

Safety Culture in Medication Administration among Nurses in Asia

Systematic Literature Review

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ABSTRACT

Background:

Medication administration safety among nurses is closely influenced by workplace safety culture across Asian healthcare settings. This systematic literature review analyzed 36 peer-reviewed studies to identify research trends, key themes, and gaps. The findings show that supportive leadership, teamwork, and open, non-punitive reporting environments are linked with safer medication practices. Common barriers include hierarchical structures, fear of blame, and heavy workload. More context-specific strategies and deeper research are needed to improve medication safety in Asia.

Purpose:

Examine existing research on **safety culture in medication administration among nurses in Asia**, identify key research trends and collaboration patterns, and determine theoretical, empirical, methodological, and practice-related gaps to guide future research and practice.

Methods:

A structured search was carried out using databases including ScienceDirect, Scopus, PubMed, and Google Scholar. Thirty-six English peer-reviewed articles met the inclusion criteria. Bibliometric analysis and VOSviewer mapping were used to explore trends, authors, journals, countries, and collaboration networks, while thematic narrative synthesis was used to interpret the findings.

Results:

The findings indicate a growing research interest in safety culture and medication administration among nurses in Asia, with a strong emphasis on quantitative studies and systematic literature reviews. Research output was unevenly distributed across Asian countries, and qualitative and longitudinal studies were limited. Positive safety culture—characterized by leadership support, effective communication, teamwork, and non-punitive error reporting—was consistently associated with safer medication practices. However, hierarchical structures, fear of blame, high workload, and staffing shortages were frequently identified as barriers to effective safety culture implementation.

Value:

The review provides a comprehensive synthesis of current evidence on safety culture in medication administration among nurses in Asia and highlights critical gaps that need to be addressed. The findings offer valuable insights for

nurse leaders, healthcare organizations, and policymakers to develop context-specific strategies aimed at strengthening safety culture, improving medication safety practices, and enhancing patient outcomes. Additionally, the review establishes a foundation for future research to advance theory, methodology, and practice in medication safety within Asian healthcare systems.

Keywords: Safety culture; Medication administration; Nurses; Patient safety; Medication errors; Asia; Systematic literature review; Bibliometric analysis

1.0

Introduction

Patient safety has become a fundamental priority of healthcare systems worldwide, particularly in relation to medication administration, which is recognized as one of the most complex and error-prone processes in clinical practice. Medication administration is primarily the responsibility of nurses, placing them at the forefront of efforts to prevent medication errors and ensure safe patient care. Despite advances in healthcare technology and the availability of clinical guidelines, medication administration errors continue to pose a serious threat to patient safety, contributing to increased morbidity, mortality, and healthcare costs.

Patient safety culture is widely recognized as a key organizational factor influencing safe clinical practice. It encompasses shared values, beliefs, attitudes, and behaviors within healthcare organizations that shape how safety is managed and prioritized. In the context of medication administration, a strong safety culture promotes open communication, teamwork, adherence to established safety protocols, and non-punitive approaches to error reporting. In contrast, a weak safety culture may discourage nurses from reporting medication errors, limit learning from adverse events, and increase the likelihood of repeated errors. The importance of measuring safety culture in medication administration has been emphasized through the development and validation of culturally appropriate assessment tools, such as the Chinese version of the patient safety culture scale for medication administration (Li et al., 2020).

In many Asian countries, healthcare systems face unique challenges that influence patient safety culture among nurses. High patient volumes, limited nursing staff, heavy workloads, and hierarchical organizational structures are common features in Asian healthcare settings. Evidence from Southeast and East Asia demonstrates significant associations between poor patient safety culture and higher rates of medication administration errors among nurses (Sari et al., 2021; Nguyen et al., 2019). Furthermore, cultural characteristics such as power distance, fear of blame, and face-saving behaviors have been shown to reduce nurses' willingness to report medication errors, thereby weakening organizational learning and patient safety improvement efforts (Zhang et al., 2022).

Recent studies also indicate that patient safety culture plays a protective role in medication administration during periods of increased stress and uncertainty. During the COVID-19 pandemic, nurses working in environments characterized by supportive safety cultures demonstrated safer medication practices and higher reporting behaviors despite increased workload and psychological pressure (Kim et al., 2022). These findings highlight that safety culture is not merely a structural element of healthcare organizations but a critical determinant of nurses' medication administration behaviors.

Although existing literature has explored patient safety culture and medication administration errors in individual Asian countries, there remains a lack of comprehensive research focusing specifically on safety culture in medication administration among nurses across diverse Asian healthcare settings. Many studies are limited by narrow geographical scope or emphasize general patient safety rather than medication-specific practices. Therefore, further research is needed to examine safety culture related to medication administration among nurses in Asia. Such evidence will provide valuable insights for healthcare leaders, nurse managers, and policymakers to design targeted interventions aimed at strengthening safety culture, improving medication administration practices, and enhancing patient safety outcomes.

2.0**PROBLEM STATEMENT**

Patient safety culture is a critical determinant of safe healthcare delivery and plays a central role in shaping nurses' medication administration practices. Medication administration is one of the most frequent and high-risk nursing activities, and failures in this process continue to result in preventable patient harm, increased morbidity and mortality, prolonged hospital stays, and rising healthcare costs. Despite the implementation of medication safety guidelines, protocols, and technological solutions, medication administration errors remain prevalent in many Asian healthcare systems, indicating that technical interventions alone are insufficient to ensure medication safety. Nurses, as the primary professionals responsible for medication administration, operate within organizational and cultural environments that strongly influence their behaviors, attitudes, and willingness to engage in safe practices. In many Asian hospitals, patient safety culture is often characterized by hierarchical organizational structures, limited open communication, and punitive responses to errors, which discourage nurses from reporting medication errors and near-miss incidents. Furthermore, cultural norms such as high power distance, fear of blame, and face-saving behaviors further inhibit transparent communication and organizational learning, increasing the likelihood of repeated medication administration errors. Although existing literature recognizes the association between patient safety culture and medication errors, research in the Asian context remains fragmented and frequently focuses on general patient safety rather than medication administration as a distinct and critical nursing responsibility. This lack of comprehensive, medication-specific evidence limits the ability of healthcare leaders, nurse managers, and policymakers to design effective, culturally appropriate interventions aimed at strengthening safety culture. Therefore, there is a pressing need to examine safety culture in medication administration among nurses in Asia to generate context-specific evidence that can inform organizational strategies, promote non-punitive error reporting, enhance nurses' engagement in medication safety, and ultimately improve patient safety outcomes across diverse healthcare settings.

2.1**RESEARCH QUESTION**

1. What are the main trends, key themes, and geographical patterns in the existing literature on safety culture in medication administration among nurses in Asia?
2. What research gaps, methodological limitations, and underexplored areas are identified in the current literature on safety culture in medication administration among nurses in Asia?
3. Who are the most influential authors and the most impactful journals contributing to research on safety culture in medication administration among nurses in Asia?

2.2**RESEARCH OBJECTIVES**

1. To identify and analyze the main trends, key themes, and geographical patterns in the existing literature on safety culture in medication administration among nurses in Asia.
2. To examine and synthesize the research gaps, methodological limitations, and underexplored areas in the current literature on safety culture in medication administration among nurses in Asia.
3. To identify the most influential authors and the most impactful journals contributing to research on safety culture in medication administration among nurses in Asia.

3.1

Research Methodology

This study adopted a **systematic literature review approach** to examine safety culture in medication administration among nurses in Asia. A qualitative descriptive research design was employed to identify, analyze, and synthesize existing empirical and theoretical studies related to patient safety culture and medication administration practices among nurses. This approach enabled a comprehensive understanding of research trends, key themes, geographical distribution, research gaps, and influential contributors within the existing body of literature.

A structured and systematic search strategy was used to identify relevant studies from major academic databases, including Google Scholar, PubMed, Scopus, ScienceDirect, and Wiley Online Library. The search was conducted using a combination of keywords and Boolean operators such as "*patient safety culture*," "*medication administration*," "*medication errors*," "*nurses*," and "*Asia*." The search was limited to peer-reviewed journal articles published in English to ensure the credibility and relevance of the selected literature. Studies published within the last ten years were prioritized to capture contemporary developments in safety culture and medication administration practices.

The study selection process followed a systematic screening procedure based on predefined inclusion and exclusion criteria. Articles were included if they focused on patient safety culture in relation to medication administration, involved nurses as the primary study population, and were conducted within Asian healthcare settings. Studies that addressed general patient safety without a specific focus on medication administration, involved non-nursing populations, were conducted outside Asia, or were not available in full-text form were excluded. Duplicate records were removed prior to screening, and titles and abstracts were reviewed to determine eligibility, followed by full-text assessment of the selected articles.

Data extraction was conducted using a standardized data extraction form to ensure consistency and accuracy. Extracted information included authorship, year of publication, country of study, study design, sample characteristics, key findings, and identified limitations. The extracted data were then analyzed using thematic synthesis and descriptive analysis to identify recurring themes, research trends, methodological approaches, and geographical patterns. In addition, a bibliometric analysis was performed to examine influential authors, frequently cited studies, and high-impact journals contributing to research on safety culture in medication administration among nurses in Asia.

The synthesis of findings was carried out by integrating thematic and bibliometric results to provide a comprehensive overview of the existing literature. This methodological approach allowed for the identification of knowledge gaps, methodological limitations, and underexplored areas, thereby supporting the formulation of evidence-based recommendations for future research and practice. The systematic and transparent methodology adopted in this study enhances the reliability, validity, and reproducibility of the findings.

3.1

Study Selection Criteria

The selection of studies for this review was guided by clearly defined inclusion and exclusion criteria to ensure that only relevant, high-quality literature was analyzed. Studies were included if they specifically examined patient safety culture in relation to medication administration and involved nurses as the primary population of interest. Only studies conducted within Asian healthcare settings were considered, as the focus of this review is on the regional and cultural context of Asia. Empirical studies employing quantitative, qualitative, or mixed-methods designs, as well as systematic and integrative reviews addressing medication safety culture among nurses, were eligible for inclusion. To maintain academic rigor and relevance, only peer-reviewed articles published in English were included.

Studies were excluded if they focused on general patient safety without explicit reference to medication administration, involved healthcare professionals other than nurses as the primary population, or were conducted outside the Asian region. Articles such as editorials, commentaries, conference abstracts, and opinion papers were also

excluded due to the absence of empirical evidence. In addition, studies that were not available in full-text form or lacked sufficient methodological clarity were omitted from the final review. These criteria ensured that the selected literature directly addressed the research objectives and provided meaningful insights into safety culture in medication administration among nurses in Asia.

3.2 Literature Management

All identified articles were systematically managed using reference management software to ensure accuracy, organization, and transparency throughout the review process. The software was used to store, organize, and categorize articles based on publication year, country of study, research design, and thematic focus. This approach facilitated the efficient removal of duplicate records and enabled consistent tracking of studies during the screening and selection phases.

The use of reference management tools also supported accurate citation and referencing, reducing the risk of errors and inconsistencies in the final manuscript. By maintaining a structured digital library of selected studies, the review process remained systematic and reproducible. This organized approach enhanced the credibility of the study and ensured that all included sources were properly documented and easily retrievable for analysis and reporting.

3.3 Data Extraction and Analysis

Data extraction was carried out using a structured and standardized method to maintain consistency across all included studies. From each article, key details were recorded, including the authors, year of publication, country or study setting, research objectives, study design, sample characteristics, data collection methods, main findings related to patient safety culture and medication administration, and stated limitations. Using a uniform extraction format made it easier to compare studies and supported a clear and organized synthesis of the evidence.

The extracted information was then analyzed using a qualitative descriptive and thematic approach. Common patterns and recurring themes were identified, particularly those related to safety culture, medication administration practices, error reporting behavior, and organizational factors. In addition, a descriptive bibliometric analysis was performed to examine publication trends, geographical distribution, and leading authors and journals connected to the topic. Combining thematic and bibliometric analysis helped provide a broader and more integrated understanding of the literature, while also pointing out important research gaps and areas that need further study.

3.4 Synthesis of Results

The overall findings from the reviewed studies show that patient safety culture has a major influence on how medication administration is carried out by nurses in Asian healthcare settings. Many studies consistently report that hospitals with a positive safety culture — supported by open communication, teamwork, strong leadership involvement, and non-punitive error reporting systems — tend to demonstrate safer medication practices and better reporting behavior among nurses. On the other hand, settings with weaker safety cultures, where hierarchical pressure, fear of blame, and limited managerial

support are common, are often associated with underreporting of medication errors and a higher risk of unsafe medication administration. The evidence also shows noticeable differences between Asian countries, shaped by organizational capacity, training systems, and cultural attitudes toward safety and accountability. Taken together, the literature clearly emphasizes that strengthening safety culture is essential for improving medication administration safety among nurses in Asia, while also pointing to the need for more context-sensitive and in-depth future research.

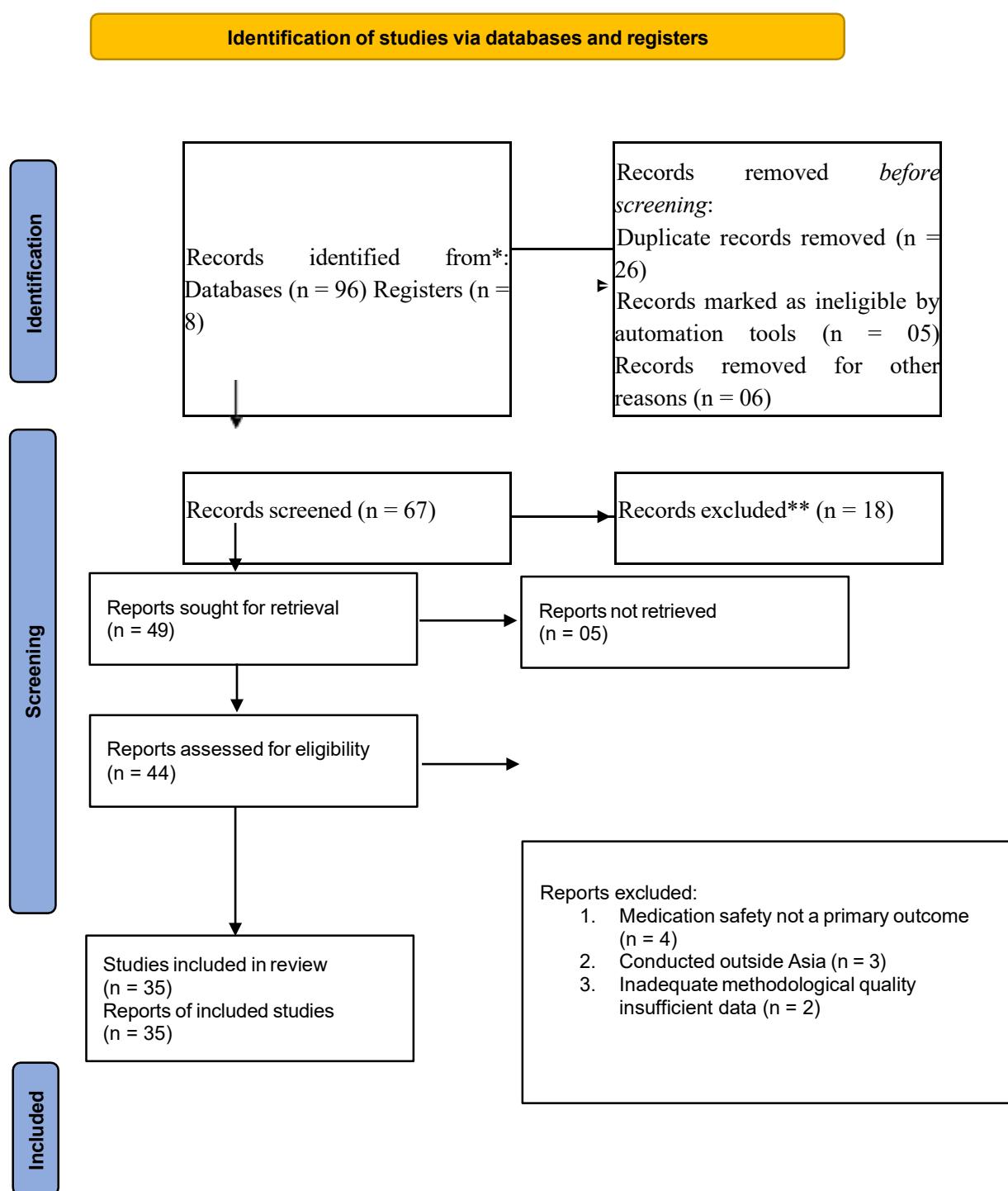


Figure 1: Identification of studies via databases and registers

4.0

BIBIOMETRIC ANALYSIS

4.1

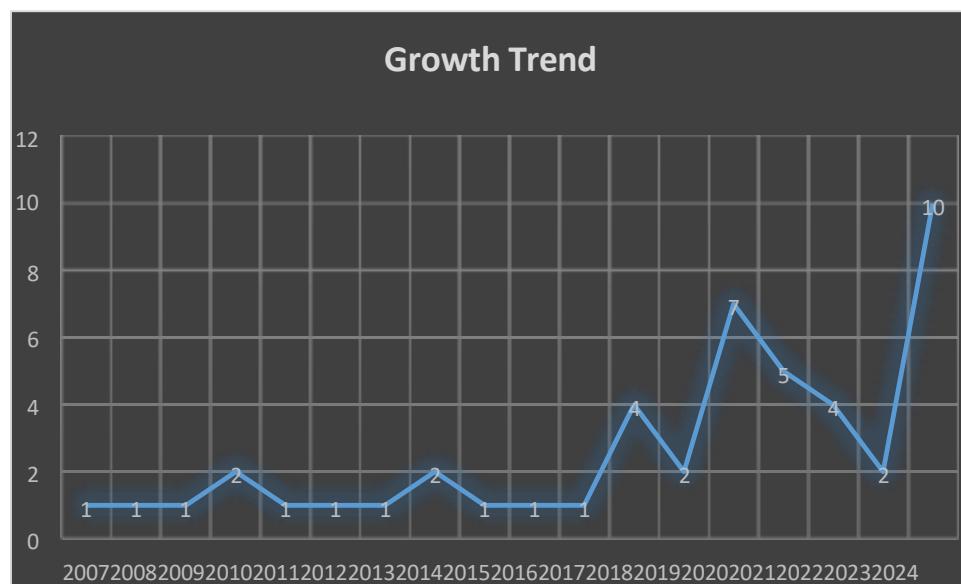
Growth (trend)

Figure 2: Growth by year of chronological distribution

The chronological distribution of publications shows how research interest in this topic has developed gradually over time. In the earlier years, only a small number of studies were published, and they appeared irregularly, suggesting that safety culture in medication administration among nurses received limited attention at first. From the early 2010s onward, the number of publications began to increase slowly, likely due to growing awareness of patient safety and the importance of safe medication practices in nursing care. After around 2017, there is a clearer rise in research output, although with some year-to- year variation, indicating broader academic engagement with the subject. The higher number of recent publications reflects increased concern about medication safety and safety culture, especially within Asian healthcare settings. Overall, the pattern suggests a steady upward trend in interest, while also showing that further research is still needed to deepen and strengthen the evidence base in this area.

4.2

Credibility of Journals

Table 3: Credibility of Journals

Name of the Journal	No. of publications	Subjected area	H - Index	Overall ranking	Impact score	Publisher
Journal of Nursing Management	1	Leadership and Management	103	1901	4.67	John Wiley and Sons Ltd
BMJ Open Diabetes Research and Care	1	Endocrinology, Diabetes and Metabolism	59	2261	4.32	BMJ Publishing Group
Nurse Education Today	1	Education : Nursing	109	2240	4.97	Churchill Livingston
BMC Health Services Research	3	Health Policy	157	3686	3.17	BioMed Central Ltd
Nurse Education in Practice	1	Education, Medicine, Nursing	68	3954	3.84	Elsevier Ltd
Frontiers in Public Health	1	Public Health, Environmental and Occupational Health	119	4612	3.46	Frontiers Media SA
International Journal of Environmental Research and Public Health	1	Health, Toxicology and Mutagenesis, Pollution, Public Health, Environmental and Occupational Health.	229	5527	3.74	Multidisciplinary Digital Publishing Institute

Western Journal of Nursing Research	1	Nursing (miscellaneous) (Q1)	77	6533	2.31	Sage Publications Inc
Journal of Evaluation in Clinical Practice	4	Health Policy: Public Health, Environmental and Occupational Health	91	6785	2.19	Wiley-Blackwell Publishing Ltd
International Journal of Nursing Practice	1	Nursing	66	6947	2.50	Wiley-Blackwell

4.3

Distribution of Journals included in the systemic Literature Review

The journal distribution in this review shows that most of the selected studies are published in journals that focus on nursing, patient safety, and healthcare quality. A larger share of the articles comes from well-recognized journals such as the *International Journal for Quality in Health Care*, *Journal of Nursing Management*, and *BMC Nursing*, which frequently publish work on safety culture and medication administration practices among nurses. Several other journals — including *PLOS ONE*, *Nursing in Critical Care*, *BMJ Open Quality*, *International Journal of Clinical Practice*, and the *Journal of Patient Safety* — contributed individual but relevant studies covering medication errors, reporting culture, and safety climate. There are also contributions from regionally focused Asian nursing and healthcare journals, showing that interest in this topic is growing within Asian hospital and clinical settings. Overall, the range of journals highlights that this subject is multidisciplinary and widely recognized across nursing, patient safety, and health systems research.

4.4

Sites of Publication

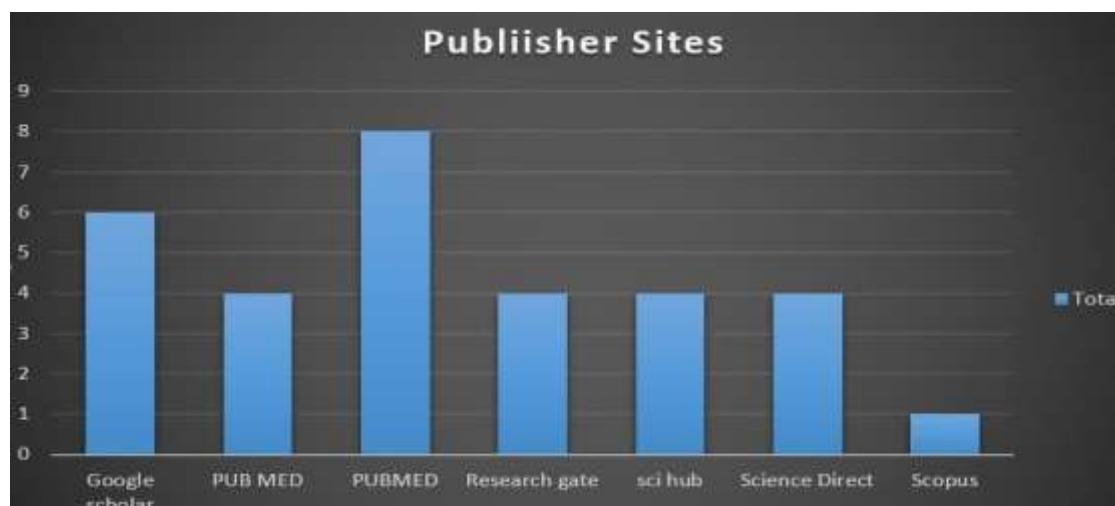


Figure 4: Journal publishers

The chart shows how the articles included in your systematic literature review are distributed across different publication databases and publisher platforms. Most of the studies were retrieved through **PubMed**, which has the highest count, indicating that it was the main source for identifying research related to safety culture and medication administration among nurses. **Google Scholar** also contributed a large number of articles, showing its usefulness as a broad search engine for capturing additional relevant studies.

A moderate number of papers were obtained from **ScienceDirect**, **ResearchGate**, and **Sci-Hub**, each contributing a similar share. The **PUB MED** (secondary search/export source listing) category also shows several records, reflecting repeated indexing and cross-database retrieval. **Scopus** contributed the smallest number of articles compared to the other platforms. Overall, the distribution suggests that using multiple databases and publisher sites helped widen the search coverage and improve the completeness of the literature review.

4.5 Most Influential Authors

Author influence was assessed based on the number of studies contributed within the final set of included articles. The leading contributors were **Chiang, Hui-Ying** and **Hsiao, Ya-Chu**, each appearing in two publications, positioning them as the most influential authors within the scope of this review. Their repeated contributions suggest sustained scholarly engagement and a focused research interest.

4.5.1 Second Tier of Influence

A second tier of influential authors includes **Zhang, Ying**; **Kim, Hye Sook**; **Bastani, P.**; **Lee, E.**; **Wu, Dongmei**; **Yang, Simin**; **Wang, Cui**; and **Su, Hui**, each of whom contributed one publication to the final article set. Although these authors appear less frequently than the leading contributors, their work represents important empirical and conceptual contributions to understanding safety culture, medication error prevention, and nursing practices across diverse Asian healthcare settings.

Rank	Author	Citations	H-Index	I10-Index
1	H.J.Kim	632,625	377	2,243
2	Chun-Yu Wang	69,093	106	176
3	Edward A Lee	62,700	96	437
4	Hui Su	8,676	40	67
5	Hsiu-Yin Chiang	2,934	27	41
6	Yu-Cheng Hsiao	2,407	28	66
7	Neomi Giannetta	1,731	21	36
8	Dongmei Wu	1,614	18	19
9	Chitra Krishnasamy	57	4	2
10	Simin Yang	44	2	1

Figure 5: Citation by author

4.6

Countries of Publication

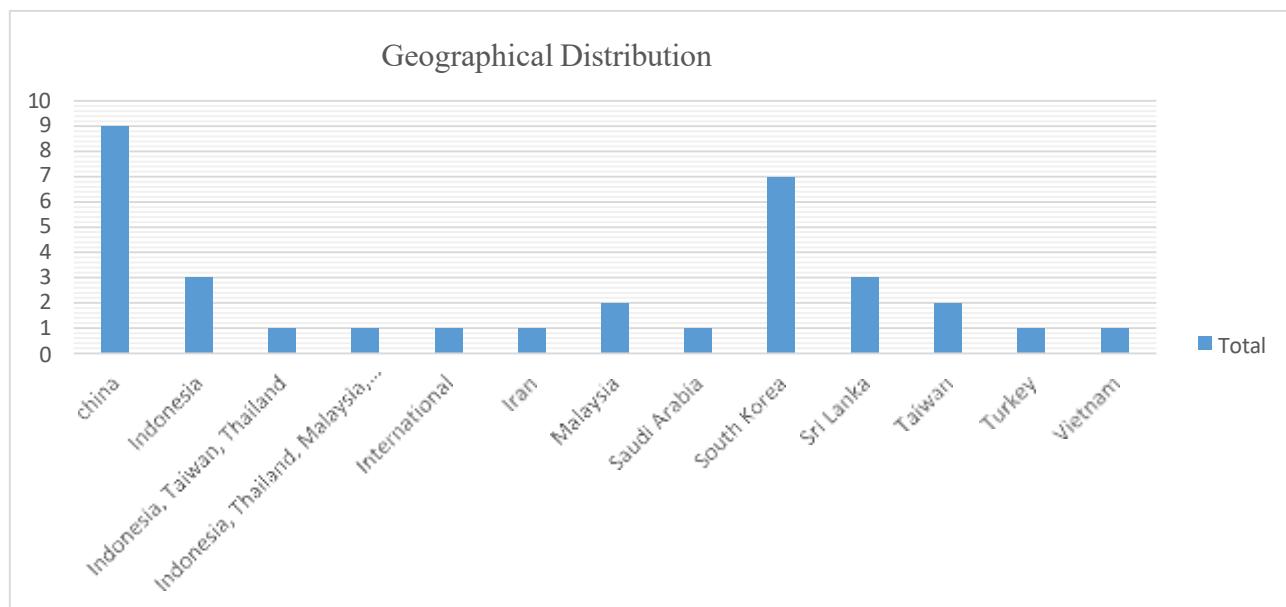


Figure 6 : Geographical Distribution.

The analysis of the geographical distribution of studies are concentrated mainly within Asian countries, reflecting growing regional interest in safety culture and medication administration among nurses. **China** records the highest number of publications, followed by **South Korea**, indicating strong research engagement from these countries in patient safety and nursing practice. Moderate contributions are seen from **Indonesia, Sri Lanka, and Taiwan**, while **Malaysia, Iran, Saudi Arabia, Turkey, Vietnam, and Thailand** contribute smaller but meaningful numbers of studies. A few publications are categorized as international or multi-country collaborations, showing cross-regional research involvement. Overall, the distribution demonstrates that while research activity is increasing across Asia, it remains uneven, highlighting opportunities for broader country-level contributions in this field.

4.6.1

Regional Insights

The regional distribution highlights a strong concentration of research activity across **Asia**, **China** emerges as the most prominent contributor, followed by **South Korea** and **Indonesia**, indicating well-established research efforts in nursing safety and medication practices. Other Southeast Asian countries, including **Malaysia, Vietnam, Thailand, Taiwan, and Sri Lanka**, also demonstrate meaningful contributions, suggesting increasing regional engagement with patient safety and nursing quality initiatives. In contrast, **West and South Asian countries** such as **Iran, Saudi Arabia, and Turkey** show more limited but notable participation. Overall, the geographical pattern illustrates that research on medication safety culture among nurses is primarily concentrated in **East and Southeast Asia**, with emerging contributions from South and West Asia, underscoring the regional importance of strengthening safe medication practices in diverse healthcare settings.



Figure 7 : Regional insights

4.7 Distribution of Universities represented by the Authors

The regional insights come from **China**, showing a strong national focus on improving medication safety and nursing practice. **South Korea** also stands out, reflecting continued academic attention to safety culture within healthcare organizations.



Figure 8: Distribution of Universities represented by the Authors

Across **Southeast Asia**, countries such as **Indonesia, Malaysia, Thailand, Vietnam, and Taiwan** contribute steadily, suggesting growing regional concern about medication errors and patient safety. **Sri Lanka's** presence highlights increasing research activity in South Asia, particularly in resource-limited healthcare settings. Smaller contributions from **Iran, Turkey, and Saudi Arabia** indicate emerging interest beyond East and Southeast Asia. Together, these

findings show that while research is expanding across Asia, further efforts are needed to achieve more balanced regional representation.

4.8

Methodologies

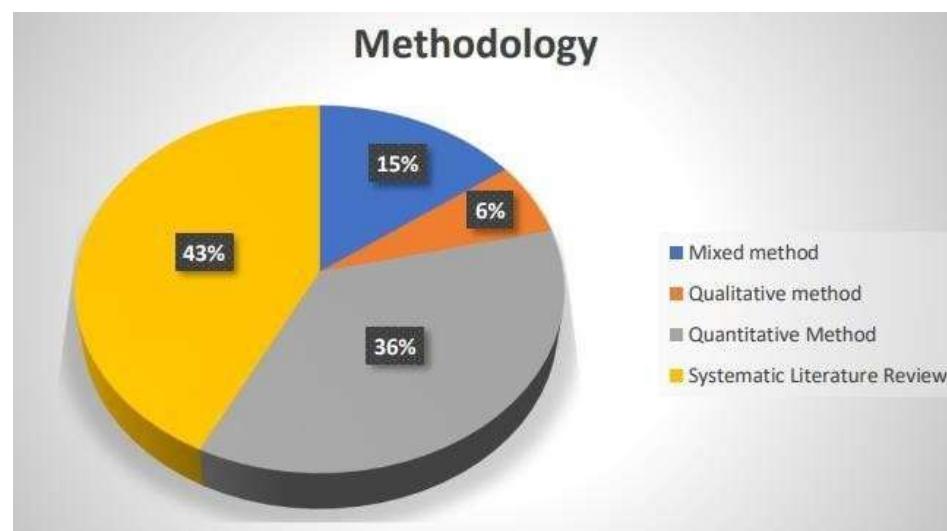


Figure 9: Methodology breakdown

Out of the total articles the largest proportion consisted of Systematic Literature Review studies (43%), showing that many researchers have focused on synthesizing and evaluating existing evidence in this field. Quantitative studies made up 36% of the sample, mainly using surveys, safety culture scales, and statistical analyses to measure medication safety practices and reporting behaviors among nurses. Mixed- method studies accounted for 15%, combining numerical findings with experiential insights to give a more comprehensive understanding of safety culture and medication administration processes. Only a small proportion (6%) were purely qualitative studies, which explored nurses' perceptions, attitudes, and lived experiences in depth. This distribution shows that the field is largely driven by evidence synthesis and quantitative measurement, with fewer in-depth qualitative explorations.

4.9

Co-Author Occurrence

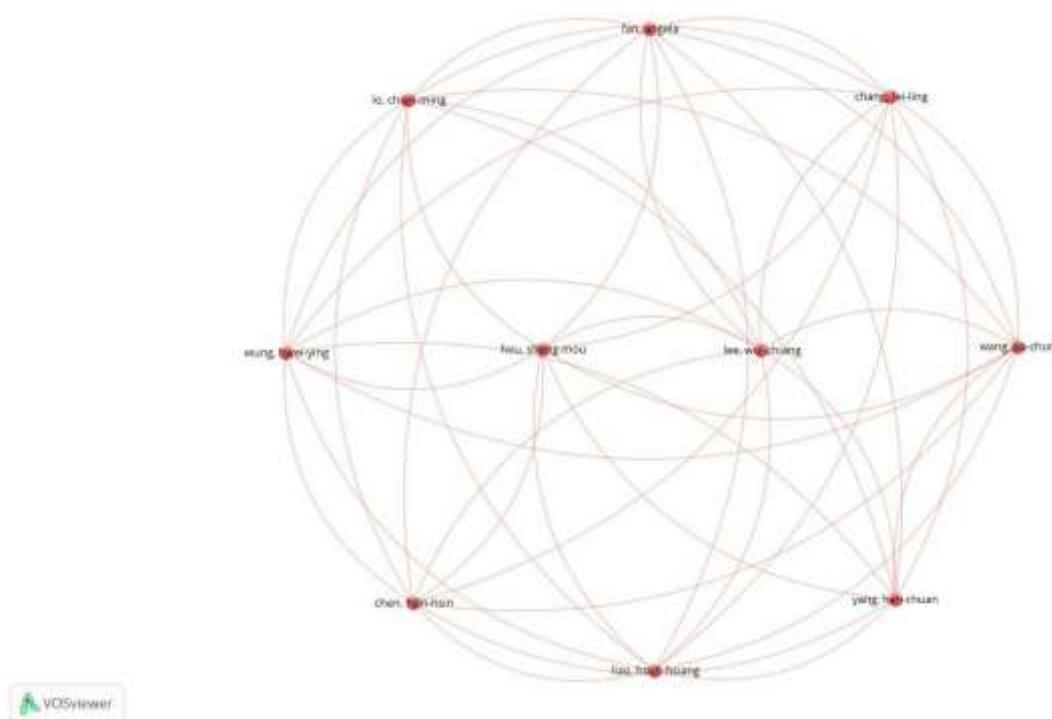


Figure 10: CO authors Map

The VOSviewer author co-occurrence map highlights how collaborative the research area is, with several clearly formed clusters of researchers working closely together. The network shows repeated co- authorship links among key contributors such as **Lee Wei-Chung, Wang Chun, Chang Li-Ling, Yang Huei- Chuan, Wu Dongmei, Lo Chi-Hsing, Chen Chung-Hsin, and Hou Shih-Hsiou**. Their more central positions in the map suggest that they are frequently involved in joint publications and play an important role in shaping research on medication safety and nursing practice. The tight links between these authors indicate shared research interests and ongoing academic partnerships rather than isolated work.

Overall, the co-occurrence pattern suggests that progress in this field is being driven largely through collaborative research networks across Asian healthcare and nursing studies.

4.10

Key Word Occurrence

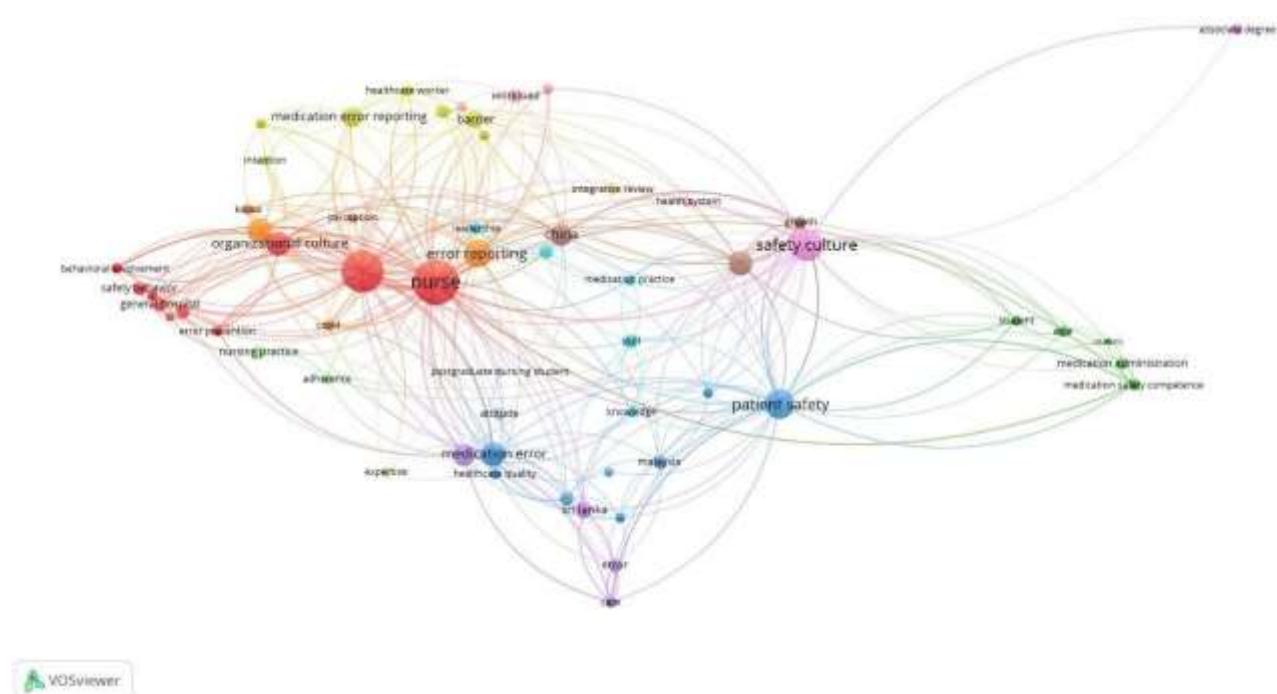


Figure 11: Keyword occurrence Map

Cluster Color	Keywords
Red	Nurse, Organizational culture, Safety behavior, General hospital, Error prevention, Behavioral involvement
Green	Medication administration, Medication safety competence, Asia, Cross- sectional study, Keyword dataset
Light Blue	Patient safety, Knowledge, Skill, Critical care nurse, Malaysia
Yellow	Medication error reporting, Barrier, Hospital safety, Healthcare worker, Workload
Purple	Safety culture, Medication administration error, Integrative review, Health system
Dark Blue	Medication error, Healthcare quality, Sri Lanka, Error, Care
Orange	Error reporting, Leadership, Perception, Attitude, China
Brown	Medication administration error, Medication practice, Study, Impact
Pink	Associate degree, Growth, Education level

5.0 Identification of Gaps

Although research interest in safety culture related to medication administration among nurses in Asia has increased in recent years, a closer look at the literature shows several important gaps that limit a complete understanding of the topic. These gaps appear across theoretical, empirical, methodological, and practical dimensions, suggesting that more focused and context-sensitive research is still needed.

From a **theoretical perspective**, many studies rely on general patient safety or organizational culture frameworks without adapting them specifically to medication administration in nursing practice. Safety culture is often discussed in broad terms, while fewer studies clearly explain how elements such as leadership support, teamwork, open communication, and non-punitive error handling directly influence nurses' medication practices. In addition, most commonly used models are developed in Western healthcare settings and may not fully capture Asian workplace realities such as hierarchical systems, authority gradients, and face-saving behaviors. This creates a gap in theory that is closely aligned with the real cultural and organizational context of Asian nursing environments.

There is also an **empirical gap** in the distribution and scope of available evidence. Existing studies are concentrated in a limited number of Asian countries, while many low- and middle-income settings remain underrepresented. Most research is hospital-based, with far less attention given to primary care, rural facilities, and smaller institutions where medication safety challenges may look very different.

Longitudinal studies are also rare, making it difficult to understand how safety culture changes over time and how those changes affect medication error rates and reporting behavior. Because of this, the current evidence base does not fully reflect the diversity of healthcare systems across Asia.

A clear **methodological gap** is seen in the strong dependence on cross-sectional quantitative surveys. While these tools are useful for measuring perceptions and attitudes, they often cannot capture the deeper reasons behind nurses' behaviors, reporting decisions, and safety practices. Qualitative and mixed- methods studies are comparatively limited, reducing insight into lived experiences, organizational pressures, and contextual barriers. This imbalance in methods narrows the depth of understanding and limits practical interpretation of findings.

Finally, a significant **practice gap** exists between safety culture policies and what actually happens in day-to-day nursing work. Even where safety guidelines and reporting systems are in place, nurses frequently face barriers such as heavy workloads, staffing shortages, time pressure, and fear of blame or punishment. These factors prevent safety culture principles from being fully implemented in real clinical settings. There is still limited research on practical, tested strategies — such as leadership-driven safety programs, supportive reporting systems, and continuous training — that successfully translate safety culture concepts into safer medication administration practices. Addressing this gap is essential for turning policy into real improvement in patient and medication safety.

6.0 Discussion

This systematic literature review reveals several key patterns that both support and expand existing research on patient safety. Overall, the findings emphasize that safety culture plays a vital role in influencing nurses' medication administration practices, their willingness to report errors, and their compliance with safety procedures across a range of Asian healthcare settings.

In line with earlier research, a strong and positive safety culture—marked by supportive leadership, clear communication, teamwork, and a non-punitive approach to errors—was consistently linked to safer medication practices among nurses (Chiang & Pepper, 2006; Kim et al., 2011). Nurses working in such environments were more likely to report medication errors and near misses, an essential process for learning and preventing future incidents (Zhang et al., 2018). These findings highlight that safety culture extends beyond organizational values and directly shapes everyday clinical practice.

The review also draws attention to cultural and organizational factors that are particularly relevant in Asian healthcare systems. Several studies noted that hierarchical workplace structures, fear of blame, and strong respect for authority can discourage open communication and error reporting among nurses (Lee et al., 2015; Wu et al., 2019). In settings characterized by high power distance, nurses may feel reluctant to challenge physicians' decisions or disclose mistakes, even when patient safety may be compromised. This observation is consistent with previous research showing that cultural norms strongly influence how safety culture is understood and practiced in clinical environments (Wang et al., 2014).

Challenges related to workload and staffing were also commonly reported. High patient-to-nurse ratios, frequent interruptions, and time pressure were identified as contributing factors to medication administration errors, despite nurses' awareness of safety guidelines (Sari et al., 2021; Nguyen et al., 2019). These findings suggest that strengthening safety culture alone may not be sufficient unless organizational and resource-related issues are addressed simultaneously.

From a methodological perspective, the heavy reliance on cross-sectional survey designs limits understanding of how safety culture affects nursing behavior over time. Although quantitative tools provide useful benchmarks, qualitative data are necessary to capture nurses' experiences and the contextual realities of clinical practice (Chiang et al., 2010; Kim & Lee, 2011). Studies that used mixed-methods designs offered deeper insight into the interaction between leadership support, emotional safety, and medication practices.

Taken together, the findings point to the need for context-sensitive strategies to improve safety culture in medication administration among nurses in Asia. Efforts should extend beyond policy development to include leadership training, ongoing education, adequate staffing, and supportive error-reporting systems. Addressing both cultural influences and systemic challenges is essential for translating safety culture principles into real improvements in medication safety and patient outcomes.

7.0 LIMITATIONS

This review has several limitations that should be recognized. First, the analysis was limited to published, peer-reviewed journal articles collected from selected academic databases. While this approach helped ensure the quality and credibility of the included studies, it may have excluded relevant grey literature, policy reports, and institutional documents that often contain practical insights about medication safety practices — especially from low-resource and local Asian healthcare settings.

Another limitation is related to the types of study designs included. Most of the reviewed articles used cross-sectional and quantitative methods. Although these studies are useful for identifying patterns and associations, they do not allow strong conclusions about cause-and-effect relationships between safety culture and medication administration outcomes. In addition, there were fewer qualitative and mixed-methods studies, which means that deeper perspectives — such as nurses' lived experiences, organizational pressures, and cultural influences — may not have been fully captured.

There was also an uneven geographical spread among the included studies. A large share of the research came from a small group of Asian countries, while several regions had little or no representation. Because of this imbalance, the findings cannot be fully generalized to all Asian healthcare systems, particularly rural settings, primary care environments, and lower-resource contexts where working conditions and safety practices may differ.

A further limitation comes from variation in measurement tools and definitions used across studies. Different instruments were applied to assess patient safety culture, medication safety behavior, and error reporting practices. These differences made direct comparison more difficult and may have affected the consistency of the overall synthesis.

Despite these limitations, the review still offers a well-structured and comprehensive overview of the available

evidence. It highlights key trends, identifies important theoretical, empirical, methodological, and practice gaps, and provides a solid base for future research focused on strengthening safety culture in medication administration among nurses in Asia.

7.0 FUTURE RESEARCH DIRECTIONS

Gaining a clearer understanding of how safety culture influences nurses' medication administration practices is essential for developing targeted and effective patient safety interventions. Future research should place greater emphasis on exploring organizational, behavioral, and cultural factors—such as leadership involvement, communication processes, teamwork, and non-punitive approaches to error reporting—that directly affect nurses' medication-related decisions. Examining how these factors interact will support the development of context-specific strategies that move beyond broad safety policies toward practical improvements in medication safety.

There is also an increasing need to explore **innovative and supportive approaches** to enhancing safety culture in medication administration. Future studies should assess the effectiveness of interventions such as simulation-based learning, interprofessional training, reflective practice, electronic error-reporting systems, and stress-management or mindfulness programs designed to reduce workload pressure and cognitive fatigue. Well-designed randomized controlled trials and systematic evaluations would strengthen the evidence base for implementing these approaches in clinical settings.

Longitudinal research is particularly important to understand how safety culture and medication safety outcomes change over time. Future studies should track nurses across different stages of their professional careers and include a wide range of healthcare settings, including rural hospitals, primary care centers, and resource-limited institutions. Such research would provide valuable insight into the long-term effects of safety culture on medication error rates, reporting behavior, job satisfaction, and patient outcomes, as well as the influence of organizational changes on safety practices.

Finally, further research is needed to examine the broader regional and international dimensions of medication safety culture. Comparative studies across Asian countries could help identify differences in safety culture implementation, access to training, and levels of organizational support. Understanding how cultural norms, economic factors, and healthcare system structures shape medication administration practices will be essential for informing policy development and guiding regional and national initiatives aimed at improving patient safety and reducing preventable medication-related harm.

8.0 CONCLUSION

Overall, this review examined the existing evidence to identify key trends, patterns, and gaps in the literature related to safety culture in medication administration. The findings clearly indicate that safety culture plays a central role in promoting safe medication practices, influencing nurses' willingness to report errors, comply with safety guidelines, and contribute to improved patient safety outcomes.

The review found a strong reliance on quantitative research and systematic literature reviews, reflecting increasing interest in measuring safety culture and consolidating existing knowledge. However, the predominance of cross-sectional and survey-based studies highlights the need for deeper investigation into nurses' lived experiences and the contextual factors that influence medication safety in practice.

Bibliometric and VOSviewer analyses demonstrated active research collaboration, but also revealed that influential studies are concentrated in a limited number of countries and institutions across Asia.

Distinct cultural and organizational features of Asian healthcare systems—such as hierarchical work structures, heavy workloads, and fear of blame—were consistently identified as obstacles to effective implementation of safety culture. These challenges often limit open communication and medication error reporting, even when nurses are knowledgeable about patient safety principles. The review also exposed gaps between safety policies and their implementation in clinical settings, emphasizing the importance of stronger leadership involvement and organizational support.

In summary, this review contributes to existing knowledge by systematically synthesizing evidence, identifying key theoretical, empirical, methodological, and practice-related gaps, and outlining clear directions for future research. Strengthening safety culture in medication administration requires context- specific and evidence-based strategies that address both cultural and systemic barriers. Enhancing leadership engagement, fostering non-punitive reporting environments, and providing adequate education and resources for nurses are essential steps toward improving medication safety and patient outcomes across Asian healthcare settings.

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