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Knowledge of diabetes mellitus: An aggregate qualitative study of students, teachers, market women, religious organization and community youths

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Abstract

Context: The increasing rate of diabetes mellitus (DM) among most age groups irrespective of social class is becoming alarming in Nigeria. Knowledge of DM is pertinent in reversing the current trend and improving the quality of life of the population. However, inadequate knowledge of DM has been documented among various subsets of the population in Nigeria.
Objective: This study was designed to assess the knowledge of DM among the aggregate of the population in Delta State Nigeria.
Methods: This was a cross-sectional study utilising qualitative methods. The researchers purposefully selected 159 discussants from schools, church, market women, and community youths. A total of 16 Focus Group Discussions (FGDs) and 21 In-depth Interviews (IDIs) were conducted among students, teachers, market women, religious organisation and community youths. An FGD and IDI guide were designed and used to collect the data. The recorded FGDs and IDIs were transcribed verbatim and analysed thematically for themes and content.
Results: Most of the discussants defined DM as excess sugar in the blood and mentioned type 1 and 2 as types of DM. The majority, exhibited inadequate knowledge of DM causes, risk factors and complications. The discussants showed good knowledge of DM management and prevention. The students generally exhibited poor knowledge of all components of DM.
Conclusion: Overall, the discussants demonstrated inadequate knowledge of DM; however, poor knowledge of DM was observed among the students. The study recommended DM health educational intervention for the entire population irrespective of DM status.

Keywords: Diabetes Mellitus, Knowledge, qualitative study, Students, Church, Market Women, Community Youths

Introduction

Diabetes Mellitus (DM) occurs when there is a high level of glucose in the blood because the body cannot produce any or enough of the hormone insulin, or cannot effectively use the insulin it produces.[1] DM has become a 21st-century pandemic that has reached frightening levels with an estimated 463 million people living with DM worldwide; out of which 19 million of those people resides in Africa.[1] This increase usually reflects in almost all age groups from 20-79 years. The rising problem of DM, especially type-2 diabetes mellitus (T2DM) has been attributed to increasing rates of obesity, physical inactivity, increased life expectancy and rapid urbanisation among the African population.[2] This increase in DM has resulted in the development of microvascular and

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macrovascular complications, including mortality among patients.[3,4,5] Nigeria has been estimated to have the highest burden of DM in sub-Saharan Africa[6], with an estimated figure of over 2.7 million people living with the disease.[1] DM is caused by lack or insufficient production of insulin, insulin resistance or both. It presents with symptoms such as frequent urination, excessive thirst, extreme hunger, unexplained weight loss, and increased fatigue. Risk factors include advancing age, family history of DM, alcohol use, tobacco use, overweight and obesity, and physical inactivity. Long term effects of poorly managed DM include complications of retinopathy with potential blindness, nephropathy that may lead to renal failure, and/or neuropathy with risk of foot ulcers, amputation, Charcot joints, and features of autonomic dysfunction, including sexual dysfunction. Management of DM entails non-drug and use of drugs. Non-drug method involve dietary practices such as reduced intake of animal fat, salt and refined food, consumption of diet high in fibre, vegetables and fruits while physical activity include housework, walking, climbing stairs, cycling and indoor exercises. Drugs usually used for DM management are oral hypoglycaemic drugs and insulin injection.[7,8] Despite the increasing prevalence of DM, especially T2DM, awareness and knowledge of the disease appears to be poor across communities in Africa and Nigeria. This is despite the fact that for chronic diseases like DM, knowledge of its prevention and management is pertinent to reducing the likelihood of developing macro-vascular and micro-vascular complications. Studies assessing knowledge of DM carried out within and outside Nigeria showed inadequate knowledge of the components (definition, causes, signs and symptoms, risk factors, complications, management and prevention) of DM.[9,10,11,12,13] Furthermore, studies among various sections of the population in Nigeria also showed poor knowledge of DM. This includes among students,[14] teachers,[15] healthcare providers.[16] Therefore, due to the reported increase of DM and poor knowledge among the population it is important to assess the knowledge of DM among various sections of the population such as students, teachers, religious women and men, market women in order to highlight the knowledge of DM and provide baseline data for future intervention to be conducted among these cohorts. Consequently, this study was carried out to assess the knowledge of DM among subsets of the population.

Materials and Methods

This was a cross-sectional study utilising qualitative methods. The study was carried out in Delta State, one of the oil-producing states in the southern part of Nigeria. The study population comprised students of Don-Domingos College Warri, Ogbe Secondary School Effurun, teachers were selected from Ihu-Iyase secondary school Agbor, Owa Model College Agbor, Don-Domingos College Warri, Agbon Secondary School Isiokolo; market women were selected in Isiokolo, Religious men and women were also selected in Isiokolo, Community youths were selected in Isiokolo and Owa Ekei communities. The sample size for the study is as highlighted in table 1.

Purposive sampling was used to select all the discussants in both the IDIs and FGDs. An IDI and FGD guide were developed and used to collect the data. The developed IDI and FGD guide consists of questions on DM definition, types of DM, causes of DM, signs and symptoms of DM, risk factors of DM, complications associated with DM, management of DM, and prevention of DM. All authors participated in the data collection. The authors moderated and facilitated both the IDIs and FGDs, with one of the authors assisting in recording the sessions, two authors serving as timekeeper and note taker respectively. Overall 8 FGDs were conducted among the students comprising between 8-10 students in two schools from JSS 1, JSS 2, SS 1 and SS 2. In addition, 21 IDIs were conducted among the teachers in 4 schools. Two FGDs were conducted among 17 market women comprising 8 discussants in the first FGD and 9 discussants in the second FGD respectively. Also, 2 FGDs were conducted among 18 religious men and women from the church consisting 9 discussants from the first FGD and 9 discussants from the second FGD. Finally, 2 FGDs were conducted among 16 youths from Isiokolo community consisting of 8 discussants from the first and second FGDs respectively. In addition, 2 FGDs were conducted among 17 youths from Owa Ekei community consisting 8 discussants from the first FGD and 9

discussants from the second FGD. All the data were collected on the agreed day with each of the various study participants. The FGDs for the students were conducted on the school premises during the break period while the IDIs for the teachers were also conducted in the school premises during the break period. The FGDs for the market women were conducted on an agreed day in an open space in the market premises while the FGDs for the religious men and women were conducted on an agreed day after church services. The FGDs for community youths were conducted in an open space in the communities.

Data analysis

The recorded FGDs and IDIs were transcribed verbatim and analysed thematically for themes and content. The generated themes for the study are as shown in table 2.

Ethical approval for the study was obtained from the Delta State Ministry of Health Ethical Committee. Also, approval was obtained from the various school principals, management of the market and church and head of the various communities before the commencement of the study.

Table 1: Category of participants and their respective sample size

Category of participants	Number of Participants
Students	**70**
Teachers	**21**
Market women	**17**
Religious men and women	**18**
Community youths	**33**
Total	**159**

Table 2: Main themes and categories generated from the data

Main theme	Category
Demographic profile	Age Sex
Knowledge of DM	Definition of DM Types of DM Causes of DM Signs and Symptoms of DM Risk factors of DM Complications of DM Management of DM Prevention of DM

Table 3: Socio-demographic characteristics of the discussants

Variable	Frequency (N=159)	Percentage
Age		
10-19	75	47.1
20-29	20	12.5
30-39	15	9.4
40-49	35	22.0
50-59	14	9.0
Sex		
Male	58	36.4
Female	101	63.6

Results

According to table 3, 75(47.16%) of the discussants were 10-19 years while 35(22.01%) were 40-49 years and 101(63.5%) were females.

Knowledge of DM

The knowledge of DM was presented at various levels of knowledge assessment.

Knowledge of DM definition among the discussants

Most of the discussants on both the FGDs and IDIs affirmed to have heard of DM and defined it as excess sugar in the blood.

"Diabetes is excess sugar in the bloodstream, making people frequently urinate, sweat and lose weight" (Market woman)

"Diabetes is when there is excess sugar in the blood" (Religious man)

"Diabetes is a situation when there is excess sugar in the body" (Teacher in Ihu-Iyase secondary school).

"Diabetes is a deformity in the human body that talks about excess sugar in the bloodstream" (Teacher in Don-Domingos College Warri).

"Diabetes is a sickness resulting from excess sugar in the body" (SS 2 Student at Ogbe Secondary School Effurun).

However few of the discussants could not define DM

"I know what it is, but I cannot define it" (JSS 2 Student at Ogbe Secondary School Effurun).

"I have no idea" (Teacher in Ihu-Iyase secondary school).

"I have no idea about the definition" (Religious man).

Nevertheless, only one of the community youth gave a concise definition of DM

"Diabetes is a disorder of carbohydrate metabolism due to deficiency of internal secretion of the pancreas (Insulin) or by resistance to its action" (Isiokolo Community Youth).

Knowledge of the discussants on types of DM

When asked to mention the types of DM, the discussants across the groups gave mixed responses while some mentioned type 1 and 2, others affirmed not to know the types of DM.

"Type 1 and Type 2" (Teacher in Owa Model College Agbor).

"Type 1 and Type 2" (Teacher in Don-Domingos College Warri).

"There are about 2-3 types, but I cannot mention their names now" (Teacher in Don-Domingos College Warri).

"It has types, but I do not know" (Market woman).

"Type 1 and Type 2" (Market woman).

"I do not know the types of DM" (Owa Ekei Community Youth).

Moreover, the discussants also gave some other responses

"Mild and severe Diabetes" (Isiokolo Community Youth).

"Diabetes Insipidus and Diabetes mellitus" (Religious man)

"Two types-Hereditary, Diabetes due to the type of food consume" (Teacher in Agbon Secondary School Isiokolo).

None of the students was able to mention the types of DM.

Knowledge of Causes of DM among the discussants

Most of the discussants across the various groups attributed the causes of DM to be consumption of excess sugar. Also, some attributed it to the causes of insulin deficiency and genetic factors.

"Too much consumption of carbohydrate" (Isiokolo Community Youth).

"Taking too much of sugar" (JSS 1 student in Don-Domingos College Warri).

"Genetic and much consumption of sugar" (Teacher in Owa Model College Agbor).

"…Something is wrong, that is when insulin is not functioning well" (Teacher in Agbon Secondary School Isiokolo).

"Lifestyle, hereditary" (Religious woman).

"Excess intake of fast food, e.g. junk food" (Religious woman).

"Excess intake of carbohydrate, alcoholic drinks and hereditary" (Market woman).

When asked if DM cause has a spiritual dimension, mixed answers were presented by the discussants. Some believe its cause has no spiritual dimension; some believe its cause has a spiritual dimension.

"It is caused by lifestyle and not witches" (Isiokolo Community Youth)

"I do not believe it is caused spiritually" (Teacher in Owa Model College Agbor)

"I believe it can also be caused by spiritual attack" (Teacher in Owa Model College Agbor)

"In my opinion, I believe it is spiritual from the evil people because it has become common in our society today" (Teacher in Owa Model College Agbor)
"It has spiritual dimension because the cause has not been properly diagnosed" (Teacher in Agbon Secondary School Isiokolo).
"I am sure it has a spiritual dimension because some people are attacked spiritually" (Owa Ekei Community Youth).

Knowledge of Signs and Symptoms of DM
The main symptoms highlighted by the discussants were frequent urination, sweating, thirst and hunger.
"Excessive urination, excessive hunger" (Owa Ekei Community Youth)
"Frequent urination, sweating" (Isiokolo Community Youth)
"Too much fatigue or tiredness" (SS 2 Student Ogbe Secondary School Effurun)
"Frequent Urination, Poor Vision" (Teacher in Ihu-Iyase secondary school)
"Frequent Urination, the thirst of water, dehydration" (Market woman)
"Difficulty of injury to heal" (Religious man).
"In a male, weak erection, excessive urination, sweating" (Isiokolo Community Youth)

Knowledge of risk factors of DM
Most of the discussants attributed the risk factors of DM to the consumption of food containing high carbohydrates
"Too much of carbohydrate" (SS 2 student in Don-Domingos College Warri).
"Excessive consumption of carbohydrate" (Teacher in Agbon Secondary School Isiokolo)
"Too much intake of sweet food, obesity" (Teacher in Owa Model College Agbor)
"High blood pressure" (SS 2 Student Ogbe Secondary School Effurun)
"Too much consumption of sugary food, e.g. yam, gari, starch e.t.c. (Religious woman)
"Excessive intake of alcohol, e.g. coca-cola (Market woman).
"Consumption of excess carbohydrate-containing food," e.g. Eba, yam, rice (Isiokolo Community Youth)
"I do not know" (Owa Ekei Community Youth)
However, it must be noted that the majority of the students could not mention any risk factors of DM

Knowledge of DM Complications
The discussants gave a mixture of responses concerning the complications of DM.
"Eye problem, high blood pressure, cataract" (Teacher in Agbon Secondary School Isiokolo)
"Wounds that do not heal easily" (SS 1 student in Don-Domingos College Warri)
"Diabetes can block blood tissues" (JSS 3 Student Ogbe Secondary School Effurun)
"In men weak erection; in women miscarriage, difficulty in childbirth" (Isiokolo Community Youth)
"Sore on the leg, eye problem, frequent urination" (Owa Ekei Community Youth)
"Delay wound healing" (Teacher in Agbon Secondary School Isiokolo)
"Diabetes can lead to stroke, watery faeces, eye disease" (Teacher in Owa Model College Agbor)
"Prolonged healing of wound, death, frequent urination, sweating, and weight loss" (Market woman).

Knowledge of DM management
The ways of DM management as highlighted by the discussants focused on dietary, physical activity and medication.
"Diet (watch what you eat, take a lot of fruit and water, take drugs and test for sugar level in the morning and evening, Exercise (take a walk in the morning and evening" (Teacher in Agbon Secondary School Isiokolo)
"Avoid too much sugar carbohydrate and alcohol, engage in physical activities like walking to sweat out excess sugar in the body, reduce fat, eat enough vegetables" (Teacher in Owa Model College Agbor)
"Eating food like plantain, wheat, avoiding sugary food and drink" (Isiokolo Community Youth).
"Avoid sugary food" (Isiokolo Community Youth).
"Going for medical checkup, monitor your sugar level all the time, reduce intake of salt especially for older people" (Teacher in Owa Model College Agbor)
Some of the discussants also mentioned drugs for the management of DM
"Drugs, e.g. Glucophage" (Isiokolo Community Youth)
"Drugs- Glucophage, diabeling, insulin" (Isiokolo

Community Youth).
Some also suggested herbal management of DM
"Wash bitter leaf and drink" (Isiokolo Community Youth)
"Mixture of scent leaf and bitter leaf" (Isiokolo Community Youth)
"Washing and drinking of bitter leaf, Ugu leaf" (Teacher in Agbon Secondary School Isiokolo).
However, some affirm not to believe in the herbal management of DM
"I do not believe in the herbal medication because there is no measurement" (Teacher in Agbon Secondary School Isiokolo).
"I have no idea of herbal management of DM" (Teacher in Agbon Secondary School Isiokolo

Knowledge of DM Prevention
The ways highlighted by the discussants in preventing DM include:
"Mindful of food consumption and consumption of sugary drink" (Religious woman)
"Avoiding taking too many carbohydrates" (SS 2 Student Ogbe Secondary School Effurun)
"Subjecting one to a dietary plan whereby you check the sugar content of the food, e.g. take vegetable today and plantain the next day" (SS 2 student in Don-Domingos College Warri)
"Awareness of the disease, stop eating carbohydrate-containing food and regular medical checkup" (Isiokolo Community Youth)
"Take groundnut oil free from cholesterol" (Owa Ekei Community Youth)
"Frequent medical checkup as one grows older" (Teacher in Agbon Secondary School Isiokolo)
"Not eating much sugar, doing regular exercise, eating many vegetables, drinking a lot of water, going for a regular checkup" (Teacher in Owa Model College Agbor).
However, one of the discussants suggested prayer and fasting as a way of preventing DM
"Praying to God, Prayer and Fasting, Avoid Sin" (Owa Ekei Community Youth).

Discussion
According to the discussants, DM is defined by excess sugar in the blood. One of the characteristic features of DM is the high level of glucose in the blood; however, it is the inability of the body to produce any or enough of the hormone insulin or utilise the insulin effectively that leads to the hyperglycaemic state. Thus, only one of the discussants a community youth was able to define DM correctly. This is a gap in knowledge as DM is often defined as excess sugar in the blood;[17,18] without a proper understanding of what causes the hyperglycaemia. Besides, most of the discussants only mentioned type 1 and type-2 as types of DM with no recall or mention of gestational DM.
Similarly, few affirmed that they did not know the types of DM. This finding was similar to that of previous studies where the respondents could not mention the types of DM.[14,17] The fact that none of the students could recall any type of DM should be a source of concern because prediabetes and type 1 diabetes mellitus is prevalent among children in Nigeria and Africa.[19,20,21,22] Thus, targeting this cohort for DM preventive health educational intervention will prepare them to handle DM challenges in the near future.
Majority of the discussants attributed the causes of DM to the consumption of excess sugar. However, few attributed the causes to insulin deficiency and genetic factors. However, studies have shown that consumption of sugar alone does not lead to DM.[23,24] This finding was similar to the result of a previous study.[8] Besides, some of the discussants superstitiously affirmed that DM cause could be attributed to spiritual attack from evil people. This finding was similar to that of a previous study.[10] A good number of the discussants correctly highlighted the symptoms of DM to be frequent urination, sweating, excessive hunger and thirst, poor vision and fatigue. This finding was similar to that of previous studies within and outside Nigeria.[14,17,18,25,26] Also, majority of the discussants mentioned excessive consumption of carbohydrate as the major risk factor of DM. Others listed were obesity, high blood pressure and consumption of alcohol. As highlighted in the finding, there was a knowledge gap of risk factors of DM among the students. The finding was similar to that of previous studies in Nigeria.[14,27]
The common complications mentioned by the discussants were eye problem, delay wound healing, stroke and high blood pressure. However, some of the discussants also erroneously stated signs and symptoms of DM such as sweating, weight loss and frequent urination. This represents a

gap in knowledge of DM complications. Similarly, the discussants mentioned weak erection, miscarriage and difficulty in childbirth as DM complications. Previous studies corroborated this erroneous ideas.[28,29,30] Most of the discussants demonstrated knowledge of DM by highlighting the three focal points for DM management which include dietary, physical activity and medication. This finding was similar to that of a previous study.[14] Similarly, some of the discussants suggesting herbal management of DM were similar to that of an earlier study.[10] However, a discussant highlighted the absence of dosage measurement as a problem with herbal medicine as is obtained in the orthodox medication. The discussants highlighted the ways of DM prevention to be a reduction in sugar consumption, engaging in exercise and regular medical checkup. The finding was similar to that of a previous study[31] while it was at variation from the results of an earlier study.[32] The implication for the inadequate knowledge of DM among the discussants will probably lead to poor attitude towards the disease as some might not avail themselves the opportunity for DM screening contributing to the already high burden of undiagnosed DM in Nigeria.[33,34] Also, the discussants might not seek prompt treatment and care when developing symptoms of DM which might lead to development of DM related complications which have been reported in Delta State[3,35] and Nigeria.[36,37,38] For the students it might lead to poor perception and attitude towards DM which could be inimical to the quality of their health in the neareast future.

Conclusion

The study showed inadequate knowledge of DM among the discussants as some could not properly define DM, mention the causes of DM, risk factors of DM and complications of DM. Components of DM where the discussants demonstrated good knowledge were signs and symptoms of DM, management of DM and prevention of DM. The study recommended DM health educational intervention for the entire population irrespective of DM status. Specifically, targeting population such as students who demonstrated inadequate knowledge of DM would help in not only improving their knowledge but also prepare them for future challenges associated with the management of the disease.

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