ORIGINAL ARTICLE

Socio-demographic determinants of the knowledge of diabetes mellitus in Onitsha-North Local Government Area, Anambra State, Nigeria

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ABSTRACT

Background: The main objective of the study was to determine the level of knowledge of diabetes mellitus in relation to its causes, symptoms, diagnosis, complications, treatment modalities and risk factors. Civil servants were chosen for this study because they are prone to sedentary lifestyles.
Methodology: A cross-sectional study design was done. The study population comprised employees of Onitsha-North Local Government Area, Anambra State, Nigeria. The instrument used for the collection of data was self-administered pre-tested questionnaire. A total of 150 copies were distributed and 143 were returned and analyzed. The data were presented in frequency tables and analyzed using *Fisher's Exact Tests* and logistic regression analysis. Statistical significance was set at *p-value* ≤ 0.05.
Results: The result indicated that subjects aged 21–30years were more likely to have poor knowledge of diabetes mellitus compared to subjects of age groups 41–50years ($p<0.05$) and ≥51years ($p<0.05$). Similarly, subjects who earned N5,000 were at greater odds for poor knowledge compared to those who earned N20,000 ($p<0.05$).
Conclusions: The study showed that there was good general knowledge of diabetes mellitus. About half of the respondents knew that lack of exercise and obesity were risk factors for developing the disease and higher income and increased age were associated with better knowledge. The authors recommended among other things that health education be given to the populace on the signs and symptoms of diabetes mellitus.

Keywords: *Adults, civil servants, health education, preventive*

INTRODUCTION

The prevalence of diabetes mellitus (DM) is increasing globally.[1] The worldwide prevalence was 171 million in the year 2000 and is estimated to rise to 366 million in 2030, but in Nigeria, the prevalence is between 2-7%.[1,2,3] Urbanization with the adoption of western lifestyles has been blamed for the increasing prevalence.[4] Evidence shows that dietary and exercise modifications offered to non-diabetic adults can reduce or delay onset of type 2 diabetes.[5] Diabetes mellitus is common in the elderly in the western countries. In developing countries it largely affects those between 35-64years.[6] Studies

have shown that there is a relationship between the knowledge of DM and certain socio-demographic variables. For example, being in high school or university, and high socioeconomic levels were found to be associated with higher levels of knowledge.[7] Higher levels of education and higher incomes have also been associated with better knowledge.[4] Similarly, findings of some studies seem to suggest that there is a relationship between higher age and increased knowledge.[7] Some studies have associated female gender with higher knowledge, while some have associated it with poorer knowledge and some have claimed that gender has no association with diabetic knowledge.[7,8,9]

Knowledge is the greatest weapon to fight this disease with.[1,7] Health information given to the public will help them assess their risk of developing the disease; motivate them to seek early and proper treatment. Health education improves the health literacy of persons which plays a significant role in self-care.[10] This study was, therefore, designed to determine the level of knowledge of causes, symptoms, diagnosis, complications, treatment and risk factors of DM among the members of staff of Onitsha-North LGA in South-East Nigeria. The study, also, explored the effects of certain socio-demographic factors on the knowledge of DM.

It is hoped that the findings of this study will provide relevant data needed in the development of appropriate preventive programmes for the country.

METHODOLOGY

The study was conducted in Onitsha-North Local Government Area (LGA) of Anambra State, Nigeria. A cross-sectional study design was done. The study population comprised of employees of the local government. A minimal sample size of 112 was calculated using the Vaughan's formula:

$$N = \frac{PQ}{(E/1.96)^2}$$

Where N is the sample size
P is the maximum expected prevalence rate of diabetes mellitus
Q is 100 – P
E is the margin of sample error tolerated in percentage (5%being the maximum accepted value).[11]

Using a prevalence rate of 7% of DM in Nigeria, a minimum sample size of 112 was recommended. The sample size of 150 was selected to account for attrition and improperly filled questionnaires. Altogether, 143 copies of the questionnaire were analyzed giving a response rate of 95.3%.

Exclusion Criterion

Established diagnosis of diabetes mellitus - all patients who had DM were excluded.

Instrument

The instrument used to collect data was a self-administered semi-structured questionnaire. The questionnaire was pre-tested in another LGA (Onitsha-South), which shares similar characteristics with the area of study. The sample was selected using a multistage sampling technique. The first stage used stratified sampling technique to group respondents according to their departments. Then, using systematic random sampling technique, every third respondent from the nominal roll of each department was selected. If the staff strength in the department was less than 20, all the respondents were studied. The maximum number of respondents selected from larger departments was 25. Altogether, 25 subjects were selected randomly from five departments, while 15 and 18, respectively were selected from two other departments. The data were analyzed using the *Statistical Package for Social Sciences (SPSS) version 15*.0, and *graph pad prism version 5*.

Ethical Considerations

Administrative approval was received from the Local Government Authority, while ethical approval was obtained from the Ethical Committee of Nnamdi Azikiwe

University Teaching Hospital, Nnewi. The concept of the study was explained to the study subjects and they were made to understand that they had rights to opt out of the study any time they wished to.

RESULTS

The demographic characteristics of the subjects (Table 1) show that the maximum age of the participants was 61years, while the minimum age was 23years. The modal age group fell within the 36-40year age bracket. Females constituted 127 (88.8%) of the participants. All the subjects were Christians and 98% were of the Igbo ethnic group. One hundred and twenty-five (87.4%) were married and 115 (80.1%) of the subjects had post-secondary school education. Forty-one (28.7%) earned incomes less than or equal to N10, 000 per month, while 102 (71.3%) earned more.

Table 1. Frequency distribution of demographic characteristics of subjects

Variable	No.	%
Age (years)		
21-30	13	9.1
31-40	57	39.9
41-50	55	38.5
51-60	18	12.5
Total	143	100
Sex		
Male	16	11.2
Female	127	88.8
Total	**143**	**100**
Marital status		
Single	16	11.2
Married	125	87.4
Separated	1	0.7
Divorced	1	0.7
Total	**143**	**100**
Educational level		
None	1	0.7
Primary	2	1.4
Secondary	25	17.5
Post-secondary	115	80.4
Total	**143**	**100**
Income		
</N5000	23	16.1
N5000-N10, 000	18	12.6
N11000-N20, 000	35	24.5
>N20, 000	67	46.8
Total	**143**	**100**
Family history of DM		
None	91	63.6
Yes 1	12	8.4
Yes 2	40	28
Total	**143**	**100**

(Yes1- grandparent, aunt, uncle, first cousin,
Yes 2-parent, brother, sister, own child

The analysis showed that 24 (16.8%) respondents had <50% of the total scores while 119 (83.2%) had ≥50%. Only 57 (39.9%) and 44 (30.8%) of the participants identified the insulin lack and failure of the body to use insulin, respectively, as the cause of DM. One hundred and three participants (72.2%) perceived consumption of lots of sugar as the cause. One hundred and ninety-five respondents (66%) were positive that it was not due to poison or witchcraft while 48 (34%) claimed it was due to poison (Table2).

Table 2. Table showing subjects' knowledge of diabetes mellitus

Variable	Yes (%)	Negative responses (%)	Total
Cause of DM			
Insulin lack	57(39.9)	86(60.1)	143(100)
Failure to use insulin	44(30.8)	98(69.2)	143(100)
Consumption of lots of sugar	103(72.2)	40(27.8)	143(100)
Poison/witchcraft	48(34)	95(66)	143(100)
Symptoms			
Frequent urination	128(89.5)	15(10.5)	143(100)
Weight loss	115(80.4)	28(19.6)	143(100)
Excess thirst	87(60.8)	56(39.2)	143(100)
Frequent boils	37(25.9)	106(74.1)	143(100)
Complication			

Blindness	111(77.6)	32(22.4)	143(100)
Kidney failure	68(47.6)	75(52.4)	143(100)
Stroke	84(58.7)	59(41.3)	143(100)
Leg ulcer	115(80.4)	28(19.6)	143(100)
Test for diagnosis			
Urine sugar	137(96)	6(4)	143(100)
Blood sugar	33(23)	110(77)	143(100)
Treatment modality			
Diet	124(86.7)	19(13.3)	143(100)
Drugs	122(85.3)	21(14.7)	143(100)
Insulin injection	111(77.6)	32(22.4)	143(100)
Risk factors for DM			
Excess weight	99(69.2)	44(30.8)	143(100)
Lack of exercise	83(58.0)	60(42.0)	143(100)

Polyuria was the most commonly identified symptom, 128 (89.5%), followed by unexplained weight loss 115 (80.4%), polydipsia by 87 (60.8%) and frequent boils 37 (25.9%).

Foot ulcers as a complication of DM was identified by 115 (80.4%) followed by visual complications identified by 111 (77.6%) of participants, then, stroke 84 (58.7%) and renal failure 68 (47.6%). Thirty-three subjects (23%) opined that the diagnosis of DM was made by testing the blood glucose while majority 137 (96%) were of the opinion that it was by urine testing. Dietary treatment was identified by 124 (86.7%), drugs by 122 (85.3%) and insulin injection 111(77.6%) of the respondents.

Overweight was identified by 99 (69.2%) as a risk factor for developing DM and 83 (58.0%) knew that the risk of developing DM could be increased by lack of exercise. The number of respondents that associated income to the knowledge of DM was significant for causes, symptoms, treatment, complications and risk factors, with *p-values* of 0.02, 0.03, <0.0001, 0.006 and 0.007, respectively. Those that opined that the level of education influenced the knowledge of DM for treatment and risk factors had *p-values* of 0.04 and 0.01, respectively, which was statistically significant (Table 3). There was a significant association between age and knowledge for complications with *p-value* of 0.008. Marital status was significantly associated with knowledge of treatment, with a *p-value* of 0.003.

Table 3. Results of cross tabulations between socio- demographic variables and knowledge of diabetes mellitus (fisher's exact tests used)

Variable	P-value	Significant (P <0.05)
Education (sec & postsec data) vs Knowledge of causes of DM	0.09	Not Significant (NS)
Sex vs knowledge of causes	0.17	NS
Marital status vs knowledge of causes	0.41	NS
Income vs knowledge of causes	0.02	Significant
Family history vs knowledge of causes	0.72	NS
Age vs knowledge of causes	0.19	NS
Education (sec &postsec data only) Vs knowledge of symptoms	0.38	NS
Sex vs knowledge of symptoms	0.09	NS
Marital status vs knowledge of symptoms	0.17	NS
Income vs knowledge of symptoms	0.03	Significant
Family history vs knowledge of symptoms	0.36	NS
Age vs knowledge of symptoms	0.79	NS
Education (sec &postsec data) vs Knowledge of diagnosis	0.42	NS
Sex vs knowledge of diagnosis	1.0	NS
Marital status vs knowledge of diagnosis	0.85	NS
Income vs knowledge of diagnosis	0.89	NS
Family history vs knowledge of diagnosis	0.10	NS
Age vs knowledge of diagnosis	0.81	NS
Education (sec & post sec data only) Vs knowledge of treatment	0.04	Significant
Sex vs knowledge of treatment	0.40	NS
Marital status vs knowledge of treatment	0.003	Significant
Income vs knowledge of treatment	<0.0001	Significant
Family history vs knowledge of treatment	0.11	NS
Age vs knowledge of treatment	0.08	NS
Education vs knowledge of complications	0.82	NS
Sex vs knowledge of complications	0.26	NS
Marital status vs knowledge of complicatio	0.12	NS
Income vs knowledge of complications	0.0062	Significant

Family history vs knowledge of complicati	0.65	NS
Age vs knowledge of complications	0.008	Significant
Education vs knowledge of risk factors for Diabetes Mellitus (sec & post sec data only)	0.01	Significant
Sex vs knowledge of risk factors	0.24	NS
Marital status vs knowledge of risk factors	0.11	NS
Income vs knowledge of risk factors	0.007	Significant
Family history vs knowledge of risk factors	0.16	NS
Age vs knowledge of risk factors	0.806	NS

There was no relationship found between certain demographic variables like gender, marital status, family history or level of education and subjects' knowledge of DM (Table 4).

Table 4. Logistic regression analysis between socio-demographic characteristics of subjects and knowledge of diabetes mellitus

SOCIO-DEMOGRAPHIC VARIABLES	ODDS RATIO (95% CI)	P-VALUE
AGE (YEARS)		
21 – 30 vs. 31 – 40	0.36 (0.12 – 1.16)	0.114
21 – 30 vs. 41 – 50	4.0 (1.22 – 13.21)	0.040 *
21 – 30 vs. ≥51	9.92 (1.34 – 68.20)	0.042 *
SEX		
Males vs. Females	1.16 (0.33 – 4.19)	0.733
MARITAL STATUS		
Single vs. Married	0.39 (0.18 – 1.21)	0.150
Single vs. Divorced	0	
Single vs. Separated	0	
INCOME (NAIRA)		
<5000 vs. 5,000 – 10,000	0.46 (0.11 – 1.97)	0.467
<5000 vs. 11,000 – 20,000	0.47 (0.14 – 1.59)	0.336
<5000 vs. >20,000	3.22 (1.05 – 9.96)	0.05 *
FAMILY HISTORY OF DM	0.53 (0.20 – 1.39)	0.250
No vs. Yes	0.19 (0.02 – 2.20)	0.342
EDUCATIONAL LEVEL	0.19 (0.02 – 1.97)	0.314
Primary vs. Secondary	0	
Primary vs. Post-secondary		
Primary vs. None		

The results of logistic regression analyses, (Table 4) further showed that subjects who were within the 21-30year age bracket were at a greater risk of poor knowledge of DM when compared to those between 41-50year (*p-value* 0.040) and >51year (*p-value* 0.042), age groups. It also showed that those who earned N5,000 monthly were at greater odds of poor knowledge than those who earned ≥N20,000 (*p-value* 0.05).

DISCUSSION

This study was among civil servants in an urban population, and they were the ones likely to be affected by the ills of urbanization.[12] This is so, because, urbanization with the adoption of western lifestyles has been blamed for the increasing prevalence of DM.[4] These lifestyle changes have resulted in over-reliance on motorized transport, sedentary living and consumption of unhealthy diets rich in carbohydrates, fats, sugars and salts.

Knowledge of DM varied among populations studied. Most studies reported low knowledge even among diabetic and non-diabetic patients.[13,14] Education seemed to play an important role here since knowledge appeared to increase with higher educational levels.[4,15] In this study, majority of the respondents had good knowledge of DM with 83% scoring ≥50%. This is in congruence with some studies among diabetics and non-diabetics where the respondents had good knowledge scores, but was in contrast with a study done among non-diabetics in a university setting in South-West Nigeria, where only 45.4% had good knowledge.[14,16,17]

Despite their overall good knowledge scores, gaps in the knowledge were still identified. In this study, only 39.7% and 30.8% perceived that DM was caused by insulin lack and inability to use insulin. The finding of this study is in agreement with two studies done in a rural community in Kenya and among secondary school students in Uyo, Nigeria where only 26% and 40% of the participants, respectively, could identify the cause.[18,19]

In terms of symptomatology, many of the respondents identified polyuria as a symptom

and this was not surprising as most people in our society associated DM with the passage of excessive urine, which also corroborated the finding in some other documented studies.[14,19] Other common symptoms of DM were less readily identified by the subjects, and so long as people are not aware of the symptoms, it will likely prevent early detection of the disease.

Majority of the respondents identified foot ulcers as a common complication of the disease. It is possible that because diabetic patients often presented late with chronic foot ulcers, which frequently are linked to amputations, it could be perceived as the most frequent complication seen by the public. In contrast, renal failure was the least perceived complication by only 47.6% of the respondents. Poor knowledge of the renal complications of DM was also observed in a study in India which reported that only 16% of the respondents agreed that DM affected the kidneys.[20]

Most of the respondents identified urine sugar as the means of diagnosis. This could be due to the fact that in this society, many people associated DM with sugar in the urine. This finding was also in conformity with a study by Unadike in the Niger Delta region of Nigeria.[21]

Nearly two-thirds of the respondents agreed that obesity was a high risk factor for developing the disease. This finding agrees with the result of a study carried out in Jordan.[22] Ironically, however, in another study in the Niger Delta region of Nigeria, less than half of the respondents agreed that weight reduction was important in DM control.[21]

Physical inactivity is a known risk factor. In this study only 58% of the respondents knew that lack of exercise was a risk factor for developing DM. In a study in Cameroon many respondents perceived that exercise was good but most did not engage in any.[23]

Some studies have shown that individuals with a family history of DM have better knowledge of the disease than those without a positive family history.[24,25] On the other hand, some other studies have not shown this relationship both in knowledge and health behaviours.[26,27] This study did not show any relationship between family history of the disease and increased knowledge of diabetes. This was probably due to the fact that many of the respondents lived in the urban area without the presence of affected relatives.

Some studies have reported increasing age as a predictor of lower knowledge of DM.[28,29] Other researchers on the other hand have reported no relationship.[26] Interestingly, in this study more of the older patients were found to be more knowledgeable than the younger ones. They were able to identify diabetic complications more than those who were younger and the disparity in numbers was statistically significant. The reason for this may not be unconnected with the fact that the prevalence of DM increases with age with the result that elderly persons are more likely to interact with their peers who have DM complications than the younger persons would.

While some studies have shown that educational background directly influenced the knowledge of DM positively, others have not.[18,25,26,28] This study showed that educational level affected the knowledge of DM with respect to their treatment modalities and knowledge of risk factors. It did not, however, differ significantly with respect to their knowledge of its causes, diagnosis, symptoms or complications.

Gender has been shown to influence the knowledge of DM. In a study amongst Mexican students, a positive relationship was noted between gender and knowledge, with female students having higher knowledge scores.[7] Conversely, in another study in Zimbabwe, female subjects were found to possess poorer knowledge of diabetes, In this study, gender did not affect the knowledge of the participants.[9]

CONCLUSIONS

The study showed that there was good general knowledge of DM among the population. A positive family history did not increase the general knowledge of diabetes. Educational background and level of income partly influenced the knowledge of the disease.

RECOMMENDATIONS

Health education of the public about DM should be improved through the mass media, and should engage the general populace irrespective of their educational background.
The need to engage in regular physical exercises, prevent obesity and do blood glucose screening, should be strongly emphasized.

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