Original Research Article

Undergraduate Students' Knowledge and Perception of Type 2 Diabetes mellitus in Benin City

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Abstract

Purpose: The prevalence of diabetes in Nigeria is rising at an alarming rate and most studies indicate that many people suffering from the disease do not often have adequate knowledge. The purpose of this study was to determine the knowledge and perception of university undergraduate students towards diabetes type 2.

Methods: In a cross-sectional descriptive survey, undergraduate students in University of Benin, Benin City studying non-health related disciplines were given questionnaire to complete. Order than information on their sociodemographic characteristics, the questionnaire used questions in Likert-type scale format to evaluate the respondents perception of diabetes. Questions covered knowledge/perception on symptoms, causes, risk factors, complications, duration of illness, preventive measures and prognosis. Data collected were analysed using descriptive statistics and data comparison.

Results: Of the 488 respondents, majority (66.39%) were 19-34 years old and distributed across nine Faculties namely, Arts, Agriculture, Education, Engineering, Law, Life Sciences, Management Sciences, Physical Sciences and Social Sciences. As many as 17.6% of them had family history of diabetes. Most respondents had good knowledge and positive perception of type 2 diabetes mellitus with majority of them knowing answers to the questions relating to causes of the disease (70.29-92.31%), duration of the illness (68.65-85.66%), preventive measures (58.81-92.42%), risk factors (51.23-95.49%) and how to treat and prevent the disease (58.81-92.42%).

Conclusion: The undergraduate students of University of Benin in non-health related disciplines have good knowledge and positive perception towards diabetes mellitus type 2. Nevertheless, a systematic education curriculum for diabetes education is paramount for all levels of educational system in Nigeria.

Keywords: Diabetes mellitus type 2, Knowledge, Perception, Undergraduate students, Benin City.

Introduction

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency can lead to chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism. Left untreated, the disease progresses and tissue or vascular damage ensues leading to severe diabetic complications such as retinopathy, neuropathy, nephropathy, cardiovascular complications and ulceration. Type 2 diabetes mellitus (T2DM) consists of an array of dysfunctions characterized by hyperglycemia and resulting from the combination of resistance to insulin action, inadequate insulin secretion, and excessive or inappropriate glucagon secretion. Poorly controlled T2DM is associated with an array of microvascular, macrovascular, and neuropathic complications. Although type 2 diabetes mellitus typically affects individuals older than 40 years, the epidemic of obesity and inactivity in children in recent times is leading to type 2 diabetes mellitus at younger and younger ages [1].

In recent times, diabetes has emerged as an epidemic of the 21st century and now threatens to overwhelm the healthcare system in the near future. Amongst middle-aged and older adults, the rising prevalence of T2DM and other related conditions that comprise the metabolic syndrome is a global health epidemic, attributed largely to sedentary lifestyles, poor diet, and lack of exercise. In 2008, it was estimated that 347 million adults worldwide had T2DM, up from 153 million in 1980 [2]. Over the next two decades, it is expected that these numbers will continue to rise, by as much as 38% by 2030 [3]. Unfortunately, hypertension is present in about 75% of individuals with T2DM [4]. The growing number of middle-aged

and older adults living with T2DM and hypertension makes T2DM important topic of study in their own right.

The progressive increase in the prevalence rates of the disease is associated with lifestyle changes – overweight and obesity, physical inactivity, alcohol consumption, dietary changes and cigarette smoking as well as lack adequate public awareness and knowledge of the disease [5]. Despite numerous research worldwide, many diabetes patients often remain under undetected and these undiagnosed diabetes sufferers ultimately present with complications. For example, a recent report by the Centers for Disease Control and Prevention (CDC) indicated that 27.8% of cases of diabetes are undiagnosed in US [6].

Majority of the people with diabetes in developing countries are within the productive age range of 45–64 years. Unfortunately, these are the same individuals who are expected to drive the economy of their countries in order to achieve the international development goals. Other than reduced productivity, diabetes imposes a high economic burden on healthcare expenditure, and economic growth.

A major approach to reducing the incidence and problems associated with diabetes is education of the public as well as those suffering from it. With a ratio of 39 doctors [7] to 160 nurses and 11 pharmacists per 100,000 patients in Nigeria as at 2012 [8], nurses stand out as the largest members of the health care professionals in the country. As the burden of diabetes continues to increase, the vital role of diabetes education becomes paramount in not only reducing the incidence of the disease but in slowing its progression in diagnosed individuals and in their management. Considering the large number of nurses and their close association with patients in health care, their contribution in diabetes education to patients is a highly important aspect of health care delivery.

Epidemiological data on the prevalence of diabetes in Nigeria are often unreliable and hardly available. Nevertheless, a prevalence rate of 4.3% was has been reported for the year 2012 [9]. Some values reported from data collected by researchers from different parts of Nigeria since 1996 range from 0.8% to 3.1% in Jos, Ibadan and Lagos in 1996-1997 to between 9.8% and 22.5% in Ekpoma (Edo State), Ohafia, Owerri in Eastern Nigeria, and Uyo in South-South Nigeria from 2010 to 2012. Diabetes-related deaths in Nigeria in 2011 was put at 63,000 people [10]. The estimated people with diabetes in United States is alarming; a 2011 Centers for Disease Control and Prevention (CDC) report estimated that nearly 26 million Americans have diabetes and an additionally, an estimated 79 million Americans have pre-diabetes [11].

Earlier reports suggest that large numbers of patients do not receive the proper education necessary to develop self management abilities [12,13]. This is traceable to the type and quality of diabetes related instructions that patients received from healthcare professionals. In a study in Benin City, the knowledge of the nurses relating to diabetes mellitus was less than satisfactory; areas of knowledge deficits include diet and signs of acute complications of diabetes as well as proper foot care [14]. Yet nurses are key providers of diabetes care and play an important role in diabetes education as they constitute the largest group of healthcare professionals who have a lengthy contact with diabetic patients. Deficiency in knowledge about diabetes by patients suffering from diabetes was also recorded in the studies of Gul [12] and Maina and colleagues [13]. Similarly, only 10.3% of the patients knew the most probable cause of diabetes, about a quarter were aware that poor control of blood glucose levels could result in complications, and as much as 75.9% were not aware of the self care approach to manage diabetic crisis in another study in Ibadan [15]. For the nurse, diabetes education is likely to be more effective if public knowledge and attitude toward diabetes is well understood. To the best of my knowledge, there are currently no published information on knowledge and attitude of undergraduate students to diabetes in Nigeria.

The main objective of this study was to evaluate the perception of undergraduate students in University of Benin towards diabetes mellitus type 2. The specific objectives were to assess the knowledge of students, selected systematically across various disciplines except those in their second year and above in nursing, medicine, medical laboratory sciences, and pharmacy, regarding diabetes mellitus and determine the perception of the students towards patients with diabetes mellitus

Methods

Setting

This study was carried out in University Benin main campus at Ugbowo, Benin City. The University, which started as an Institute of Technology and funded by Mid-Western State Government, was accorded the status of a full-fledged University by National Universities Commission (NUC) on 1st July 1971. At the request of the State Government, the University was taken over by the Federal Government and became a Federal University on 1st April 1975. At present, the University has various academic programmes in ten faculties (Agriculture, Arts, Education, Engineering, Law, Life Sciences, Management Sciences, Pharmacy, Physical Sciences and Social Sciences) as well as three schools (Basic Medical Sciences, Dentistry and Medicine) and the Institute of Child Health.

Design

This was a descriptive questionnaire-based cross-sectional survey conducted amongst University undergraduate students. Participants were recruited for the study using randomised cluster sampling. Outcomes measured were the knowledge and perception of the students towards diabetes mellitus type 2. For each possible correct answer provided for each item in the questionnaire relating to the disease, the proportion of respondents rating 1 (strongly agree) or 2 (agree) in a Likert-type scale used in the questionnaire for each item was considered to be the proportion with correct knowledge for that item and an average score >50% was considered to be a demonstration of good knowledge. But, an average score of <2.5 for each question, other than those for collecting demographic data, was considered to be positive perception while an average score >3.0 was considered to be negative perception.

Study Population and Sample

The study population consisted of all non-health related undergraduate students on full-time programme in University of Benin, Benin City. Sample size of 499 used in this study was calculated as previously described [16] and a sample of 58 students was selected from each of the faculties. This selection was based on simple random cluster sampling using the departments and levels of the students in each faculty as the clusters. Included in the sample were male and female full-time students in the faculties of Agriculture, Arts, Education, Engineering, Law, Life Sciences, Management Sciences, Physical Sciences and Social Sciences who consented to take part in the study.

Instruments

A review of the literature concerning different aspects of public knowledge and perceptions towards diabetes identified potential items to include in the survey questionnaire used in this study. The survey instrument contained 36 items, subdivided into 2 sections. The first section included questions on participant demographics and family history of diabetes while the second section contained questions on signs and symptoms (identify), cause and risk factors, complications (consequences), cure/control measures and duration of illness (timeline). The questionnaire used Likert-type response scales (strongly agree = 1, agree = 2, not sure = 3, disagree = 4, and strongly disagree = 5).

Pilot Study

A randomly selected set of 20 students were used for the pilot study. These students were given the questionnaire for self-completion after explaining to them how to complete the questionnaire. This was done in order to assess the suitability of the contents, clarity, sequence, and flow of the questionnaire. As appropriate, the questions were then refined for final use. The participants for the pilot study and their responses were not included in the final data for the results of this work but were used for the validity and reliability assessment using regression analysis based on Cronbach's alpha. The r-square values for consistency and reliability ranged from 0.075-0.931.

Data Collection

After receiving administrative approval from the appropriate University authorities, the purpose of the study was explained to each set of students surveyed and questionnaire was then distributed to those who consented to participate in the study. Once completed, the questionnaires were retrieved for data processing and analysis.

Data analysis

Data collected were entered into Microsoft Excel and double checked for accuracy. Statistical analysis was carried out using SPSS and outputs were presented using descriptive statistics. Data comparison was carried out using chi-square tests for proportional data and nonparametric statistics for continuous variables. At 95% confidence interval, p values less than 0.05 were considered to be significant.

Results

Sociodemographic characteristics of respondents

Four hundred and ninety-nine (499) questionnaires were distributed but 488 were returned giving a response rate of 97.8%. The sociodemographic characteristics of the participants are given in Table 1. Majority of the participants (66.39%) were 19-24 years old. These were distributed across the nine Faculties (Arts, Agriculture, Education, Engineering, Law, Life Sciences, Management Sciences, Physical Sciences and Social Sciences).

The proportion of females (41.39%) was significantly less than that of the males (χ^2=31.429, df=8, p<0.001) and majority of the participants (36.9%) were in their third year of study. As many as 17.6% of the respondents (8.4% males and 9.2% females) had family history of diabetes.

Knowledge and perception of diabetes

In general, many respondents had very good knowledge about diabetes. This included their ability to recognise the symptoms, causes, risk factors, complications, duration of illness, preventive measures and prognosis. The highest level of knowledge was demonstrated among factors relating to prognosis which 82-86.47% of the respondents knew. Majority of them also knew the questions

Table 1: Sociodemographic characteristics of respondents

Variable	Male n (%)	Female n (%)
Age		
<19	46 (9.43)	26 (5.33)
19-24	193 (39.55)	131 (26.84)
>25	47 (9.63)	45 (9.22)
	286 (58.61)	**202 (41.39)**
Faculty*		
Agriculture	30 (6.15)	28 (5.74)
Arts	24 (4.92)	28 (5.74)
Management Sciences	29 (5.94)	28 (5.74)
Social Sciences	35 (7.17)	21 (4.3)
Life Sciences	31 (6.35)	26 (5.33)
Physical Sciences	24 (4.92)	9 (1.84)
Law	29 (5.94)	29 (5.94)
Engineering	45 (9.22)	5 (1.02)
Education	39 (7.99)	28 (5.74)
	286 (58.61)	**202 (41.39)**
Year of study**		
One	21 (4.3)	27 (5.53)
Two	70 (14.34)	59 (12.09)
Three	103 (21.11)	77 (15.78)
Four	61 (12.5)	33 (6.76)
Five	31 (6.35)	6 (1.04)
	286 (58.61)	**202 (41.39)**

*$\chi^2 =31.429$, df=8, p =0.001; **$\chi^2 =16.712$, df=4, p =0.002*

relation to causes of the disease (70.29-92.31%), duration of the illness (68.65-85.66%), preventive measures (58.81-92.42%) and risk factors (51.23-95.49%). Some of them (5, 1.02%) knew the correct answers to all the questions relating to diabetes. More than half of the respondents (58.81-92.42%) knew how to treat and prevent the disease even though 77.71% of the females did not know that physical inactivity is a risk factor for diabetes. However, as many as 37.5-64.34% of the respondents were unfamiliar with the complications of the disease. Furthermore, majority of them (82.99%) did not know that diabetes may not present with any symptoms while some (69.86%) did not also know that increased hunger is common symptom of the disease.

The knowledge demonstrated by the respondents was irrespective of the year of study, age or sex. Other than knowledge on the risk factors of diabetes (p<0.039), there was no significant difference between the knowledge demonstrated by the males as compared to the females (Table 2).

The respondents generally had positive perception about diabetes as determined by the average rating scores which were generally less than 3.0 (neutral point on the 5 point scale) for each of the areas where questions were asked. The proportion of respondents who correctly agreed to the factors listed as being associated with the symptoms, causes, risk factors, complications, duration of illness, preventive measures, and ability to get cured of the disease were 49.62%, 58.87%, 68.7%, 59.17%, 77.16%, 76.93% and 83.74%, respectively while only 1.02% totally agreed on all factors as being associated with each of the questions relating to diabetes. However, negative perception of the disease was obvious among some of the respondents in the area of complications of the disease (37.5-64.34%), disease not presenting with any symptoms in some cases (82.99%) and increase in hunger as symptoms common (69.86%). As many as 77.71% of the females did not have positive perception about physical inactivity as a risk factor for diabetes (Table 3). There were no significant differences between the responses of the males as compared to the females (p>0.05).

Discussion

This work specifically targeted University undergraduate students since this category of persons are those who should ideally be able to support their family members with relevant information that could be useful in their care. The results of this study have revealed that the respondents have good knowledge and positive perception of type 2 diabetes mellitus with majority of them knowing answers to the questions relating to causes of the disease, duration of the illness, preventive measures, risk factors and how to treat and prevent the disease.

In contrast to this study, most studies on diabetes in Africa often address knowledge, attitude and practices of patients with diabetes. In some of such earlier studies, knowledge regarding diabetes was reported to be poor. In the study by Mulkhopadhyay et al [17] in Kolkata, it was only in symptoms and complications of the disease relating to frequent urination (42.2%) and eye complications (62.2%) that good knowledge was demonstrated by patients. In a similar study in Pakistan [12], 69%, 39%, 76% and 76% of the respondents correctly answered questions for risk factors complications of the disease, sedentary life style and body weight, respectively. Also, in the study in Kenya, only 29% of patient respondents had good knowledge of signs and symptoms of diabetes, 27% had good knowledge of complications, 26% could correctly identify the probable causes while 71% had poor knowledge of the disease. However, an earlier study on knowledge and perception of adult residents in Oman indicated suboptimal level of knowledge and concluded that there is lack of awareness of major risk factors for diabetes mellitus [5]. Overall, the respondents in this present study have much better knowledge of diabetes than these earlier studies even though only 17.6% of them had family history of diabetes.

Table 2: Proportion of respondents who knew the correct answers to the questions on different aspects of diabetes

Variables	Male n (%)	Female n (%)
Symptoms of diabetes		
Increased thirst	137 (28.07)	103 (21.11)
Frequent urination	219 (44.88)	162 (33.2)
Increased hunger	90 (18.44)	62 (12.7)
Weight loss	165 (33.81)	116 (23.77)
Blurred vision	132 (27.05)	95 (19.47)
Slow-healing sores or frequent infections	191 (39.14)	140 (28.69)
The person may not have any symptoms	51 (10.45)	32 (6.56)
Causes of diabetes		
Excessive intake of sugary items	266 (54.51)	184 (37.7)
Past dietary/Drinking habits	214 (43.85)	146 (29.92)
Lack/Insufficient insulin	211 (43.24)	132 (27.05)
Inheritance/Genetics	203 (41.6)	154 (31.56)
Risk factors of diabetes*		
Excessive sugar intake	274 (56.15)	192 (39.34)
Obesity	173 (35.45)	116 (23.77)
Presence of family history	182 (37.3)	154 (31.56)
Physical inactivity	165 (33.81)	85 (17.42)
Complications of diabetes		
Blindness	105 (21.52)	69 (14.14)
Limb amputation/foot ulcer	142 (29.1)	113 (23.16)
Stroke	153 (31.35)	101 (20.7)
Kidney failure	185 (37.91)	120 (24.59)
Heart failure	147 (30.12)	96 (19.67)
Duration of the illness		
Diabetes is a life long illness	189 (38.73)	146 (29.92)
Suddenly death if not properly treated	240 (49.18)	178 (36.48)
Preventive measures of diabetes		
Alcohol cessation	225 (46.11)	149 (30.53)
Avoiding obesity and overweight	218 (44.67)	160 (32.79)
Smoking cessation	159 (32.58)	128 (26.23)
Increased physical activity	230 (47.13)	157 (32.17)
Control of diet	264 (54.1)	187 (38.32)
Ability to get cured of diabetes		
Diabetic person can have good quality of life	237 (48.57)	166 (34.02)
Drugs can be used to treat the disease	224 (45.9)	177 (36.27)
Life style modification	247 (50.61)	175 (35.86)

χ^2=8.394, df=3, p =0.039

A major weapon in the fight against diabetes is knowledge and good perception. The ability of people to assess the risk of diabetes, their motivation to seek proper treatment and care, and encourage them to properly manage their disease depends on the information they know [13]. Among diabetes patients, poor knowledge have frequently been reported [13]. For example, in Kenya only 27% and Jos, Nigeria 30% of the respondents were reported to have demonstrated good knowledge. Good knowledge of diabetes is known to play a vital role in future development and early prevention and detection of the disease [18]. It can also improve the attitude of people towards the disease and in the long

Table 3: Mean rating scores of factors associated with diabetes by respondents on a scale of 1-5 (strongly agree=1, agree=2, not sure=3, disagree=4 and strongly disagree=5)

Variable	Males*	Females*
Symptoms of diabetes		
Increased thirst	2.53±1.13	2.35±1.03
Frequent urination	1.90±0.98	1.70±0.87
Increased hunger	2.84±1.05	2.76±1.0
Weight loss	2.31±1.08	2.24±1.02
Blurred vision	2.53±1.03	2.43±1.03
Slow-healing sores or frequent infections	2.05±1.16	1.95±1.10
The person may not have any symptoms	3.68±1.24	3.72±1.20
Causes of diabetes		
Excessive intake of sugary items	1.47±0.75	1.43±0.75
Past dietary/Drinking habits	1.95±0.89	2.01±1.0
Lack/Insufficient insulin	1.87±0.91	1.93±0.97
Inheritance/Genetics	2.11±1.15	1.82±1.07
Risk factors of diabetes		
Excessive sugar intake	1.31±0.63	1.32±0.62
Obesity	2.22±1.08	2.26±1.01
Presence of family history	2.27±1.13	1.88±0.96
Physical inactivity	2.43±1.14	2.7±1.11
Complications of diabetes		
Blindness	2.75±1.13	2.70±1.15
Limb amputation/foot ulcer	2.55±1.60	2.26±1.13
Stroke	2.35±0.98	2.29±1.04
Kidney failure	2.11±0.95	2.16±0.92
Heart failure	2.40±1.01	2.36±0.89
Duration of the illness		
Diabetes is a life long illness	2.10±1.09	1.93±1.06
Suddenly die if not properly treated	1.76±0.85	1.60±0.82
Preventive measures of diabetes		
Alcohol cessation	1.85±1.01	1.87±0.99
Avoiding obesity and overweight	1.96±0.95	1.8±0.86
Smoking cessation	2.29±1.14	2.28±2.45
Increased physical activity	1.82±0.96	1.83±0.93
Control of diet	1.72±3.47	1.44±0.97
Ability to get cured of diabetes		
Diabetic person can have good quality of life	1.84±0.99	1.68±0.86
Drugs can be used to treat the disease	1.94±0.91	1.66±0.85
Life style modification	1.66±0.95	1.55±0.91

$p > 0.05$

run change their practices to embrace healthier lifestyles [13]. Such practices can reduce the risk of the disease and delay the onset of complications in those already with diabetes. Furthermore, knowing how to prevent a disease potentially ensures that an individual is able to avoid contacting the disease and certainly postpones possible suffering from that disease.

Studies in India estimate that as much as 25% of family income may be devoted to diabetes. In USA, the total health care costs of a person with diabetes is two to three times that of a person without the

condition. As at 1997, it costs USA US$ 44 billion to treat diabetic patients. Recent cost estimates for some other countries include those for Brazil (US$ 3.9 billion), Argentina (US$ 0.8 billion) and Mexico (US$ 2.0 billion). As much as 16% of hospital expenditure in Western Pacific region has been shown to be on people with diabetes but in the Republic of the Marshall Islands, this figure was reported to be 25%. Direct costs to individuals and their families include medical care, drugs, insulin and other supplies. Patients may also have to bear other personal costs, such as increased payments for health, life and automobile insurance. In the health care system, direct costs involving diabetes include hospital services, physician services, laboratory evaluations and products such as syringes, hypoglycaemic agents and blood-testing equipment. Costs range from relatively low-cost items, such as primary-care consultations and hospital outpatient episodes, to very high-cost items, such as long hospital inpatient stays for the treatment of complications [19]. With improved knowledge and good perception, these staggering figures can be reduced to below 10% of current estimates across countries.

The findings of this study are limited by the sample size and educational level of the participants. Therefore, the knowledge and perception reported here cannot be generalised. However, the outcome is a useful tool in planning educational programme for creating awareness about the problems of diabetes and the rising prevalence of the disease in the Nigeria. It will help to understand the level and type of education programme to be designed for the purpose of dealing with the treat of the disease and hence reduce the over all health care cost for individuals and the government.

Conclusion

The findings of this work indicate that the students have good knowledge and positive perception towards type 2diabetes mellitus. This suggests that the students may be able to avoid risk factors of diabetes and take other measures to prevent them from acquiring the disease. At the same time, they can be of immense benefit to people suffering from diabetes mellitus in their communities and help reduce the prevalence of the disease.

It is hoped that the findings from this study will encourage the development of a national diabetes awareness education programme to narrow knowledge gap in diabetes management and education in Nigeria. A systematic education curriculum for diabetes education is paramount for all levels of educational system in Nigeria so that the long predicted high population of people that will be suffering from diabetes by 2030 will be an illusion rather than a reality. The curricular for such a

programme should be structured around basic health education at the primary and secondary schools and as a general study course at the tertiary education level including colleges of education, polytechnics and universities.

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