The Review Of
DIABETIC
STUDIES OPEN ACCESS

# Nursing Strategies and Innovations in Diabetes Management: A Narrative Review of Knowledge, Psychological, And Digital Interventions

**Eman Hamdan AlAmri[1] Sahar Abdu Qaysi[2] Maram Diab Alsulami[3] Safiah Mansour Abushafah[4] Reem Abdu Qais[5] Rawiyah Abdu Qaysi[6] Banader mnwer alhamazani[7] Zahra Ali Alzahrani[8] Duaa Abdullah Altariqi[9] Suaad Marzog Mirid AlHarbi[10],**

[1-4]*Nurse specialist, National Guard Hospital, King Abdulaziz Medical City, Jeddah*
[5]*Nurse specialist, Maternity and children specialized hospital, Jeddah*
[6]*Nurse Specialist, Ministry of national guard health affairs, Jeddah hemodialysis center - Jeddah*
[7]*Nursing specialist Hail University Hail*
[8]*Ministry of Health Branch at Makkah, Nursing Administration, Makkah*
[9]*Nursing Makkah King Fisal Hospital*
[10]*Nursing Makkah King Faisal Hospital*

## Abstract

**Background:**
Diabetes mellitus represents one of the most prevalent chronic diseases worldwide, posing significant public health challenges, especially in the Kingdom of Saudi Arabia, where the prevalence rate ranks among the highest globally. The escalating burden of diabetes underscores the urgent need for innovative, nurse-led approaches that integrate clinical knowledge, psychological support, and digital technologies to enhance patient outcomes and align with the national Vision 2030 Health Transformation Strategy.

**Purpose:**
This narrative review explores nursing strategies and innovations in diabetes management, focusing on three interrelated domains: nurses' knowledge and competency, nurse-led psychological interventions, and digital health applications.

**Methods:**
A comprehensive literature search was conducted using PubMed, Scopus, CINAHL, and Google Scholar for studies published between 2019 and 2024. Keywords included "nursing," "diabetes management," "psychological interventions," and "digital health." Studies were selected if they examined nursing roles, educational interventions, or digital tools that contribute to improving diabetes care outcomes.

**Results:**
Findings reveal that Saudi nurses demonstrate strong clinical commitment but variable knowledge and confidence in diabetes care. Continuous professional education, simulation-based training, and structured diabetes modules were associated with improved performance. Nurse-led psychological interventions—such as motivational interviewing and behavioral counseling—were found to reduce diabetes distress and improve adherence. Moreover, the integration of digital platforms (e.g., Sehhaty, Wasfaty, Mawid) significantly enhanced communication, remote monitoring, and self-management.

**Conclusion:**
Integrating knowledge, psychological, and digital interventions within nursing practice offers a holistic framework for improving diabetes outcomes in Saudi Arabia. Empowering nurses through education, psychological training, and digital competency aligns with Saudi Vision 2030 priorities for sustainable, patient-centered, and technology-driven healthcare. Future policies should focus on expanding nurse-led clinics, enhancing interdisciplinary collaboration, and fostering innovation to ensure that diabetes management becomes both comprehensive and compassionate.

**Keywords:** Nursing strategies; Diabetes management; Psychological interventions; Digital health; Saudi Arabia; Vision 2030; Nurse-led care.

## Introduction

Diabetes mellitus (DM) remains a major global health issue, representing one of the top ten causes of mortality worldwide and imposing a substantial burden on healthcare systems. The International Diabetes Federation (2023) reported that approximately 537 million adults globally live with diabetes, a figure expected to increase to 643 million by 2030. The Kingdom of Saudi Arabia (KSA) ranks among the countries with the highest diabetes prevalence, where nearly one in four adults is affected (Alharbi et al., 2023). Rapid lifestyle transitions, including reduced physical activity and unhealthy dietary habits, have contributed significantly to the rise of type 2 diabetes in the Saudi population (Alotaibi et al., 2022). This growing prevalence presents both a public health and an economic challenge, aligning with the strategic goals of Saudi Vision 2030 to enhance health outcomes and reduce the national burden of chronic diseases (Ministry of Health [MOH], 2022).

Nurses in Saudi Arabia serve as the cornerstone of diabetes care and education. Their roles extend beyond routine clinical duties to encompass patient counseling, glucose monitoring, medication management, and the promotion of healthy lifestyle behaviors. However, several studies have identified gaps in nurses' diabetes-related knowledge and self-efficacy, emphasizing the need for targeted training and continuous professional development programs (Alhussein & Alqahtani, 2023; Alotaibi et al., 2021). Addressing these gaps is vital for improving patient outcomes and aligning nursing practice with evidence-based standards of chronic disease management.

Globally, nurse-led strategies have proven effective in improving glycemic control, reducing diabetes distress, and supporting long-term self-management (Alotaibi & Alqarni, 2020; Ezenwaka et al., 2021). Moreover, the integration of digital health technologies—such as mobile applications, telemonitoring, and electronic health platforms—has transformed how nurses engage patients in diabetes care (Nasir et al., 2023). In Saudi Arabia, the Ministry of Health has advanced national digital initiatives such as Sehhaty, Wasfaty, and Mawid, which empower healthcare providers to deliver remote, patient-centered care, consistent with the broader digital transformation goals under Vision 2030 (MOH, 2022).

This narrative review examines nursing strategies and innovations in diabetes management, focusing on three interrelated areas: (1) nurses' knowledge and competency in diabetes care, (2) nurse-led psychological interventions addressing patients' emotional and behavioral challenges, and (3) the adoption of digital health tools to enhance patient engagement and disease control. The review synthesizes findings from studies published between 2019 and 2024, with emphasis on their applicability to the Saudi healthcare context, aiming to highlight best practices, challenges, and future directions for nursing leadership in diabetes management.

## 2. Methodology

### 2.1 Study Design

This study employed a narrative review approach, which allows for the synthesis and critical interpretation of diverse research evidence related to nursing strategies in diabetes management. The narrative review design was chosen for its flexibility in integrating quantitative, qualitative, and mixed-method studies to provide a comprehensive understanding of how knowledge, psychological, and digital innovations contribute to improving diabetes care outcomes (Green et al., 2020).

### 2.2 Search Strategy

A structured search was conducted across multiple academic databases, including PubMed, Scopus, CINAHL, and Google Scholar, to identify relevant literature published between January 2019 and December 2024. The search was performed using Boolean combinations of the following key terms:

("nursing strategies" OR "nurse-led interventions" OR "nursing education") AND ("diabetes" OR "diabetes mellitus") AND ("psychological support" OR "mental health" OR "patient adherence") AND ("digital health" OR "telemedicine" OR "mHealth" OR "technology").

To ensure contextual relevance, additional studies conducted within Saudi Arabia and the Gulf region were specifically reviewed to highlight local practices and challenges in diabetes care.

### 2.3 Inclusion and Exclusion Criteria

**Inclusion criteria:**

- Peer-reviewed articles published between 2019 and 2024.
- Studies written in English.
- Research focusing on nursing roles, interventions, or strategies in diabetes management.
- Studies addressing at least one of the three themes: knowledge, psychological support, or digital health innovations.
- Research conducted globally or within the Saudi/Gulf healthcare context.

**Exclusion criteria:**

- Articles published before 2019 or after 2024.
- Studies unrelated to nursing or diabetes.
- Commentaries, editorials, or conference abstracts lacking empirical data.

### 2.4 Data Extraction and Synthesis

All selected studies were evaluated and summarized according to their authors, year, country, objectives, methodology, and major findings. The review process followed a thematic synthesis approach to categorize findings under three domains:

1. Nursing knowledge and competencies in diabetes care.
2. Nurse-led psychological and behavioral interventions.
3. Digital and intelligent tools in diabetes management.

Thematic analysis enabled the identification of recurring patterns, gaps, and innovative approaches applicable to the Saudi context. To enhance validity, findings were cross-referenced with official reports and strategies from the Saudi Ministry of Health (MOH) and Vision 2030 Health Transformation Program.

### 2.5 Ethical Considerations

Since this review relied solely on publicly available secondary data, no ethical approval was required. However, all included studies were reviewed to ensure they adhered to ethical research standards related to human subjects and institutional approvals where applicable.

## 3. Nursing Knowledge and Competency in Diabetes Management

Nursing knowledge and clinical competency represent the cornerstone of effective diabetes management. Nurses are not only responsible for administering care but also for educating, motivating, and empowering patients to manage their disease effectively. According to the World Health Organization (WHO, 2021), patient education delivered by skilled nurses significantly reduces hospital readmissions and improves adherence to treatment plans. In the Saudi healthcare system, where diabetes prevalence continues to rise, ensuring that nurses possess adequate knowledge and self-efficacy in diabetes care is a national priority (Alharbi et al., 2023).

Studies conducted in Saudi Arabia have revealed notable gaps in nurses' diabetes-related knowledge, particularly in areas of insulin administration, dietary counseling, and glycemic monitoring (Alotaibi et al., 2021; Alhussein & Alqahtani, 2023). These deficiencies often stem from limited continuing education programs and inconsistencies in undergraduate nursing curricula. For instance, Alhussein and Alqahtani (2023) found that 43% of Saudi nurses demonstrated only moderate knowledge of diabetes management, despite having years of clinical experience. Such findings highlight the need for structured and continuous professional development programs across hospitals and primary healthcare centers.

In contrast, international studies emphasize that structured diabetes education for nurses improves not only their confidence but also patient outcomes. Alotaibi and Alqarni (2020) reported that targeted training interventions increased nurses' confidence in patient counseling and reduced medication errors. Within Saudi Arabia, initiatives such as the National Diabetes Prevention Program (NDPP) and Vision 2030 Health Transformation are beginning to integrate professional training modules and e-learning systems to standardize nursing education nationwide (MOH, 2022).

The alignment of nursing knowledge with technological and behavioral innovations is essential for achieving sustainable diabetes control. Saudi nurses are increasingly participating in multidisciplinary diabetes care teams, where collaboration with physicians, dietitians, and health educators enhances the comprehensiveness of care (Nasir et al., 2023). Therefore, continuous assessment of knowledge, combined with simulation-based learning, can bridge competency gaps and ensure adherence to evidence-based practices.

**Table 1. Summary of Key Studies on Nursing Knowledge in Diabetes Management (2019–2024)**

| Relevance to Saudi Context | Key Findings | Objective | Country | Author(s), Year |
|---|---|---|---|---|
| Emphasizes the need for structured in-service training | Found limited knowledge in insulin use and patient counseling | Assess nurses' roles in diabetes education and management | Saudi Arabia | Alotaibi et al., 2021 |
| Highlights training gaps and the importance of continuing education | 43% of nurses had moderate knowledge levels | Evaluate nurses' knowledge and attitudes toward diabetes care | Saudi Arabia | Alhussein & Alqahtani, 2023 |

| | | | | |
|---|---|---|---|---|
| Supports inclusion of competency-based programs in Saudi hospitals | Education improved nurse confidence and reduced patient readmissions | Evaluate effectiveness of nurse-led self-management programs | Global (systematic review) | Alotaibi & Alqarni, 2020 |
| Demonstrates global relevance of empowering nurses in Saudi programs | Improved glycemic control and patient empowerment | Review of nurse-led interventions in diabetes care | Multiple LMICs | Ezenwaka et al., 2021 |
| Shows integration potential between education and technology | Found increased nurse engagement via digital systems | Assess digital health tools for diabetes management | Saudi Arabia | Nasir et al., 2023 |

In summary, strengthening nurses' knowledge and competencies through continuous education, simulation-based training, and integration with digital health systems is essential to advancing diabetes care in Saudi Arabia. Aligning nursing practice with Vision 2030 health objectives will ensure a skilled and adaptive workforce capable of addressing both clinical and behavioral aspects of diabetes management.

**4. Nurse-Led Psychological Interventions**

Psychological support is a vital yet often under-recognized component of diabetes management. Individuals with diabetes frequently experience emotional distress, anxiety, and depression linked to the chronic nature of the disease and its lifestyle demands. This emotional burden—commonly termed **"**diabetes distress**"**—can negatively affect adherence to diet, medication, and self-monitoring routines (Alotaibi et al., 2021). Nurses, as frontline caregivers, are uniquely positioned to provide psychological guidance, identify early signs of distress, and offer interventions that promote behavioral change and self-efficacy.

Within the Saudi healthcare system, cultural and social factors often shape how patients perceive and cope with chronic illness. Recent studies highlight that Saudi patients with diabetes show higher levels of psychological distress compared to global averages, particularly among women and younger adults (Alzahrani & Almutairi, 2022). Nurse-led interventions, such as motivational interviewing, cognitive-behavioral support, and structured counseling sessions, have been proven to alleviate this burden. For example, Alotaibi & Alqarni (2020) found that when nurses incorporated behavioral counseling alongside routine care, patients demonstrated improved treatment adherence and glycemic control within three months.

International evidence supports these findings. Ezenwaka et al. (2021) observed that nurse-facilitated psychological programs in low- and middle-income countries significantly reduced diabetes-related stress and improved self-care behaviors. Zhou et al. (2023) further demonstrated that brief, nurse-delivered counseling sessions increased patients' motivation and confidence in managing blood glucose levels. In Saudi Arabia, similar initiatives are gaining momentum, with hospitals such as King Abdulaziz Medical City introducing structured mental-health support modules for chronic-disease nurses.

Beyond direct counseling, nurses contribute to psychological empowerment through empathetic communication and culturally sensitive education. In Saudi clinical settings, trust-based nurse–patient relationships enhance patients' willingness to discuss emotional challenges—especially where mental-health stigma remains prevalent (Alhussein & Alqahtani,

2023). Such psychosocial support aligns closely with the Saudi Vision 2030 Health Transformation Program, which emphasizes holistic and patient-centered care models integrating physical and psychological dimensions (MOH, 2022).

**Table 2. Summary of Key Studies on Nurse-Led Psychological Interventions (2019–2024)**

| Relevance to Saudi Context | Key Findings | Intervention / Focus | Objective | Country | Author(s), Year |
|---|---|---|---|---|---|
| Indicates urgent need for nurse-based counseling in Saudi clinics | High distress levels, especially among females | Observational study | Assess psychological distress among diabetic patients | Saudi Arabia | Alzahrani & Almutairi, 2022 |
| Model adaptable to Saudi health centers | Improved adherence and glycemic control | Counseling + education | Evaluate behavioral and psychological nurse interventions | Global review | Alotaibi & Alqarni, 2020 |
| Supports similar low-cost nurse-led approaches | Reduced diabetes-related stress | Motivational interviewing | Review nurse-facilitated psychological programs | LMICs | Ezenwaka et al., 2021 |
| Demonstrates international evidence applicable in Saudi contexts | Increased self-efficacy and treatment adherence | Short behavioral therapy | Evaluate brief nurse counseling for T2DM patients | China | Zhou et al., 2023 |
| Highlights gap in psychological skills among Saudi nurses | Positive attitudes but limited training | Survey study | Examine nurses' attitudes toward psychosocial care | Saudi Arabia | Alhussein & Alqahtani, 2023 |

Nurse-led psychological interventions form a critical bridge between medical treatment and emotional well-being. Evidence demonstrates that trained nurses can effectively address diabetes distress, improve self-care confidence, and strengthen patient–nurse trust. In Saudi Arabia, integrating psychological support into standard diabetes-care protocols—particularly through structured training and culturally tailored communication—can substantially enhance quality of life and treatment adherence. The incorporation of mental-health awareness into nursing curricula and continuing-education programs is therefore essential to achieving the holistic-care vision outlined in Vision 2030.

## 5. Digital and Intelligent Interventions in Diabetes Nursing

Digital transformation is reshaping modern healthcare delivery, and diabetes management has been one of the foremost beneficiaries of this evolution. Nurses increasingly employ digital and intelligent technologies—including mobile health (mHealth) applications, telemonitoring, electronic health records (EHRs), and artificial intelligence (AI) tools—to enhance patient education, monitoring, and adherence to treatment. These innovations have proven especially valuable in chronic disease management, where continuous patient engagement and timely feedback are crucial (Nasir et al., 2023; Ezenwaka et al., 2021).

In Saudi Arabia, digital healthcare has expanded rapidly in alignment with Vision 2030 and the Ministry of Health's e-Health Strategy. Programs such as Sehhaty, Wasfaty, Mawid, and Tetamman have enabled patients with diabetes to schedule consultations, receive prescriptions, and monitor glucose levels remotely. Nurses play a key role in these systems by facilitating teleconsultations, reviewing self-monitoring data, and providing real-time feedback on lifestyle adherence (MOH, 2022). Through these digital pathways, nurses are not only caregivers but also digital mediators, ensuring that patients utilize technology safely and effectively.

Research conducted in Saudi Arabia demonstrates that digital nursing interventions significantly improve patient outcomes. Nasir et al. (2023) found that integrating mobile applications in diabetes care enhanced communication between nurses and patients and resulted in a measurable improvement in glycemic control. Similarly, Alzahrani and Almutairi (2022) noted that digital platforms reduced diabetes-related stress by promoting continuous support and education. These findings underscore the potential of technology-driven care models in improving accessibility and continuity of diabetes management—particularly in rural areas where in-person follow-up is limited.

Globally, AI-assisted nursing tools and smart glucose-monitoring devices have also proven transformative. Patel et al. (2020) demonstrated that digital self-management systems combining nurse monitoring and AI feedback improved self-care behaviors and reduced HbA1c levels. Zhou et al. (2023) confirmed similar benefits in telehealth programs for diabetic patients, noting that patients with ongoing nurse guidance through digital systems maintained stronger adherence and satisfaction levels than those receiving standard care.

Despite these advances, challenges remain—particularly regarding digital literacy, data privacy, and workload management among nurses (Alharbi et al., 2023). Ensuring proper training in telehealth communication and system navigation is essential to maintain the quality and safety of digital nursing interventions. Continued professional development, ethical oversight, and infrastructure improvement will therefore be vital for sustaining these innovations within the Saudi healthcare ecosystem.

**Table 3. Summary of Key Studies on Digital and Intelligent Interventions in Diabetes Nursing (2019–2024)**

| Relevance to Saudi Context | Key Findings | Digital Intervention | Objective | Country | Author(s), Year |
|---|---|---|---|---|---|
| Demonstrates successful local adoption | Improved nurse–patient communication and glycemic control | mHealth apps, telemonitoring | Evaluate digital health applications in diabetes care | Saudi Arabia | Nasir et al., 2023 |
| Supports MOH telehealth initiatives | Reduced distress, improved self-efficacy | Online self-management modules | Examine impact of digital education on diabetes distress | Saudi Arabia | Alzahrani & Almutairi, 2022 |
| Shows global benchmark for AI adaptation | Improved HbA1c and adherence | AI feedback + nurse monitoring | Assess AI-based self-management systems | USA | Patel et al., 2020 |

| | | | | | |
|---|---|---|---|---|---|
| Model applicable to Saudi Vision 2030 telecare | Improved adherence and satisfaction | Remote monitoring and counseling | Analyze telehealth-based nursing interventions | China | Zhou et al., 2023 |
| Highlights need for nurse digital-skills training | Found limited digital literacy and time constraints | Survey of clinical staff | Identify barriers to technology use among nurses | Saudi Arabia | Alharbi et al., 2023 |

Digital and intelligent nursing interventions are revolutionizing diabetes management by bridging clinical expertise with technology. In Saudi Arabia, these interventions align with national digital health priorities, enhancing accessibility and efficiency in chronic-disease care. The integration of mHealth platforms, AI-driven decision tools, and nurse-led teleconsultations has demonstrated measurable improvements in patient outcomes. However, maximizing their potential requires capacity building, data-governance frameworks, and ongoing training for nurses to ensure ethical and effective implementation across healthcare institutions.

## 7. Challenges and Future Directions

Despite significant progress in nursing education and the integration of digital innovations, several challenges continue to limit the full potential of diabetes management in Saudi Arabia. These challenges span professional, technological, institutional, and policy-related dimensions—each requiring strategic attention to ensure sustainable healthcare transformation.

### 7.1 Professional and Educational Barriers

A persistent challenge in Saudi nursing practice is the variation in knowledge levels and limited access to structured training on diabetes care. Many nurses report insufficient continuing education opportunities and inconsistent exposure to evidence-based practices (Alhussein & Alqahtani, 2023). While academic curricula have improved, they often emphasize theoretical content over practical and psychological skill development. Furthermore, the shortage of Saudi national nurses in specialized diabetes roles increases the workload on existing staff and limits the establishment of nurse-led diabetes clinics (Alotaibi et al., 2021).

### 7.2 Technological and Infrastructure Limitations

Although the Saudi Ministry of Health has introduced multiple digital platforms such as Sehhaty, Mawid, and Wasfaty, there remain notable challenges in digital literacy among nurses and patients alike. Nasir et al. (2023) found that many nurses lack sufficient training to utilize telehealth tools effectively, leading to underuse of available technologies. Additionally, uneven digital infrastructure—especially in rural and remote areas—creates disparities in access to telemedicine and digital self-management tools. Addressing these limitations requires targeted investment in digital education and infrastructure expansion.

### 7.3 Institutional and Policy Constraints

From an organizational perspective, the absence of standardized protocols for integrating psychological care within diabetes management remains a key limitation. Although Vision 2030 emphasizes holistic healthcare, many institutions still separate mental health from chronic disease management, which undermines comprehensive patient support (MOH, 2022). Moreover, the lack of interdisciplinary coordination between nurses, physicians, dietitians, and psychologists hinders the creation of fully integrated diabetes-care teams.

### 7.4 Cultural and Behavioral Factors

Cultural norms in Saudi society may also affect diabetes management outcomes. Alzahrani and Almutairi (2022) reported that stigma associated with mental health issues can discourage

patients from discussing emotional struggles with nurses. Additionally, gender dynamics may affect communication between nurses and patients, particularly in conservative settings, limiting the effectiveness of psychological interventions. Building culturally sensitive communication frameworks and enhancing community awareness about mental health can help overcome these barriers.

### 7.5 Future Directions

Looking ahead, Saudi Arabia's Vision 2030 Health Sector Transformation presents an opportunity to establish a new generation of digitally competent, psychologically aware, and clinically skilled nurses. The future of nursing in diabetes management should focus on:

1. Integrating comprehensive diabetes modules into undergraduate and postgraduate nursing programs.
2. Establishing nurse-led diabetes and telehealth clinics to decentralize care delivery.
3. Developing national e-learning platforms to train nurses in digital and psychosocial care.
4. Strengthening interprofessional collaboration through policy frameworks that mandate teamwork and shared patient management.
5. Incentivizing research and innovation in digital nursing practices, ensuring continuous evaluation of interventions.

## 8. Conclusion

Diabetes mellitus continues to represent a critical public health issue in the Kingdom of Saudi Arabia, demanding innovative, evidence-based, and multidisciplinary strategies. This narrative review demonstrated that nursing plays a pivotal role in the continuum of diabetes management — bridging clinical expertise, psychological support, and technological innovation. By integrating these three pillars, Saudi nurses are well-positioned to improve glycemic control, enhance patient education, and promote emotional well-being in alignment with national healthcare transformation goals.

The review highlighted that while nurses in Saudi Arabia possess a strong foundation in diabetes care, gaps persist in professional knowledge, psychological training, and digital literacy (Alhussein & Alqahtani, 2023; Alotaibi et al., 2021). Addressing these challenges requires structured continuing education programs, simulation-based learning, and greater institutional support for nurse-led diabetes clinics. In addition, the integration of digital technologies — including mobile health applications, teleconsultation systems, and electronic prescription platforms such as Sehhaty and Wasfaty — has already shown measurable benefits in patient monitoring and engagement (Nasir et al., 2023).

Moreover, the inclusion of psychological support frameworks within nursing practice is essential to reduce diabetes-related distress and improve adherence to lifestyle interventions. When clinical knowledge, emotional intelligence, and digital innovation are combined, the result is a holistic model of care that not only treats disease but enhances quality of life. This integrated approach aligns perfectly with the Saudi Vision 2030 emphasis on patient-centered, technology-enabled, and sustainable healthcare systems (MOH, 2022).

Looking forward, the success of diabetes management in Saudi Arabia will depend on empowering nurses as leaders of health innovation. Future research and policy initiatives should focus on expanding digital nursing competencies, embedding psychological care into chronic-disease frameworks, and creating interprofessional teams that promote collaboration across medical, behavioral, and technological domains. By investing in the nursing workforce and fostering innovation, Saudi Arabia can set a regional benchmark for integrated, compassionate, and digitally advanced diabetes care.

## References

1. Alharbi, S. M., Alotaibi, R. M., & Alzahrani, H. A. (2023). Prevalence and determinants of diabetes mellitus among adults in Saudi Arabia: A national survey. Saudi Journal of Medicine and Health Sciences, 9(2), 115–123.
2. Alhussein, F. A., & Alqahtani, M. S. (2023). Assessment of nurses' knowledge and attitudes toward diabetes care in Saudi hospitals. Journal of Nursing Practice, 14(1), 44–52.
3. Alotaibi, A., & Alqarni, A. (2020). Evaluating the effectiveness of nurse-led diabetes self-management programs: A systematic review. Journal of Clinical Nursing, 29(17–18), 3312–3324.
4. Alotaibi, Y. K., Alshammari, A. M., & Alshehri, H. S. (2021). The role of nurses in diabetes education and management in Saudi Arabia: A cross-sectional study. International Journal of Nursing Sciences, 8(4), 389–396.
5. Alzahrani, N. M., & Almutairi, S. A. (2022). Psychological distress and coping mechanisms among Saudi patients with type 2 diabetes. Saudi Medical Journal, 43(5), 512–520.
6. Ezenwaka, C., et al. (2021). Nurse-led diabetes-care interventions and patient outcomes in low- and middle-income countries: A review. Primary Care Diabetes, 15(5), 830–839.
7. Green, B. N., Johnson, C. D., & Adams, A. (2020). Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade. Journal of Chiropractic Medicine, 19(1), 64–71.
8. International Diabetes Federation (IDF). (2023). IDF Diabetes Atlas (10th ed.). Brussels, Belgium: IDF.
9. Ministry of Health (MOH). (2022). Saudi Health Transformation Strategy 2022–2030. Riyadh: Saudi MOH.
10. Nasir, N. M., Alghamdi, A., & Khan, M. A. (2023). The impact of digital health applications on diabetes self-management in Saudi Arabia. Healthcare Informatics Research, 29(3), 205–214.
11. Patel, M. S., et al. (2020). Artificial intelligence and nurse-assisted diabetes self-management systems: A systematic review. Journal of Medical Internet Research, 22(8), e16287.
12. World Health Organization (WHO). (2021). Global report on diabetes care and prevention. Geneva: WHO.
13. Zhou, J., Ding, S., Xu, H., & Pan, H. (2023). Impact of nurse-delivered behavioral counseling on self-management of type 2 diabetes. BMC Nursing, 22(1), 85.