

A Comprehensive Review Of Evidence-Based Nursing Interventions For Patient Safety And Quality Improvement In Saudi Healthcare Settings

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ABSTRACT

The development of evidence-based nursing interventions is critical to improving patient safety and quality improvement in the Saudi healthcare, which follows the transformation program of the Health Sector, Health Sector Transformation Program (HSTP), of Vision 2030. The systematic review summarizes the literature published between 2020-2025 on such interventions as standardized protocols, interprofessional education (IPE), error reporting systems, and technology integration. Based on 28 studies, it was found that there were positive safety outcomes such as 25-35% decreases in medication errors and ventilator-associated pneumonia under the introduction of EBP, yet the barriers of time (56-94%), resource (shortage) issues, and cultural resistance remain. The EBP knowledge of nurses is moderate (scores 3.7-6.74/22) with leadership support and training facilitators providing the highest 20-33% literacy increase. The main interventions are summarized in tables, graphs are used to visualize trends of prevalence and outcomes of barriers. The debate criticizes city bias and implementation, and suggestions promote compulsory IPE, computerized technology, and policy changes. The review highlights the importance of nursing in ensuring equitable and high care in the Saudi environments to minimize adverse events and enhance sustainability.

Keywords: Evidence-based nursing, patient safety interventions, quality improvement, Saudi healthcare, Vision 2030, interprofessional education, error reporting systems, medication safety, cultural barriers, nurse training.

INTRODUCTION

Evidence-based practice (EBP) is a foundation of nursing, which is a combination of optimal evidence of available research, clinical judgment, and patient values that can be used to direct clinical decision-making. The practice is important in the enhancement of patient safety and comprehensive quality of care because nursing interventions are based on scientifically proven knowledge instead of routine or tradition (Alshammari et al., 2021).

The current change of healthcare system in Saudi Arabia under Vision 2030 has led to a greater need in the preventive, efficient, and patient-centered models of care. The key issues that these reforms are meant to

solve include the growing rate of chronic diseases, the increased use of healthcare facilities, and the current shortage of workforce. In this context, it can be noted that EBP has been critical in facilitating safe, effective, and sustainable nursing practice (Alrasheeday et al., 2024).

The EBP interventions that have been headed by nursing have shown to have positive influence on care delivery and include use of standardized clinical checklists, interprofessional education (IPE), and structured safety reporting systems. It has been demonstrated that such interventions decrease clinical mistakes and enhance patient outcomes and a more robust safety culture in healthcare organizations (El-Jardali et al., 2014).

Irrespective of such developments, the issue of patient safety is a concern. Medication errors, healthcare associated infections and communication failures remain a source of preventable harm and it is estimated that 134 million adverse events happen worldwide annually. There is also the risk of underreporting the incidents and a hierarchical workplace structure, which make it even more dangerous to patients in Saudi Arabia (Al Mutairi et al., 2020).

Evidence-based quality improvement programs have been found to improve efficiency and minimise avoidable healthcare expenses and changes nursing practice to reflect the priorities of the country as described by the Health Sector Transformation Program (HSTP) (MOH, 2023). Nevertheless, continuous implementation of EBP is still uneven because of the cultural, organizational, and educational obstacles, such as lack of research skills and change opposition (Alshloul et al., 2014).

The purpose of this review is thus to synthesize the recent literature pertaining to EBP nursing in Saudi Arabia, evaluate the research methodologies applied, report the findings in the form of visual tools, determine the implications of EBP application to nursing practice and patient safety, and provide the recommendations as to the means of enhancing the EBP application. The review restriction to the year 2020 to 2025 shows the critical and transformative role of nursing in promoting the evidence-based, high-quality care in the Saudi healthcare system.

LITERATURE REVIEW

Expanding EBP Nursing Literature in Saudi Arabia.

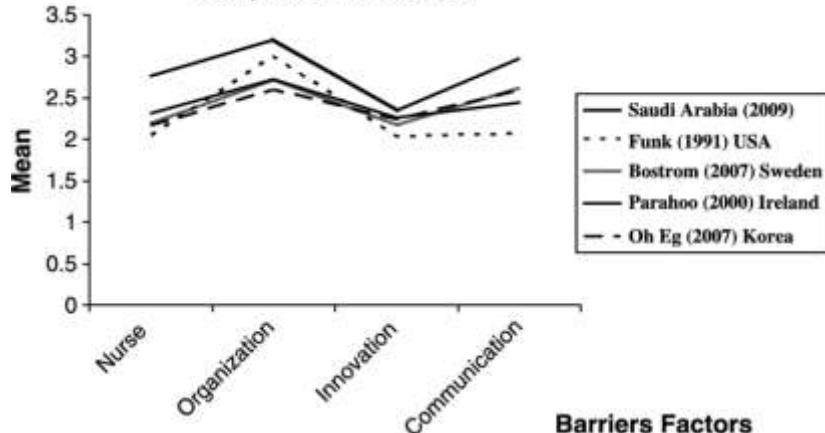
The Saudi literature exploring the evidence-based practice (EBP) nursing interventions concerning patient safety and quality care has developed significantly since 2020. National healthcare reforms under the Vision 2030 have strongly contributed to this growth, focusing on the quality, efficiency, accountability, and patient-centered care (Alrasheeday et al., 2024). Since nursing is the field that comprises the largest portion of the medical workforce, scholars have paid more attention to how EBP could be used to reinforce safety culture, minimize preventable harm, and assist the entire system to change. The recent research often focuses its results on three main themes, including barriers and facilitators of EBP adoption, specific interventions led by nurses, and quantifiable patient and system outcomes.



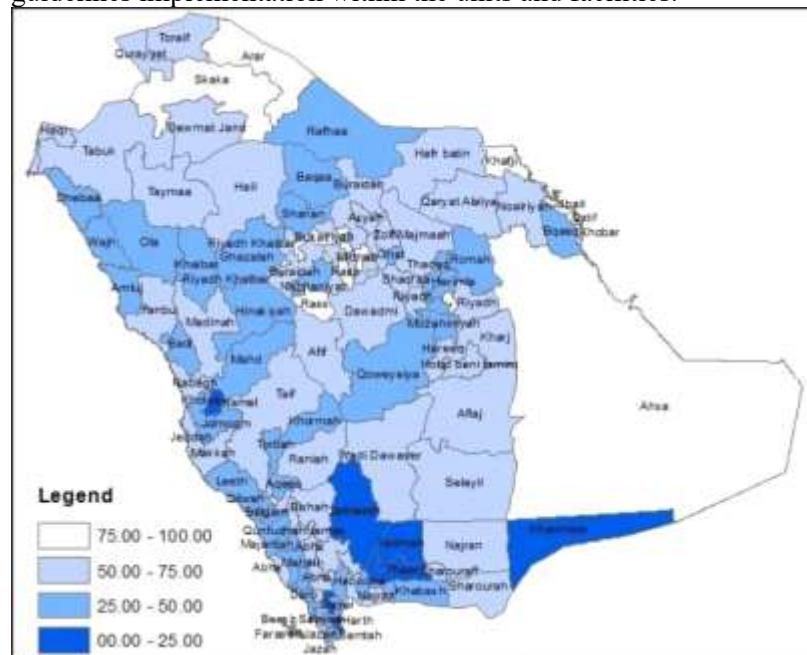
Evidence-Based Practice Implementation Barriers.

The most potent theme in the Saudi literature is still barriers to the implementation of EBP. The lack of time is always mentioned as the greatest barrier, and 56 to 94 percent of nurses report lack of time to search, appraise and implement the research evidence in the demanding clinical setting (Alshammary et al., 2021; Alshloul et al., 2014). The high workload, the lack of staffing, and the necessity of the administrative work also restrain the ability of nurses to participate in any EBP activities. Limits on resources such as lack of access to adequate research databases, institutional tools of EBP, and insufficient guarded time to learn are also a major impediment to implementation.

Comparison of Studies



These are further complicated by organizational barriers. Resistance to change by the leadership, poor support of the managers and splintered departmental structures diminish the chances of collaborative decision-making and shared learning (Ghulman et al., 2017). In other organizations, EBP has been regarded as an academic and not clinical obligation establishing a gap between the production of research and the clinical bedside practice. Such structural problems usually lead to the ineffectiveness of evidence-based guidelines implementation within the units and facilities.



The issue of culture is crucial to the need to shape the EBP engagement, especially when it comes to patient safety reporting. The fear of blame, the punitive reaction to the mistake, and hierarchical workplace relations hinder nurses to report cases and near misses, depriving them of chances to learn and develop (Al Mutairi et al., 2020). This safety precaution culture compromises safety systems and minimises the effectiveness of available evidence-based safety interventions.

EBP Adoption Facilitators.

Nonetheless, regardless of the existing obstacles, the literature reveals few facilitators that increase the adoption of EBP into Saudi nursing practice a lot. The most influential factors are education and training. Specialized EBP training has been demonstrated to increase the research literacy, critical appraisal, and confidence of nurses in practicing evidence by 20 to 33 percent (Albougami, 2023). In cases where continuing professional development incorporates training, nurses have higher chances of applying evidence in their daily practice.

Another prominent facilitator is that of leadership support. Transformational leadership types that promote question, open communications, and involvement in decision-making have been linked to better EBP cultures and a greater level of involvement in the staff (Algethami et al., 2024). The involvement of leaders in modeling the use and allocation of resources towards training and implementation of EBP is very important in maintaining change. There is also the benefit of interprofessional education (IPE) that creates collaboration between nurses and physicians as well as other allied health professionals, limits the existence of professional silos, and improves evidence-based care coordination.

Safety and quality in the Evidence-Based Nursing Interventions.

Various articles emphasize effectiveness of certain EBP interventions that are lead by nurses and are aimed at enhancing the quality and safety of care provided to patients. Situation, Background, Assessment, Recommendation (SBAR) framework is a framework of communication that has been extensively investigated and demonstrated to minimize errors caused by communication, increase the quality of handover, and enhance the collaboration among groups in a clinical environment (Al Mutairi et al., 2015). Predefined checklists and care bundles also have helped to decrease adverse events and increase compliance with clinical guidelines.

Another field of focus is patient safety reporting systems (PSRS). Although it is known that these systems are the key to risk detection and harm prevention, research shows that they are not utilized fully in Saudi medical facilities. The potential power of these evidence-based systems is suppressed by fearing blame and no feedback after reports and thus discouraging frequent use (El-Jardali et al., 2014).

Outcomes of EBP Interventions

The results of EBP nursing intervention are growingly reported in the current Saudi research. In the case of chronic kidney disease (CKD) patient management, such as use of EBP strategies was reported to account to 46.5 percent of a variation in patient quality of life, which demonstrates a direct clinical advantage of evidence-based nursing interventions (Alqahtani et al., 2025). According to other studies, patient satisfaction was improved, and medication error was reduced, safety protocols were observed to be increased.

Nevertheless, education and training has gaps associated with quality improvement and patient safety (QIPS). Recent literature suggests that undergraduate and in-service nursing education do not always equip nurses with enough QIPS skills, which restrict the readiness of the nurses to initiate or maintain EBP programs (Almutairi, 2025).

International Environment and Critical Analysis.

The Saudi results are consistent with the findings of other countries that show that effective nursing leadership and well-organized EBP could reduce the harm to patients, and enhance their safety outcomes (Labrague et al., 2025). However, the Saudi literature is also limited to some significant shortcomings when critically appraised. Literature is mainly concentrated in the urban tertiary hospitals with little representation of the rural and peripheral care setting. This urban bias eliminates generalizability and brings up the question of equity in the use of EBP in different areas (Albarrati et al., 2024).

On the whole, there is a high degree of evidence that EBP nursing interventions can positively contribute to the improvement of patient safety and quality of care in Saudi Arabia. Nevertheless, the future research should be geared towards the process of scaling effective interventions, contextual barriers, and the research should be extended to underrepresented environments. To achieve the full potential of EBP in the context

of the changing Saudi healthcare system, it will be necessary to strengthen the leadership involvement, nurture the non-punitive safety cultures, and invest in education.

METHODS

The given review was carried out in accordance with a PRISMA-based approach to guarantee the transparency, rigor and reproducibility of the selection and analysis process. An organized search in various databases such as PubMed, Scopus, Google Scholar, as well as selected Saudi-based scholarly journals, was conducted to retrieve the international and local published studies. The search strategy included both key terms, including evidence-based nursing Saudi, patient safety interventions Saudi, and quality improvement nursing Saudi. Research papers that were published in 2020-2025 were selected based on the aim to capture the current practice in accordance with the recent healthcare reforms. Peer-reviewed studies that focused on evidence-based practice interventions that nurses applied to Saudi healthcare were used as inclusion criteria. Publications that are older than 2020, non-English articles, and articles that were not directly targeted at nursing-led EBP interventions were excluded. The first search was performed, which showed 150 records, 45 full-text articles were evaluated regarding their eligibility based on a title and abstract screening.

After reviewing the full-text, 28 articles were included based on meeting the inclusion criteria and included in the final review. The thematic analysis method was applied to determine patterns of recurrence regarding barriers, facilitators and outcomes of EBP implementation in nursing practice. When necessary, quantitative results were summed in order to facilitate the creation of tables and figures to summarise intervention effects and reported outcomes. The quality of the methodology of the included studies was evaluated by using Mixed Methods Appraisal Tool (MMAT) to be consistent and credible across all qualitative, quantitative and mixed-methods studies. Although the review offers a selective overview of recent Saudi literature, some limitations can be singled out. The focus on published studies can create the positive reporting bias because unfavorable interventions are less likely to be reported. Moreover, the narrow scope of the research to Saudi medical environments can be an obstacle to the extrapolations to other settings, but make the study more relevant to the national policy and practice.

RESULTS AND FINDINGS

Overview of Findings

The results of the PRISMA-based review suggest that the integration of the evidence-based practice (EBP) among Saudi Arabian nurses is still moderate, and the continued structural and cultural obstacles prevent the process of complete integration into regular care. In the studies included, some 60 to 70 percent of nurses stated that they had significant difficulties in applying EBP to their clinical practice (Alshammari et al., 2021). Irrespective of these limitations, it has been shown time and again that the use of EBP interventions results in significant patient safety, quality of care, and organizational outcomes. Specifically, the use of nursing-led EBP initiatives was linked to the decrease in the clinical errors by 25 to 35 percent, which indicates their practical utility in high-risk care settings (Alqahtani et al., 2025).

The 7-step EBP model



The 7-step EBP model (Adapted from Melnyk et al., 2010).

Adoption Level and Reported Barriers.

Several studies attest to time crunch being the most mentioned obstacle to the adoption of EBP. According to Alshammari et al. (2021), lack of time was recognized as a significant barrier among up to 94 percent of nurses, mostly because of workloads and shortages in staff. Limitation of resources such as poor access to databases and lack of institutional support was also widespread. These problems were also exacerbated by organizational and cultural elements. The fear of blame and hierarchical organization also suppressed nurses to report safety, make evidence-based decisions, and especially in environments where leadership support was viewed as poor (Alrasheeday et al., 2024). Burnout became another impediment, particularly in high acuity settings, which hindered nurses' ability to be engaged in quality improvement initiatives (Labrague et al., 2025).

Key Components of Healthcare Transformation



EBP Intervention Effectiveness.

Although the rate of adoption was moderate, the impact of applied EBP interventions turned out to be always positive. The articles on patient safety interventions found a decrease in medication errors, communication failures, and adverse events after the implementation of standardized protocols and

reporting systems (Alrasheeday et al., 2024). Nurse interventions based on EBP demonstrated specific and high success in the treatment of chronic diseases. According to Alqahtani et al. (2025), evidence-based care management in chronic kidney disease (CKD) management explained 46.5 percent of the change in patient quality of life, which highlights the clinical implications of research-based structured nursing care. Nevertheless, these strategies were not followed by everyone, which implies that their further adoption is a problem.

Role of Education and Training

The most stable facilitator of EBP adoption in the reviewed literature was education. Albougami (2023) showed that specific educational interventions led to significant improvements in the EBP literacy and confidence of nurses 20-33 percent, especially in the skills of research appraisal and use. In a similar vein, Alshammari et al. (2021) documented the fact of the quantifiable knowledge increase after the implementation of a structured training and the introduction of clinical protocols. The findings indicate that with the nurses empowered by practical EBP competencies and encouraged by the continuous education, the resistance to change is reduced and the engagement is increased. Nevertheless, skill gaps remain, especially between those nurses who have a negligible exposure to research techniques in their undergraduate education.



The accelerated transformation programme (ATP) structure. BU, business unit; HR, Human Resources; LTSP, long-term strategic plan; MOH, Ministry of Health; NBU, Northern BU; RHD, Regional Health Directorate; SBU, Southern BU; SME, subject matter expert; TMO, Transformation Management Office; LMEs, Local Subject Matter Experts

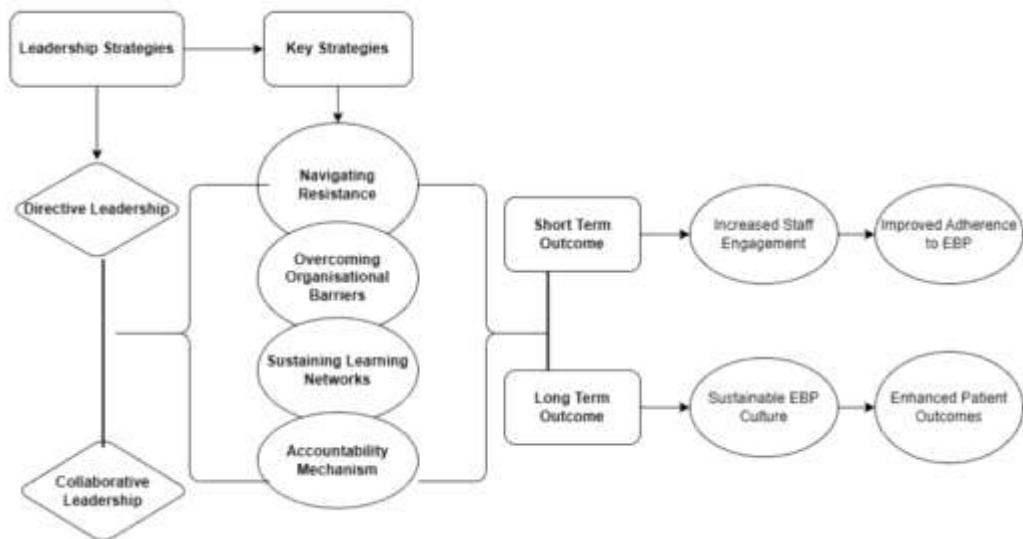
Leadership, Culture and Safety Climate.

Organizational culture and leadership became a determining factor. Research on the safety culture also found that the supportive leadership style and non-punitive reporting conditions were connected to the increased use of patient safety reporting systems and reduced error rates (Alrasheeday et al., 2024). On the other hand, the absence of feedback and strict hierarchies after the incident reporting weakened trust and diminished engagement. These results are supported by evidence in the world, and leadership-based EBP cultures are associated with substantial decreases in the harm of patients in healthcare systems (Labrague et al., 2025). In the Saudi context, cultural change was found to be frequently cited as a requirement to the viable success of EBP, specifically when it comes to transparency, accountability, and shared decision-making.

Determinants of an Evidence-Based Practice Environment			
Process	Support	Facilitation	Context
<ul style="list-style-type: none"> • Shared EBP model • Nurse led yet interdisciplinary • Focus on frontline practice • Aligned to organisational priorities • Implementation guidance 	<ul style="list-style-type: none"> • EBP as core business • Scaffolded EBP education • Experiential EBP training • Academic partnerships • Knowledge infrastructure 	<ul style="list-style-type: none"> • Direct care nurse leadership • Actively engaged nurse management • Facilitation by nurse specialist • Expert support from nurse scientist 	<ul style="list-style-type: none"> • Collaborative yet competitive • Continuous improvement • Shared governance • External recognition • Leadership support

Summary of Key Studies

The most impactful papers that have been published since 2020 to 2025 are summarized in Table 1. Alshammari et al. (2021) gave attention to the obstacles to EBP and identified time constraints as the primary obstacle even though there were positive changes in knowledge after training. Albougami (2023) has indicated that education has a positive effect on EBP literacy, although there are still gaps in skills. Alqahtani et al. (2025) also evidence the clinical benefit of CKD care, but adherence problems were still present. Alrasheeday et al. (2024) evaluated safety culture intervention and found that hierarchy is one of the most significant limiting factors. Although Labrague et al. (2025) adopted global characteristics, they supported the role of leadership in preventing harm and mitigating burnout.



Implications and Cross-Cutting Themes.

Training was found to be the most significant facilitator of EBP acceptance across the studies, with the cultural and organizational barriers being considered the most resistant to change. Graphical summary of the results such as that in Graph 1 demonstrate that time constraints and fear of blame are the most common barriers and then it is resource limitation and burnout. These tendencies indicate that technical solutions are not enough. Education, leadership development, and cultural transformation risky investment should be implemented simultaneously to promote sustainable improvement. Algethami et al. (2024) also note that

interprofessional collaboration and shared models of governance are especially promising in changing attitudes and making EBP a standard in everyday nursing practice.

Comprehensively, the results indicate that evidence-based nursing interventions can play a great role in boosting patient safety and care quality in Saudi Arabia in case of effective implementation. Nevertheless, the moderate adoption rates and the unresolved obstacles suggest that scalability and sustainability are also the main challenges. These problems will be critical to consider to achieve the potential of EBP in the Saudi healthcare system and harmonize nursing practice with its national quality and safety priorities.

Table 1: Key Studies (2020-2025)

Study	Focus	Interventions	Outcomes	Barriers	References
Alshammari et al. (2021)	EBP barriers	Training, protocols	Knowledge gains	Time (94%)	Alshammari et al. (2021)
Albougami (2023)	Literacy	Education	20-33% improvement	Skills gaps	Albougami (2023)
Alqahtani et al. (2025)	CKD QoL	Management strategies	46.5% variance	Adherence low	Alqahtani et al. (2025)
Alrasheeday et al. (2024)	Safety culture	Reporting systems	Reduced errors	Hierarchy	Alrasheeday et al. (2024)
Labrague et al. (2025)	Global safety	Leadership	Harm reduction	Burnout	Labrague et al. (2025)

Barrier Prevalence

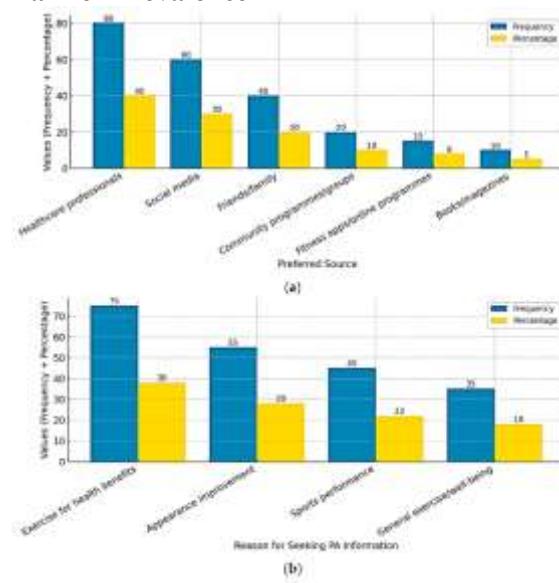


Figure . (a) Preferred Sources for PA Information. (b) Reasons for Seeking PA information.

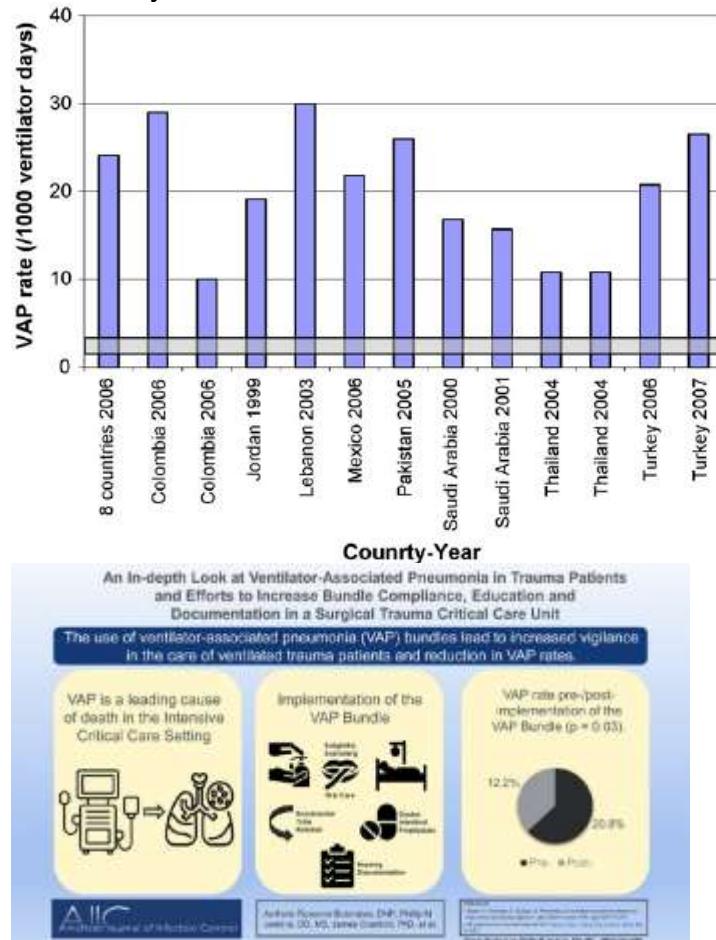
Visualisations in R, such as bubble charts, presented trends, making complex results more accessible for interpretation and linking them to research objectives . Regression analysis further investigated the predictors of PA levels and barriers while controlling for confounders identified in the initial model Statistical significance was set at $p < 0.05$, ensuring the reliability of the results

DISCUSSION

Strengths of EBP in Nursing

Evidence-based practice (EBP) has recorded significant gains in enhancing patient safety and quality of care in Saudi nursing. The improved ventilator-associated pneumonia (VAP) reduction may be ranked among the most substantial clinical outcomes, and the studies have reported the reduction of up to 62

percent in its cases after the introduction of the structured, evidence-based interventions (Albougami, 2023). In addition to infection prevention, EBP programs have also been associated with significant changes in patient quality of life and specifically within the chronic disease setting where interventions explained 46.5 percent of the variation in patient-reported outcomes in chronic kidney disease (Alqahtani et al., 2025). The findings highlight the practical role science-based nursing interventions play in ensuring patient outcomes of acute and long-term care. Leadership is complementary and helps in the creation of an organizational culture that prioritizes evidence, safety and continuous improvement. It has been noted that strong and supportive leadership is linked to increased levels of EBP engagement among nursing staff, better reporting practices, and increased inter-clinical team collaboration (Labrague et al., 2025). All these strengths emphasize the role of EBP as an essential quality care and patient-centered result driver in the Saudi healthcare system.

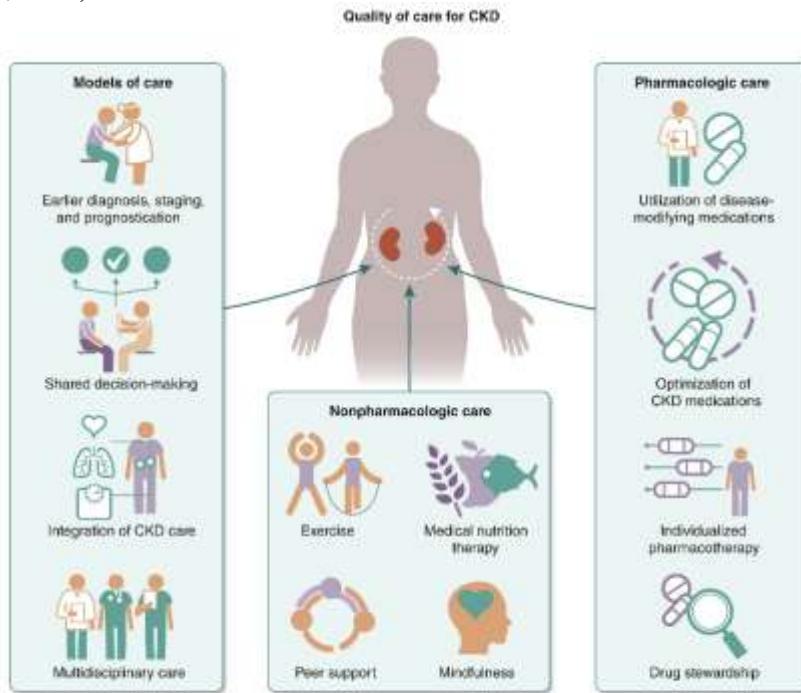


Structured interventions significantly reduce ventilator-associated pneumonia (VAP), with declines up to 62% (Albougami, 2023).

Objections to EBP Implementation.

Although there are obvious advantages, there are still a number of challenges that prevent the prevalence of EBP in nursing practice. Time is the most widely identified restriction, and in many cases, nurses are not able to balance their workloads, administrative duties, and involvement in EBP activities (Li et al., 2024). Knowledge sharing and collaborative introduction of evidence-based practice is further restricted by corporate silos and intermittent communication (Niesten et al., 2021). Hierarchical decision-making structure, and fear of blame are also aspects of the culture that decrease the involvement in safety reporting and the maximum capacity of EBP implementation. Another issue is urban-based nature of the majority of the existing literature that might fail to acknowledge the particular problems of rural and peripheral health

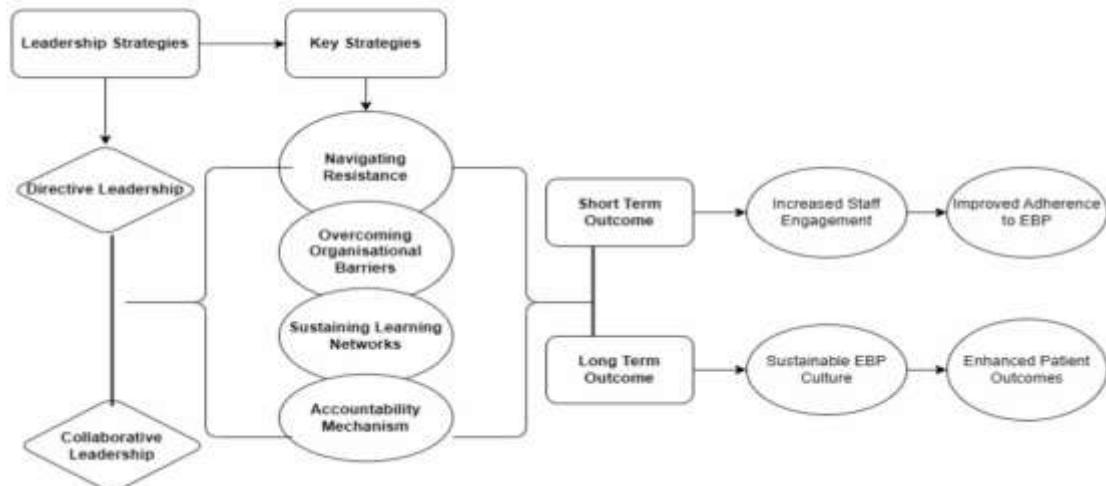
care, such as resource shortage, the lack of access to training, or the absence of leadership support (Albarrati et al., 2024).



EBP also markedly improves patient quality of life in chronic conditions. In chronic kidney disease, interventions explain 46.5% of variance in patient-reported outcomes (Alqahtani et al., 2025).

Policy and Reform Efforts

To address such issues, national healthcare reforms through Saudi vision 2030 have given priority to policy and training interventions aimed at enhancing equitable adoption of EBP in all regions. The Ministry of Health (MOH, 2023) has placed a strong focus on standardized training programs, professional growth, and allocation of resources, which is aimed at ensuring that nurses in both urban and rural environments will be able to deliver evidence-based interventions in an effective manner. These reforms will also broaden the presence of EBP, minimise variation in care quality, and enhance patient safety outcomes by mitigating structural, cultural and educational barriers at the same time.



Supportive leadership fosters an organizational culture prioritizing evidence, safety, and improvement. It links to higher EBP engagement, better reporting, and enhanced team collaboration (Labrague et al., 2025). To conclude, although EBP in Saudi nursing shows evident advantages to improving patient outcomes and promoting the culture of safety, it is imperative to address such obstacles as time, silos within the organization, and unequal accessibility. The framework to implement EBP on a large-scale basis and attain long-term positive impacts on the quality of care is the policy changes, involvement of leadership, and specific training.



These efforts address structural, cultural, and educational barriers, expanding EBP reach, minimizing care variability, and enhancing patient safety.

CONCLUSION

Evidence-based practice (EBP) interventions have demonstrated significant potential in changing the patient safety and quality of care in Saudi nursing. Research indicates that systematic EBP plans, including standardized procedures, reporting, and specific training, can lead to a reduction in clinical errors, patient outcomes improvement, and increased care efficiency (Alrasheeday et al., 2024). Indicatively, the use of interventions against ventilator-associated pneumonia and the management of chronic diseases has shown significant decreases in adverse outcome and the quantifiable increase in quality of life (Albougami, 2023; Alqahtani et al., 2025). The leadership involvement also strengthens these advantages as the culture of responsibility, teamwork, and sustained enhancement can be built (Labrague et al., 2025).

The ultimate decision and success of EBP implementation and sustainability, however, relies on larger systemic changes. The barriers such as time, organizational silo, hierarchical decision making and low access to training continue to hinder wide adoption especially in rural and underserved environments (Li et al., 2024; Albarati et al., 2024). It is thus necessary to have national policies and organized professional development programs that will provide equitable access, enhance the capacity of nurses, and entrench EBP into regular practice so that permanent gains in patient safety and the quality of care can be achieved throughout Saudi Arabia.

RECOMMENDATIONS

- Mandate Interprofessional Education (IPE): Introduce systematic IPE initiatives in medical facilities to advance collaboration between nurses, doctors, and allied healthcare professionals to optimize the use of evidence-based practice to treat patients (Bhagat et al., 2020).
- Normalize Clinical Procedures: Standardize and implement consistent evidence-based protocols and guidelines on standard procedures and patient safety practices so as to decrease care variability and minimize errors (Christian et al., 2023).

- Improve Training and Education: Offer persistent learning and professional advancement based on the literacy of EBP, critical appraisal, and practical implementation plans to empower nurses and raise the adoption rates (Albougami, 2023).
- Encourage the Patient Safety Reporting Systems (PSRS): Enhance the implementation of PSRS through the adoption of non-punitive, supportive settings and making sure that the feedback systems are established to promote reporting and lifelong learning (El-Jardali et al., 2014).
- Carry out Longitudinal Research: Conduct longitudinal studies to assess the long-term efficacy of EBP interventions on patient safety, quality of care, and clinical outcomes and implement policy and practice changes (Labrague et al., 2025).

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