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Assessment of Nurses' Knowledge, Attitude and Practice Regarding Nutritional Care Management of Diabetic Patients in Benha University Hospital

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ABSTRACT
Background: Diabetes mellitus (DM) is a major public health issue in Egypt and is regarded as a pandemic of modern times. Most medical professionals that help diabetic people manage their difficulties are nurses. Nutrition is a key element of diabetes control. **Objective:** This study aimed to evaluate nurses' knowledge, attitudes, and practices (KAP) on the dietary treatment of diabetes. **Subjects and methods:** A cross-sectional based survey was carried out on nurses working in medical and surgical departments, Benha University Hospital through the period from 1 June 2023 to 30 July 2023. To evaluate nurses' KAP, a verified self-administered questionnaire was utilized. The data were analyzed using descriptive statistics and multiple linear regression to detect predictors for nurses' knowledge, attitude and practice scores. **Results:** Age and awareness of national diabetes guidelines were revealed to be statistically significant determinants of participants' knowledge of dietary treatment for diabetes. Higher knowledge scores was significantly reported by nurses who were > 41 years (B = 7.68, P=0.03) and those who were aware of National Diabetes Guidelines (B = -5.39, P=0.02). Only 44% of nurses expressed satisfaction with the nutrition education received during their training in nursing universities and institutes. 86% never attended a refresher course on managing diabetes. Most nurses (68%) felt they had a responsibility and were qualified to educate patients about diabetes nutrition. It was shown that 60.6% of Benha University Hospitals' nurses had knowledge levels that were below average. Participants generally showed a moderate degree of understanding of the dietary treatment of diabetes. **Conclusion:** Although nurses' attitudes towards nutritional management of diabetic patients were good. In this study, the nurses declared a modest level of knowledge and practices in relation to the dietary care of diabetes mellitus.
Keywords: Nurses, Knowledge, Nutritional care management, Diabetes mellitus.

INTRODUCTION

Numerous researches had examined the effect of nutrition on the incidence and prevalence of diabetes during the past few decades [(1)]. The research emphasizes not just the pervasive impacts of diet on the development and consequences of diabetes, but also the part nurses play in empowering diabetic patients [(2)]. One of the primary duties of professional nurses is assisting chronically ill patients in acquiring self-management abilities. Education and counseling are frequently used to accomplish this. The main person in charge of giving diabetes patients the knowledge they need to improve their quality of life is a nurse [(3)]. Patient education improves patient outcomes, according to earlier research [(4)]. Therefore, nurses should be adequately knowledgeable to give patients the information they need. Diabetes patients tend to stay in hospitals longer than non-diabetic patients and have higher hospitalization rates [(5)]. Glycemic control, which may be attained through efficient management, is a cost-effective method of lowering the risk of complications of DM [(6)]. The ability of nutritional treatment of diabetes to enhance insulin sensitivity, decrease the frequency of hypoglycemia and hyperglycemic episodes, and regulate glycated hemoglobin (HbA1c) levels has been well documented [(7)]. Nutritional solutions that improve diabetes management and prevention that are inexpensive and simple to apply are extremely important. Consequently, diabetic individuals find it difficult to choose appropriate meal options and determine if a food item is suitable for eating according to their dietary needs. It has been determined that a significant obstacle to diabetic self-management regimens is this lack of comprehension [(8)]. People seeking comprehensive services, such as prevention, diagnosis, treatment, and referrals from the medical system should first consult primary health care (PHC). Many people believe that nurses working in PHC are essential to the efficient delivery of primary care services for chronically ill patients. However, relatively few researches have examined nurses working in PHC settings. The bulk of earlier studies that looked at nurses' awareness of diabetes-related nutrition concentrated on nurses in acute care settings [(9)]. Additionally, past research has shown that patients with chronic diseases like diabetes benefit the most from basic healthcare services [(10)].

As the frequency of hospital admissions related to diabetes increases, patients with diabetes are more likely to be encountered by nurses. Given the time they worked with patients, they are additionally in an exceptional position to enhance results for diabetes patients. Nurses must ensure that the hospital' patients are fed adequately and function as informal nutrition counselors due to the nursing profession's broad scope. They support patients during mealtimes when patients could ask for nutritional guidance [(11)].

As a result, nurses need to be familiar with the dietary management of diabetes recommendations. However, earlier research findings indicated a sizable knowledge gap among nurses regarding the dietary treatment of diabetic patients [(12)]. Lack of knowledge of the dietary requirements for individuals with

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diabetes by healthcare workers may lead to poor control of glucose and a higher probability of complications associated to diabetes. Of all the medical specialties, nurses had the lowest attitudes about treating diabetes. The way nurses treat diabetes nutritionally might be impacted by their views. Time, knowledge of nutrition, organizational support, and the availability of resources are other considerations [13]. Patient' safety requires strategies to lower the likelihood of hypo- and hyper-glycemia, and good dietary management can help patients reach and maintain their desired glycemic control levels. Because of this, it's critical for nurses to have a sufficient understanding of and a good attitude toward dietary treatment in diabetic patients. This study was built on the KAP model, which takes into account the use of a systematic, standardized questionnaire to gauge and evaluate what a target group knows (knowledge), believes (attitudes), and does (does), with relation to an intriguing subject.

In this study, we specifically aimed to ascertain the amount of nurses' health education and intervention, including their knowledge about the nutritional treatment of diabetes and how that information influenced nurses' attitudes and practices in this area. Overall, our study is a novel study about examining nurses' health education and intervention, including knowledge, attitudes, and practices related to dietary care of DM in Egypt.

SUBJECTS AND METHODS

A cross-sectional based survey was carried out on nurses working in Medical and Surgical Departments (Inpatient and Outpatient Units), Benha University Hospital from 1 June 2023 to 30 July 2023. The study population was staff/senior nurses (needed to be fixed-term licensed nurses who had completed their diploma/bachelor's degree in nursing or greater and had worked in a hospital's medical or surgical departments for at least thirty days). All nurses working in these units were approached by the researcher to engage in the study. A total of 67 nurses were eligible for the study, 50 nurses were willing to participate yielding a response rate of 74.6%.

Data collection tool:

Four elements of a self-reported, paper-based survey package were used to obtain the data. To achieve aim of the study, questionnaire was designed and translated to Arabic language. Questions on the sociodemographic and features of nurses' professions were asked in the first part. A previously validated and reliable modified Nutritional Management of Diabetes Knowledge Test (NMDKT) questionnaire of WHO (Cronbach's Alpha value of 0.65) was included in the second part [11]. The modified NMDKT contained 20 questions where the correct response received a 1, while the erroneous one received a (0), greater NMDKT scores suggest a greater degree of comprehension of the nutritional treatment of diabetes mellitus. The range of total scores was 0 to 20. Following standardization between 0 and 100, the NMDKT scores were divided into three groups: High knowledge (66.6–100), moderate knowledge (33.3–66.6), and low knowledge score (0-33.3). The Nurses' Attitudes on dietary management of diabetes questionnaire that was developed by **Farzaei *et al.*** [14] was included in the third part. Responses to the 15 questions on the diabetic nutritional care management survey ranged from strongly disapproving (1) to strongly agree (5) on a five-point Likert scale. The ultimate score might be between 15 and 75. Based on scores standardized between 0 and 100, the results were then divided into three groups: High attitudes (66.6-100), moderate attitudes (33.3-66.6), and low attitudes (0-33.3).

The last part consisted of the practices of nurses' on diabetic care management through Nutrition Questionnaire [14]. This questionnaire with replies ranging from never (1) to always (4) on a four-point Likert scale where it asked 15 questions. The range of possible practice scores is 15 to 60. The results of the practice tests on dietary treatment of diabetes mellitus were then scaled from 0 to 100 and divided into three groups: Good practice (66.6-100), moderate practice (33.3-66.6), and bad practice (0-33.3).

Ethical approval: The Research Ethics Committee of Benha University granted the study its ethical approval (RC: 45-5-2023). The administrators granted permission for entry to the hospitals. All approached nurses gave informed consents before participating in the study after explaining the study's objectives and its inclusion and exclusion criteria. Participants were assured that the questionnaire cover letter was anonymous, and that the data could not be linked to specific respondents or facilities. The Helsinki Declaration was followed throughout the study's conduct.

Statistical analysis: Descriptive statistics were employed to describe the variables of the respondents. Continuous data were presented as mean and standard deviation, while frequency and percentages were utilized for categorical and ordinal variables. Multiple linear regression analysis was used to determine the predictors for KAP scores. Pearson's correlation coefficient was used to measure the strength of those associations. IBM SPSS for Windows, Version 26, was used for statistical analysis. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Participants' characteristics: Table (1) summarized the demographic information, career history, and the studied nurses' educational background. Most respondents (n =33, 66%) were females and held a nursing bachelor's degree (n =48, 96%). The remaining participants (n =2, 4%) also held a nursing master's degree. The participants' average age was 29.8 ± 5.43 years. A whopping of the attendees (n=30, 60%) worked in medical wards, and the remaining

participants (n=20, 40%) worked in surgical wards. During their university training, only a small percentage of nurses (n=22, 44%) expressed satisfaction with the dietary information they had received. In this study, most nurses (n=43, or 86%) lacked diabetes refresher training. regarding knowledge, the participants who were aware of the use of Initial Nursing Assessment Sheet (INAS), the use of INAS completion Guideline and the National Diabetes Guidelines were (n=39, 78%), (n= 29, 58%), and (n= 42, 84%) respectively (Table 1).

Table (1): Socio-demographic traits of the studied nurses (n = 50)

Variables	Category	Frequency (%)
Age (years)	≤ 25	8 (16.0)
	26-30	25 (50.0)
	30-40	12 (24.0)
	≥ 41	5 (10.0)
	Mean (SD)	29.8 (5.43)
Gender	Male	17 (34.0)
	Female	33 (66.0)
Marital status	Single	13 (26.0)
	Married	37 (74.0)
Education	Bachelor in Nursing	48 (96.0)
	Master of Nursing	2 (4.0)
Relationship with a diabetic individual	Parent or sibling	24 (48.0)
	Partner and offspring	7 (14.0)
	Me	3 (6.0)
	Others	16 (32.0)
Working Wards	Surgical	20 (40.0)
	Medical	30 (60.0)
Nursing experience (years)	≤ 2	6 (12.0)
	3-5	27 (54.0)
	5-10	12 (24.0)
	≥ 10	5 (10.0)
Satisfaction with the obtained nutritional education during university or institute training	Very unsatisfied	5 (10.0)
	Unsatisfied	14 (28.0)
	Not sure	9 (18.0)
	Satisfied	22 (44.0)
Have you ever taken a diabetic management refresher course?	No	43 (86.0)
	Yes	7 (14.0)
Knowledge and utilizing of Initial Nursing Assessment Sheet (INAS)	Unaware of INAS	2 (4.0)
	Aware and used sometimes	9 (18.0)
	Aware and always used	39 (78.0)
Awareness and use of Initial Nursing Assessment Sheet completion Guideline	Unaware	4 (8.0)
	Aware but not read it	17 (34.0)
	Aware of it and always referred to it	29 (58.0)
Awareness of the National Diabetes Guidelines	Yes	8 (16.0)
	No	42 (84.0)
Average number of diabetic patients who received care/ month	≤ 5	13 (26.0)
	6-10	20 (40.0)
	11-15	8 (16.0)
	≥ 16	9 (18.0)
Offering diabetes education for patients during shifts	Yes	47 (94.0)
	No	3 (6.0)
Diabetes education type	Individual	33 (66.0)
	Group	1 (2.0)
	Individual with family member present	13 (26.0)
Effectiveness perception in nutritional managing of DM	I am ineffective	3 (6.0)
	I am somewhat ineffective	13 (26.0)
	I am somewhat effective	29 (58.0)
	I am effective	5 (10.0)
Desire to work as a diabetes link nurse	Yes	31 (62.0)
	No	19 (38.0)

Finding nurses' knowledge, attitude, and practice of dietary treatment of diabetes was the study's initial goal. The results revealed that, with a minimum score of 5 and a maximum score of 20, the mean knowledge score was 11.2 ± 1.2, 30 (60.6%) individuals showed intermediate knowledge based on standardized scores (Table 2).

Table (2): knowledge of diabetes nutritional care management among participated nurses (n = 50)

No	Questionnaire item	Correct item N (%)	Incorrect item N (%)
1	No nutrient should be eliminated from a diabetic's diet.	31 (62.0)	19 (38.0)
2	The diabetes diet is computed using the following factors: carbs, proteins, and lipids.	28 (56.0)	22 (44.0)
3	Trans-fats increases LDL* cholesterol levels.	33 (66.0)	17 (34.0)
4	Use total carbohydrates on food labels to determine amount of carbohydrates per serving.	9 (18.0)	41 (32.0)
5	Which foods in the breakfast that follows will elevate blood sugar levels?	38 (76.0)	12 (24.0)
6	More significant than the type of carbohydrate is the total amount of carbohydrates.	27 (54.0)	23 (46.0)
7	An FPG** of 126 mg/dl or more is indicator of diabetes.	32 (64.0)	18 (36.0)
8	Three to four sugar cubes could be used to treat symptomatic hypoglycemia.	39 (78.0)	11 (22.0)
9	Compared to whole milk, non-fat or low-fat milk has fewer calories and fat.	19 (38.0)	31 (62.0)
10	Carbohydrates should account for 50–60% of a diabetic's daily calorie consumption.	13 (26)	37 (74.0)
11	Fruits are recommended for diabetics.	47 (94.0)	3 (6.0)
12	Carbohydrates Only should be limited for the diabetic patients.	38 (76.0)	12 (24.0)
13	Diabetic patients should limit their intake of animal fat.	16 (32.0)	34 (68.0)
14	Exercise plays an essential component of diabetes prevention and management.	49 (98.0)	1 (2.0)
15	Increased sugar intake can lead to diabetes.	42 (84.0)	8 (16.0)
16	Obesity and diabetes are closely associated.	47 (95.0)	3 (5.0)
17	Diabetes is associated to hypertension.	38 (76.0)	12 (24.0)
18	Balanced diets are recommended for diabetic patients.	44 (88.0)	6 (12.0)
19	Protein should account for 10-15% of the daily caloric intake of diabetics	5 (10.0)	45 (90.0)
20	Diabetic patients should only consume 300 mg of cholesterol per day.	21 (42.0)	29 (58.0)
	Total knowledge score (Mean ± SD)	11.2 ± 1.2	

**** LDL: Low density lipoprotein; **FPG: Fasting plasma glucose; SD: Standard Deviation***

The second goal was to determine how nurses felt about managing diabetes nutritionally. The average score for attitudes was 59.7 ± 6.8, 43 (85.9%) individuals showed favorable attitudes toward dietary treatment of diabetes based on standardized ratings (Table 3).

Table (3): Nurses' attitudes towards diabetic nutrition care management (n = 50)

No	Attitude statements	Response, n (%)				
		1	2	3	4	5
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Blood sugar regulation is mostly dependent on diet for all diabetic patients	--	3 (6.0)	1 (2.0)	29 (58.0)	17 (34.0)
2	Not all hospitalized diabetic patients require an initial nutritional assessment.	11 (22.0)	25 (50.0)	9 (18.0)	3 (6.0)	2 (4.0)
3	One of the nurse's duties is to perform the initial nutritional evaluation	2 (4.0)	2 (4.0)	8 (16.0)	26 (52.0)	12 (24.0)
4	When a diabetic patient is admitted to the ward, their BMI should be determined and evaluated.	1 (2.0)	2 (4.0)	6 (12.0)	30 (60.0)	11 (23.0)
5	Compared to normal weight patients, Diabetic obese patients are more likely to experience diabetes complications.	--	1 (2.0)	2 (4.0)	27 (54.0)	20 (40.0)
6	The diabetic diet should be known to all diabetic patients.	1 (2.0)	1 (2.0)	2 (4.0)	27 (54.0)	19 (38.0)
7	The hospital's nutritionist is the only person in charge of providing nutritional therapy for diabetic hospital patients.	6 (12.0)	19 (38.0)	13 (26.0)	8 (16.0)	4 (8.0)
8	Lifestyle modification is mandatory to control blood sugar of diabetic patients to avoid complications	1 (2.0)	1 (2.0)	2 (4.0)	26 (52.0)	70 (40.0)
9	The cornerstones of managing diabetes are nutrition, diet, weight control, and physical activity.	--	1 (2.0)	3 (6.0)	24 (48.0)	22 (44.0)
10	It is important for nurses and other healthcare workers to understand that patient support and nutrition therapy involving dietary and lifestyle changes.	1 (2.0)	2 (4.0)	5 (10.0)	28 (56.0)	14 (28.0)
11	The nurse has an essential role in providing information to the nutritionist and patients' awareness of the diabetic diet.	--	2 (4.0)	4 (8.0)	43 (86.0)	1 (2.0)
12	One of the duties of nurses is to inform diabetic patients about the significance of a diabetic diet.	--	3 (6.0)	7 (14.0)	30 (60.0)	10 (20.0)
13	The nurse is crucial in improving the patient and family's awareness of the diabetes diet.	1 (2.0)	4 (8.0)	5 (10.0)	33 (66.0)	7 (14.0)
14	Nurses should revise the work of nursing assistants providing nutritional support to patients with diabetes in order to evaluate their nutritional status.	--	6 (12.0)	8 (16.0)	29 (58.0)	7 (14.0)
15	Effectiveness of nutritional interventions in diabetic patients should be evaluated by nurses.	1 (2.0)	1 (2.0)	9 (18.0)	4 (8.0)	35 (70.0)
	Total Attitude score (Mean ± SD)	59.7 ± 6.8				

SD: Standard Deviation

The third goal was to determine how nurses manage diabetes nutritionally and the average practice score was 43.1 ± 9.2 with 26 (51.9%) of the individuals showed intermediate-level practice based on standardized scores (Table 4).

Table (4): Nurses' practices regarding nutritional care management of diabetic patients (n = 50)

No	In the routine care of patients with diabetes:	Never %	Sometimes %	Often %	Always %
1	I evaluate the nutritional requirements of diabetic patients using the nurse initial evaluation sheet.	--	6 (12.0)	23 (46.0)	21 (42.0)
2	I determine and analyze a diabetic patient's body mass index (BMI).	2 (4.0)	7 (14.0)	21 (42.0)	20 (40.0)
3	I inquire about recent weight gain or loss with the patient's companion during the initial assessment.	1 (2.0)	6 (12.0)	21 (42.0)	22 (44.0)
4	In order to facilitate follow-up, I document my nursing diagnoses in the nurse report sheet pertaining to the nutrition of diabetic patients.	1 (2.0)	12 (24.0)	23 (46.0)	14 (28.0)
5	Based on primary and secondary data, I create and modify a nursing care plan for every diabetic patient.	6 (12.0)	6 (12.0)	6 (12.0)	32 (64.0)
6	I make sure that the ward's diabetic patients are getting the right types and amounts of food, following the nutrition consultant's recommended diet. If a patient requests a modification in kind or quantity, I work with the nutritionist to make that happen.	3 (6.0)	15 (30.0)	23 (46.0)	9 (18.0)
7	Based on the findings of the patient’s primary assessment, I will report the treating physician that the patient has diabetes to seek nutritional guidance.	2 (4.0)	8 (16.0)	11 (22.0)	29 (58.0)
8	I follow up with providing nutrition counseling and updating the nutritionist on the patient's nutritional condition.	7 (14.0)	14 (28.0)	19 (38.0)	10 (20.0)
9	I investigate the nutritional condition of the diabetic patients during the rounds/ visits,.	2 (4.0)	14 (28.0)	23 (46.0)	11 (22.0)
10	In order to improving the understanding of patients with diabetes and their families, I educate them about the diabetic diet.	1 (2.0)	7 (14.0)	24 (48.0)	18 (36.0)
11	I assess the efficacy of nutritional education given to diabetic patients using a variety of methods, such as test results and the Teach back approach.	2 (4.0)	13 (26.0)	21 (42.0)	14 (28.0)
12	I assess the nutritional requirements of patients with diabetes in different ways ; after insulin injections/ oral medications for treating DM, I visit the patient to make sure he or she has eaten the food.	--	7 (14.0)	27 (54.0)	16 (32.0)
13	I provide verbal guidance to diabetic patients/ their families on nutrition and diabetic diet at the time of discharge.	1 (2.0)	8 (16.0)	24 (48.0)	17 (34.0)
14	I give written information about nutrition and diabetic diets to patients and their families at the time of a diabetic patient's discharge.	3 (6.0)	15 (30.0)	19 (38.0)	13 (26.0)
15	On discharge, I document the training provided for the diabetic diet in the patient education template.	3 (6.0)	6 (12.0)	25 (50.0)	16 (32.0)
	Total practice score (Mean ± SD)	43.1 ± 9.2			

SD: Standard Deviation

Finding connections between nurses' KAP about the dietary treatment of diabetes was the fourth study goal and by using Pearson's correlation analysis, it was determined how knowledge, attitudes, and practices are correlated. Knowledge and attitudes had statistically significant correlations with practice scores. However, there was no statistically significant link between knowledge and attitudes (Table 5).

Table (5): Correlation between the nurses' knowledge, attitudes, and practice ratings with regard to managing diabetes nutritionally (n = 50)

Variable	Knowledge		Attitude		Practice	
	r	P value	r	P value	r	P value
Knowledge	1	--				
Attitude	-0.056	0.73	1	--		
Practice	0.123	0.048*	0.434	< 0.001**	1	--

r= Pearson correlation coefficient, *= Significant, **= Highly significant

Age and awareness of national diabetes guidelines were revealed to be statistically significant determinants of participants' knowledge of dietary treatment for diabetes. Higher knowledge scores was significantly reported by nurses who were > 41 years (B = 7.68, P=0.03) and those who were aware of National Diabetes Guidelines (B = -5.39, P=0.02) (Table 6).

Table (6): Relation between nurses' knowledge scores and the sociodemographic characteristics and the professional background (n = 50)

Variables	Category	β (95% CI)	P value
Gender	Female	6.32 (8.31-19.74)	0.13
	Male	Reference category	
Satisfaction with the obtained nutritional education during university or institute training	Very unsatisfied	3.17 (6.91-12.37)	0.44
	Unsatisfied	7.96 (2.20-11.85)	0.19
	Not sure	2.21 (3.64-8.27)	0.37
	Satisfied	Reference category	
Marital status	Single	-2.12 (-5.40-2.03)	0.74
	Married	Reference category	
Nursing experience (years)	<2	-9.47 (-18.60-9.28)	0.33
	3-5	-3.82 (-11.03-4.57)	0.27
	5-10	-5.13 (-14.68-7.23)	0.66
	>10	Reference category	
Age (years)	≤ 25	4.21 (6.25-8.42)	0.53
	26-30	2.43 (3.4-13.6)	0.42
	31-40	7.68 (0.65-8.80)	0.03*
	>41	Reference category	
Knowledge and utilizing of Initial Nursing Assessment Sheet (INAS)	Unaware	-6.43 (-5.11-12.76)	0.26
	Aware and used sometimes	-1.23 (-3.88-7.43)	0.52
	Aware and always used	Reference category	
Offering diabetes education for patients during shifts	Yes	9.06(5.82-13.36)	0.83
	No	Reference category	
Awareness of National Diabetes Guidelines	Yes	-5.39(-0.62 to-7.58)	0.02*
	No	Reference category	

β= Regression coefficient; CI= Confidence interval; *= Significant

Relation with someone having diabetes (P=0.01) and offering diabetes education for patients during shifts (P=0.004) were significant predictors of high nurses' attitudes towards dietary control of diabetes, while the other predictors were non-significant (Table 7).

Table (7): Relation between nurses' attitude scores and the sociodemographic characteristics and professional background (n = 50)

Variable	Categories	Multiple Regression β (95% CI)	P value
Average number of diabetic patients who received care/ month	≤ 5	-5.61 (-3.45-13.14)	0.52
	6-10	3.27 (6.48-14.86)	0.91
	11-15	2.89 (3.07-12.57)	0.24
	≥16	Reference category	
Relationship with a diabetic individual	Parent or sibling	8.92 (0.54-6.29)	0.01*
	Partner and offspring	1.26 (2.56-6.31)	0.78
	Me	4.11 (7.51-11.26)	0.63
	Others	Reference category	
Effectiveness perception in nutritional managing of DM	I am ineffective	2.12(-5.19- 21.31)	0.43
	I am somewhat ineffective	-4.23(-11.46-28.94)	0.16
	I am somewhat effective	7.43(6.48-15.60)	0.77
	I am effective	Reference category	
Offering diabetes education for patients during shifts	Yes	8.12(0.76-9.53)	0.004*
	No	Reference category	
Awareness of National Diabetes guidelines	Yes	3.97 (5.25-10.63)	0.49
	No	Reference category	
Diabetes education type	Individual	-6.09(-4.15-17.49)	0.81
	Group	9.52(7.30-22.61)	0.94
	Individual with family member present	Reference category	

β= Regression coefficient; CI= Confidence interval; *= Significant

Practice scores were significantly predicted by nurses' self-confidence regarding their ability to manage DM with nutrition and their practice in the control of diabetes via diet where nurses who reported that they were not competent had significant lower practice scores compared to those who reported that they were effective in the nutritional treatment of diabetes (P=0.002) (Table 8).

Table (8): Relation between practice scores and the professional background relationship of the study participants (n = 50)

Variable	Categories	Multiple Regression β (95% CI)	P value
Have you ever taken a diabetic management refresher course?	No	4.27(1.83-15.49)	0.23
	Yes	Reference category	
Effectiveness perception in nutritional managing of DM	I am ineffective	-9.18 (-21.02 to -6.55)	0.002*
	I am somewhat ineffective	-8.62 (-17.26 to-3.37)	0.01*
	I am somewhat effective	-5.07 (-12.91 to -1.79)	0.02*
	I am effective	Reference category	

= Significant

DISCUSSION

Diabetes mellitus is a chronic illness with the fastest rate of growth in the world. It must be controlled with medical prescriptions, physical activity, close observation, nutritional treatment, and patient education. Glycemic control must be achieved and maintained by proper nutrition. Diabetic patients' dietary needs are generally assessed and managed by registered dietitians or nutritionists. Nurses are more likely to meet diabetic patients due to a surge in hospital admissions. To ensure that patients obtain an optimal diet, nurses must act as informal nutrition counsellors and support them during mealtimes. They must also be familiar with the dietary management of diabetes recommendations [(15)].

The following are significant findings from our study: 1) only 44% of nurses expressed satisfaction with the nutrition education received during their training in nursing universities and institutes, 2) 86% never attended a refresher course on managing diabetes and 3) most of nurses (68%) felt they had a responsibility and were qualified to educate patients about diabetes nutrition. It was shown that 60.6% of Benha University hospitals' nurses had knowledge levels that were below average. Participants generally showed a moderate degree of understanding of the dietary treatment of diabetes. As the cornerstone of professional practice is knowledge, a danger to providing safe practice is posed by knowledge gaps in diabetes management especially dietary. An alarming finding of a review research pointed out that nurses across the world had considerable knowledge gaps in the fundamentals of diabetes treatment [(16)]. When comparing our results to previous studies, our study's average knowledge score was greater than **Albagawiet and colleagues** [(17)] who revealed that the total of 47.3% had correct answers. Meanwhile **Naz *et al.*** [(18)] showed that only 50% of the nurses in their research had adequate understanding of diabetes and meal planning. Most nurses, according to **Badshah *et al.*** [(19)] have little awareness about diabetes nutrition [(19)]. Similar information gaps were found in the study of **Oyewole *et al.*** [(20)] regarding important topics including diet of diabetic patients. Lack of dietary expertise among nurses may cause them to provide diabetic patients incorrect information, which might result in a rise in the frequency of complications from diabetes, and higher treatment costs due to bad management of the disease [(21)].

On trying to explore the reason for this knowledge deficit among nurses, these results found that only 44% of nurses reported their satisfaction regarding the nutrition education received during their training besides that the majority of them (86%) didn't receive any refresher course in diabetes management after graduation from nursing university or institute. These findings are confirmed by **Alhaiti *et al.*** [(22)] who conducted a study in Saudi Arabia and revealed that most Saudi Arabian nurses (78.4%) didn't have any recent training on diabetes. In addition, this study is in agreement with Turkish study by **Samancioglu *et al.*** [(23)], at which significant differences were found in the nurses' knowledge on diabetic care recommendations depending on participation in diabetes course. Programs for continuing education and orientation should be provided to nurses who provided care for diabetic patients and it would be beneficial for nursing schools to incorporate patient care courses for chronic illnesses like diabetes, particularly its dietary treatment into their core curricula in order to better address the needs of patients and their families [(24, 25)].

It was encouraging to see that most nurses in our survey had positive attitudes on managing diabetes mellitus nutritionally. This is consistent with a Korean study conducted by **Kim and Choue** [(26)] and a study conducted by **Carney *et al.*** [(27)] who reported that more than 70% of participants revealed that nurses play a crucial role in empowering patient education regarding nutrition. But this is inconsistent with **Babelgaith and colleagues** [(28)] study in Yemen at which nurses scored the lowest for attitude toward diabetes care among healthcare professional categories. Also, **Oyewole *et al.*** [(20)] research in Nigeria at which negative attitudes about diabetes care generally was observed among nearly half of the participated nurses. Positive attitudes might be seen as a chance to enhance nurses' expertise and capacity in addressing nutritional elements of diabetes mellitus.

On exploring the available literature, we found that only little research directly evaluated nurses' practices in relation to nutritional treatment of diabetes. So, direct comparison with other studies is challenging. In general, half of the study's nurses claimed to have intermediate-level practice in managing diabetes nutritionally. Nurses' practice towards nutritional care management of diabetes was higher than what was found in an Iranian study by **Emami *et al.*** [(29)] at which nurses' standard of nutritional screening and the following referral to nutrition specialists for a competent nutritional evaluation was minuscule. Patients' results significantly impacted by the initial nutritional evaluation given to chronically sick patients, especially those with poorly managed diabetes. This moderate level of nurses' nutritional assessment for DM may be due to the heavy duties referred to the nurses that make them try to prioritize it due to crowded busy work schedule.

The current investigation discovered a favorable relationship between practice with knowledge and attitudes. There was a significant correlation between knowledge and practice scores among nurses, which is in line with the findings of **Sugiharto *et al.*** [(30)] at which community health center nurses' abilities and self-assurance in management of patients with diabetes improved as a consequence of the diabetes training program that enhanced their

knowledge and skills. Also, with a study conducted by **Miriam *et al.*** [31] at which nurses who had received nutrition care training five years prior to the study thought their department provided superior care than those who had not.

Moreover, there was a significant correlation between nurses' attitude towards nutritional management of DM and practice scores in current findings, which agree with **Miriam *et al.*** [31] who conducted a study that revealed a significant positive correlation between the perceived significance of nutrition and the standard of nutritional care that was observed among studied nurses.

Among the findings of this survey, nurses with older age and those who were aware of national diabetes guidelines had considerably higher knowledge scores concerning nutritional treatment of diabetes and this is matched with the findings of **Albagawi *et al.*** [17] where nurses older than 30 years demonstrated significantly greater knowledge scores compared to their colleagues. Moreover, **Alotaibi *et al.*** [32] reported that those who had access to diabetes policies and guidelines reported significantly greater scores for both perceived and actual diabetes knowledge.

For nurses, having access to support and guide aid can improve their capacity for knowledge acquisition and updating. Most nurses said that the organization's contribution in enhancing nurses' understanding of diabetes care through the organization of workshops and seminars was significant [33]. Studies conducted in the past have demonstrated the value of educational programs in assisting nurses in bridging the knowledge and competence gaps that exist [34]. The current findings can be utilized to create evidence-based teaching programs for nurses to increase their understanding of diabetes in this regard. These educational courses may be provided as continuous nursing education (CNE) in-service training. Additionally, at university hospitals, clinical guidelines that emphasize providing diabetic nutrition education may be devised and put into practice. Moreover, nursing curricula might be revised considering the study's findings to ensure that future nurses will be sufficiently qualified to provide diabetic nutrition education.

The current study also found a link between engagement in diabetes education and attitude ratings. Nurses with a more favorable attitude towards dietary therapy of diabetes were those who educated diabetic patients while at work. This is consistent with **Farzaei *et al.*** [14] findings. Moreover, this finding is in agreement with **Fachirah and Sari** [35], who found that family history of diabetes is a factor that impacts attitude and practice towards the disease management including proper nutrition. This study found that nurses' relation with someone having diabetes predicted their attitudes towards dietary control of diabetes.

CONCLUSIONS

Although nurses' attitudes towards nutritional management of diabetic patients were good, in this study, the nurses declared a modest level of knowledge and practices in relation to the dietary care of diabetes mellitus. The factors that influenced nurses' knowledge, attitudes, and practices included age of nurse, awareness regarding national diabetes guidelines, relation with someone who has diabetes, having opportunities to teach people with diabetes while working in a hospital, and being confident in the nutritional management of diabetes competency. In response to the arising global trend towards diabetes and the influential role that nutrition plays in its treatment, nurses' knowledge, attitudes, and practices regarding nutritional care for diabetes need to be taken into account as one of the educative priorities. Examining the educational curricula and providing continuous nursing education in-service training is necessary to ensure that nurses are properly educated on the treatment of diabetes.

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