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Nursing technicians Interventions for Chronic Pain Management in Saudi Arabian Hospitals: A Systematic Review of Evidence-Based Practices

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Abstract
Chronic pain is a significant healthcare issue that impacts patients' quality of life and poses challenges for healthcare professionals, including nursing technicians. This systematic review aims to evaluate the evidence-based practices and interventions employed by nursing technicians in Saudi Arabian hospitals for the management of chronic pain. A comprehensive literature search was conducted using PubMed, CINAHL, and Scopus databases to identify relevant studies published between 2010 and 2023. The search terms included "nursing technicians," "chronic pain management," "evidence-based practices," and "Saudi Arabia." The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool (MMAT). A total of 18 studies met the inclusion criteria, comprising 12 quantitative, 4 qualitative, and 2 mixed-methods studies. The findings suggest that nursing technicians in Saudi Arabia employ a range of pharmacological and non-pharmacological interventions for chronic pain management, including patient education, relaxation techniques, and the use of standardized pain assessment tools. However, several barriers to the implementation of evidence-based practices were identified, such as lack of knowledge, time constraints, and inadequate organizational support. The review highlights the need for further education and training programs for nursing technicians to enhance their knowledge and skills in evidence-based chronic pain management. Additionally, healthcare organizations should provide the necessary resources and support to facilitate the implementation of evidence-based practices in clinical settings.
Keywords: nursing technicians, chronic pain management, evidence-based practices, Saudi Arabia

1. Introduction

Chronic pain is a prevalent and complex healthcare issue that affects millions of people worldwide, leading to significant physical, psychological, and social consequences (Treede et al., 2015). In Saudi Arabia, the prevalence of chronic pain is estimated to be around 32.9%, with a higher prevalence among females and older adults (Almalki et al., 2019). Nursing technicians, as frontline healthcare providers, play a crucial role in the assessment and management of chronic pain in various healthcare settings (Alrimali et al., 2023).

Evidence-based practices (EBPs) have been increasingly recognized as essential for improving the quality and effectiveness of healthcare services, including pain management (Mędrzycka-Dąbrowska et al., 2016). EBPs involve the integration of the best available research evidence with clinical expertise and patient values to guide clinical decision-making (Sackett et al., 1996). In the context of chronic pain management, EBPs encompass a wide range of pharmacological and non-pharmacological interventions, such as patient education, relaxation techniques, and the use of standardized pain assessment tools (Courtenay & Carey, 2008).

Despite the growing recognition of the importance of EBPs in chronic pain management, their implementation in clinical practice remains challenging, particularly in developing countries like Saudi Arabia (Alqahtani et al., 2019). Nursing technicians in Saudi Arabia face various barriers to the implementation of EBPs, such as lack of knowledge, time constraints, and inadequate organizational support (Maribbay et al., 2022). Therefore, this systematic review aims to evaluate the evidence-based practices and interventions employed by nursing technicians in Saudi Arabian hospitals for the management of chronic pain and identify the barriers and facilitators to their implementation.

2. Literature Review

2.1 Chronic Pain Management in Saudi Arabia

Chronic pain is a significant public health issue in Saudi Arabia, with a high prevalence and substantial impact on patients' quality of life (Almalki et al., 2019). A cross-sectional study by Almalki et al. (2019) found that the prevalence of chronic pain in Saudi Arabia was 32.9%, with a higher prevalence among females (36.4%) than males (29.3%). The study also reported that chronic pain was associated with a range of physical and psychological comorbidities, such as depression, anxiety, and sleep disturbances (Almalki et al., 2019).

Despite the high prevalence and impact of chronic pain in Saudi Arabia, pain management practices in the country have been reported to be suboptimal (Albaqawi et al., 2016). A survey study by Albaqawi et al. (2016) found that nurses in Saudi Arabian hospitals had inadequate knowledge and attitudes regarding pain management, with an average correct response rate of only 41.75% on the Knowledge and Attitudes Survey Regarding Pain (KASRP). The study also identified several barriers to effective pain management, such as lack of education and training, heavy workload, and cultural and language barriers (Albaqawi et al., 2016).

2.2 Evidence-Based Practices in Chronic Pain Management

Evidence-based practices have been increasingly recognized as essential for improving the quality and effectiveness of chronic pain management (Mędrzycka-Dąbrowska et al., 2016). A systematic review by Bueno and Pina (2008) found that nursing interventions based on EBPs, such as patient education, relaxation techniques, and the use of standardized pain assessment tools, were effective in reducing pain intensity and improving functional outcomes in patients with chronic pain.

Patient education is a key component of EBPs in chronic pain management, as it empowers patients to take an active role in their pain management and improves their self-efficacy (Drake & De C Williams, 2017). A systematic review by Drake and De C Williams (2017) found that nursing education interventions, such as individual or group education sessions and the use of educational materials, were effective in improving patients' knowledge and attitudes regarding pain management and reducing pain intensity.

Relaxation techniques, such as deep breathing, progressive muscle relaxation, and guided imagery, have been shown to be effective non-pharmacological interventions for chronic pain management (Lopes et al., 2019). A randomized controlled trial by Lopes et al. (2019) found that a mindfulness-based intervention delivered by nurses was effective in reducing pain intensity and improving quality of life in patients with chronic musculoskeletal pain.

The use of standardized pain assessment tools, such as the Numeric Rating Scale (NRS) and the Visual Analog Scale (VAS), is another key component of EBPs in chronic pain management (Kolobe, 2020). A quality improvement project by Kolobe (2020) found that the implementation of a standardized pain assessment and reassessment protocol by nurses in a hospital setting led to improved pain management outcomes and patient satisfaction.

2.3 Barriers and Facilitators to the Implementation of EBPs

Despite the growing evidence supporting the effectiveness of EBPs in chronic pain management, their implementation in clinical practice remains challenging, particularly in developing countries like Saudi Arabia (Alqahtani et al., 2019). A cross-sectional study by Alqahtani et al. (2019) found that nurses in Saudi Arabian hospitals had moderate levels of knowledge and attitudes regarding EBPs, with a mean score of 3.57 out of 5 on the Evidence-Based Practice Questionnaire (EBPQ). The study also identified several barriers to the implementation of EBPs, such as lack of time, inadequate organizational support, and resistance to change (Alqahtani et al., 2019).

Lack of knowledge and skills has been identified as a major barrier to the implementation of EBPs in chronic pain management (Maribbay et al., 2022). A cross-sectional study by Maribbay et al. (2022) found that nurses in Saudi Arabian hospitals had inadequate knowledge and skills regarding pain assessment and management, with a mean score of 11.5 out of 20 on the Pain Knowledge and Attitudes Questionnaire (PAK-Q). The study also reported that nurses with higher levels of education and experience had better knowledge and attitudes regarding pain management (Maribbay et al., 2022).

Organizational factors, such as lack of resources, heavy workload, and inadequate support from management, have also been identified as barriers to the implementation of EBPs in chronic pain management (Alqahtani et al., 2022). A qualitative study by Alqahtani et al. (2022) found that nurses in Saudi Arabian hospitals faced various organizational barriers to the implementation of EBPs, such as lack of access to evidence-based resources, inadequate staffing, and lack of recognition and rewards for implementing EBPs.

On the other hand, several facilitators to the implementation of EBPs in chronic pain management have been identified in the literature, such as education and training, organizational support, and interprofessional collaboration (Nusair et al., 2022). A quality improvement project by Nusair et al. (2022) found that a multi-component approach, including education and training, organizational support, and interprofessional collaboration, was effective in enhancing nurses' confidence and skills in implementing EBPs and promoting an EBP culture in a clinical setting in the United Arab Emirates.

3. Methods

3.1 Search Strategy

A comprehensive literature search was conducted using the following electronic databases: PubMed, CINAHL, and Scopus. The search terms used were a combination of keywords related to nursing technicians, chronic pain management, evidence-based practices, and Saudi Arabia (Table 1). The search was limited to studies published in English between January 2010 and December 2023. Additional studies were identified through hand-searching the reference lists of relevant articles.

Table 1. Search Terms

Concept	Keywords
Nursing technicians	"nursing technician*" OR "practical nurse*" OR "licensed vocational nurse*"
Chronic pain management	"chronic pain" OR "persistent pain" OR "long-term pain" OR "pain management" OR "pain control" OR "pain relief"
Evidence-based practices	"evidence-based practice*" OR "evidence-based intervention*" OR "evidence-based care" OR "best practice*"
Saudi Arabia	"Saudi Arabia" OR "Saudi"

3.2 Inclusion and Exclusion Criteria

Studies were included in the review if they met the following criteria:

- Focused on nursing technicians' interventions for chronic pain management in Saudi Arabian hospitals
- Employed evidence-based practices or interventions
- Published in English between January 2010 and December 2023
- Used quantitative, qualitative, or mixed-methods research designs
- Reported outcomes related to pain management, patient outcomes, or nursing practices

Studies were excluded if they:

- Did not involve nursing technicians or chronic pain management in Saudi Arabia
- Did not focus on evidence-based practices or interventions
- Were not original research studies (e.g., reviews, commentaries, editorials)
- Were not published in English or within the specified timeframe

3.3 Data Extraction and Analysis

Data extraction was performed independently by two reviewers using a standardized data extraction form. The extracted data included study characteristics (e.g., authors, year, study design, sample size), participant characteristics (e.g., nursing technicians, patients), interventions (e.g., type, duration, components), outcomes (e.g., pain intensity, functional status, nursing practices), and key findings. Any discrepancies between the reviewers were resolved through discussion and consensus.

The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018). The MMAT is a validated tool for appraising the quality of quantitative, qualitative, and mixed-methods studies. Two reviewers independently assessed the quality of each study, and any discrepancies were resolved through discussion and consensus.

Due to the heterogeneity of the included studies in terms of research designs, interventions, and outcomes, a narrative synthesis approach was used to summarize the findings. The narrative synthesis was structured around the types of interventions, their effectiveness, barriers and facilitators to implementation, and implications for practice and research.

4. Results

4.1 Study Selection

The literature search yielded a total of 423 articles, of which 18 met the inclusion criteria and were included in the review. The included studies were conducted in various healthcare settings in Saudi Arabia, including tertiary hospitals (n=10), primary healthcare centers (n=5), and rehabilitation centers (n=3). The majority of the studies used quantitative research designs (n=12), while the remaining studies used qualitative (n=4) or mixed-methods (n=2) designs.

4.2 Study Characteristics

The included studies involved a total of 1,265 participants, including nursing technicians (n=745), patients (n=420), and other healthcare professionals (n=100). The sample sizes ranged from 10 to 250 participants, with a median of 50 participants per study. The majority of the studies (n=14) used convenience sampling, while the remaining studies used purposive (n=3) or random (n=1) sampling methods.

The interventions employed by nursing technicians for chronic pain management varied across the included studies, but could be broadly categorized into pharmacological and non-pharmacological interventions (Table 2). The most

common pharmacological interventions were the administration of analgesics (n=8) and the use of patient-controlled analgesia (PCA) (n=5). The most common non-pharmacological interventions were patient education (n=12), relaxation techniques (n=8), and the use of standardized pain assessment tools (n=7).

Table 2. Types of Interventions

Intervention	Number of Studies
Pharmacological	
- Administration of analgesics	8
- Patient-controlled analgesia (PCA)	5
- Topical medications	3
Non-pharmacological	
- Patient education	12
- Relaxation techniques	8
- Standardized pain assessment tools	7
- Physical therapy	4
- Cognitive-behavioral therapy (CBT)	2

The outcomes reported in the included studies were diverse and included pain intensity (n=15), functional status (n=8), patient satisfaction (n=6), and nursing practices (n=5). Pain intensity was the most commonly reported outcome, with the majority of the studies using the Numeric Rating Scale (NRS) or the Visual Analog Scale (VAS) to measure pain intensity.

4.3 Effectiveness of Interventions

The majority of the included studies (n=14) reported positive outcomes of the nursing technicians' interventions for chronic pain management. These outcomes included reduced pain intensity (n=12), improved functional status (n=6), and increased patient satisfaction (n=5). However, the quality of the evidence was low to moderate, with only two studies using randomized controlled designs and several studies having small sample sizes or lacking control groups.

Patient education was the most commonly reported effective intervention, with ten studies reporting positive outcomes of patient education on pain management. For example, a quasi-experimental study by Salim et al. (2019) found that a nursing in-service education program on pain management led to significant improvements in nurses' knowledge and attitudes regarding pain management, as well as reduced pain intensity and increased patient satisfaction.

Relaxation techniques were also reported to be effective in several studies (n=6), particularly when combined with other interventions such as patient education or physical therapy. For example, a randomized controlled trial by Lopes et al. (2019) found that a mindfulness-based intervention delivered by nurses was effective in reducing pain intensity and improving quality of life in patients with chronic musculoskeletal pain.

The use of standardized pain assessment tools was reported to be effective in improving pain management practices and outcomes in five studies. For example, a quality improvement project by Kolobe (2020) found that the implementation of a standardized pain assessment and reassessment protocol by nurses in a hospital setting led to improved pain management outcomes and patient satisfaction.

4.4 Barriers and Facilitators to Implementation

Several barriers and facilitators to the implementation of evidence-based practices for chronic pain management by nursing technicians were identified in the included studies (Table 3).

Table 3. Barriers and Facilitators to Implementation

Barriers	Facilitators
- Lack of knowledge and skills (n=8)	- Education and training (n=10)
- Time constraints (n=6)	- Organizational support (n=7)
- Heavy workload (n=5)	- Interprofessional collaboration (n=5)
- Inadequate organizational support (n=4)	- Access to evidence-based resources (n=3)
- Cultural and language barriers (n=3)	- Positive attitudes and beliefs (n=2)

The most commonly reported barriers were lack of knowledge and skills (n=8), time constraints (n=6), and heavy workload (n=5). For example, a cross-sectional study by Alqahtani et al. (2019) found that nurses in Saudi Arabian hospitals had moderate levels of knowledge and attitudes regarding evidence-based practices, with lack of time and inadequate organizational support being the main barriers to implementation.

On the other hand, the most commonly reported facilitators were education and training (n=10), organizational support (n=7), and interprofessional collaboration (n=5). For example, a qualitative study by Mohamed et al. (2024) found that a web-based training program on evidence-based practice was effective in improving nurses' knowledge,

skills, and attitudes regarding evidence-based practice, as well as promoting a culture of evidence-based practice in the organization.

5. Discussion

This systematic review aimed to evaluate the evidence-based practices and interventions employed by nursing technicians in Saudi Arabian hospitals for the management of chronic pain and identify the barriers and facilitators to their implementation. The findings suggest that nursing technicians in Saudi Arabia employ a range of pharmacological and non-pharmacological interventions for chronic pain management, including patient education, relaxation techniques, and the use of standardized pain assessment tools. However, the effectiveness of these interventions was variable, with the majority of the studies reporting positive outcomes but having low to moderate quality of evidence.

The finding that patient education was the most commonly reported effective intervention is consistent with previous research on the importance of patient education in chronic pain management (Drake & De C Williams, 2017). Patient education empowers patients to take an active role in their pain management and improves their self-efficacy, which can lead to better pain management outcomes and increased patient satisfaction (Drake & De C Williams, 2017). However, the effectiveness of patient education may depend on various factors, such as the content, format, and delivery of the education, as well as the patients' literacy levels and learning preferences (Alotaibi et al., 2022).

The finding that relaxation techniques were effective in reducing pain intensity and improving quality of life is also consistent with previous research on the benefits of non-pharmacological interventions for chronic pain management (Lopes et al., 2019). Relaxation techniques, such as deep breathing, progressive muscle relaxation, and guided imagery, have been shown to reduce pain intensity, anxiety, and stress, as well as improve sleep quality and overall well-being (Lopes et al., 2019). However, the effectiveness of relaxation techniques may depend on the patients' preferences, expectations, and adherence to the techniques, as well as the nurses' skills and confidence in teaching and guiding the techniques (Van Veen et al., 2024).

The finding that the use of standardized pain assessment tools was effective in improving pain management practices and outcomes is consistent with previous research on the importance of pain assessment in chronic pain management (Kolobe, 2020). Pain assessment is a critical component of evidence-based pain management, as it provides a basis for planning, implementing, and evaluating pain management interventions (Kolobe, 2020). However, the effectiveness of pain assessment may depend on various factors, such as the reliability and validity of the assessment tools, the nurses' knowledge and skills in using the tools, and the patients' ability and willingness to report their pain (Altaweli et al., 2023).

The finding that lack of knowledge and skills, time constraints, and heavy workload were the main barriers to the implementation of evidence-based practices for chronic pain management is consistent with previous research on the challenges of implementing evidence-based practices in nursing (Alqahtani et al., 2022). Lack of knowledge and skills can hinder nurses' ability to critically appraise and apply evidence-based practices, while time constraints and heavy workload can limit their opportunities to engage in evidence-based practice activities, such as searching for and reading research articles (Alqahtani et al., 2022). These barriers highlight the need for education and training programs that are tailored to the needs and preferences of nursing technicians, as well as organizational support and resources that facilitate the implementation of evidence-based practices in clinical settings (Nusair et al., 2022).

The finding that education and training, organizational support, and interprofessional collaboration were the main facilitators to the implementation of evidence-based practices for chronic pain management is also consistent with previous research on the enablers of evidence-based practice in nursing (Mohamed et al., 2024). Education and training programs that are based on adult learning principles and incorporate interactive and experiential learning activities can enhance nurses' knowledge, skills, and attitudes regarding evidence-based practice (Mohamed et al., 2024). Organizational support, such as the provision of resources, incentives, and recognition for evidence-based practice, can create a culture of evidence-based practice and motivate nurses to engage in evidence-based practice activities (Alamri, 2021). Interprofessional collaboration, such as the involvement of nurses in multidisciplinary pain management teams and the sharing of knowledge and expertise across professions, can promote the integration of evidence-based practices into clinical practice and improve patient outcomes (Hadi et al., 2015).

6. Limitations

This systematic review has several limitations that should be acknowledged. First, the included studies were conducted in specific healthcare settings in Saudi Arabia, and the findings may not be generalizable to other settings or countries. Second, the majority of the included studies used convenience sampling and had small sample sizes, which may limit the representativeness and power of the findings. Third, the included studies used a variety of research designs, interventions, and outcome measures, which made it difficult to compare and synthesize the findings across studies. Fourth, the quality of the included studies was low to moderate, with several studies having

methodological limitations, such as lack of randomization, blinding, or control groups, which may have introduced bias and confounding to the findings.

7. Conclusion

In conclusion, this systematic review provides an overview of the evidence-based practices and interventions employed by nursing technicians in Saudi Arabian hospitals for the management of chronic pain, as well as the barriers and facilitators to their implementation. The findings suggest that nursing technicians in Saudi Arabia employ a range of pharmacological and non-pharmacological interventions for chronic pain management, including patient education, relaxation techniques, and the use of standardized pain assessment tools. However, the effectiveness of these interventions was variable, with the majority of the studies reporting positive outcomes but having low to moderate quality of evidence.

The review also highlights the need for education and training programs that enhance nursing technicians' knowledge and skills in evidence-based chronic pain management, as well as organizational support and resources that facilitate the implementation of evidence-based practices in clinical settings. Future research should focus on conducting high-quality, well-designed studies that evaluate the effectiveness and cost-effectiveness of evidence-based interventions for chronic pain management, as well as exploring the perspectives and experiences of nursing technicians and patients regarding the barriers and facilitators to the implementation of evidence-based practices in Saudi Arabian healthcare settings.

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