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## Research Article

# Patients' Knowledge of Diabetes Mellitus in a Nigerian City

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## Abstract

**Purpose:** To assess the knowledge of diabetes mellitus among diabetes patients and to identify knowledge deficits and patient specific characteristics that are associated with this knowledge.

**Methods:** This was a descriptive cross sectional observational clinic study conducted among previously diagnosed patients with diabetes attending the Consultant Outpatient Departments (COPD) of the University of Benin Teaching Hospital (UBTH). The study employed the use of a 14-item Diabetes Knowledge Test (DKT), developed by the University of Michigan Diabetes Research and Training Centre (MDRTC) and a demographic questionnaire to assess patient's knowledge and its association with some patient specific variables.

**Results:** The overall mean knowledge score of the subjects was  $5.54 \pm 2.3$  (39.5 %  $\pm$  16.7 %) range 7 - 79 %. There was no statistically significant difference in knowledge scores with respect to family history of the disease, recent training in DM, age and sex  $p > 0.05$ . Respondents without any formal education scored significantly higher in the DKT ( $7.0 \pm 2.27$ ) followed by those with post graduate and University education  $6.67 \pm 2.41$  and  $6.65 \pm 2.41$  respectively. Higher score on the DKT was significantly correlated with duration of disease awareness ( $r = 0.217$ ; 95 %CI = 0.02 – 0.39,  $p < 0.05$ ) but not associated with improved glucose control as measured by FBG levels. ( $r = -0.073$ ; 95 %CI = -0.277 - 0.137,  $p > 0.05$ ). Only 12 (13.5 %) of the respondents had FBG levels with the normal range of 5.6 – 6.9 mmole/L.

**Conclusion:** Respondents' knowledge of diabetes mellitus based on the DKT was very poor. There were knowledge deficits which relate to misconceptions in the diabetics diet and knowledge of blood glucose monitoring with glycosylated haemoglobin test. Longer duration of diabetes, irrespective of educational status, was associated with higher knowledge score.

**Keywords:** Diabetes, knowledge, Patient's characteristics.

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## INTRODUCTION

The practice of diabetes care has dramatically changed during the past three decades. Knowledge regarding diabetes pathophysiology has rapidly accumulated and has led to the development of new medications. The current philosophy of diabetes care places emphasis on patient autonomy and optimal utilization of health care professionals' different specialties [1]. Efficient management of diabetes includes the patient developing an understanding of his or her disease and incorporation of such knowledge into an effective self-care programme [2, 3].

Diabetes knowledge may enhance the ability of diabetic patients to cope and adjust to their illness (4). Similarly, patients with greater understanding and knowledge of their medications have been shown to have better glycaemic control (5). On the other hand, poor knowledge of diabetes is associated with increased rate of hospitalization for unstable diabetes [6].

The UK Prospective Diabetes Study (UKPDS) showed that proper control of blood glucose could reduce the complications of diabetes (7). In order to achieve proper glucose control patients need to adhere to medications, undertake lifestyle modifications and frequent blood glucose monitoring. All these behavioural changes require proper education and counselling of the patient.(8). Patient education could be provided formally or informally. Evidence suggests that formal programmes are more effective, especially if they are non- didactic and are oriented towards behaviour modification [6].

Generally, there is increasing amount of evidence to suggest that patient education for people with chronic diseases such as diabetes is an essential component of disease management. Mazzuca et al carried out three comprehensive reviews of the patient education literature and the reviews converge on 2 general findings. "First,

education in any form is better than none i.e. use of pamphlets, films, lectures, behavioural modification techniques is more likely to produce improved outcomes than is routine chronic care without formal patient education. The second general finding is that all types of patient education programmes are not equal. They, like others, concluded that behavioural oriented patient education to be 150- 300% more potent than didactic programmes" [9].

Patient education has been termed the cornerstone of care for patients with type 2 diabetes mellitus (DM). Patients need to make informed decisions about diet, exercise, weight control, blood glucose monitoring, use of medications, foot and eye care, and control of macrovascular risk factors for the patient to make informed decisions [10,11]

In a previous study, we reported the less than satisfactory knowledge of diabetes among nurses (12) who constitute numerically the largest component of the health care team and often the ones who undertake a semi formal diabetes education of patients, in our public hospitals. This present study therefore seeks to assess the knowledge of diabetes mellitus among these diabetes patients, and to identify knowledge deficits and patient specific characteristics that are associated with this knowledge.

## METHODS

### Setting

The study was conducted among previously diagnosed patients with diabetes attending the Consultant Outpatient Departments (COPD) of the University of Benin Teaching Hospital (UBTH) Benin City, Nigeria. The hospital is a tertiary health care facility catering for the health care needs of the generality of people in Benin City, as well as referrals from the neighbouring states. An average of 54 diabetic patients attends the clinics daily.

## Sample

Consenting consecutive patients previously diagnosed by a consultant endocrinologist using the WHO 1999 criteria were recruited as they took their turn to see the physician. Patients included in the study were those who were above 18 years old and were known diabetic with either type 1 or 2 diabetes. Patients were excluded from the study if they refused consent, were below 18 years, had severe speech or obvious mental impairment, were pregnant or had no diagnosis for type 1 or 2 diabetes.

Prior to the interview, the purpose of the study was clearly explained to the patients and those who could read and write self-completed the research questionnaire, while the researcher was on hand to attend to any queries arising from the respondents. On the other hand one of the researchers assisted those who could neither read nor write to complete their questionnaires. The researcher ensured that these illiterate respondents understood the questions by eliciting feedback from them. Following completion of the questionnaire each patient's fasting blood glucose (FBG) level was determined.

## Study instrument

The University of Michigan Diabetes Research and Training Centre (MDRTC) Diabetes Knowledge Test (DKT) was used with kind permission to assess patients' knowledge of diabetes mellitus. The questionnaire consisted of 23 items which represented a test of general knowledge of diabetes. The first 14 items (which was used in this study) is appropriate for people who do not use insulin, while the entire 23 items can be administered to those who use insulin [13]. Some patient's demographic data such as age, sex, educational level, duration of diabetes, family history, smoking and alcohol use were included. Patients were also asked if they thought they had a good knowledge of diabetes and if they had received any recent diabetic education.

## Data analysis

In this study, each correct answer was awarded 1 point and the total score was converted to percentages. The maximum score obtainable in the DKT is 14. Higher scores indicate higher knowledge based on the DKT. Scores on the DKT were computed for each patient and the subjects' corresponding diabetes control parameters were entered into Microsoft Excel database, this was then loaded into Statistical Package for Social Sciences (SPSS) version 10. Demographic variables were reported as percentages. Student's *t*-tests were performed to investigate relationships between factors. Pearson correlation was done to examine bivariate associations between diabetes knowledge and demographic variables.

## RESULTS

A total of 100 patients were recruited and these completed the questionnaire. The mean age of the respondents was  $54.8 \pm 11.9$  years. Majority were male 52%, had no previous training on diabetes mellitus 56% and had Type 2 diabetes 96%. Married subjects constituted 87% of the sample population 6% were single, 5% divorced and 2% widowed. The mean duration of subjects awareness of their diabetic status was  $6.2 \pm 5.7$  years. Other demographics are as shown in Table 1.

The mean fasting blood glucose (FBG) level of the respondents was  $7.89 \pm 3.6$  mmol/L (range 4 – 20 mmol/L). The overall mean knowledge score of the subjects was  $5.54 \pm 2.3$  (39.5%  $\pm$  16.7%) (range 7 – 79%). There was no statistically significant difference in knowledge scores with respect to family history of the disease, recent training in DM, age and sex  $p > 0.05$  (Table 1). Respondents without any formal education scored significantly higher in the DKT ( $7.0 \pm 2.27$ ) followed by those with post graduate and University education  $6.67 \pm 2.41$  and  $6.65 \pm 2.41$ , respectively.

Higher score on the DKT was significantly correlated with duration of disease awareness ( $r=0.217$ ; 95% CI= 0.02 – 0.39,  $P < 0.05$ ) but not associated with improved glucose control as measured by FBG levels. ( $r= -0.073$ ; 95% CI = -0.277-0.137,  $P > 0.05$ ) Only 12 (13.5%) of the respondents had FBG levels with the normal range of 5.6 – 6.9 mmole/L others are as shown in Table 1.

**Table 1:** Patient characteristics and DKT scores

| Characteristic               | N  | Test score (Mean $\pm$ SD) | P-value |
|------------------------------|----|----------------------------|---------|
| <b>History</b>               |    |                            |         |
| Family history of DM         | 43 | 5.14 $\pm$ 2.31*           | 0.06    |
| No family history of DM      | 50 | 6.06 $\pm$ 2.34            |         |
| <b>RECENT TRAINING IN DM</b> |    |                            |         |
| Recently trained             | 34 | 5.56 $\pm$ 2.34            | 0.04    |
| No recent training           | 56 | 5.23 $\pm$ 2.00            |         |
| <b>Sex</b>                   |    |                            |         |
| Male                         | 52 | 5.67 $\pm$ 2.37            | 0.55    |
| Female                       | 48 | 5.39 $\pm$ 2.32            |         |
| <b>Education</b>             |    |                            |         |
| No education                 | 8  | 7.0 $\pm$ 2.27             | <0.01   |
| Primary education            | 27 | 4.0 $\pm$ 1.87             |         |
| Junior secondary school      | 4  | 4.25 $\pm$ 0.50            |         |
| Senior secondary school      | 31 | 5.48 $\pm$ 2.32            |         |
| University                   | 20 | 6.65 $\pm$ 2.41            |         |
| Post graduate                | 9  | 6.67 $\pm$ 1.73            |         |
| <b>FBS (mmole/L)</b>         |    |                            |         |
| 5.6 – 6.9                    | 12 | 6.5 $\pm$ 3.5              | 0.59    |
| > 6.9                        | 45 | 5.4 $\pm$ 2.0              |         |
| > 6.9                        | 32 | 5.8 $\pm$ 2.3              |         |

Mean score on the DKT based on patient's characteristics.

Overall, on the DKT, two items had the poorest scores. One inquired about "free foods" for diabetic patients, only 2 (2%) of the respondents chose the correct option which is any food that contains less than 20 calories. The other item inquired about the duration of time glucose control is measured by the glycosylated haemoglobin test. Only 11 (11%) picked the right answer which is 6 -

10 weeks. The item with the highest percentage score inquired about which food among four options is highest in carbohydrate content. Eighty-two 82 % of the respondents answered correctly. Other items and the respondents' percent correct responses are as shown in Table 2.

**Table 2:** Percentage of respondents with correct answers for each item on the DKT

| ITEM  | N=100 | (% Correct) |
|---|-------|-------------|
| Free food for a diabetic  | 2     | (2%)        |
| Glycosylated haemoglobin measures average Blood glucose within which period | 11    | (11%)       |
| What should not be used to treat low blood glucose                          | 21    | (21%)       |
| Effect of unsweetened fruit juice on blood glucose                          | 27    | (27%)       |
| Symptoms of nerve disease   | 32    | (32%)       |
| Food with highest fat content   | 36    | (36%)       |
| Effect of low fat diet  | 38    | (38%)       |
| Best method for testing blood glucose                                       | 42    | (42%)       |
| Diabetes associated complications   | 45    | (45%)       |
| Effect of exercise on blood glucose   | 52    | (52%)       |
| Effect of infection on blood glucose  | 54    | (54%)       |
| Foot care   | 56    | (56%)       |
| Diabetes care   | 58    | (58%)       |
| Food and highest carbohydrate content                                       | 82    | (82%)       |

## DISCUSSION

This study revealed that our respondents had a very low level of diabetes knowledge based on the DKT (39.5%  $\pm$  16.7%). A similar study among persons with type 2 diabetes with serious mental illness revealed a score of 53.6%  $\pm$  18% [4]. Such poor knowledge score in our respondents implies huge knowledge deficits about diabetes. Almost all the respondents did not know what a diabetic free food is. This we think may be as a result of the type of education or prevailing cultural thinking about diabetes which suggests that

diabetes patients are to avoid any sugar containing food. Incidentally, the most frequently chosen wrong answer for this question was that a free food for a diabetic is any food that says "sugar free" on the label. Furthermore, the DKT question that was most frequently answered correctly by our respondents was the one that asked about which food was highest in carbohydrate.

Expectedly, our respondents also performed poorly with regard to the question about glycosylated haemoglobin test. Majority of them did not know that HbA1c test measures average blood glucose level 6-10 weeks prior to the test. This is no surprise because as at the time of this study no such test was available in the hospital and as far as we know none of the respondents had ever done this test. Several studies have recorded similar findings of patients having poor knowledge of glycosylated haemoglobin test. [14,15].

Other studies have shown that higher school education has a positive effect on diabetic knowledge [4,16]. On the contrary, in our study the group of respondents with no formal education had the highest average DKT score compared to their counterparts that had primary to post graduate education. However, only the difference in scores between the respondents with no formal education and those with primary education reached statistical significance  $P < 0.05$ . The higher DKT scores of respondents with no formal education can be attributed to their many years of experience and discipline in diabetes self care. In this study this group of respondents had the longest average duration of awareness of their condition. There was also a significant correlation between duration of awareness of disease and level of knowledge.

Other studies have reported increasing patient age [16-18] and female gender [17-19,] to be predictors for lower diabetes knowledge. In our study we found no such relationships. Another study has reported a similar finding [4.]

The level of glycaemic control in our respondents was poor. Only 12% of the study population had a FBG within the accepted normal range of 5.6 – 6.9 mmole/L. However, there was no statistical difference in the knowledge of these respondents compared to those with poor control  $P = 0.58$ . This corroborates the fact that knowledge alone is insufficient to produce the behavioural changes required for effective self management and eventual metabolic control [16].

### Limitation of the study

The type and content of diabetes education or counselling received by our respondents was not assessed and as such we cannot categorically ascertain the reason for the patients' poor knowledge of diabetes. Furthermore the use of FBG level as a measure of blood glucose control instead of HbA1c may have implications for the respondents actual glucose control.

### CONCLUSION

Our respondents' knowledge of diabetes mellitus based on the DKT was very poor. There are major knowledge deficits which relate to misconceptions in the diabetics diet and knowledge of blood glucose monitoring with glycosylated haemoglobin test. Longer duration of diabetes irrespective of educational status was associated with higher knowledge score.

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