



RESEARCH PAPER

A cross-sectional study of the knowledge and screening practices of diabetes among adults in a south western Nigerian city

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Keywords

Diabetes • Knowledge • Screening Practices

Summary

Introduction. The control of diabetes depends largely on preventive actions often influenced by knowledge and awareness of the condition, its risk factors, complication, and management. This study assessed the awareness, knowledge, and practices regarding diabetes among adults in two communities in Ibadan, Nigeria.

Methods. A community-based cross-sectional study was conducted among five hundred randomly selected non-diabetic respondents, aged 18 to 65 years. Data was collected using the pretested, modified version of the WHO STEPS instrument translated into Yoruba language. Data collected were analysed using descriptive and inferential analysis and the level of significance was set at $p < 0.05$.

Results. Majority of the respondents (89.6%) had previously heard about diabetes. Of these ($n = 448$), 31.8% were knowledgeable

about diabetes and only 28% have ever had their blood glucose level measured by a doctor or other health professionals. Sex and monthly income were statistically associated with respondents' diabetes knowledge while age, religion, monthly income, employment status, marital status, ethnicity and level of education were statistically associated with screening practices ($p < 0.05$). Monthly income was found to be a significant predictor of the level of knowledge adjusted by sex. Earning N20,000 (\$ 52.60) or less had higher odds of being knowledgeable compared to earning no income (OR 0.54, CI 0.35, 0.83).

Conclusion. Though Diabetes awareness is high, knowledge gaps and poor screening practices is of concern. This calls for tailored multi-component, community-based, health education interventions.

Introduction

Diabetes is a fast-rising non-communicable disease of global public health importance. In Africa, it is projected to be the 7th leading cause of death by 2030 [1]. As of 2013, Nigeria had the highest number of diabetes cases at 3.9 million cases with a national prevalence of 4.9%. This prevalence with its attributed death of 1.3 million in 2019 is projected to reach 41 million cases by 2045 [1-3].

The control of diabetes majorly depends on early diagnosis, prevention and self-management often influenced by the awareness and knowledge of the condition, its risk factors and complications [4-10]. Assessing diabetes mellitus knowledge and preventive behaviours in the general public would aid the identification of knowledge gaps and guide the development of tailored and appropriate interventions [11]. However, studies conducted in Nigeria have been limited to healthcare providers and related communities [12-14]. Therefore, this study assessed the diabetes knowledge, screening practices and associated factors among community members.

Methods and Subjects

DESCRIPTION OF THE STUDY AREA

This study was a part of a larger community-based,

cross-sectional study which explored the knowledge, risk factors and preventive practices on non-communicable diseases in Nigeria. This paper report results from two urban communities in Ibadan North Local Government Area (one of the five [5] Local Government Areas in Ibadan Metropolis) with an estimated size of 27,249 square kilometers of Oyo State, Nigeria. The local government is divided into twelve [12] wards with a population size of 432,900 [15]. The people are mainly of the Yoruba tribe, although other ethnic groups in Nigeria are well represented but constitute the minority. Data for the study were collected between November 14th and December 3rd, 2018.

SAMPLING PROCEDURE

The study with a sample size of 500 included 147 males and 353 females within the ages of 18 and 65 years randomly selected from both communities. The calculated sample size was allocated proportionally to the size of the population in each community after getting the number of households in each community. The first household was chosen by lottery method and systematic sampling technique was used in selecting the subsequent households. One respondent was then selected by ballot method from each randomly selected household who after giving consent to participate was interviewed. In the absence of such, the next household was chosen.

DATA COLLECTION AND MANAGEMENT

This study was approved by the University of Ibadan/ University College Hospital Ethical Review Committee, Nigeria and the assigned reference number is UI/EC/17/0410. Informed and voluntary consents were given by all the participants. Data were collected through an electronic data capture tool (ODK Collect) using a pretested KAP questionnaire on diabetes and the modified WHO STEPS instrument [16] which was translated into the local language, Yoruba. Nine data collectors and two supervisors collected the data by moving from house to house after a two-day training on research ethics, data collection procedures and tool contents to increase the quality of data obtained. Supportive supervision was daily carried out by the supervisor during the period of data collection.

DATA ANALYSIS

The data collected was exported into the Statistical Package for Social Science (SPSS) version 21.0; frequency distribution was computed for all items and the variables were computed for further inferential analysis such as Chi-square test and regression. Analysis of the dependent variable, knowledge about diabetes, and the independent variables, demographic characteristics (age, sex, religion, level of education, ethnicity, marital status, employment status, household size, monthly income and years of residence) and previous awareness and practice towards diabetes were reported. The data was explored using descriptive statistics. All individual answers to knowledge about diabetes were computed to obtain total scores and calculated for the mean. We then classified the level of knowledge of respondents into two groups (knowledgeable and not knowledgeable) using the mean score as the cut-off. In calculating the mean score for awareness, all respondents who answered yes to previous awareness about diabetes were considered to be previously aware of diabetes. Then binary logistic regression was done using the Hosmer and Lemeshow test to see the independent effect of predictors on the dependent variable while the amount of variation in the dependent variable was indicated using the Nagelkerke R Square values. Odds ratio and adjusted odds ratio were respectively calculated and all statistical tests were considered statistically significant at $p < 0.05$ and 95% CI.

Result

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Majority of the respondents, 70.6% were females 54.2% were adults and 54.8% lived in households with 2 to 4 members. The overall respondents' median age was 33 years. Majority of the respondents (88.8%) were of Yoruba ethnicity, had lived in the community for at least 10 years (65.8%) and with 8.4% having no

Table 1. Sociodemographic characteristics of respondents (n = 500).

Participants' characteristics	Statistics
Sex	
Male, n (%)	147 (29.4)
Female, n (%)	353 (70.6)
Age group	
Youth, n (%)	119 (23.8)
Adult, n (%)	271 (54.2)
Middle age, n (%)	110 (22.0)
Religion	
Christianity, n (%)	255 (51.0)
Islam, n (%)	245 (49.0)
Years of residence	
10 years or less, n (%)	329 (65.8)
11 to 20 years, n (%)	75 (15.0)
21 to 30 years, n (%)	60 (12.0)
More than 30 years, n (%)	36 (7.2)
Monthly income	
No income, n (%)	34 (6.8)
20,000 or less, n (%)	336 (67.2)
More than 20,000, n (%)	130 (26)
Household size	
1 member, n (%)	41 (8.2)
2 to 4 members, n (%)	274 (54.8)
5 and more members, n (%)	185 (37.0)
Employment status	
Employed, n (%)	64 (12.8)
Self-employed, n (%)	363 (72.6)
Non-paid employment, n (%)	5 (1.0)
Unemployed, n (%)	61 (12.2)
Retired, n (%)	7 (1.4)
Marital status	
Never married, n (%)	136 (27.2)
Currently married, n (%)	320 (64.0)
Separated, n (%)	4 (0.8)
Divorced, n (%)	3 (0.6)
Widowed, n (%)	31 (6.2)
Cohabiting, n (%)	6 (1.2)
Ethnic group	
Yoruba, n (%)	444 (88.8)
Igbo, n (%)	26 (5.2)
Hausa, n (%)	4 (0.8)
Other tribes, n (%)	26 (5.2)
Level of education	
No formal schooling, n (%)	42 (8.4)
Primary school not completed, n (%)	7 (1.4)
Primary school completed, n (%)	78 (15.6)
Secondary school not completed, n (%)	37 (7.4)
Secondary school completed, n (%)	226 (45.2)
College/University completed, n (%)	105 (21.0)
Postgraduate degree, n (%)	5 (1.0)

formal education. Most of the respondents were self-employed (72.6%) and earned an average monthly income of 20,000 or less (54.8%) (Tab. 1).

Table II. Level of knowledge of participant about diabetes (n = 448).

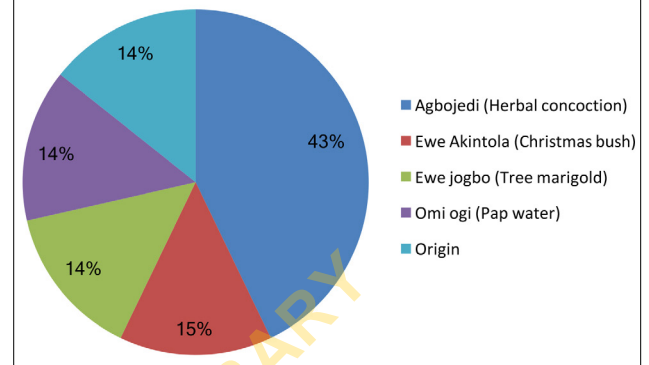
	Frequency	%	Maximum score	(SE)	±SD
Not Knowledgeable	289	57.8	36.0	13.7(0.35)	7.3
Knowledgeable	159	31.8			

Table III. Frequency distribution of participants' responses to knowledge on diabetes (n = 448).

Variables	Response (%)	
	Yes	No
Risk factors for diabetes		
Family history of diabetes	37.9	62.1
Age over 40 years	35.0	65.0
Lack of exercise	33.3	66.7
Tobacco use	41.1	58.9
Alcohol use	61.6	38.4
Eating too much sugar	87.7	12.3
Old age	37.3	62.7
Overeating	30.6	69.4
Stress	29.7	70.3
Eating too much fat	28.1	71.9
Overweight	32.1	67.9
Early symptoms of diabetes		
Passing lots of urine	76.1	23.9
Excess thirst	46.0	54.0
Tiredness/Lethargy	51.3	48.7
Loss of appetite	33.3	66.7
Weight loss	51.1	48.9
Vision problems	31.7	68.3
Skin and genital infections	24.1	75.9
Methods of Prevention		
No action	9.4	90.6
Weight control	42.2	57.8
Exercise	49.3	50.7
Eat lots of fruits and vegetables	73.0	27.0
Limit sugar	87.3	12.7
Limit fatty foods	42.4	57.6
Health checks/screening	81.0	19.0
Avoid stress	40.2	59.8

AWARENESS AND KNOWLEDGE OF RESPONDENTS ABOUT DIABETES

Majority of the respondents (89.6%; n = 500) had previously heard about diabetes, however, overall, 57% were not knowledgeable about the disease causation symptoms, and prevention (n = 448) (Tab. II); 76.1% and 46.0% of the respondents knew that frequent urination and excessive thirst are early symptoms of the disease (Tab. III) while 87.7% of the respondents agreed that excessive sugar consumption is a risk factor for developing diabetes and 87.3% agreed that limiting sugar intake is a measure to reduce the likelihood of developing diabetes (Tab. III). However, majority disagreed to family history (62.1%), lack of exercise (66.7%) and overweight (67.9%) as risk factors for diabetes (Tab. III). Although, the aggregated mean score for knowledge on diabetes was 13 ± 7.3 (Tab. II) all the respondents indicated a willingness to have more information about the problems associated with diabetes.

Fig. 1. Herbal drugs used for diabetes, n = 18.

SCREENING PRACTICES FOR DIABETES AMONG RESPONDENTS

Only 31% (139) of the respondents (n=448) had ever had their blood glucose level measured by a doctor or other health professionals. Of this proportion, 13% reported being diagnosed with diabetes. All 13% also reportedly use medications as prescribed by the health professional with herbal drugs (Fig. 1).

FACTORS ASSOCIATED WITH DIABETES AWARENESS, KNOWLEDGE AND SCREENING PRACTICES

Age group, religion and years of residence in the community, monthly income, employment status, and level of education are statistically associated with the level of awareness ($p < 0.05$) (Tab. IV). Adults age group (93.4%) was the most aware group while the middle age (15.5%) was the most unaware group. Respondents with unpaid employment (60.0%), and no formal schooling (33.3%) were mostly unaware compared with those with post-graduate degrees (100%) (Tab. IV).

Only monthly income was statistically associated with respondents' level of knowledge about diabetes ($p < 0.05$). Respondents' earning more than 20,000 NGN monthly (48.8%) were more knowledgeable than the other groups while the least knowledgeable (8.3%) were those without a source of income (Tab. V). Respondents who had lived in the community for more than 10 years (11-30 years) were more un-aware compared to those who had lived 10 years or less (92.4%).

Similarly, age group, religion and marital status, monthly income, employment status, and level of education are statistically associated with screening practices ($p < 0.05$) (Tab. VI). Most of the respondents had never been screened for diabetes. Of these, 84.0% are youths, 71.6% are adults while 60.0% are middle age. Respondents with no source of income (91.2%)

Table IV. Chi-square test for association between respondents' socio-demographic characteristics and awareness about diabetes (n = 500).

Participants' characteristics	Aware	Un-aware	Chi ² -test
Sex			
Male, n (%)	136 (92.5)	11 (7.5)	0.17
Female, n (%)	312 (88.4)	41 (11.6)	
Age group			
Youth, n (%)	102 (85.7)	17 (14.3)	0.01
Adult, n (%)	253 (93.4)	18 (6.6)	
Middle age, n (%)	93 (84.5)	17 (15.5)	
Religion			
Christianity, n (%)	237 (92.9)	18 (7.1)	0.01
Islam, n (%)	211 (86.1)	34 (13.9)	
Years of residence			
10 years or less, n (%)	304 (92.4)	25 (7.6)	0.03
11 to 20 years, n (%)	62 (82.7)	13 (17.3)	
21 to 30 years, n (%)	50 (83.3)	10 (16.7)	
More than 30 years, n (%)	32 (88.9)	4 (11.1)	
Monthly income			
No income, n (%)	24 (70.6)	10 (29.4)	0.00
20,000 or less, n (%)	297 (88.4)	39 (11.6)	
More than 20,000, n (%)	127 (97.7)	3 (2.3)	
Household size			
1 member, n (%)	37 (90.2)	4 (9.8)	0.87
2 to 4 members, n (%)	247 (90.1)	27 (9.9)	
5 and more members, n (%)	164 (88.6)	21 (11.4)	
Employment status			
Employed, n (%)	60 (93.8)	4 (6.3)	0.00
Self-employed, n (%)	330 (90.9)	33 (9.1)	
Non-paid employment, n (%)	2 (40.0)	3 (60.0)	
Unemployed, n (%)	7 (100.0)	0 (0.0)	
Retired, n (%)			
Marital status			
Never married, n (%)	125 (91.9)	11 (8.1)	0.56
Currently married, n (%)	285 (89.1)	35 (10.9)	
Separated, n (%)	3 (75.0)	1 (25.0)	
Divorced, n (%)	3 (100.0)	0 (0.0)	
Widowed, n (%)	26 (83.9)	5 (16.1)	
Cohabiting, n (%)	6 (100.0)	0 (0.0)	
Ethnic group			
Yoruba, n (%)	398 (89.6)	46 (10.4)	0.05
Igbo, n (%)	25 (96.2)	1 (3.8)	
Hausa, n (%)	2 (50.0)	2 (50.0)	
Other tribes, n (%)	23 (88.5)	3 (11.5)	
Level of education			
No formal schooling, n (%)	28 (66.7)	14 (33.3)	0.00
Primary school not completed, n (%)	6 (85.7)	1 (14.3)	
Primary school completed, n (%)	65 (83.3)	13 (16.7)	
Secondary school not completed, n (%)	31 (83.8)	6 (16.2)	
Secondary school completed, n (%)	209 (92.5)	17 (7.5)	
College/University completed, n (%)	104 (99.0)	1 (1.0)	
Postgraduate degree, n (%)	5 (100.0)	0 (0.0)	

non-paid employment (100%) had never been screened for diabetes. Only 16.2% of single respondents and 9.5% of those with no formal education (9.5%) had ever been screened (Tab. VI).

PREDICTORS OF AWARENESS, KNOWLEDGE AND SCREENING PRACTICES OF DIABETES

The logistic regression performed to ascertain the effect of socio-demographic characteristics on the awareness

Table V. Chi-square test for association between respondents' socio-demographic characteristics and levels of knowledge (n = 448).

Participants' characteristics	Not-Knowledgeable	Knowledgeable	Chi ² -test
Sex			
Male, n (%)	76 (55.9)	60 (44.1)	0.012
Female, n (%)	213 (68.3)	99 (31.7)	
Age group			
Youth, n (%)	67 (65.7)	35 (34.3)	0.947
Adult, n (%)	163 (64.4)	90 (35.6)	
Middle age, n (%)	59 (63.4)	34 (36.6)	
Religion			
Christianity, n (%)	149 (62.9)	88 (37.1)	0.44
Islam, n (%)	140 (66.4)	71 (33.6)	
Years of residence			
10 years or less, n (%)	197 (64.8)	107 (35.2)	0.98
11 to 20 years, n (%)	40 (64.5)	22 (35.5)	
21 to 30 years, n (%)	31 (62.0)	19 (38.0)	
More than 30 years, n (%)	21 (65.6)	11 (34.4)	
Monthly income			
No income, n (%)	22 (91.7)	2 (8.3)	0.00
20,000 or less, n (%)	202 (68.0)	95 (32.0)	
More than 20,000, n (%)	65 (51.2)	62 (48.8)	
Household size			
1 member, n (%)	24 (64.9)	13 (35.1)	0.85
2 to 4 members, n (%)	162 (65.6)	85 (34.4)	
5 and more members, n (%)	103 (62.8)	61 (37.2)	
Employment status			
Employed, n (%)	36 (60.0)	24 (40.0)	0.63
Self-employed, n (%)	217 (65.8)	113 (34.2)	
Non-paid employment, n (%)	2 (100.0)	0 (0.0)	
Unemployed, n (%)	29 (59.2)	20 (40.8)	
Retired, n (%)	5 (71.4)	2 (28.6)	
Marital status			
Never married, n (%)	76 (60.8)	49 (39.2)	0.36
Currently married, n (%)	185 (64.9)	100 (35.1)	
Separated, n (%)	1 (33.3)	2 (66.7)	
Divorced, n (%)	3 (100.0)	0 (0.0)	
Widowed, n (%)	20 (76.9)	6 (23.1)	
Cohabiting, n (%)	4 (66.7)	2 (33.3)	
Ethnic group			
Yoruba, n (%)	261 (65.6)	137 (34.4)	0.34
Igbo, n (%)	12 (48.0)	13 (52.0)	
Hausa, n (%)	1 (50.0)	1 (50.0)	
Other tribes, n (%)	15 (65.2)	8 (34.8)	
Level of education			
No formal schooling, n (%)	24 (85.7)	4 (14.3)	0.08
Primary school not completed, n (%)	6 (100)	0 (0.0)	
Primary school completed, n (%)	42 (64.6)	23 (35.4)	
Secondary school not completed, n (%)	22 (71.0)	9 (29.0)	
Secondary school completed, n (%)	131 (62.7)	78 (37.3)	
College/University completed, n (%)	61 (58.7)	43 (41.3)	
Postgraduate degree, n (%)	3 (60.0)	2 (40.0)	

level was statistically significant (X^2 16.26, $p = 0.04$). The model explained 29% (Nagelkerke R^2) of the variance in awareness and correctly classified 90.4% of the cases (Tab. VII). Only monthly income was found to be a significant predictor of the level of awareness

adjusted by other covariates. Earning N20,000 or lesser had double odds of awareness compared to earning no income (OR 0.28, CI 0.08, 0.99).

The logistic regression performed to ascertain the effect of socio-demographic characteristics on the level of

Table VI. Chi-square test for association between respondents' socio-demographic characteristics and screening practices (n = 500).

Participants' characteristics	Screened	Never screened	Chi ² -test
Sex			
Male, n (%)	42 (28.6)	105 (71.4)	0.85
Female, n (%)	98 (27.8)	255 (72.2)	
Age group			
Youth, n (%)	19 (16.0)	100 (84.0)	0.00
Adult, n (%)	77 (28.4)	194 (71.6)	
Middle age, n (%)	44 (40.0)	66 (60.0)	
Religion			
Christianity, n (%)	84 (32.9)	171 (67.1)	0.01
Islam, n (%)	56 (22.9)	189 (77.1)	
Years of residence			
10 years or less, n (%)	94 (28.6)	235 (71.4)	0.92
11 to 20 years, n (%)	19 (25.3)	56 (74.7)	
21 to 30 years, n (%)	16 (26.7)	44 (73.3)	
More than 30 years, n (%)	11 (30.6)	25 (69.4)	
Monthly income			
No income, n (%)	3 (8.8)	31 (91.2)	0.00
20,000 or less, n (%)	88 (26.2)	248 (73.8)	
More than 20,000, n (%)	49 (37.7)	81 (62.3)	
Household size			
1 member, n (%)	10 (24.4)	31 (75.6)	0.12
2 to 4 members, n (%)	87 (31.8)	187 (68.2)	
5 and more members, n (%)	43 (23.2)	142 (76.8)	
Employment status			
Employed, n (%)	23 (35.9)	41 (64.1)	0.00
Self-employed, n (%)	106 (29.2)	257 (70.8)	
Non-paid employment, n (%)	0 (0.0)	5 (100.0)	
Unemployed, n (%)	7 (11.5)	54 (88.5)	
Retired, n (%)	4 (57.1)	3 (42.9)	
Marital status			
Never married, n (%)	22 (16.2)	114 (83.8)	0.00
Currently married, n (%)	102 (31.9)	218 (68.1)	
Separated, n (%)	0 (0.0)	4 (100.0)	
Divorced, n (%)	0 (0.0)	3 (100.0)	
Widowed, n (%)	12 (38.7)	19 (61.3)	
Cohabiting, n (%)	4 (66.7)	2 (33.3)	
Ethnic group			
Yoruba, n (%)	120 (27.0)	324 (73.0)	0.05
Igbo, n (%)	7 (26.9)	19 (73.1)	
Hausa, n (%)	0 (0.0)	4 (100.0)	
Other tribes, n (%)	13 (50.0)	13 (50.0)	
Level of education			
No formal schooling, n (%)	4 (9.5)	38 (90.5)	0.02
Primary school not completed, n (%)	2 (28.6)	5 (71.4)	
Primary school completed, n (%)	25 (32.1)	53 (67.9)	
Secondary school not completed, n (%)	9 (24.3)	28 (75.7)	
Secondary school completed, n (%)	58 (25.7)	168 (74.3)	
College/University completed, n (%)	39 (37.1)	66 (62.9)	
Postgraduate degree, n (%)	3 (60.0)	2 (40.0)	

knowledge was not statistically significant (X^2 0.91, $p > 0.05$). The model explained 7% (Nagelkerke R^2) of the variance in the level of knowledge and correctly classified 64.5% of the cases. However, monthly income was found to be a significant predictor of the level of

knowledge adjusted by another covariate (sex). Earning 20000 NGN or less had higher odds of knowledge compared to earning no income (OR 0.54, CI 0.35, 0.83) (Tab. VIII).

However, the logistic regression performed to ascertain

Table VII. Logistic regression analysis for the predictors of level of awareness of diabetes (n = 500).

Independent variable	Regression coefficient	Sig.	EXP (B)	95% Confidence Interval EXP(B)	
				Lower	Upper
Age group (Ref Middle age)					
Youth	-0.54	0.31	0.58	0.21	1.64
Adult	0.30	0.49	1.35	0.58	3.16
Religion (Ref. Islam)					
Christianity	0.40	0.26	1.50	0.74	3.02
Years of residence (Ref. more than 30 years)					
10 years or less	0.30	0.65	1.35	0.37	5.02
11 to 20 years	-0.57	0.42	0.57	0.14	2.24
21 to 30 years	-0.46	0.51	0.63	0.16	2.51
Monthly income (Ref. More than 20,000)					
No income	-1.98	0.01	0.14	0.03	0.67
20,000 or less	-1.27	0.05	0.28	0.08	0.99
Employment status (Ref. Retired)					
Employed	-20.51	0.99	0.00	0.00	0.00
Self-employed	-19.61	0.99	0.00	0.00	0.00
Non-paid employment	-22.57	0.99	0.00	0.00	0.00
Unemployed	-20.03	0.99	0.00	0.00	0.00
Ethnic Group (Ref Other tribes)					
Yoruba	0.45	0.54	1.58	0.37	6.68
Igbo	1.19	0.38	3.29	0.23	47.38
Hausa	-0.35	0.80	0.71	0.05	9.94
Level of Education (Ref Postgraduate degree)					
No formal schooling	-19.16	0.99	0.00	0.00	0.00
Primary school not completed	-17.89	0.99	0.00	0.00	0.00
Primary school completed	-18.53	0.99	0.00	0.00	0.00
Secondary school not completed	-18.41	0.99	0.00	0.00	0.00
Secondary school completed	-17.25	0.99	0.00	0.00	0.00
College/University completed	-15.55	0.99	0.00	0.00	0.00
Constant	40.34	0.99	3.36E+17		
Hosmer and Lemeshow test = Chi-square 16.26, sig 0.04					
-2 Log Likelihood = 256.729					
Nagelkerke R² = 0.29					

the effect of socio-demographic characteristics on the screening practice was not statistically significant (X^2 3.78, $p > 0.05$).

The model explained 21% (Nagelkerke R^2) of the variance in screening practice and correctly classified 75.2% of the cases (Tab. IX).

Discussion

In this study, we assessed the level of awareness, knowledge and screening practices towards diabetes in selected communities in Ibadan, Nigeria. The main findings of this research indicate an 89.6% awareness level about diabetes but a 28% positive practice towards diabetes screening and a 31.8% (13.7 ± 7.3) level of knowledge on diabetes in the communities. We also found only income was significantly associated with respondent's level of knowledge about diabetes while sex, household size and marital status were the only socio-demographic features not statistically associated with the level of awareness ($p > 0.05$).

These findings are consistent with studies from low- and middle-income countries such as Pakistan and Zimbabwe which found poor knowledge, attitude and practices regarding diabetes in a community population and among patients attending an outpatient diabetic clinic [7,8]. However, studies within Nigeria show a high level of awareness about diabetes [17,18]. These studies revealed good knowledge of the diseases compared to other NCDs assessed in their study and among diabetic patients receiving treatments, but we assessed the knowledge of a larger population with no discrimination to whether or not they have the disease.

Although this study revealed a high level of awareness about diabetes in the studied population, poor level of knowledge and poor screening practices were of concern. These findings were similar to those reported in other studies with relatively poor knowledge and attitude towards diabetes among a relatively similar population of Nigerian youths [19-21]. Though knowledge is known to contribute significantly to early prevention and detection of diseases, given the consistency of the poor level of knowledge and screening reported in this study

Table VIII. Logistic regression estimate for the level of knowledge (n = 448).

Independent variable	Regression coefficient	Sig.	EXP (B)	95% Confidence Interval EXP(B)	
				Lower	Upper
Sex (Ref. Female)					
Male	0.32	0.16	1.38	0.89	2.13
Monthly income (Ref. More than 20,000)					
No income	-2.23	0.00	0.11	0.02	0.48
20,000 or less	-0.62	0.01	0.54	0.35	0.83
Constant	-0.21	0.32	0.81		
Hosmer and Lemeshow test = Chi-square 0.91, sig 0.82					
-2 Log Likelihood = 559.974					
Nagelkerke R² =0.07					

Table IX. Logistic regression estimate for screening practices (n = 500).

Independent variable	Regression coefficient	Sig.	EXP (B)	95% Confidence Interval EXP(B)	
				Lower	Upper
Age group (Ref Middle age)					
Youth	-1.07	0.02	0.34	0.15	0.82
Adult	-0.71	0.02	0.49	0.28	0.89
Religion (Ref. Islam)					
Christianity	0.14	0.55	1.15	0.72	1.85
Monthly income (Ref. More than 20,000)					
No income	-1.28	0.07	0.28	0.07	1.12
N20,000 or less	-0.29	0.25	0.75	0.46	1.23
Employment status (Ref. Retired)					
Employed	-0.46	0.63	0.63	0.10	4.12
Self-employed	-0.61	0.51	0.54	0.09	3.29
Non-paid employment	-19.95	0.99	0.00	0.00	0.00
Unemployed	-0.83	0.42	0.44	0.06	3.19
Marital status (Ref. Cohabiting)					
Never married	-3.03	0.00	0.05	0.01	0.35
Currently married	-2.31	0.02	0.10	0.01	0.70
Separated	-22.62	0.99	0.00	0.00	0.00
Divorced	-22.84	0.99	0.00	0.00	0.00
Widowed	-1.43	0.21	0.24	0.03	2.20
Ethnic Group (Ref Other tribes)					
Yoruba	-1.08	0.03	0.34	0.13	0.89
Igbo	-1.21	0.08	0.30	0.08	1.13
Hausa	-19.47	0.99	0.00	0.00	0.00
Level of Education (Ref Postgraduate degree)					
No formal schooling	-3.04	0.01	0.05	0.01	0.48
Primary school not completed	-1.16	0.40	0.31	0.02	4.58
Primary school completed	-1.15	0.26	0.32	0.04	2.36
Secondary school not completed	-1.61	0.14	0.20	0.02	1.69
Secondary school completed	-0.95	0.35	0.39	0.05	2.77
College/University completed	-0.49	0.62	0.61	0.09	4.20
Constant	4.93	0.00	137.69		
Hosmer and Lemeshow test = Chi-square 3.78, sig 0.88					
-2 Log Likelihood = 513.459					
Nagelkerke R² = 0.21					

and previous studies, it is crucial that a multi-sectorial or multifaceted intervention which will address these features for effective change result be implemented. Multifaceted interventions have been proven to improve

behaviour change while enhancing knowledge, skills, health-seeking behaviour and personal empowerment for non-communicable diseases such as hypertension [22,23]. This study did not consider community centered policies

and strategies that may aid the screening practices of diabetes. We, however, argue that though there are operational policies, strategies and action plans for diabetes in Nigeria and other low-and middle-income countries, there is a need to be more intentional in the intervention approach. People are aware of diabetes but have poor knowledge about the condition and this in turn affects their practices about it. However notably, majority of the respondents in this study are willing to have more information about problems associated with diabetes.

Conclusion

Though Diabetes awareness is high, knowledge gaps and poor screening practices is of concern. This calls for tailored multi-component, community-based, health education interventions. With respect to the study's findings, including the willingness of the population to have more information about the problems associated with diabetes, we recommend a socio-ecological approach for community health education intervention on the knowledge of diabetes in Nigeria.

Ethical approval

This study was approved by the University of Ibadan/ University College Hospital Ethical Review Committee, Nigeria and the assigned reference number is UI/EC/17/0410.

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Conflict of interest statement

The authors declare that they have no competing interests.

Authors' contributions

AAO, MMO, MO and YJ were involved in the conceptualized of the research idea, planning, data collection and analysis led by OO. AAO wrote the first draft; MMO, MO, YJ and OO performed extensive

edits and all authors approved the final version of the manuscript.

References

- [1] International Diabetes Federation [Internet]. 2019 [cited 2019 Jan 30]. Available from: <https://idf.org/our-network/regions-members/africa/members/20-nigeria.html>
- [2] Annual Diabetes Report [Internet]. 2013. Available from: www.idf.org
- [3] Nigeria's NCD Indices, Major Public Health Challenge. Nigeria Pilot. 2013.
- [4] Frumento D, Ben Nasr M, El Essawy B, D'Addio F, Zuccotti GV, Fiorina P. Immunotherapy for type 1 diabetes. *J Endocrinol Invest* 2017;40:803-14. <https://doi.org/10.1007/s40618-017-0641-y>
- [5] Oguejiofor O, Odenigbo C, Onwukwe C. Diabetes in Nigeria: Impact, Challenges, Future Directions. *Endocrinol Metab Syndr* 2014;3:2. <https://doi.org/10.4172/2161-1017.1000130>
- [6] Ahmed N, Shaha SK, Jennings H, Kuddus A, Morrison J, Akter K. Diabetes knowledge and care practices among adults in rural Bangladesh: A cross-sectional survey. *BMJ Glob Health* 2018;3:891. <https://doi.org/10.1136/bmjgh-2018-000891>.
- [7] Gillani AH, Islam FMA, Hayat K, Atif N, Yang C, Chang J. Knowledge, attitudes and practices regarding diabetes in the general population: A cross-sectional study from Pakistan. *Int J Environ Res Public Health* 2018;15:1906. <https://doi.org/10.3390/ijerph15091906>
- [8] Mufunda E, Ernersson Å, Hjelm K. Limited knowledge of diabetes in patients attending an outpatient diabetes clinic at a referral hospital in Zimbabwe: A cross-sectional study. *Pan Afr Med J* 2018;29:144. <https://doi.org/10.11604/pamj.2018.29.144.12301>
- [9] Al Shafae MA, Al-Shukaili S, Rizvi SGA, Al Farsi Y, Khan MA, Ganguly SS, et al. Knowledge and perceptions of diabetes in a semi-urban Omani population. *BMC Public Health* 2018;8:249. <https://doi.org/10.1186/1471-2458-8-249>
- [10] Demaio AR, Otgontuya D, De Courten M, Bygbjerg IC, Enkh-tuya P, Oyumbileg J, et al. Exploring knowledge, attitudes and practices related to diabetes in Mongolia: A national population-based survey. *BMC Public Health* 2013;13:236. <https://doi.org/10.1186/1471-2458-13-236>
- [11] Ben Nasr M, Frumento D, Fiorina P. Adipose stem cell therapy for chronic pancreatitis. *Mol Ther* 2017;25:2438-39. <https://doi.org/10.1016/j.ymthe.2017.10.007>
- [12] Asekun-Olarinmoye E, Adebimpe W, Omobawa O, Oyekenu-Agoro Y, Omisore A. Knowledge, attitude and practice towards screening and risk factors for diabetes mellitus among staff of a University in South-Western Nigeria. *Niger Endocr Pract* 2011;5(1).
- [13] Marian A, Joy I. Knowledge, attitudes and practices of people with type 2 diabetes mellitus in a Tertiary Health Care Centre, Umuahia, Nigeria. *J Diabetes Metab* 2012;3:3. <https://doi.org/10.4172/2155-6156.1000187>
- [14] Onyiriuka A, Oluwayemi I, Achonwa C, Abdullahi M, Oduwole A, Oyenusi E, et al. Nigerian physicians' knowledge, attitude and practices regarding diabetes mellitus in the pediatric age group. *J Community Med Prim Heal Care* 2016;28(1).
- [15] Ibadan North Local Government Population Census - 2016.
- [16] NCDs. The STEPS Instrument and Support Materials. WHO [Internet] 2017 [cited 2019 Jan 30]; Available from: <http://www.who.int/ncds/surveillance/steps/instrument/en/>
- [17] Odeyinka O, Ajayi I. Prevalence of hypertension and diabetes and their determinants among commercial drivers in Ibadan metropolis, South-Western Nigeria. *Niger J Cardiol* 2017;14(2):75-83. https://doi.org/10.4103/njc.njc_11_17

- [18] Otovwe A, Henry E, Ese O. Knowledge of dietary and medical management of type-2 diabetes in an urban and rural community of Delta State Nigeria. *African Journal of Diabetes Medicine* 2018;26(19).
- [19] Omobuwa O, Alebiosu O. Awareness of diabetes amongst undergraduates in a Nigerian University, South-West Nigeria. *Sahel Med J* 2014;17:29-33. <https://doi.org/10.4103/1118-8561.129151>
- [20] Ubbangha L, Odugbemi T, Abiola A. Diabetes mellitus: Identifying the knowledge gaps and risk factors among adolescents attending a public school in Lagos State. *J Clin Sci* 2016;13:193-8. <https://doi.org/10.4103/2468/6859>
- [21] Aturaka S, Omotola O, Olaiya A, Imohi P, Faturoti A. Knowledge of Risk Factors and Screening for Diabetes Mellitus among Youths in Southwestern Nigeria. *Am J Heal Res* 2017;5:110-3. <https://doi.org/10.11648/j.ajhr.20170504.14>
- [22] Yang C, Hu J, Tao M, Li Y, Chai Y, Ning Y, et al. Effectiveness of a multifaceted intervention on improving the hand-washing skills and behaviors of migrant workers in Beijing. *Glob Health Promot* 2017;24:32-9. <https://doi.org/10.1177/1757976915601833>
- [23] Lambert-Kerzner A, Havranek EP, Plomondon ME, Albright K, Moore A, Gryniewicz K, et al. Patients' perspectives of a multifaceted intervention with a focus on technology: A qualitative analysis. *Circ Cardiovasc Qual Outcomes* 2010;3:668-74. <https://doi.org/10.1161/CIRCOUTCOMES.110.949800>

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