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Knowledge of Diabetes Mellitus among Registered Nurses in Benin City

Abstract

Purpose: To determine the level of diabetes knowledge and knowledge gaps among registered nurses.

Methods: We conducted a cross sectional study among four major hospitals located in Benin City. Levels of knowledge were assessed using the 23-item University of Michigan Diabetes Research and Training Centre Knowledge Test questionnaire. Demographic characteristics of the respondents were also outlined. Association and differences between nurses' knowledge scores and relevant demographic variables were carried out using Pearson correlation and Student t-tests as appropriate.

Results: The 191 nurses who participated in the study had an average score of 61.9 ± 14.24 on a 100 point scale. No nurse was able to correctly answer all questions. Nurses were able to recognise long term complications of diabetes with 86.9%, 86.4% of the respondents answering correctly questions on symptoms of numbness and tingling, cause of high blood glucose, and problems associated with diabetes respectively. Although, nurses knew that diet plays a great role in management of diabetes mellitus, they were not aware of the effect of "unsweetened" fruit juice on blood glucose (15.2%), a free food for a diabetic (20.9%), and the identification of a proper diabetes diet (42.9%). There was a statistical difference in the knowledge scores of nurses that had a family history of diabetes and those that did not ($P < 0.05$).

Conclusion: The knowledge of the nurses sampled as regards diabetes mellitus was less than satisfactory; areas of knowledge deficits include diet and signs of acute complications of diabetes as well as proper foot care. We suggest regular appraisal of nurses' knowledge requirement followed by educational training tailored to improve nurses' level of knowledge.

Keywords: Nurses, Health education, Understanding of diabetes.

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Introduction

Diabetes has emerged as one of the world's biggest health problems and its prevalence is increasing at an alarming rate. People with diabetes who want to live their lives without limits will need to know a lot about their illness [1] and develop a range of competencies that allow them to take greater control over the treatment of their disease. This requires comprehensive education that promotes health whilst respecting individuals' self-perceived needs and voluntary choices [2,3,4]. Whilst such a concept is not new in the field of diabetes, health professionals are still struggling with how to administer it successfully [2]. One way to reduce the morbidity and mortality from diabetes is to educate people with diabetes in self care practices. According to the United States National Standards for Diabetes self-Management Education, Diabetes Self-Management Education (DSME) is the cornerstone of care for all individuals with diabetes who want to achieve successful health-related outcomes. These standards for DSME are designed to define quality diabetes self-management education that can be implemented in diverse settings and will facilitate improvement in health care outcomes. [5]

Epidemiologic data indicate that large numbers of patients do not receive the proper care or education necessary to develop such self-management abilities [1]. This is traceable to the type and quality of diabetes related instructions that patients receive from healthcare professionals [6]. Nurses are key providers of diabetes care but research has shown that their knowledge is variable [7]. Nurses play an important role in diabetes education as they constitute the largest group of healthcare professionals who have a lengthy contact with diabetic patients. The need for nurses to play an active role in diabetes education has been discussed though evidence indicates that this role is not undertaken appropriately [8,9]. Reasons identified by nurses for this shortcoming include the patients' lack of understanding and lack of desire to understand, the nurses' workloads, and lack of confidence. Studies have been carried out

to determine the knowledge of nurses in diverse settings among many specialties of nursing. One study directly measured and compared the knowledge of surgical and medical nurses [10]. The results were not statistically significant but indicated that the mean knowledge score was lower for surgical nurses than for medical nurses. Another study noted that in general, nurses' knowledge was adequate, but there were deficiencies in certain aspects of diabetes management [11]. Yet another study revealed that nurses' understanding of diabetes is not at a desirable level to provide adequate diabetic care [7].

In Nigeria nurses are the largest members of the health care team and are the ones who often carry out a semi formal diabetes education of patients. To the best of our knowledge there is little information on the knowledge of nurses and indeed other health care professionals who care for patients with diabetes in Nigeria. This study was therefore designed to determine the level of diabetes knowledge as well as to identify knowledge gaps, if any, among registered nurses in four hospitals located in Benin City, Nigeria.

Methods

Setting

This cross-sectional study was carried out in Benin City, Edo State located in Southern Nigeria. Four hospitals were used in the study namely; University of Benin Teaching Hospital (UBTH), Central Hospital, St Philomena Hospital and Faith Medical Complex. UBTH is a federal government owned 560-bed tertiary health care facility, which is the sixth of the first generation teaching hospitals in Nigeria. Central Hospital is a state government owned secondary health care institution with about 450 beds, while St Philomena and Faith Medical Complex are privately owned institutions with a capacity of 120 and 50 beds, respectively.

Population

The study population consisted of consenting registered nurses working in all the wards of the

afore-mentioned hospitals during the period of the study. The wards were visited repeatedly and the questionnaires distributed to the nurses at work. Questionnaires completed immediately were retrieved immediately while others were collected at a later time.

Study instrument

A structured standard questionnaire consisting of closed ended questions with multiple choice responses was employed. The first part of the questionnaire addressed the demographics of the respondents such as age, qualification, marital status and other additional qualifications. The second part utilized the University of Michigan Diabetes Research and Training Centre Knowledge Test questionnaire which is a valid and reliable instrument for the estimation of general diabetes knowledge [12]. It consists of 23 questions; 14 general multiple choice test and 9-item insulin subscale used to assess diabetes related knowledge of the respondents as regards diagnosis, treatment, complications and lifestyle modifications. This part also covered knowledge regarding optimal glucose control levels, hypoglycaemia and recognition of microvascular and macrovascular complications, diet and exercise. Each correctly answered question earned a score of 1 and a total score was summed and converted to percentage with 23 or 100% being the maximum score.

Data analysis

Data from the questionnaire were entered into Microsoft Excel. Descriptive and inferential statistics were done using SPSS software version 10 (SPSS Inc, Chicago IL, USA) and InStat version 3 (Graph Pad, San Diego, USA). Pearson correlation was used to determine the level of association between knowledge scores and relevant demographic variables such as having a family history of diabetes, previous diabetic education, age, gender, qualifications etc. Student t-tests was employed to determine differences in knowledge score with respect to categorical variables as well as compare knowledge scores of nurses across hospitals. At 95% confidence interval, 2-tailed p values were considered significant if ≤ 0.05 .

Results

A total of 300 questionnaires were distributed and 191 completed and usable questionnaires were retrieved giving a response rate of 63.6%. Of this, 166 (86.9%) were females. The average years of work experience of the nurses was 12 ± 9.4 years (4 months to 35 years). Forty six nurses had additional qualifications in different areas and the most frequent additional qualification was the Diploma in Nursing Administration and Management (DNAM) – 18 (9.4%) (Table 1).

Table 1: Profile of respondents

Variable	Frequency	Percent
Location		
Central	48	25.1
Faith Medical Complex	42	22.0
St Philomena	31	16.2
UBTH	70	36.6
Total	191	100.0
Age		
20-30	50	26.2
31-40	71	37.2
41-50	51	26.7
51-60	19	9.9
Total	191	100.0
Sex		
Female	166	86.9
Male	25	13.1
Total	191	100.0
Marital Status		
Divorced	1	0.5
Married	129	67.5
Single	61	31.9
Total	191	100.0
Qualification		
BSc	8	4.2
Registered Nurse	44	23.0
Midwife	6	3.1
Registered Nurse/Midwife	132	69.1
Not indicated	1	0.5
Total	191	100.0

Majority of the nurses claimed they had no family history of diabetes mellitus while 157 (82.2 %) and 34 (17.8 %) nurses were on the contrary. Of these 34 nurses only 19 (55.9 %) had first degree family relatives suffering from diabetes, that is, mother, father, brother, sister, or a husband or wife. Out of the total number of

Table 2: Diabetes knowledge score by respondent characteristics

Variable	N	Mean	%	P value
Sex				
Male	25	14.48±2.78	62.96	0.6570
Female	166	14.20±2.9	61.70	
Age				
20-30	50	13.92±2.93	60.50	0.5476
31-40	71	14.23±3.05	61.90	
41-50	51	14.27±2.68	62.04	
51-60	19	15.05±2.66	65.40	
Diabetic Education				
Nurses with Diabetic Education	54	14.26±2.67	62.00	0.9560
No Diabetic Education	137	14.23±2.97	61.90	
Family History				
Family History	34	13.35±2.96	58.00	0.0470
No Family History	157	14.43±2.84	62.70	
Qualification				
BSc	8	14.38±4.44	62.50	0.3559
Registered Nurse	44	13.57±3.14	59.00	
Midwife	6	13.83±2.93	60.10	
Registered Nurse/Midwife	132	14.45±2.64	62.80	
Wards				
Medical Ward	83	14.13±2.994	61.40	0.5906
Non-Medical Ward	108	14.36±2.635	62.40	
Perceived Knowledge of Diabetes Mellitus				
Yes	178	14.31±2.85	62.23	0.3836
No	7	13.57±3.26	59.00	
Unsure	6	14.27±3.43	62.04	

nurses that participated in this study, only 1 nurse claimed she was diabetic hence no relationship between this parameter and knowledge score could be determined. Majority of the nurses (137, 71.7%) affirmed they had not received any recent diabetic education, while the rest claimed to have had a recent diabetic education. Seven nurses (3.7%) agreed they did not have good knowledge of diabetes mellitus, 6 (3.1%) were unsure and 178 (93.2%) thought they were knowledgeable.

The mean knowledge score for all nurses was 14.15±2.86 corresponding to a mean percentage score of 61.5±12.43%. No nurse was able to correctly answer all questions. Those that had a family history of diabetes performed significantly better than others ($p=0.05$). Previous diabetic education, age, gender, qualifications, perceived knowledge of diabetes, ward of practice of nurses on diabetes knowledge had no significant effect (Table 2). There was a poor correlation between years of experience and diabetes knowledge ($r=0.2152$, $p<0.001$).

Respondents had better knowledge on questions relating to complications of diabetes. They were able to recognize long term complications of diabetes with 164 (86.4%), 188 (86.9%) and 165 (86.4%) of the respondents answering correctly questions on symptoms of numbness and tingling, causes of hyperglycemia and problems associated with diabetes. The majority of nurses (84.8%) who answered the question on the effect of unsweetened juice on blood glucose got it wrong; most of the respondents (95, 49.7%) thought that unsweetened fruit juice had no effect on blood glucose. Some respondents (40, 20.9%) correctly identified a “free food” for patients with diabetes, while majority (68, 35.6%) thought that the correct answer was any food that says “sugar free” on the label. More than half of the nurses (109, 57.1%) could not identify a proper diabetic diet. The most frequently incorrect answer chosen was that a diabetic diet was too high in protein for most normal people (64, 33.5%).

Table 3: Frequency (%) distribution of answers to questionnaire items (N=191)

Item	Frequency of correct answer (%)
What effect does unsweetened fruit juice have on blood glucose?	29 (15.2)
Which of the following is a “free food” for a diabetic?	40 (20.9)
Signs of ketoacidosis	53 (27.7)
Which should not be used to treat low blood glucose?	61 (31.9)
Which one of the following will most likely cause an insulin reaction?	72 (37.7)
The diabetes diet is?	82 (42.9)
If a diabetic has taken an intermediate acting insulin he is most likely to have an insulin reaction in?	83 (43.5)
The best way a diabetic can take care of his feet is?	102 (53.4)
Glycosylated haemoglobin is a test that measures average blood glucose level for the past	109 (57.1)
Which is the best method for testing blood glucose?	122 (63.9)
Infection is likely to cause	128 (67.0)
Which of the following is highest in fat?	135 (70.7)
For a person in good control, what effect does exercise have on blood glucose	136 (71.2)
A diabetic realises just before lunch that he forgot to take his insulin before breakfast, what should he do?	138 (72.3)
If a diabetic takes his morning insulin but skips breakfast his blood glucose level will	143 (74.9)
If a diabetic is sick with the flu (cold), which of the following changes should he make?	148 (77.5)
If a diabetic is beginning to have an insulin reaction, he should.....	149 (78.0)
Low blood glucose may be caused by	151 (79.1)
Eating food lower in fat decreases a diabetic’s risk of	153 (80.1)
Numbness and tingling may be symptoms of	165 (86.4)
Which of the following is usually not associated with diabetes?	165 (86.4)
High blood glucose may be caused by	166 (86.9)
Which of the following is highest in carbohydrate	174 (91.1)

Only 53 (27.7%) and 61 (31.9%) of respondents correctly answered questions on signs of ketoacidosis and what should not be used to treat low blood glucose, respectively. Most of the respondents (83, 43.5 %) thought that a sign of ketoacidosis was sweating and hard candies should not be used to treat low blood glucose. Less than half of the nurses (83, 43.5%) answered correctly that a diabetic who had taken an intermediate acting insulin would have an insulin reaction in 6–12 hr. Only 73 (38.2%) of them chose 1 – 3 hr, which was the most frequently chosen incorrect answer. Others (19, 9.9%) and (16, 8.4%) indicated 12 – 15 hr and more than 15 hr, respectively. Questions aimed at determining the nurses’ knowledge on likely causes of an insulin reaction were answered poorly, with 112 (62.3%) of nurses giving incorrect answers. About half of the nurses responded correctly to

the question on foot care, 102 (53.4%) agreed that the best way to care for the feet was to look at and wash them daily. However, quite a large number 80 (41.9 %) indicated that buying shoes a size larger than usual was the best way to care for the feet of diabetic (Table 3). When nurses’ knowledge scores were compared based on hospitals where they practiced, it was found that there was no significant difference in scores ($p=0.652$).

Discussion

Normally it is expected that more experienced nurses should be more knowledgeable about diseases and their management and should be involved in the training and inculcating relevant skills to the younger inexperienced nurses. From the results of this study, we found a poor

correlation between years of experience and knowledge scores, inferring that for our nurses, years of experience do not guarantee greater knowledge in diabetes mellitus. We suppose that this is probably because as these nurses climb up the ladder of the profession their roles majorly become administrative, and have less time for programmes on continuing education because of their busy schedules. This thought is also buttressed by the fact that the most frequent additional qualification obtained by these nurses is the Diploma in Nursing Administration and Management.

Nurses in this study who claimed to have received recent diabetic education fared just as poorly as those who had not received any recent diabetic training; this is unlike other studies where positive correlation between higher knowledge scores and recent diabetes training was recorded [13]. Our respondents who perceived they had a good knowledge of diabetes fared just as poorly as those who thought otherwise. It has been reported that the nurses in their study who thought they had knowledge about diabetes scored less than those who thought they knew little [6,13]. It can therefore be deduced that these nurses' knowledge on diabetes has either become outdated or recent trends in the care and management of diabetic patients were not known to them.

Areas of knowledge deficits, such as diabetic diet, could be due to the nurses' misconception based on cultural beliefs that a diabetic patient is not supposed to take food containing sugar or high quantity of carbohydrates. Most of the nurses claimed that a diabetes diet is a diet that is too high in protein and any food that says "sugar free" on the label is good for the diabetic. But recent findings suggest that diabetic diet should be well balanced, low in fat and high in protein [14-17]. Fats, proteins, and carbohydrates (which are the major classes of food) are important and should be present in a diabetic's diet but the proportion should be individualized with the help of a dietician. This misconception by nurses was also seen in their response to the effect of unsweetened fruit juice on blood glucose. The knowledge deficits pertaining to diet by the

nurses are noteworthy and become especially important when we consider the fact that the global market has developed and many unhealthy eating habits have spread from industrialized to developing countries; this coupled with the reality that energy – dense foods rich in fats and carbohydrates are often cheaper than healthy foods means that diabetic patients must therefore be properly educated on lifestyle changes with regard to diet [17].

Most nurses performed averagely in areas focusing on foot care and methods of measuring blood glucose. Although, nurses were knowledgeable in the fact that people with diabetes had problems with their feet, they erroneously believed that the best way diabetics can take care of their feet was by wearing shoes larger than usual indicating a theory – practice gap.

There are areas of knowledge that need to be improved if the care provided to people with diabetes is to be enhanced. Nurses in this study have been shown to possess insufficient knowledge in some areas to fulfill these recommendations or to teach patients appropriately. Lack of knowledge or inadequate knowledge among nursing staff has contributed to diabetic patients receiving inadequate health care instruction [8].

Conclusion

In this study the knowledge of nurses sampled as regards diabetes mellitus was less than satisfactory. Areas of knowledge deficits include diet and signs of acute complications of diabetes as well as proper foot care. We suggest regular appraisal of nurses' knowledge requirement followed by educational training tailored to improve nurses' level of knowledge. The knowledge gaps identified in this study can be a focus for initiating educational programmes.

Conflict of Interest

We declare no conflict of interest with this work.

Contribution of Authors

We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. VUO conceived, designed, and analysed the data. IE collected, analysed, and took part in writing the manuscript. Both authors contributed to the final write up.

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