Nurses' Knowledge And Practices Toward Diabetes Care In Governmental Hospitals: An Analytical Cross-Sectional Study

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Abstract

Background: iabetes mellitus represents a major public health challenge in Saudi Arabia, placing a substantial burden on governmental hospitals. Nurses play a central role in diabetes management through glycemic monitoring, insulin administration, patient education, and prevention of complications. However, variations in nurses' knowledge and clinical practices may influence the quality and safety of diabetes care.

Aim: This study aimed to assess nurses' knowledge and practices toward diabetes care in governmental hospitals in Saudi Arabia and to examine the relationship between knowledge, clinical practices, and selected demographic and professional factors.

Methods: An analytical cross-sectional study was conducted among **1,000 nurses** working in governmental hospitals and primary healthcare facilities across multiple Saudi health clusters. Data were collected using a structured self-administered questionnaire assessing demographic characteristics, diabetes-related knowledge, and nursing practices. Descriptive and inferential statistics were applied, including correlation and multivariate regression analyses.

Results: The findings revealed that **45.0%** of nurses demonstrated good knowledge of diabetes care, while **41.0%** had moderate knowledge. Good nursing practice was observed in **43.0%** of participants, whereas gaps were identified in patient education, lifestyle counseling, and routine diabetic foot assessment. A significant positive correlation was found between knowledge and practice scores (**$r = 0.48$, $p < 0.001$**). Multivariate analysis identified diabetes-related training, higher knowledge

levels, clinical experience, and educational attainment as significant predictors of good nursing practice.
Conclusion: Although nurses in Saudi governmental hospitals exhibit satisfactory foundational knowledge and adherence to protocol-driven diabetes care practices, important deficiencies persist in preventive and educational aspects of care. Enhancing structured diabetes education, strengthening organizational support, and integrating patient-centered approaches into routine nursing practice are essential to improving diabetes care outcomes and aligning with national health transformation goals.
Keywords: Diabetes care; Nursing practice; Knowledge; Governmental hospitals; Saudi Arabia; Cross-sectional study

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It represents one of the most significant global public health challenges, with rapidly increasing prevalence, morbidity, and mortality. According to the World Health Organization, diabetes affects hundreds of millions of individuals worldwide and is a major contributor to cardiovascular disease, renal failure, blindness, lower-limb amputations, and premature death (World Health Organization [WHO], 2023). In hospital settings, poorly controlled diabetes is associated with prolonged length of stay, higher infection rates, increased healthcare costs, and adverse patient outcomes.

Nurses play a pivotal role in the management of diabetes within governmental hospitals, as they are directly involved in day-to-day patient care, including blood glucose monitoring, insulin administration, recognition and management of hypo- and hyperglycemia, patient education, and prevention of acute and chronic complications. Evidence-based nursing practices are essential to ensure safe and effective diabetes care, particularly in inpatient settings where patients often present with complex comorbidities (American Diabetes Association [ADA], 2024).

Adequate knowledge among nurses is a fundamental prerequisite for optimal diabetes care. Insufficient understanding of diabetes pathophysiology, insulin pharmacodynamics, glycemic targets, and complication management may lead to medication errors, delayed interventions, and compromised patient safety. Previous studies have demonstrated that gaps in nurses' knowledge are associated with suboptimal clinical practices and inconsistent adherence to diabetes care guidelines (Alotaibi et al., 2017; Shrivastava et al., 2013). Conversely, higher levels of knowledge have been linked to improved clinical decision-making and better patient outcomes.

In addition to knowledge, nursing practices are influenced by multiple factors, including years of clinical experience, educational level, work unit, workload, and access to continuing professional education. Governmental hospitals, in particular, often face challenges such as high patient volume, staff shortages, and limited training opportunities, which may negatively affect the quality of diabetes care delivered by nursing staff. Understanding how these factors interact with nurses' knowledge and practices is critical for designing targeted interventions and training programs.

Despite the growing burden of diabetes, there remains limited analytical evidence examining the relationship between nurses' knowledge and their clinical practices

in diabetes care within governmental hospital settings, especially in regional and developing healthcare systems. Most existing studies are descriptive in nature and do not adequately explore predictors or associations that may inform policy and practice improvements.

Therefore, this analytical cross-sectional study aims to assess nurses' knowledge and practices toward diabetes care in governmental hospitals and to examine the relationship between knowledge levels and clinical practices, as well as the demographic and professional factors associated with optimal diabetes care. The findings of this study are expected to provide evidence-based insights to support nursing education, enhance clinical protocols, and ultimately improve the quality and safety of diabetes care in governmental healthcare institutions.

Research Gap and Problem Statement

Despite the high prevalence of diabetes in Saudi Arabia and the critical role of nurses in its management, there is a limited body of analytical research examining nurses' knowledge and practices toward diabetes care within governmental hospitals across different Saudi health clusters. Most available studies conducted in the Kingdom have focused on patient-related outcomes or physician practices, while nursing-focused studies are often descriptive and do not adequately explore the relationship between knowledge levels, clinical practices, and associated professional factors.

Furthermore, variations in nurses' educational background, years of experience, clinical units, and exposure to diabetes-related training programs across governmental hospitals may contribute to inconsistencies in diabetes care delivery. The lack of analytical evidence identifying predictors of optimal nursing practices limits the ability of policymakers and healthcare leaders to design targeted interventions aimed at improving diabetes care quality.

Therefore, this study addresses an important gap by analytically assessing nurses' knowledge and practices toward diabetes care in governmental hospitals in Saudi Arabia and by examining the relationship between knowledge levels, clinical practices, and selected demographic and professional variables. Generating such evidence is essential to support nursing education initiatives, enhance clinical protocols, and strengthen diabetes care outcomes within the Saudi governmental healthcare system.

Study Objectives

General Objective

To assess nurses' knowledge and practices toward diabetes care in governmental hospitals in Saudi Arabia and to examine the relationship between knowledge levels and clinical practices.

Specific Objectives

1. To assess the level of knowledge among nurses regarding diabetes care in governmental hospitals.
2. To assess the level of nursing practices related to diabetes care in governmental hospitals.
3. To examine the relationship between nurses' knowledge and their clinical practices toward diabetes care.
4. To identify demographic and professional factors (such as age, educational level, years of experience, clinical unit, and diabetes-related training) associated with nurses' knowledge of diabetes care.
5. To determine the predictors of good nursing practice toward diabetes care among nurses working in governmental hospitals in Saudi Arabia.

Research Questions

1. What is the level of knowledge among nurses regarding diabetes care in governmental hospitals in Saudi Arabia?
2. What is the level of nursing practices toward diabetes care in governmental hospitals?
3. Is there a significant relationship between nurses' knowledge and their practices toward diabetes care?
4. Are nurses' knowledge and practices significantly associated with selected demographic and professional characteristics?
5. What factors significantly predict good nursing practice toward diabetes care in governmental hospitals?

4. METHODS

4.1 Study Design and Setting

This study employed an **analytical cross-sectional design** to assess nurses' knowledge and practices toward diabetes care and to examine the relationship between knowledge levels, clinical practices, and selected demographic and professional variables. The cross-sectional analytical approach was considered appropriate as it allows for the evaluation of associations between variables at a single point in time within real clinical settings (Setia, 2016).

The study was conducted in **governmental hospitals and primary healthcare facilities under the Saudi Ministry of Health**, distributed across several health clusters in Saudi Arabia. These included hospitals and primary care centers located in Al-Majmaah, Hail, Qassim, Hafar Al-Batin, and Al-Ahsa regions. All selected facilities operate under the Saudi health cluster model as part of the Health Sector Transformation Program aligned with Saudi Vision 2030 (Saudi Ministry of Health, 2023).

Table 1 Distribution of Study Settings and Health Clusters

Region	Health Cluster	Healthcare Facility Type	Facility Name
Riyadh Region	Riyadh Health Cluster	General Hospital	King Khalid Hospital, Al-Majmaah
Riyadh Region	Riyadh Health Cluster	Primary Health Care	Al-Fayha PHC Center, Al-Majmaah
Hail Region	Hail Health Cluster	General Hospital	Baqaa General Hospital
Qassim Region	Qassim Health Cluster	General Hospital	Asyah Hospital
Qassim Region	Qassim Health Cluster	Tertiary Hospital	Buraidah Central Hospital
Eastern Province	Eastern Health Cluster	Mental Health Hospital	Irada & Mental Health Hospital, Hafar Al-Batin

Eastern Province	Al-Ahsa Health Cluster	Specialty Hospital	Al-Jaber ENT & Ophthalmology Hospital
Eastern Province	Al-Ahsa Health Cluster	General/Cluster Hospitals	Hospitals under Al-Ahsa Health Cluster

4.2 Study Population and Sampling

The study population consisted of **registered nurses working in governmental hospitals and primary healthcare centers** in the selected regions. Nurses were recruited from medical, surgical, emergency, intensive care, outpatient, mental health, and primary care units.

Inclusion Criteria

- Registered nurses employed in governmental healthcare facilities
- Minimum of six months of clinical experience
- Direct involvement in patient care

Exclusion Criteria

- Nursing interns and students
- Administrative nurses with no direct patient contact
- Nurses on extended leave during data collection

Table 2 Eligibility Criteria for Study Participants

Category	Inclusion	Exclusion
Employment status	Registered nurse (MOH)	Intern / student
Clinical role	Direct patient care	Administrative only
Experience	≥ 6 months	< 6 months
Availability	On-duty during study	On long leave

A non-probability convenience sampling technique was used due to workforce availability and operational constraints common in governmental hospitals. This approach has been widely used in nursing research conducted in similar healthcare settings (Polit & Beck, 2021).

4.3 Data Collection Instrument

Data were collected using a **structured self-administered questionnaire** developed after an extensive review of the literature and international diabetes care guidelines, including those issued by the American Diabetes Association and the World Health Organization (ADA, 2024; WHO, 2023). The questionnaire consisted of three main sections: demographic and professional characteristics, knowledge related to diabetes care, and nursing practices toward diabetes care.

Table 3 Structure of the Data Collection Instrument

Section	Content	Number of Items	Measurement Scale
A	Demographic & professional data	8 items	Nominal / Ordinal
B	Knowledge toward diabetes care	12 items	Binary (Correct/Incorrect)

Section	Content	Number of Items	Measurement Scale
C	Practices toward diabetes care	10 items	4-point Likert scale

Scoring System

- **Knowledge score:** 0–12
  - Poor: <60%
  - Moderate: 60–79%
  - Good: ≥80%
- **Practice score:** 10–40
  - Poor practice: <60%
  - Fair practice: 60–79%
  - Good practice: ≥80%

4.4 Validity and Reliability

Content validity was established through review by a panel of nursing and diabetes care experts. A pilot study was conducted on approximately 10% of the sample to test clarity and feasibility. Reliability was assessed using Cronbach's alpha coefficient.

Table 4 Validity and Reliability Assessment

Scale	Number of Items	Cronbach's Alpha	Interpretation
Knowledge scale	12	≥ 0.70	Acceptable
Practice scale	10	≥ 0.80	Good

4.5 Data Collection Procedure

After obtaining administrative approvals, data collection was conducted during regular working hours. Questionnaires were distributed manually to eligible nurses and collected after completion. Participation was voluntary, and anonymity was ensured by excluding personal identifiers.

4.6 Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize demographic variables, knowledge scores, and practice scores. Analytical statistics were applied to examine associations and predictors.

Table 5 Statistical Analysis Plan

Objective	Variables	Statistical Test
Describe sample	Demographics	Frequencies, percentages
Assess knowledge level	Knowledge score	Mean, SD
Assess practice level	Practice score	Mean, SD
Association	Knowledge ↔ Practice	Pearson correlation
Group comparison	Practice vs demographics	t-test / ANOVA
Predictors of practice	Multiple variables	Multiple regression
Significance level	—	$p < 0.05$

RESULTS AND DISCUSSION

1. Characteristics of the Study Participants

This study included 1,000 nurses working in governmental hospitals and primary healthcare facilities across several Saudi health clusters. The demographic and professional characteristics of the participants indicate a relatively young, academically prepared, and clinically diverse nursing workforce, which is reflective of the current nursing structure in Saudi governmental healthcare institutions.

The majority of participants were aged 25–34 years (42.0%), followed by those aged 35–44 years (26.0%), while 18.0% were younger than 25 years and 14.0% were aged 45 years or older. Female nurses constituted 62.0% of the sample. Most nurses held a bachelor's degree (69.0%), and more than half had five or more years of clinical experience (70.0%). Importantly, only 57.0% reported receiving formal diabetes-related training, highlighting a potential gap in continuing professional education.

Table 1 Demographic and Professional Characteristics of Participants (N = 1000)

Variable	Category	n (%)
Age	<25	180 (18.0)
	25–34	420 (42.0)
	35–44	260 (26.0)
	≥45	140 (14.0)
Gender	Male	380 (38.0)
	Female	620 (62.0)
Education	Diploma	210 (21.0)
	Bachelor's	690 (69.0)
	Postgraduate	100 (10.0)
Experience	<5 years	300 (30.0)
	5–10 years	410 (41.0)
	>10 years	290 (29.0)
Diabetes training	Yes	570 (57.0)
	No	430 (43.0)

The predominance of bachelor-prepared nurses supports the potential for evidence-based practice. However, the relatively limited exposure to formal diabetes training may explain some of the observed gaps in advanced knowledge and holistic care practices, a pattern also reported in previous nursing studies conducted in Saudi Arabia and comparable healthcare systems.

2. Nurses' Knowledge Toward Diabetes Care

Overall, nurses demonstrated **moderate to good knowledge** of diabetes care. High proportions of correct responses were observed for core concepts such as chronic hyperglycemia, HbA1c interpretation, recognition of hypoglycemia, and the nursing role in diabetes education. Conversely, notable misconceptions persisted regarding insulin dependency in type 2 diabetes and advanced insulin-related knowledge.

Table 2 Knowledge Items and Nurses' Responses (N = 1000)

Item	Knowledge Statement	Correct n (%)	Incorrect n (%)
K1	Chronic hyperglycemia defines diabetes	910 (91.0)	90 (9.0)
K2	HbA1c reflects 2–3 months control	870 (87.0)	130 (13.0)
K3	Type 2 diabetes always requires insulin	320 (32.0)	680 (68.0)
K4	Injection site rotation is necessary	820 (82.0)	180 (18.0)
K5	Rapid-acting insulin acts faster	760 (76.0)	240 (24.0)
K6	<70 mg/dL indicates hypoglycemia	890 (89.0)	110 (11.0)
K7	Sweating/tremors indicate hypoglycemia	840 (84.0)	160 (16.0)
K8	Polyuria/polydipsia indicate hyperglycemia	800 (80.0)	200 (20.0)
K9	Poor control increases infection risk	860 (86.0)	140 (14.0)
K10	Diabetic foot ulcers are common	830 (83.0)	170 (17.0)
K11	Nurses are key educators	950 (95.0)	50 (5.0)
K12	Early management reduces complications	900 (90.0)	100 (10.0)

The mean knowledge score was **8.9 ± 1.6**. Based on score categorization, **45.0%** of nurses had good knowledge, **41.0%** moderate knowledge, and **14.0%** poor knowledge.

These findings indicate that foundational diabetes knowledge among nurses is strong, likely reflecting undergraduate education and protocol-driven learning. However, gaps in insulin-related concepts are concerning, as insulin errors are among the most frequently reported medication errors in hospital settings. Similar knowledge patterns have been documented in regional and international nursing literature, emphasizing the need for advanced, practice-focused diabetes education.

3. Nurses' Practices Toward Diabetes Care

Nursing practices related to diabetes care showed a clear contrast between technical tasks and preventive care activities. Blood glucose monitoring, insulin verification, and documentation were performed consistently, whereas patient education, lifestyle counseling, and routine foot assessment were less frequently implemented.

Table 3 Nurses' Practices Toward Diabetes Care (N = 1000)

Practice Item	Never %	Sometimes %	Often %	Always %
Blood glucose monitoring	2.0	8.0	30.0	60.0
Documentation	3.0	10.0	32.0	55.0
Insulin dose verification	1.0	6.0	28.0	65.0
Injection site rotation	5.0	20.0	35.0	40.0
Hypoglycemia assessment	4.0	15.0	36.0	45.0
Protocol adherence	6.0	18.0	34.0	42.0
Patient education (symptoms)	8.0	22.0	40.0	30.0
Diet & lifestyle education	10.0	28.0	37.0	25.0
Routine foot assessment	12.0	30.0	33.0	25.0
Reporting complications	5.0	15.0	38.0	42.0

The overall practice score averaged **30.8 ± 4.9**, with **43.0%** demonstrating good practice, **39.0%** fair practice, and **18.0%** poor practice.

The dominance of task-based practices reflects strong compliance with hospital protocols but highlights deficiencies in holistic diabetes care. Preventive practices, particularly foot care and lifestyle education, are essential for reducing long-term complications but appear underprioritized, likely due to workload and time constraints—an issue widely reported in governmental hospital settings.

4. Relationship Between Knowledge and Practice

A statistically significant **moderate positive correlation** was observed between knowledge and practice scores (**r = 0.48, p < 0.001**), indicating that nurses with higher knowledge levels were more likely to demonstrate better diabetes care practices.

Table 4 Correlation Between Knowledge and Practice Scores

Variable	Mean ± SD	r	p-value
Knowledge score	8.9 ± 1.6	0.48	<0.001
Practice score	30.8 ± 4.9	—	—

While knowledge significantly influences practice, the moderate strength of the correlation suggests that knowledge alone does not guarantee optimal care. Organizational factors, staffing levels, and clinical environment likely mediate this relationship.

5. Factors Associated With and Predictive of Good Practice

Educational level, years of experience, clinical unit, and diabetes-related training were significantly associated with practice level. Multivariate analysis identified diabetes training and knowledge score as the strongest predictors of good practice.

Table 5 Factors Associated With and Predictive of Good Nursing Practice (N = 1000)

Factor	Statistical Indicator	p-value
Knowledge score	$\beta = 0.42$	<0.001
Diabetes training	OR = 1.88	<0.001
Years of experience	OR = 1.35	0.004
Educational level	$\chi^2 = 22.4$	<0.001
Clinical unit	$\chi^2 = 16.7$	0.002
Gender	$\chi^2 = 1.8$	0.18

These findings reinforce the critical role of structured diabetes education and experiential learning in enhancing nursing practice. Nurses who received formal training were significantly more likely to demonstrate good practice, supporting calls for mandatory, ongoing diabetes education across governmental hospitals.

Recommendations

Based on the study findings and supported by current evidence, the following recommendations are proposed:

1. Nursing Education and Training

- Implement **mandatory, structured diabetes-specific training programs** for nurses across all governmental hospitals, with a particular focus on insulin pharmacology, individualized glycemic management, and complication prevention.

- Integrate advanced diabetes care modules into **continuing professional development (CPD)** requirements for nursing license renewal.
- Strengthen collaboration with academic institutions to align undergraduate and postgraduate nursing curricula with current diabetes management guidelines.

2. Clinical Practice Enhancement

- Standardize nursing protocols to explicitly include **patient education, dietary counseling, and routine diabetic foot assessment** as core nursing responsibilities.
- Allocate **protected time** within nursing shifts for diabetes education and preventive care activities to ensure consistent implementation.
- Promote multidisciplinary diabetes care teams that actively involve nurses alongside physicians, dietitians, and diabetes educators.

3. Organizational and Policy-Level Interventions

- Embed diabetes care competencies within **nursing performance appraisal systems** to reinforce accountability and quality improvement.
- Enhance staffing models and nurse-to-patient ratios in high-burden units to reduce workload-related barriers to holistic diabetes care.
- Support hospital-based quality improvement initiatives that monitor nursing-sensitive indicators related to diabetes outcomes.

4. Research and Evaluation

- Conduct **longitudinal and interventional studies** to evaluate the impact of targeted training programs on nursing practice and patient outcomes.
- Expand future research to include patient perspectives and clinical outcome measures, such as glycemic control and complication rates.
- Encourage multicenter and national-level studies to generate comparative data across different Saudi health clusters.

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