients in the ICU, leading to improved oral health, reduced patient costs, and enhanced overall cost-effectiveness, with positive clinical outcomes. Given limited equipment resources, hospitals should prioritize resource allocation based on patient care needs. For instance, critically ill patients could be given priority in receiving essential items like humidifiers and oral care tools to ensure timely and effective treatment. Additionally, establishing a shared resource pool to allocate oral care equipment across multiple ICU wards may maximize resource utilization and improve care delivery.

5. Implications for nursing practice

A systematic analysis of the factors influencing oral care for ICU patients who are endotracheally intubated identifies several key areas for clinical improvement. The research indicates that enhancing nursing quality requires multifaceted interventions. Central to this is the need for standardized training, which should be bolstered through frequent simulation exercises to improve nurses' skills in managing complex airway care. To optimize oral care and airway management, it is essential to integrate human resources, the healthcare environment, and medical equipment with electronic reminder systems. Additionally, fostering collaboration between medical and nursing staff will ensure effective coordination. The adoption of intelligent nursing tools can greatly enhance compliance, such as using integrated oral care kits as part of the VAP prevention bundle strategy. Implementing these comprehensive strategies will not only improve the accuracy of nursing care but also reduce the risk of VAP and optimize patient outcomes.

6. Limitations and strengths of the review

This study has several limitations. It only included literature in Chinese and English, with most of the research being follow-up studies on intervention programs. Furthermore, only three studies involved medical and dental professionals. Future research should focus more on the oral care of non-intubated patients and explore their actual perspectives on oral care during extubation. Additionally, gaining insights from family members and other stakeholders regarding ICU patients' attitudes and views on oral care could provide valuable information for developing effective oral care intervention strategies.

7. Conclusion

This study conducted a meta-analysis of 10 articles that examined the factors facilitating and hindering oral care by medical and nursing staff in ICUs. The analysis identified two integrated outcomes and nine categories of factors. The results suggest that future efforts should focus on promoting positive perceptions of oral care among ICU staff, establishing a comprehensive support system, and developing patient-centered oral care plans. These strategies aim to enhance the enthusiasm and compliance of medical staff when providing oral care to ICU patients with endotracheal intubation.

Declarations

Author Contributions

Yao Xu: Writing-original draft and review. Jiaqi Li: Writing-Review and Editing. Min Zhu: Conceptualization and methodology

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Ethics approval and consent to participate

Ethics declaration: not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Figures

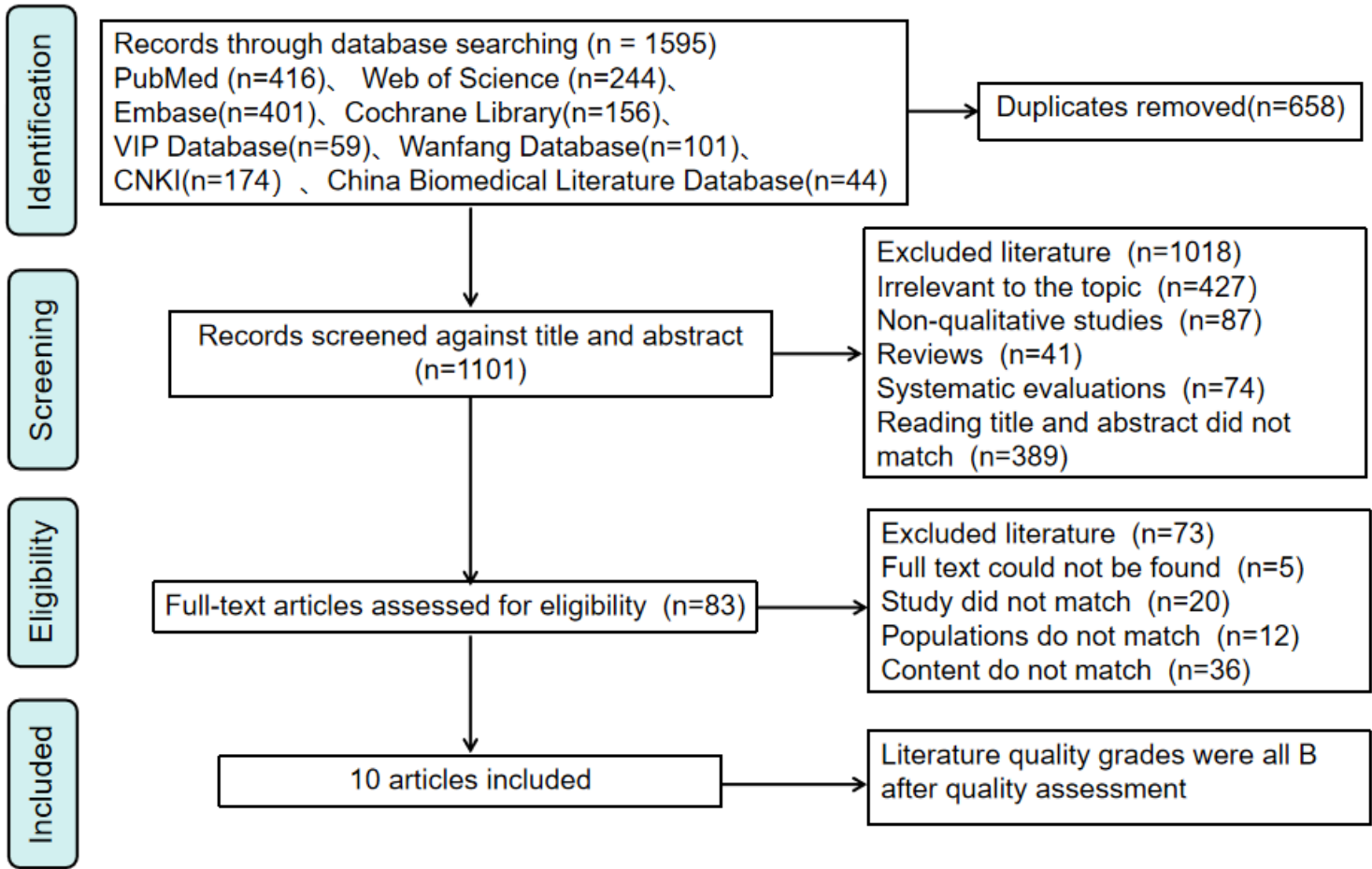


Figure 1

