



Assessment of Knowledge and Awareness of Diabetic and Non-Diabetic Population Towards Diabetes Mellitus in Kaduna, Nigeria

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ABSTRACT

This study was aimed to assess the knowledge and awareness among diabetic and non diabetic Nigerian population in Kaduna state towards diabetes mellitus (DM) different knowledge domain and, to evaluate diabetic patients' awareness towards anti-diabetic therapy, hypoglycemia management and their practical approach towards DM control. This was a cross-sectional study based on validated, self administered questionnaire. Three hundred forty (340) subjects included 33.7% diabetic subjects and 66.2% non diabetic participants attending NNPC-industrial clinic and Barau Dikko specialist hospital Kaduna, Nigeria. 78.96% of total participants have good knowledge towards DM etiology, disease monitoring (70.6%), management (57.1%), and physical control (52.7%). Average knowledge was recorded towards DM clinical manifestation (47.5%) and complication (42.4%). Low knowledge response (38.3%) towards risk problems associated with high blood pressure. 35% of diabetic participants missed some doses of their anti-diabetic drug. 34.2% of diabetic participants are not aware about hypoglycemic symptoms and 53.8% not aware about management of these symptoms. 47.9% of diabetic participants did not have eye examination and 30.8% did not have urine test. Employed participants with age group 40-60 years have significant knowledge towards DM etiology and complication ($P < 0.005$). Diabetic female was significantly aware about practical management and control of DM ($P < 0.005$). The study highlighted the need of people in Kaduna state in Nigeria for better health information through large scale awareness interventions regarding diabetes. In addition diabetic patient adherence to their anti-diabetic therapy can be achieved through patient counseling by clinical pharmacist or health professional.

Keywords: DM Knowledge, Practice, Hypoglycemia Management, Drug Adherence

1. INTRODUCTION

The prevalence of diabetes mellitus (DM) and other non communicable disease is rising in African communities, many factors are responsible for this increase, including unhealthy Western lifestyles with reduced physical activity, sedentary lifestyles, and excessive intake calories, this contribute to obesity which is a risk factor for the development of diabetes [1, 2]. Due to a lack of proper awareness and education, diabetes sufferers are particularly prone to complications and increased mortality. Diabetes have nearly doubled to more than 7 million within the past 15 years, the illness receives scan attention from donors or governments in Africa [3]. In Nigeria the prevalence of diabetes is 2.6 million [4]. The high burden of diabetes mellitus in Nigeria is largely attributable to cardiovascular disease which account for 15% of all DM deaths [5, 6]. Kaduna is the state capital of Kaduna State in north-central Nigeria. Kaduna State forms a portion of the country's cultural meltina Dot. Apart from six major ethnic

groups found in the State, there are over twenty other ethnic minority groups, each with its language and arts or religion different from the other. The population of Kaduna is at 760,084 as of the 2006 Nigerian census. A study revealed that urban people of Kaduna state engaged in sedentary lifestyle more than the rural counterparts, hence health problems suffered by the people of Kaduna state are significantly related to their sedentary lifestyle and public health education is recommended to reduce health problems like obesity, hypertension, stroke and other cardiovascular disease caused by sedentary lifestyle [7]. A study characterize the electrocardiographic abnormalities in persons with type 2 DM in Kaduna, that ischemic heart disease is merging fast in developing, poverty –stricken environment like Nigeria and should be routinely examined [8]. Furthermore it's reported that dyslipidemia exists in type 2 diabetes mellitus population in Kaduna, Nigeria [9]. This study was carried out in order to assess the knowledge, awareness among diabetic and non diabetic Nigerian population in Kaduna state towards DM various knowledge domain and diabetic patients' awareness

about anti-diabetic drug utilization and adherence, hypoglycemia management and their practice towards the management and control of DM.

2. MATERIAL AND METHODS

A cross-sectional observational knowledge and practice study was performed among diabetic and non diabetic old inhabitant in Nigeria population who were attending NNPC-industrial clinic and Barau Dikko specialist hospital Kaduna/Nigeria. A nonrandomized sampling strategy was used. Inclusion criteria diabetic patients, with Type 1 or Type 2 diabetes mellitus, and non diabetic individuals who willing to participate in this study. Collection of data was done twice weekly during the period between April and July 2011. A self-administered questionnaire was used as a tool for data collection. The questionnaire was prepared by the investigators and validated by two specialists [one community medicine and one clinical pharmacist]. The questionnaire was divided into two parts. The first part included information on socio-demographic characteristics of the participants (gender, age, education and occupation). The second part included twenty questions focused on the knowledge of diabetes etiology (high blood sugar and low insulin level in blood), clinical manifestation (increased thirst, urination frequency, tiredness and slow healing of wound), complications (eye and kidney problems, foot ulcers and heart problems), management by life style modification required for diabetic (weight reduction, stopping smoking and alcohol), factors help in controlling blood sugar (regular exercise, blood sugar monitoring, planned diet, medication and education), antidiabetic drug used in DM treatment (insulin, metformin, gliburide), drug therapy

utilization and adherence (diabetic medicine can be stopped immediately, after one month or should be continued lifelong, and can diabetic person miss his/her medication dose), monitoring method (checking blood or urine sugar level), hypoglycemic symptoms (weakness, confusion, visual disturbances), hypoglycemia management (taking sugar, or medicines or insulin), various diagnostic domain involved in controlling DM (frequency of eye examination, urine test and blood pressure test recommended for diabetic patients). Data was analyzed using SPSS software version 17. Proportions and percentages were used to summarize categorical variables. Chi-square test examined the association between variables. Data collection from Nigeria was done by two professionals under the supervision of specialist doctor.

Ethical considerations: The study was approved by the Ethics Committee of the Gulf Medical University. Verbal consent was taken from the participants before enrollment in the study. Confidentiality of the participants was preserved.

3. RESULTS

Total 347 participants were included in the study, 230 (66.2%) non diabetic (ND) subjects and 117 (33.7%) diabetic (D) subjects, 45.8% males and 54.2% females. Their ages ranged between 15-65 years. Table 1 shows demographic characteristics of participants. The highest age group of total participants is below 40 years 53.9% (n=187) and 46.1% (n=160) above 40 years. The highest educated group for both diabetic and non diabetic participants have diploma 61.7% (n=214). 55.3% (n=192) of participants are employed.

Table 1: Demographic Characteristics of Participants

Gender	Male number (%)		Female number (%)		Total (%)	
	159 (45.82)		188 (54.18)		347 (100)	
	D (35)	ND (124)	D (82)	ND (106)	D (117)	ND (230)
Age years						
<40	19 (54.28)	91 (73.39)	27(32.93)	50(47.17)	46(39.31)	141(61.30)
>40*	16 (45.72)	33 (26.61)	55 (67.07)	56(52.83)	71(60.69)	89(38.69)
Level of education						
illiterate	0 (0.0)	1 (0.8)	3 (3.7)	2 (1.9)	3 (2.6)	3 (1.3)
Diploma	29 (82.8)	52 (41.9)	64 (78.0)	69 (65.1)	93 (79.5)	121 (52.6)
Graduation	6 (17.2)	71 (57.2)	15 (18.3)	35 (33.0)	21 (17.9)	106 (46.1)
Occupation						
Employed*	34 (97.1)	74 (59.68)	38 (46.34)	46 (43.4)	72 (61.54)	120 (52.17)
Unemployed	1 (2.9)	50 (40.32)	44 (53.66)	60 (56.6)	45 (38.46)	110 (47.83)

* $P < 0.005$

Table 2 shows comparison between diabetic and non diabetic subjects percentage correct response towards different diabetes knowledge domain. The higher percentage correct knowledge response was recorded for DM etiology 72% (n=85) for diabetic subjects and 82.2% (n=189) for non

diabetic participants. Followed by DM monitoring 70.1% (n=82) for diabetic subjects and 70.9% (n=163) for non diabetic subjects. DM management through life style modification records 56.4% (n=66) for diabetic subjects and 57.4% (n=132) for non diabetic subjects. Both diabetic and

non diabetic participants have good knowledge towards DM physical control by planned diet and regular exercise 52.1% (n=61) for diabetic and 53.04% (n=122) non diabetic subjects. Average knowledge response was recorded for DM clinical manifestation 50.4% (n=59) for diabetic and 46% (n=106) for non diabetic subjects. Followed by DM

complication 53% (n=62) for diabetic subjects and 36.9% (n=85) for non diabetic subjects. The lowest knowledge response was recorded for risk problems associated with high blood pressure in patients with DM. 41.9% (n=49) diabetic and 36.5% (n=84) non diabetic subjects.

Table 2: Number (%) of Participants Correct Response towards DM Knowledge Domains

Knowledge Domain	Diabetic subjects (n=117)		Non-Diabetic subjects (n=230)		Total (n=347) 100%
	Male, n=35 (% Response)	Female, n=82 (% Response)	Male, n=124 (% Response)	Female, n=106 (% Response)	
*Etiology	29 (82.9)	56 (68.3)	102 (82.3)	87 (82.1)	78.96
Clinical Manifestation	16 (45.7)	43 (52.4)	57 (46.0)	49 (46.2)	47.5
*Complications	21 (60.0)	41 (50.0)	48 (38.7)	37 (34.9)	42.4
B.P Risk Factors	19 (54.3)	30 (36.6)	47 (37.9)	37(34.9)	38.3
Management	21(60)	45 (54.8)	73 (58.8)	59(55.6)	57.1
Physical Control	19 (54.3)	42(51.2)	64 (51.6)	58 (54.7)	52.7
Monitoring	28(80.0)	54(65.9)	84(67.7)	79(74.5)	70.6

*P< 0.005

Table 3: Comparison Between Diabetic and Non Diabetic Subjects Knowledge Response

Variable	Diabetic subjects n=117	Non-Diabetic subjects n=230	Total (100%) n =347
	(% Response)	(% Response)	(% Response)
Management by life style modification			
Weight reduction	18 (15.4)	20 (8.3)	38(11.0)
Stopping smoking	6 (5.1)	7 (3.0)	13(3.7)
Stopping alcohol	2 (1.7)	28 (12.2)	30(8.6)
All above	66 (56.4)	132 (57.4)	198(57.1)
Don't know	24 (20.5)	38 (16.5)	62(17.9)
Type of Complication			
Eye problem	12 (10.3)	25 (10.9)	37(10.7)
Kidney problem	10 (8.5)	40 (17.4)	50(14.4)
Foot ulcer	7 (6.0)	14 (6.1)	21(6.1)
Heart problem	6 (5.1)	19 (8.3)	25(7.2)
All above	66 (56)	85 (37)	147(42.4)
Don't know	20 (17.1)	43 (18.7)	63(18.2)
High blood pressure risk			
Heart attack	13(11.1)	22(9.6)	35(10.1)
Stroke	8(6.8)	36(15.7)	44(12.7)
Eye problem	8(6.8)	9(3.9)	17(4.9)
Kidney problem	8(6.8)	28(12.2)	36(10.4)
All the above	49(41.9)	84(36.5)	133(38.3)
Don't know	31(26.5)	42(18.3)	73(21)

Comparison between diabetic and non diabetic subjects knowledge towards the management of DM through life style modification, DM complication and risk problems associated with high blood pressure in diabetic patients is shown in table 3. About 21% of diabetic subjects are unaware about the management of DM by life style modification. Diabetes Mellitus if not treated can lead to different complication problems, 17% of diabetic subjects are unaware about these

complications. About 27% of diabetic subjects are unaware about risk problems associated with high blood pressure during diabetes mellitus.

Diabetic participants' awareness about antidiabetic therapy they used in the treatment of DM is low. 41% of diabetic participants don't know the name of antidiabetic drug they utilized. About 15% said by antibiotic, 25% insulin, 12%

metformin. Diabetic subjects awareness about antidiabetic drug utilization is low. 44.9% said antidiabetic therapy should be continued lifelong while 11.5% therapy can be stopped immediately after improvement of sugar level, 7.5% can be stopped after one month and 36% don't know. Diabetic participants' adherence to their therapy is low. 35% of diabetic participants missed the doses of their diabetic medications. Frequency of dose missing was varied 20.5% said occasionally, 8.5% once a week and 6% once a month.

Hypoglycemia may occur during the treatment with antidiabetic therapy. Table 4 shows the comparison between diabetic male and female knowledge percentage response towards hypoglycemic symptoms. 67.07% (n=55) of female are aware about hypoglycemic symptoms compared with 62.85% (n=22) for male.

Table 4: Comparison between Diabetic Male and Female (%) Correct Knowledge Response towards Hypoglycemic Symptoms

Symptoms	Diabetic		Total 100%
	Male, n=35 (% Response)	Female, n=82 (% Response)	(n=117) (%Response)
Weakness	13 (37.1)	37 (45.1)	50 (42.7)
Confusion	6 (17.1)	8 (9.8)	14 (12.0)
Visual disturbances	3 (8.5)	10 (12.2)	13 (11.1)
Don't know	12 (34.2)	28 (34.1)	40 (34.2)

53.8% (n=63) of diabetic participants are unaware about the management of hypoglycemic symptoms. Surprisingly about 10% of diabetic participants said by insulin.

Table 5 shows the practical approach of diabetic participants towards DM control by measuring blood pressure, eye examination and urine analysis was examined. 10% never check their blood pressure (BP), 47.9% did not have eye examination and 30.8% did not have urine test.

Table 5: Number (%) of participants who have correct knowledge in various aspects

Various Aspects	Male, n=148 (% Response)	*Female, n=87 (% Response)	Total 100 % (n= 235) % (no)
Eye examination	42 (28.4)	37 (42.5)	33.6
Urine test	68 (45.9)	25 (28.7)	39.6
Blood sugar test	130 (87.8)	75 (86.2)	87.2
Blood pressure test	31 (20.9)	25 (28.7)	23.8

* $P < 0.005$

Results showed that employed participants with age group 40-60 years have significant knowledge towards DM etiology and complication ($P < 0.005$). There is no significant difference

observed between male and female regarding different knowledge domain of DM. Diabetic female was significantly aware about practical management and control of DM than male regarding blood pressure test and eye examination ($P < 0.005$).

4. DISCUSSION

Research studies have shown that education in populations about diabetes resulted in a significant increase in knowledge about the disease [10, 11]. Early diagnosis and treatment of diabetes mellitus is important for limiting its adverse effects. It is important to know about the awareness level of this condition, as knowledge is a critical component of behavior change. Once awareness is created, people are more likely to participate in prevention and control activities [12]. In this study Nigerian participant, both diabetic and non diabetic subjects, have good knowledge towards DM etiology and disease monitoring. But they have average knowledge towards DM management and physical control and low knowledge towards DM clinical manifestation and complication. Complications of DM have been found to set in long before clinical manifestation of the disease [13, 14]. It's reported that hypertension is associated with unrecognized diabetes [15], type 2 diabetes mellitus [16] and fasting hyperglycemia [17]. This study shows that diabetic patients have poor knowledge about 27% towards risk problems associated with high blood pressure. The high prevalence and poor control of elevated blood pressure in Nigerian with diabetes pose an increased risk of future development of nephropathy [18]. With the increasing incidence, emphasis is now placed on implementing primary prevention and detection. Education of people about DM symptoms, complication and risk problems associated with high BP is required. Diabetic participants have poor knowledge towards antidiabetic therapy they used regarding its name, utilization method and adherence. In fact DM is a chronic disease that requires ongoing monitoring and treatment [19]. There is a misconception that treatment should be stopped if blood sugar is well controlled for months, this will lead to an increased number of diabetics over the next years due to general changes in behavior patterns and sedentary lifestyles. In addition diabetic subjects' adherence to their therapy is low; this will lead to complication of diabetes. In this study diabetic participants practice towards the management and control of DM is low. Diabetic females show significant awareness than male towards the control of DM through regular blood pressure checking and eye test. There are recommended diabetes care standards and guidelines that are used to guide patient health care team in recommending the management strategies that will help people to meet their glucose targets and to reduce the occurrence of diabetes complications [20, 21]. Hypoglycemic agents are usually used to maintain adequate glucose control [22]. Over time, due to the progressive nature of Type 2 diabetes, a combination of oral

agents is frequently necessary to maintain glucose control [23]. In this study 34.2% of diabetic participants are unaware about hypoglycemic symptoms and 53.8% are unaware about the management of hypoglycemia, so education of people about management of hypoglycemia is required. Well-planned short education programmes are useful in improving knowledge and in creating enthusiasm to improve diabetes care and awareness [24]. Control and prevention of diabetes requires a multidisciplinary and multisectorial integrated approach [25] concentrating on a community and primary care approach. Education, lifestyle and behavior change are also vital elements of control and prevention [26].

This study highlighted the need of people in Kaduna state in Nigeria for better health information through large scale awareness interventions regarding diabetes mellitus. This may be achieved by using audio-visual aids, as well as posters showing patients with diabetes complications and their consequences such as lower limb amputation, blindness and renal dialysis; hypoglycemic symptoms after drug treatment such as weakness, confusion, and visual disturbances and how to control hypoglycemia. In addition diabetic patient adherence to their anti-diabetic therapy can be achieved through patient counseling by clinical pharmacist or health professional to improve diabetes care and can go a long way in the prevention and management of diabetes.

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