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PREVALENCE OF DIABETES MELIITUS AMONG TEACHERS IN AN URBAN AREA IN SOUTH EAST NIGERIA

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ABSTRACT

Background: The global burden Diabetes mellitus (DM) is rising disproportionately in low- and middle-income countries, including Nigeria. Teachers represent a unique occupational group with sedentary work patterns, work-related stress, and limited access to routine health screening. Data on the burden of diabetes among school teachers in South Eastern Nigeria remain scarce. **Objective:** This study aimed to determine the prevalence of diabetes and pre-diabetes among primary and secondary school teachers in Nnewi, Anambra State, Nigeria. **Methods**: This was a cross – sectional study carried out in Nnewi, an urban area in South East Nigeria. Sixteen (16) schools consisting of eight (8) primary schools and eight (8) secondary schools were selected randomly from a list of all public schools in the city. Four hundred and ten (410) teachers who were present in the school and gave consent to participate in the study were enrolled. A self administered questionnaire was used to collect demographic information, medical history and social habits. Height, weight, waist circumference and body mass index were obtained by the research team. Fasting blood sample was collected to measure fasting blood sugar. Pre-diabetes was defined as fasting plasma glucose of 5.6–6.9 mmol/L, and diabetes mellitus was defined by a fasting plasma glucose of ≥7.0 mmol/L or self-reported prior diagnosis or being on glucose lowering therapy recommended by a physician after prior diagnosis. Data were analyzed using Statistical package for social sciences (SPSS) version 22. Association between two groups was determined using Chi square. Student T test was used to compare mean while analyses of variance was used to test for association between multiple groups. **Results**: A total of 410 teachers participated in the study. There were 73 (17.8%) males and 337(82.2) females. The age range of the respondents were 19-72years with mean age of 41.1± 11.1. The overall prevalence of diabetes in our study 4.4 % while prevalence of Pre diabetes was 4.1%. There was no statistical difference in the mean blood sugar and the mean body mass index (BMI) of the different blood sugar categories. **Conclusion:** There is a substantial burden of previously undetected diabetes and pre-diabetes among school teachers in Nnewi. These findings highlight an urgent need for routine workplace-based metabolic screening, health education programs, and lifestyle interventions targeting this occupational.

KRYWORDS: The overall prevalence of diabetes in our study 4.4 % while prevalence of Pre diabetes was 4.1%.

INTRODUCTION

Diabetes mellitus(DM) is one of the major non-communicable disease in Nigeria.[1] It carries a huge socioeconomic burden to affected individuals, national economy and the health systems.[2] The prevalence of diabetes mellitus in Nigeria was 2.2% according to a nation wide study of non communicable disease in 1997 by Akinkugbe et al.[1] The International diabetes federation (IDF) estimated the prevalence of DM in Nigeria to be 2.8% in 2024.[3] According to the World Health Organisation (WHO) 2022 global report, the global prevalence of diabetes mellitus among adults aged

18 and above has more than doubled increasing from 6.8% to 14.1% in 2022.[4] In African sub-region the prevalence has surged from 6.4 % in 1990 to 10.5% in 2022 and increasing in low and middle income countries including Nigeria.[4] Recent studies in different parts of the country have also reported rising prevalence of diabetes mellitus in Nigeria.[5-7] However there is no recent nationwide population study on the prevalence since the earlier study in 1995. We carried out this study among teachers to determine the prevalence of diabetes mellitus in this occupational group in order to create awareness on this condition knowing that teachers play vital role in public education on health and other issues. Studies have linked development of DM to occupation with job strain and stress.[8-11] This has been attributed to chronic activation of psychoneuroendocrine pathways with the release of catecholamines and glucocorticoids resulting in increased hepatic glucose output, decreased insulin sensitivity, central accumulation of body fat, hypertension and adverse lipid profile. Teachers may be stressed at work due to large number of school children taught, long hours at work with extramural classes and private lessons to meet up with economic need.

METHODOLOGY

Study Design

This was a cross sectional study. Sixteen(16) schools were selected from the list of all government owned primary and secondary schools in Nnewi, Anambra state in South East, Nigeria using a simple random sampling method. Eight (8) primary schools and eight (8) secondary schools were selected.

Subjects

Four hundred and twelve(410) teachers in the sixteen selected schools who were present in the school at the time of the visit by the research team and who gave a consent to participate were recruited.

Ethical Clearance

Permission to conduct the study and ethical clearance was obtained from the Anambra state Ministry of health. Informed consents were obtained from the respondents before recruitment for the study. A self administered questionnaire was used to collect data from the respondents. Information collected include demographic data, medical history and social habits such as tobacco and alcohol consumption.

Anthropometry

The weight and height were measured with a standard weighing scale and stadiometer to the nearest 0.05kilogram and 0.05meters respectively. Abdominal circumference and waist hip ratio were measured with a non stretchable tape at standard body landmarks. Body mass index was calculated using the standard formula Weight/$(Height)^2$ in Kg/m^2

Blood Glucose Measurement

2milliliters of blood was collected from each respondent in a fluoride bottle in the morning in a fasting state. The teachers had been informed earlier to fast on the day of the recruitment. Fasting blood sugar was measured using spectrophotometry by a medical laboratory scientist.

Diagnosis of Diabetes mellitus

Diabetes mellitus was diagnosed using a fasting blood sugar level equal to or greater than 126mg/dl in the presence of symptoms such as polyuria, polydipsia. Respondents who were already diagnosed of diabetes mellitus irrespective blood glucose level were classified as having diabetes mellitus.

Data analysis

Data obtained was analyzed using Statistical Package for Social Sciences (SPSS) Version 26.

RESULTS

A total of 410 respondents participated in the survey. Missing data were observed for some variables giving rise to varying number N analyzed for different variables as depicted in Table 1. There were 73 (17.8%) males and 337(82.2%) females with a male female ratio of 1:4.6.The age range of the respondents were 19 – 72 years with mean age of 41.1± 11.1. 283(69%) of the subjects were married, 122(29%) were single and 4(1%) were widowed. Most of the subjects had tertiary education as shown in Table 1.

Table 1: Sociodemographic Characteristics Of Respondents.

	Frequency	Percentage
Gender (N =410)		
Male	73	17.8%
Female	337	82.2%
Age group (N =377)		
< 30 years	87	23.1
30-39 years	92	24.4
40- 49 years	71	18.8
50- 59 years	114	30.2
>60 years	13	3.5
Marital Status(N = 409)		
Single	122	29.8
Married	283	69.1

Widowed	4	0.9
Level of Education(N=410)		
Primary	11	2.7
Secondary	23	5.6
Tertiary	367	89.5

Ninety (22%) of respondents had family history of Diabetes Mellitus. Most of the respondents N=398 (91.5%) had a normal fasting blood sugar as depicted in figure 1. The prevalence of diabetes mellitus in our study was 4.4% while that of pre-diabetes was 4.1% as depicted in Figure 1. The mean body mass index of the respondents with normal blood sugar and those with elevated blood sugar is shown in Table 3. There is no statistical difference in the variance of the mean BMI of the blood sugar categories as shown in table 4. F statistic is 0.096 with significant value of 0.98.

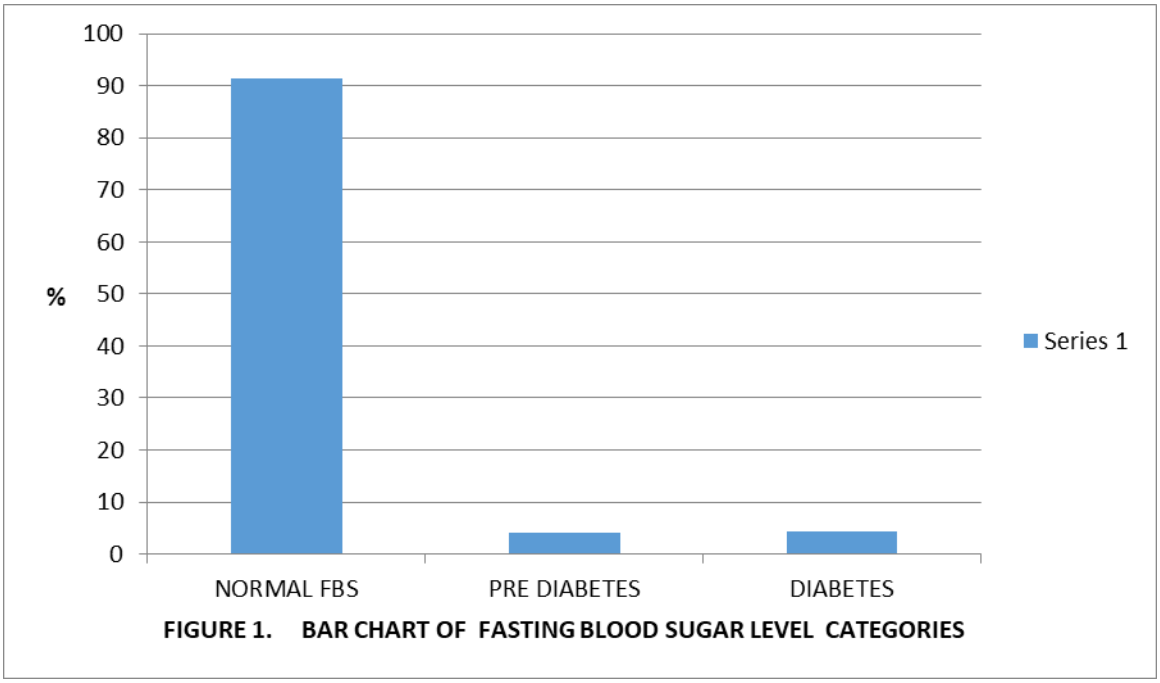

FIGURE 1. BAR CHART OF FASTING BLOOD SUGAR LEVEL CATEGORIES

Table 2: Fasting Blood Sugar Category And Body Mass Index(Bmi)

	N	Mean	Standard deviation	Standard error	Confidence Interval	
					Lower Bound	Upper Bound
Normal	355	28.0054	5.49842	.29183	27.4314	28.5793
Pre-Diabetes	16	27.9560	4.40828	1.10207	25.6070	30.3050
Diabetes	17	28.5962	5.82465	1.41268	25.6015	31.5910
Total	388	28.0292	5.46126	.27725	27.4841	28.5743

Table 3: Comparison of Bmi Among Different Blood Sugar Category.

	Sum of squares	Df	Mean Square	F	Sig
Between Groups	5.754	2	2.877	0.096	.908
Within groups	11536.68	385	29.965		
Total	11542.43	387			

Table 4: Mean Fasting Blood Sugar Of The Different Age Groups.

	N	Mean	Std deviation	Std error	95%confidence interval for mean	
					Lower bound	Upper bound
<30years	87	4.71	0.88	0.09	4.55	4.90
30-39 years	92	4.84	1.35	0.14	4.55	5.12
40-49 years	71	4.89	1.35	0.16	4.57	5.21
50-59years	114	5.12	2.11	0.20	4.72	5.51

60 and above	13	5.46	0.82	0.22	4.96	5.95
Total	377	4.93	1.53	0.07	4.77	5.08

Table 5: Comparism of Mean Fbs Among Age Groups.

	Sum of squares	Df	Mean square	F	Sig
Between groups	12.58	4	3.14	1.334	0.2
Within groups	877.06	372	2.35		
Total	889.65	376			

DISCUSSION

This study was carried out to determine the prevalence of DM among school teachers and determine factors associated with developing diabetes. 82.2% of our respondents were females. This is consistent with reports from the whole of Anambra state where according to the National Bureau of statistics report of 2015, 80.5 % of teachers in both primary and secondary school in Anambra state were females.[12] This is however different from the national average of 48% of teachers being females according to the National bureau of statistics.[12] Reports from United States, United Kingdom and many European countries showed that females constitute more than 80% of teachers at the primary and secondary level.[13] Reasons for this may include poor remuneration which is unattractive to males who may have more financial obligations. Moreover females may be opting for jobs that are not so demanding to have time to look after their families. The prevalence of diabetes in our study is 4.4 %. There are no studies known to the authors on the prevalence of diabetes mellitus among school teachers in Nigeria. Our finding is similar to a study in Bengalore, India by Manjula et al[14] who also found diabetes prevalence of 4.4 % among primary school teachers. The prevalence of diabetes in our study agrees with findings by Sabir et al[15] and Rasaki et al.[16] Sabir et al reported a prevalence of 4.3% in 2 suburban communities in Sokoto state in northwest Nigeria while Rasaki et al reported a prevalence of 4.6% in Oke Ogun area of Oyo state in South West Nigeria. However our prevalence was higher than that reported by Oladapo et al[17] who found a prevalence of 2.5% in south west Nigeria. The difference may be related to the fact that our study was conducted in a semi urban area while that reported by Oladapo et al was in a rural population. Other studies done in rural areas in different parts of Nigeria have corroborated the fact that prevalence of diabetes in rural population is lower than in urban population. Okesina et al[18] found a prevalence of 2.6% in 3 rural villages near Maiduguri in northern Nigeria while a study in a rural population in Sokoto state by Sabir et al[19] found a prevalence of 0.8%. In the Niger delta area of Nigeria, the prevalence of diabetes is higher than the national average. Nyaenwe et al[7] reported the prevalence of diabetes to be 8% in Port Harcourt which is an urban area. Arugu and Maduka[20] documented a prevalence of 8% in Abua a rural district in Rivers State. Another study by Ekpenyong et al[21] in Uyo in the Niger delta region of Nigeria reported the prevalence of diabetes to be 10.5% among civil servants. This was quite different from our finding. The high prevalence may be attributed to the fact that the study was in a urban area as well as differences in the criteria used for diagnosis.

Our study did not show a significant association between blood glucose and body mass index. The categories of blood glucose which include normal blood glucose, pre-diabetic and diabetic range showed no difference in the body mass index. This is in contrast to other studies that have shown a correlation between blood sugar and body weight and BMI.[22,23] This was in contrast with report by Bakari et al[24] who reported a positive correlation of BMI with blood sugar in males. However in females they did not see a correlation with blood sugar and body mass index. This was similar to the observation in our study with 82% of the our respondents being females.

CONCLUSION

There was a relatively high prevalence of diabetes (4.4%) among primary and secondary school teachers in our study compared to the national prevalence of 2.2% reported in 1997. This suggest a rising prevalence which has been projected to increase further. This calls for concerted effort to increase awareness and screening for diabetes in the larger population to reduce the morbidity and mortality associated with diabetes mellitus.

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