Original Article

Non-diabetic Out-Patients' Lifestyle and Awareness of Type 2 Diabetes Symptoms in two Nigerian Secondary Health Care Facilities

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Abstract:

Objectives: Diabetes is a highly prevalent, lifestyle-related, but preventable chronic disease in parts of Nigeria. The study assessed lifestyle and awareness of non-diabetics on diabetes for effective primary prevention. ***Materials and methods****:* A cross-sectional survey was conducted on non-diabetic out-patients in two hospitals using a structured questionnaire. Descriptive analyses were performed using SPSS version 21.0. Outcome variables were presence of unhealthy diet and classical diabetes symptoms in the respondents. $p \leq 0.05$. ***Results and discussion:*** A **t**otal of 300 respondents participated in the study. Majority 186(62.0%) had never monitored their blood glucose. Over half 168(56%), were not aware of diabetes preventive measures, and few, reported the occurrence of diabetic symptoms with fatigue having the highest occurrence 61(20.3%), followed by blurred vision 58(19.3%). Age (p=0.229), Marital status (p=0.375), Education (p=0.217), Income (p=0.240), were not associated with diabetic symptoms. Majority did not smoke 262(87.3%) or take alcohol 216(72.0%). ***Conclusion****:* Low awareness of diabetes was mostly found among the respondents. Majority was not aware of diabetes symptoms and had never checked their blood glucose. However, healthy social lifestyle was found among them. Findings indicate the need for enhanced diabetes education to non-diabetic patients.

Keywords: Type 2 diabetes mellitus, awareness, lifestyles, out-patients, Nigeria.

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Introduction

Diabetes mellitus is a chronic disease and affects several millions of people, predisposing them to complications.[1] Modifiable risk factors that contribute to the global increase in diabetes mellitus and other chronic diseases include sedentary lifestyles and unhealthy diets.[2] Ageing population, although non-modifiable, is another risk factor also contributing to the global increase of this disease condition.[2]

The International Diabetes Federation reports that a global population of 352 million adults, live with impaired glucose tolerance and are at high risk of diabetes.[3] It is seen to be on the rise, especially in developing countries as a result of lifestyle changes and modernization.[4] It is estimated that about 552 million people will be affected by 2030, if urgent steps are not taken to halt its increase.[5] Sub-Saharan Africa where Nigeria is located, is reported to have the fastest growing rates of diabetes mellitus with a drastic increase in the population living with diabetes between year 2000 and 2010.[6] The presence of several undiagnosed cases increases the disease burden, with over 80% identified in African region.[7]

According to the World Health Organization

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(WHO) diabetes country profile in 2016, Nigeria had a 4.3 % prevalence of diabetes, with 27,830 diabetes related mortality of persons between 30 – 69 years, and 45,060 deaths from high blood glucose.[8] There has been an increase in the prevalence of diabetes mellitus in all regions of Nigeria and this was noted in 2017 where the prevalence was reported as 5.77% in a meta-analysis, with the highest pooled prevalence being in the south-south part of the country 9.8%.[9] Diabetes mellitus is a major cause of hospital admissions in Nigerian, and several risk factors including obesity, have been identified.[10]

Knowledge of diabetes symptoms encourages early presentation of persons to health care facilities and prevents/delays the onset of complications. Type 2 diabetes is associated with several clinical, humanistic and economic consequences, hence a major cause of concern in both the old and the young.[11] Also, the development of this disease condition may be prevented or delayed by good knowledge of the disease; its preventive measures, early signs and symptoms, routine monitoring of blood sugar in adults, among others. Low knowledge score on diabetes risk factors, types, prevention and symptoms has been associated with non-diabetic persons resident in a Nigerian community.[12] Similarly, knowledge deficits on diabetes among non-diabetic persons in Nigeria, have been demonstrated to be mostly on diabetes symptoms.[13] As a result of low awareness of diabetes symptoms, several cases are diagnosed at onset of complication.[14] Following the observed low awareness of diabetes among non- diabetes Nigerian residents, the reported increase in prevalence is expected.

Primary prevention of diabetes begins with general awareness of the disease condition. Awareness therefore plays a major role in lifestyle modification, the overall prevention, management and control of diabetes mellitus, hence; the need for its enhancement, through health education and health promotion among the populations.[15] The educational programs empower individuals to assess their diabetes risks and enables them to follow preventive measures. Insufficient education influences the outcome of diabetes as it results in low awareness and poor self-care.[16] Awareness of diabetes, therefore, enhances proper health seeking behaviours in individuals.

It is evident that the improvement of awareness and knowledge of diabetes is one of the steps for diabetes prevention. Therefore, it is essential to explore the level of awareness and lifestyle associated with persons in the Country, for targeted messaging. Non-diabetes outpatients are targeted to promote primary prevention of the disease. The study assessed the lifestyle, awareness of diabetes and presence of diabetes-related symptoms among individuals who were not diagnosed of diabetes, in two secondary health facilities in Ogun State Nigeria. This was done to determine the possibility of early detection of chronic diseases, including diabetes.

Materials and methods

Study setting

The study was conducted in the out-patients' department (OPD) of two secondary institutions in the suburban region of Ogun state, Nigeria. They are located in Isara and Ijebu ode of Ogun State, south western Nigeria. These health institutions are at the middle of hierarchy of hospital classifications in Nigeria. These hospitals receive referrals from the primary health centers and make referrals to the tertiary health institutions, which include the teaching hospitals and Federal medical centers, when necessary. An average of about 47 patients visit the out-patients' department (clinic) O.P.D. of General hospital Isara on clinic days. Also, Ogun State General Hospital Ijebu Ode has an average number of about 30 patients who visit the out-patients' department (O.P.D.) on clinic days.

Study design and study population

A cross-sectional survey was conducted over a 2-month period, among out-patients who visited the hospital for various subjective health reasons, which were not validated against the eventual patients' diagnosis. A total of 377 out-patients participated in the study, following a 2-month period of consecutive recruitment, after verbal informed consent was obtained from each of them. The aim of the study was explained to the recruited participants and the questionnaire was distributed to them while they waited to see their physicians. Only patients who attended the OPD clinic of the two secondary health facilities, not previously diagnosed of diabetes and were of 45 years and above, were included in the study. Patients who declined informed consent were excluded.

Study Instrument

The theoretical framework used in the questionnaire design was based on risk factors for type 2 diabetes which are both hereditary and

lifestyle related. These factors could be modified to delay or prevent onset of type 2 diabetes through adequate awareness. The questionnaire made up of questions that allowed for evaluation of the respondents' awareness of diabetes, presence of diabetes symptoms and lifestyles that may influence the development of type 2 diabetes.

A two-sectioned structured questionnaire was used for the study and the constructs measured were respondents' awareness and knowledge on diabetes-related symptoms, and presence of diabetes symptoms in the respondents. Section A was used to obtain the socio-demographic data of the respondents, while section B was used to obtain information on the patient's lifestyle, awareness of diabetes mellitus and presence of likely symptoms of diabetes mellitus. Questions on awareness on diabetes and presence of likely diabetes symptoms were anchored on a "Yes or No" response scale. However, questions on lifestyle were anchored on a 3-point Likert scale, which include: Monthly, Yearly, Not at all".

The questionnaire was validated through expert assessment by an endocrinologist and a clinical pharmacist to ensure the relevance of the questions. Pretesting was carried out among 20 respondents of similar demographics in another health facility who were not diagnosed of diabetes. This led to the modification of the questions to suit the respondents' comprehension and to ensure clarity.

Outcome measures and statistical analysis

Outcome variables were the presence of unhealthy diet and 3 or more classical diabetes symptoms in the respondents. Collected data was inputted into Microsoft excel for easy sorting and descriptive analysis and cross tabs was performed using IBM Statistical Package for Social Sciences (SPSS) version 21.

Presence or absence of diabetic symptoms were categorised into, No symptoms or Mono; Bi; or poly symptoms, Chi square was used to assess relationship between respondents' variables and absence or presence of symptoms. Respondents index diagnosis were categorised using ICD-11 for mortality and Morbidity Statistics (ICD-11 MMS).[17] P value of 0.05 was considered significant.

Polyphagia was defined as eating more frequently than usual as a result of increased hunger in the patients, polyuria was defined as excessively increased frequency of urination more than usual in a patient, and polydipsia was defined as unusually increased thirst. Unhealthy diet was defined as regular intake of fatty foods and refined/ simple sugars.

Results

Socio-demographic characteristics of the study participants

Out of the 377 questionnaires distributed, 300 complete responses were obtained giving a response rate of 79.6 %. A total of 300 respondents participated in the study and majority were females 204(68.0 %), married 255 (85.0 %) and had only primary education, 94 (31.3 %); about half 149 (49.7%) had less than secondary education. Others are as shown in Table 1.

Respondents' reasons for visiting the hospital categorized using ICD 11th edition.

More than half of the study participants visited the hospital for cough 90 (30.0 %), followed by a

Table 1. Socio-demographics of the non-diabetic respondents in secondary health facilities located in Nigeria.

Variables	Frequency (n = 300)	Percentage (%)
Age		
40 to 44	74	24.7
45 to 54	80	26.7
55 to 64	71	23.7
65 to 74	75	25.0
Sex		
Male	96	32.0
Female	204	68.0
Marital Status		
Single	3	1.0
Married	255	85.0
Separate/ Divorce	18	6.0
Widowed	24	8.0
Others	6	1.0
Education		
None	94	31.3
Primary school certificate	90	30.0
Secondary school certificate	59	19.7
Bachelor degree	17	5.7
Master degree	40	13.3
Income (In US dollars)		
< 13.02	137	45.7
13.02 to 28.64	14	4.7
28.65 to 78.11	20	6.7
78.12 to 156.23	71	23.7
>156.23	58	19.3

*One US dollar = 380.492 according to XE currency converter at 5th November 2020, 1:44 pm

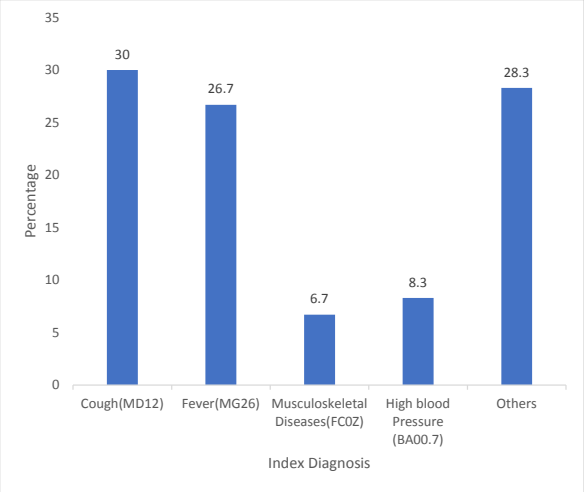

Figure 1: Respondents' reasons for visiting the hospital categorized using ICD 11th edition.

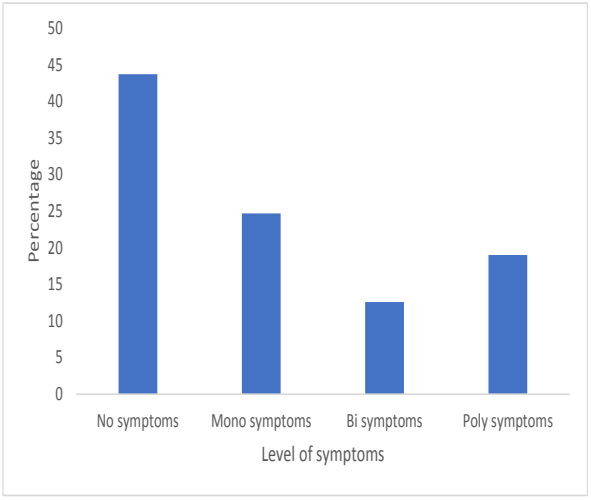

Figure 2: Occurrence of diabetic symptoms among non-diabetic persons in the out-patients' department of 2 secondary health facilities in Nigeria.

fever 80 (26.7 %). See Figure 1.

Social lifestyle of the non-diabetic respondents in secondary health facilities located in South West Nigeria

From the study, it was observed that 262 (87.3%) of the patient did not smoke at all, 30 (10.0%) smoked occasionally and 8 (2.7%) smoked on daily basis. Out of the 12.7% that smoked, 15 (39.5%) had smoked between 0 to 10 years while 23 (60.5%) had smoked between 10 to 50 years. Also, 226 (75.3%) of the patients took soft drinks occasionally, 216 (72.0%) did not take alcohol at all, 214 (71.3%) ate fatty foods occasionally, 178 (59.3%) took sugar occasionally, 75 (37.5 %) of the patients did diet. Other variables are shown in Table 2.

Awareness of diabetes and health behaviour of the non-diabetic respondents in secondary health facilities located in South Western Nigeria

Majority of the respondents 222(74.0 %) and 239 (79.7%) monitored their blood pressure and cholesterol yearly respectively, while 186 (62.0 %) had never monitored their blood sugar level. However, 178 (59.3 %) reported to be knowledgeable on diabetes mellitus. Almost half 122(40.7 %) had no response on the symptoms of diabetes mellitus and only 90 (30 %) knew it is associated with raised blood sugar level, however; only 3 (1.0 %) each of the study population, knew it is associated with slow wound healing and polydipsia. Other parameters are represented in Table 3.

Occurrence of Diabetes symptoms among non-diabetic respondents in secondary health facilities located in South Western Nigeria.

More than half, 168 (56.0 %) of the study participants were not aware of preventive measures of diabetes mellitus and only very few, reported the occurrence of symptoms similar to diabetes symptoms, with fatigue having the highest occurrence 61(20.3 %), followed by blurred vision 58(19.3 %). See Table 4.

Occurrence of diabetic symptoms among non-diabetic persons in the out-patients' department of 2 secondary health facilities in Nigeria

Figure 2 shows the level of occurrence of diabetic symptoms among study participants. Majority did not report symptoms, while about a quarter reported mono diabetic symptom. See Figure 2.

Associations between Socio-demographic characteristics and level of diabetes symptoms of the non-diabetic respondents in secondary health facilities located in Nigeria.

There was no significant association between Age (X^2 =11.835. df 12, P=0.229), Marital status (X^2 =5.839. df 9, P=0.375), education (X^2 =12.142 df 12, P=0.217), Income(X^2=11.583. df 12, P=0.240) and levels of diabetic symptoms. See Table 5.

Discussion

The study shows majority of the respondents had never smoked. Smoking may be regarded as a recreational activity, but it is associated with increased risks of developing several health conditions. The demographic characteristics of the study participants provides an insight to the possible reasons for this finding. In Nigeria, especially in the rural and suburban regions, smoking is usually not socially acceptable for females, who were observed to be majority of the study participants. A previous study also reported

Table 2. Social lifestyle of the non-diabetic respondents in secondary health facilities located in South West Nigeria.

Life styles of the patients	Frequency (n = 300)	Percentage (%)
Smoking		
Daily	8	2.7
Occasionally	30	10.0
Not at all	262	87.3
Soft drinks		
Daily	28	9.3
Occasionally	226	75.3
Not at all	46	15.3
Alcohol		
Daily	18	6.0
Occasionally	66	22.0
Not at all	216	72.0
Fatty food		
Daily	43	14.3
Occasionally	214	71.3
Not at all	43	14.3
Refined sugar		
Daily	27	9.0
Occasionally	178	59.3
Not at all	95	31.7
Dieting		
Yes	95	31.7
No	205	68.3
If yes, the measures taken		
Eating breakfast always	5	2.4
skipping meals	41	20.0
Eating plenty of fruits.	29	14.2
Eating plenty of vegetables	3	1.5
Avoiding sugar	3	1.5
Avoiding salt	6	2.9
Not eating meats and other animal fats	16	7.8
Others (Native)	3	1.5
No response	99	48.3

Table 3. Awareness of diabetes of the non-diabetic respondents in secondary health facilities located in South Western Nigeria.

Variables	Frequency (n = 300)	Percentage (%)
Knowledge of diabetes		
Yes	178	59.3
No	122	40.7
Signs and Symptoms of diabetes mellitus		
Frequent urination	57	19.0
High blood sugar	90	30.0
sugary urine	25	8.3
Drinking a lot of water	3	1.0
Slow healing of wounds	3	1.0
No response	122	40.7
Awareness of measures taken to avoid the risk of developing diabetes		
Yes	132	44.0
No	168	56.0
If yes;		
Avoiding sugar	106	35.3
Avoiding starchy foods	22	7.3
Native drugs	4	1.3
Monitor blood pressure		
Monthly	17	5.7
Yearly	222	74.0
Not at all	61	20.3
Monitor cholesterol		
Monthly	51	17.0
Yearly	239	79.7
Not at all	10	3.3
Monitor blood sugar		
Monthly	5	1.7
Yearly	109	36.3
Not at all	186	62.0

low prevalence of smoking among females in a Nigerian population.[18] Respondents in a similar study recommended the avoidance of alcohol and smoking in diabetes.[19] Also, lifestyle modification has been described as a major way of preventing or delaying type 2 diabetes [20], and control of smoking would be a step in the right direction. Smoking is reportedly significantly associated with type 2 diabetes mellitus.[21]

Also, majority of the respondents in this study took sweetened drinks (soft drinks) occasionally, meanwhile, majority did not take alcoholic drinks. The predominant female gender among the study participants and the social implication of alcohol intake in the immediate society may have contributed to this finding. Alcohol inactivity was the predominant lifestyle found in non-diabetics in a previous study.[22] Alcoholism has been reported to be significantly associated with type 2 diabetes mellitus.[21,23] Fatty foods and refined sugar were occasionally taken by majority of the respondents in this study. This frequency is not considered to be unhealthy. Meanwhile, the commonest challenges reported in managing diabetes were dietary modifications.[24] Again diet has been noted to be the commonest risk factor for diabetes.[19] Although

Table 4. Occurrence of Diabetes symptoms among non-diabetic respondents in secondary health facilities located in South Western Nigeria **(n = 300)**

Symptoms	Yes	No
	Frequency (%)	Frequency (%)
Polyphagia	24(8.0)	276(92.0)
Polyurea	50(16.7)	250(83.3)
Polydypsia	40(13.3)	260(86.7)
Fatigue	61(20.3)	293(79.7)
Blurred vision	58(19.3)	242(80.7)
Itching	53(17.3)	247(82.3)
Skin disorder	14(4.7)	286(95.3)
Weight loss	43(14.3)	257(85.7)
Tingling/ numbness	42(14.0)	258(86.0)
Thrush	6(2.0)	294(98.0)
Slow healing of wounds	9(3.0)	291(97.0)

*Multiple responses

study participants did not report unhealthy dietary habits, regular education on dietary habits is recommended to ensure sustainability.

Majority had never checked their blood sugar level; this finding is consistent with findings in a similar study where only few stated that they monitored their blood sugar levels at home using a glucometer.[24] It is also consistent with a previous study where respondents reportedly did not monitor their blood sugar levels on an annual basis.[25] Low awareness of diabetes among the study participants may be responsible for these findings. It is recommended that adults who are overweight and who have other risk factors, be screened every 1 to 3 years.[20] Regular monitoring of blood sugar allows for early detection and prevents the risk of delayed diagnosis; hence, reducing the risks of complications. However, it is not surprising that blood sugar was not frequently monitored by the study participants, since they had no diagnosed diabetes.

The study also revealed that almost all the respondents monitored their blood pressure yearly and less than half had never monitored their cholesterol level. A previous study showed that diastolic blood pressure is significantly associated with diabetes mellitus.[23] It is therefore pertinent to target educational intervention on the need for regular monitoring of the blood pressure and lipid profiles. Although the study participants were not diagnosed of diabetes, they were above forty years old and therefore required routine blood pressure

Table 5. Associations between Socio-demographic characteristics and level of diabetes symptoms of the non-diabetic respondents in secondary health facilities located in Nigeria.

Variables	Frequency n	Occurrence of diabetic symptoms None	mono	bi poly		χ2	df	p-value
Age						11.84	12	0.459
40 to 44	74	41	14	8	11			
45 to 54	80	35	24	10	11			
55 to 64	71	26	16	11	18			
65 to 74	75	28	20	9	17			
Sex						0.87	3	0.833
Male	96	38	24	13	20			
Female	204	93	50	25	37			
Marital Status								
Single	3	1	1	0	1	5.89	9	0.751
Married	255	109	66	34	46			
Separate/ Divorce	18	9	2	1	6			
Widowed	24	12	5	3	4			
Education						12.14	12	0.434
None	94	45	23	11	15			
Primary school certificate	90	44	20	13	13			
Secondary school certificate	59	25	16	4	14			
Bachelor's degree	17	5	6	2	4			
Master's degree	40	12	9	8	11			
Income (In US dollars)						11.58	12	0.480
< 13.02	137	58	30	22	27			
13.02 to 28.64	14	5	5	1	3			
28.65 to 78.11	20	9	8	2	1			
78.12 to 156.23	71	35	16	4	16			
>156.23	58	24	15	19	10			

*One US dollar = 380.492 according to XE currency converter at 5th November 2020, 1:44 pm checks.

More than half of the study population indicated they were knowledgeable on diabetes mellitus, but only few appeared be aware of the symptoms of the disease condition and more than half were not aware of the preventive measures. Average knowledge of diabetes was found in a similar study in Kerala[19] and good knowledge was found in the respondents of another study in Jordan.[25,26] However, poor knowledge of diabetes was

reported by other previous studies in Zimbabwe and Gambia.[1,15] Educational level is a determinant of the knowledge base of the respondents,[25] as people with university degrees appear to have significantly higher knowledge.[27] Targeted educational intervention on diabetes awareness is essential to enhance and promote healthy lifestyle practices and improved quality of life among these populations.

Awareness of diabetes prevention measures was low among study participants, majority were not aware of any measures for preventing risks of developing diabetes. Although there was majorly no response on associated diabetes symptoms, high blood sugar was the commonest observed knowledge in the participants. A previous study in Nigeria also showed poor knowledge of diabetes symptoms among study participants.[13] Conversely, a study among undergraduates in Nigeria showed high awareness of diabetes.[28] Difference in educational background may be major contributory factor to this difference in findings. Diabetes education should not only be focused on persons with diabetes, but also on non-diabetic persons, for appropriate prevention. Awareness of diabetes symptoms aids in prompt detection and early management of the disease state.

Diabetes-related symptoms appeared to be low among the study participants. Although at low frequencies, all the listed symptoms of diabetes were found in the study participants. Fatigue was the most common symptom reported in this study and this is consistent with findings from a previous study.[19] Meanwhile fatigue is not limited to diabetes as it is associated with several other health conditions. The classical symptoms of diabetes occurred at much lower rate in the respondents. Positive lifestyle among the respondents with regards to diabetes risk factors, may be contributory to this finding.

Some limitations were associated with the study, one of which was the lack of assessment of the respondents' physical activity. Height, weight and waist circumference could also not be measured for analysis in the study. Also, assessment of diabetes symptoms was based on patients' reported symptoms, as diabetes screening could not be performed. As peculiar with surveys, bias in self-reporting is usually difficult to rule out. Alternate methodology would be prospective approach, which may present a clearer picture of the respondents' lifestyle and knowledge base. New questions arising from this study are on the best approaches towards lifestyle modification in a similar population and the educational measures that would be more effective. Despite these limitations, our study has provided an insight on awareness of diabetes in persons who were not diagnosed of the disease, for improved approach towards diabetes prevention.

Conclusion

Healthy dietary lifestyle as regards diabetes risks, and low awareness of diabetes preventive measures were found among the study participants. Majority was also not aware of diabetes-related symptoms and had never checked their blood sugar level. These findings highlight the need for enhanced health information through awareness intervention regarding diabetes. More strategic diabetes education, including routine outpatients' diabetes education during patients' waiting time could be employed to facilitate awareness and knowledge.

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Conflict of Interest: Authors declare no conflicts of interest.

Ethical Approval: Ethical approval was obtained from the hospitals' ethics committee with the reference numbers, SHI.58/VOL.1/83 and IT/I/VOL1. Informed consent was also obtained from all the respondents prior the study, and confidentiality of the patient's information was maintained during and after the study.

Authors Contribution: UIHE and DOO conceived and designed the study. UIHE and COI analyzed and interpreted findings. COI wrote the initial draft. All authors read and approved the final manuscript for submission.

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