

Comparative Assessment of Knowledge Gap on Diabetes Mellitus Among Diabetic and non-diabetic Residents of a Rural Community in Enugu state, Southeast, Nigeria

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Abstract

Hyperglycaemia is main feature of diabetes mellitus. Type 1 and Type 2 are main categories. Symptoms are polyuria, polydipsia, polyphagia, blurring of vision and weight loss. It is preventable but has some risk factors, and complications. This study compared the knowledge on diabetes among diabetic and non-diabetic residents of a rural community in Enugu State, Nigeria. It was a cross-sectional study carried out during a medical outreach activity. Glucometer was used to determine the level of blood sugar, among the respondents. Pretested interviewer administered questionnaire was used for data collection, and SPSS 20.0 for windows was used for analysis.

Among the 296 respondents interviewed and tested, 25 (8.4%) had diabetes mellitus while 271 (91.6%) are non-diabetic. Overwhelming percentage of diabetics had better knowledge on the parameters studied. The score of diabetics

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on the types, prevention, and risk factors of diabetes mellitus was 47.0%, while non-diabetics scored 16.3%. The difference in knowledge is statistically significant. For symptoms and complications, diabetics scored 57.2%, while non-diabetics scored 16.1%. The difference is also statistically significant.

Health educating rural dwellers will equip them with the knowledge of DM prevention and management, and ultimately reduce the cases of DM in the rural areas.

Keywords: Diabetes mellitus, knowledge, rural community

1 Introduction

Diabetes mellitus can be defined as a syndrome that has hyperglycaemia as the main feature. It manifests as a result of disturbances in carbohydrate, fat, and protein metabolism. This is usually caused by defects in insulin secretion, insulin action or both [1]. Majority of this disease fall into two broad a etiopathogenetic categories namely Type 1 and Type 2 diabetes mellitus [1]. The usual symptoms of Diabetes mellitus are polyuria, polydipsia, polyphagia, blurring of vision and weight loss [2]. Poorly managed diabetes mellitus could lead t complications such as heart disease, stroke, high blood pressure, blindness, kidney disease, nervous system disease, amputations, dental disease, and complications of pregnancy [3]. These complications contribute significantly to morbidity and mortality among diabetic patients [4]. Over 366 million people globally are affected by diabetes mellitus. It is estimated that this figure may double by the year 2030 [5, 6]. The disease is projected to be 7th leading cause of death globally in the year 2030 [7]. Some of the identified reasons for increase in the prevalence of diabetes mellitus include; urbanization, obesity, inability to adopt healthy lifestyle, and population growth [8].

This chronic health problem, is rapidly emerging as a major public health problem in developing countries [9]. In Nigeria, Type 2 diabetes mellitus is the commonest metabolic disorder [10,11]; with the prevalence being between 2 - 7% [12,13]. Complications can however be prevented or reduced by continuing medical care, and education of patients on self-care and management [14]. The ability of diabetic patients to practice self-care is dependent on their knowledge on diabetic mellitus [15]. Empowering patients with knowledge on diabetes leads to better blood glucose control and improved quality of life [16].

Diagnosis of diabetes mellitus can be made by symptoms of diabetes plus casual (random) blood glucose concentration of 200mg/dl (11.1mmol/L) or more, Fasting blood glucose (8hours fasting) concentration of 126mg/dl (7.0mmol/L), or Oral Glucose Tolerance Test (after giving 75g anhydrous glucose dissolved in water) of

200mg/dl (11.1mmol/L) [1,17].

It has been documented that many diabetic patients do not have adequate knowledge about diabetes mellitus, and hence are unable to adopt good self-care management practices that will enable them achieve adequate glycaemic control [18]. Assessment of the knowledge gap on diabetes mellitus among diabetic and non-diabetic residents of a rural community will provide information that will be useful in developing diabetes mellitus health education module that will be effective in enhancing self-care management of diabetes mellitus by rural residents in a developing country. The objective of this study is to assess and compare the knowledge gap on diabetes mellitus among diabetic and non-diabetic residents of a rural community in a developing country.

2 Materials and Methods

Enugu state located in the South Eastern part of Nigeria, is made up of 17 Local Government Areas. It is bounded by Imo and Abia States on the south, Anambra State on the west, Ebonyi State on the east, and Benue and Kogi States on the north. The state is predominantly inhabited by the Igbo speaking tribe [19]. The population of Enugu state was given as 3.26 million people in 2006 [20]. Farmers and palm wine tappers make up a significant number of residents in rural areas. This study was conducted in Egede town, a rural community in Udi Local Government Area of Enugu State, South East, Nigeria. There are two health facilities in Egede town; a cottage hospital and a health post. These facilities are however minimally functional.

Observational cross-sectional study design was employed, and adult residents of Egede town, Udi Local Government Area of Enugu State that are 18 years and above were enrolled in the study. Pre-tested interviewer-administered, structured questionnaire was used. The pre-testing was done in Iwollo town, a rural community of Ezeagu Local Government Area, Enugu state. Data was collected in January, 2015, during a well publicized medical outreach activity organized by the UDI HEALTH WORKERS' ASSOCIATION, ENUGU STATE UNIVERSITY TEACHING HOSPITAL, PARK LANE, ENUGU. The trained Research Assistants that collected information from respondents were five junior resident doctors and ten Internists. Two hundred and ninety six (296) respondents were interviewed. AccuCheck Glucometer was used to check the casual (random) blood glucose sugar concentration of the respondents. Information was also collected simultaneously on another diabetes mellitus study, and studies on malaria and HIV/AIDS.

Statistical Package for Social Sciences (SPSS) 20.0 for windows was used for the data analysis. Only quantitative analysis was done. The questionnaire was

analyzed in terms of the number and percentage of diabetics and non-diabetics with correct knowledge on types, symptoms, risk factors, prevention, and complications of diabetes mellitus. It was also ascertained whether the difference in the knowledge gap between diabetic and non-diabetic respondents was significant. The Ethical Committee of the Enugu State University of Science and Technology Teaching Hospital, Park lane, Enugu gave the approval for the study. The respondents freely consented to being interviewed.

In this study, only random (casual) blood glucose concentration of 200mg/dl was used in making a diagnosis of diabetes mellitus. It is possible that some of the respondents actually fasted for 8 hours and above before the test was conducted, in which case the test could actually be Fasting Blood Sugar test. This implies that some respondents with test results between 126mg/dl and 200mg/dl could be diabetic. None of the respondents that came out with a diagnosis of diabetes mellitus was assessed clinically for symptoms of diabetes mellitus. These are limitations to this study.

3 Main Results

Out of a total of 296 respondents interviewed and tested, 25 (8.4%) had diabetes mellitus (DM), while 271 (91.6%) are non-diabetic.

3.1 Socio-demographic variables of respondents

Greater percentage of the respondents were above the age of 50 years (78.1%). Most of them are also females (70.3%), married (82.4%), had no formal education (53.0%), and had farming as their occupation. (Table 1).

3.2 Knowledge of respondents on types, prevention, and risk factors of diabetes mellitus

None of the diabetic respondents knew that there are two major types of DM, whereas only 5 persons (1.8%) among the non-diabetics had the correct knowledge. The percentage of diabetics that are aware that DM can be prevented (60.0%) are a lot higher than the percentage of non-diabetics that have the same knowledge (28.8%). Generally, higher percentage of diabetics are aware of DM preventive measures such as being careful with what one eats (52.0%), regular exercises (44.0%), and regular checking of blood sugar (48.0%). Among non-diabetics, the scores are 26.6%, 17.3%, and 25.8% respectively. Small percentage of non-diabetics (11.4%) know that positive family of DM, and obesity (16.2%), can be a risk factor for developing DM; while impressive 80% of diabetics know that positive family history and obesity are risk factors. Small percentage of diabetics (12.0%), and even smaller percentage of non-diabetics (2.6%) know that

DM is not curable. The aggregate knowledge score of diabetics on the types, prevention, and risk factors of DM is 47.0%, while the score for non-diabetics is 16.3%. The difference in knowledge is statistically significant [Chi square = 112.296 ($P < 0.01$)]. Table 2.

3.3 Knowledge of respondents on symptoms and complications of diabetes mellitus

Very high percentage of diabetics (84.0%) knew that excessive urination is a symptom of DM, while only 30.3% of non-diabetics have the knowledge. Diabetics also have better knowledge on the other symptoms such as excessive eating (40.0%), excessive drinking of water (44.0%), and weight loss (60.0%). The scores among non-diabetics are 7.4%, 10.0%, and 17.3% respectively. The correct knowledge score on complications of DM among diabetics are kidney problems (60.0%), eye problems (60.0%), nerve problems (44.0%), amputation of the leg (76.0%), genital infection such as candidiasis (56.0%), and some other health problems (48.0%). The scores among non-diabetics are a lot lower. These are 17.3%, 18.5%, 12.2%, 20.7%, 10.3%, and 17.3% respectively. The aggregate knowledge score of diabetics on the symptoms and complications of DM is 57.2%, while the score for non-diabetics is 16.1%. The difference in knowledge is statistically significant [Chi square = 245.10 ($P < 0.01$)]. Table 3.

4 Tables

Table 1: Socio-demographic variables of respondents

Age range (in years)	Frequency (N = 296)	Percent (100%)
18-19	2	0.7
20-29	11	3.7
30-39	23	7.8
40-49	29	9.8
50-59	73	24.7
60-69	74	25.0
70 and above	84	28.4
Sex		
Female	208	70.3
Male	88	29.7

Marital status		
Married	244	82.4
Single	12	4.1
Divorced/Separated	3	1.0
Widowed	37	12.5
Educational status		
No Formal Education	157	53.0
Primary level	88	29.7
Secondary level	38	12.8
Tertiary level	5	1.7
Postgraduate level	8	2.7
Occupation		
Farmer	209	70.6
Petty trader	38	12.8
Artisan	17	5.7
Retired	15	5.1
Civil servant	12	4.1
Unemployed student	5	0.7

Table 2: Knowledge of respondents on types, prevention, and risk factors of diabetes mellitus

Questions	DM present N=25	DM not present N=271
	Correct response (%)	Correct response (%)
How many major types of diabetes mellitus are there?	0(0.0)	5(1.8)
Can diabetes mellitus be prevented?	15(60.0)	78(28.8)
Diabetes mellitus can be prevented by being careful with what you eat	13(52.0)	72(26.6)
Diabetes mellitus can be prevented by regular exercise	11(44.0%)	47(17.3)
Diabetes mellitus can be prevented by checking blood sugar regularly	12(48.0)	70(25.8)
Diabetes mellitus can run in families	20(80.0)	31(11.4)
Obesity can lead to diabetes mellitus	20(80.0)	44((16.4)
Diabetes mellitus is curable	3(12.0)	7(2.6)

Total knowledge of diabetics on type, prevention, and risk factors of diabetes mellitus = total correct response/total possible correct response X 100% = 94/200 X 100% = 47.0% (poor knowledge)

Total knowledge of non-diabetics on type, prevention, and risk factors of diabetes mellitus = total correct response/total possible correct response X 100% = 354/2168 X 100% = 16.3% (poor knowledge).

The difference in knowledge is statistically significant [Chi square = 112.296 (P < 0.01)].

Table 3: Knowledge of respondents on symptoms and complications of diabetes mellitus

Symptoms	DM present N=25	DM absent N=271
	Correct response (%)	Correct response (%)
Symptoms of diabetes mellitus include excessive eating.	10 (40)	20 (7.4)
Symptoms of diabetes mellitus include excessive drinking of water.	11(44)	27(10)
Symptoms of diabetes mellitus include excessive urination	21(84.0)	62 (30.3)
Symptoms of diabetes mellitus include weight loss	15(60.0)	47(17.3)
Complications of uncontrolled diabetes mellitus		
Uncontrolled diabetes can result in kidney problem	15(60.0)	47(17.3)
Uncontrolled diabetes can result in eye problems	15(60.0)	50(18,5)

Uncontrolled diabetes can result in nerve problems	11(44.0)	33(12.2)
Uncontrolled diabetes can result in amputation of the leg	19(76.0)	56(20.7)
Uncontrolled diabetes can result in infection of private part, such as candidiasis	14(56.0)	28(10.3)
Uncontrolled diabetes can result in some other health problems	12(48.0)	47(17.3)

Total knowledge of diabetics on symptoms and complications of diabetes mellitus = total correct response/total possible correct response X 100% = 143/250 X 100% = 57.2% (Fair knowledge)

Total knowledge of non-diabetics on symptoms and complications of diabetes mellitus = total correct response/total possible correct response X 100% = 437/2710 X 100% = 16.1% (poor knowledge).

The difference in knowledge is statistically significant [Chi square = 245.10 (P < 0.01)

5 Discussion and Conclusion

Majority of the respondents being above 50 years, and not reasonably educated probably contributed to the low level of knowledge recorded in both diabetic and non-diabetic persons interviewed; since it has been documented that increasing age is inversely related to knowledge of DM [21,22]. None of the diabetic respondents knew that there are two major types of DM, while only 1.8% of non-diabetics knew that there type 1 and type 2 DM. This is in sharp contrast to the finding in a study among diabetics in Durban South Africa (2008), where 96% of respondents knew that there are two major types of DM [23]. The high DM type knowledge score is probably as a result of majority of the respondents being migrant Indians (53.8%), who are obviously more educated. In a study done recently in Brazil, 42.7% was found to be the knowledge score among respondents on types of DM [24]. This is also a lot higher than the 1.8% found among non-diabetics in this study. The percentage of diabetics (60.0%) that knew that DM is

preventable is high when compared to non-diabetics (28.8%) with the same knowledge. This 60.0% found among diabetics is quite close to the 54.3% found in a study among diabetics in Gambia [25]. Diabetics in this our study demonstrated higher knowledge of the different preventive ways such as diet (52.0%), regular exercises (44.0%, and regular blood sugar check (48.0%); when compared to diabetics in the referenced Gambian study that recorded 34.0% for diet, and 5.6% for physical activity. In a Mongolian population based study, 63.4% of respondents irrespective of being diabetic or not knew that diet was essential for preventing DM. However only 26.9% in the Mongolian study knew that regular exercise was important in preventing DM [26]. Regarding positive family history of diabetes and obesity being risk factors for developing DM, diabetics in this study had impressive percentage knowledge score of 80% for each of them. This is even slightly higher than 75.9% score in positive family history, and 72.3% score in obesity recorded among diabetic respondents in Klinik Kesihatan Seremban in the year 2006 [27]. Knowledge of positive family history of DM being a risk factor is a lot less (27.0%) among diabetics in a study done in Gambia about three years ago [25]. One would have expected a somewhat similar finding in Nigeria and Gambia, since both countries are developing countries in the West African sub-region. On the other hand, non-diabetics in our study had a poor knowledge about positive family history (11.4%) and obesity (16.2%) being risk factors for developing DM. Among non-diabetics in the Klinik Kesihatan Seremban study, 66.7% was the score for knowledge of positive family history, and 54.5% for obesity. This is a lot higher than what we found among diabetics. In our environment, diabetics usually receive health education on DM including the risk factors during their DM clinic days, while non-diabetics rarely have any source of information on DM, outside the very occasional electronic media. The situation may be different from what obtains at Klinik Kesihatan, Seremban, where possibly there is more sustained effort to health educate the populace on DM. Both diabetic (12.0%) and non-diabetic (2.6%) in our study have very poor knowledge of DM not being curable. This implies that significant percentage of diabetics could be deceived into abandoning their orthodox medical care for claimed local/traditional remedies. Higher percentage of diabetics (59.0%) and non-diabetics (27.3%) in the Seremban study know that DM is not curable. The total knowledge score of diabetics on the types, prevention, and risk factors of DM is 47.0%, while the total knowledge score for non-diabetics is 16.3%. Both groups scored below 50%, which implies that they have poor knowledge. However, the difference in knowledge is statistically significant [Chi square = 112.296 ($P < 0.01$)]. Diabetic respondents have statistically significant better knowledge on the type, prevention methods, and risk factors of DM.

Excessive passage of urine is the symptom of DM that is mostly identified by both diabetics (84.0%) and non-diabetics (30.3%) in our study. This is probably due to the fact that in the study area, the vernacular name for DM is literally translated to "Disease of the urine" [28]. Diabetics also demonstrated better knowledge in the

other symptoms which are; excessive eating (40.0%), excessive drinking of water (44.0%), and weight loss (60.0%). In the Klinik Kesihatan Seremban, Malaysia study, diabetics and non-diabetics clearly had better knowledge of the key symptoms of DM such as excessive urination (89.2% diabetics and 65.2% non-diabetics), excessive drinking of water (89.2% diabetics and 63.6% non-diabetics), and weight loss (73.5% diabetics and 47.0% non-diabetics). Non-diabetics in our study had 7.4% knowledge score on excessive eating, 10.0% on excessive drinking, and 17.3% on weight loss as symptoms of DM. The wide difference between the knowledge gap on symptoms of DM among the respondents in the Malaysian study and ours could probably be as a result of our respondents being less formally educated (82.7% have only primary level education or no formal education at all, while only 36.1% diabetics and 12.1% non-diabetics have primary or none formal education in the Malaysian study). Diabetics in this study obviously demonstrated better knowledge of common diabetic complications such as kidney problems (60.0%), eye problems (60.0%), nerve problems (44.0%), amputation of the leg (76.0%), genital infection such as candidiasis (56.0%), and some other health problems (48.0%), than the non-diabetics. Findings in a recent study in Gambia clearly revealed lower knowledge among respondents on amputation (31.0%) and kidney problem (13.5%) as complications of DM. They however demonstrated higher knowledge on eye problems being a complication of DM [25]. The low knowledge of the Gambian respondents may be a pointer that those complications are not seen frequently among diabetics in that area. This could imply that diabetics in that environment of study are properly managed. This line of reasoning however requires further research work authenticate or disprove. In that same study, the knowledge on eye problems as complication of DM (67.0%) is not very different with the finding in this study. However, higher percentage knowledge was found among diabetics in the Klinik Kesihatan Seremban, Malaysia study, where the findings were 92.8% for eye problems, 84.3% for amputation, and 84.3% for kidney problems [27]. The huge knowledge gap on diabetic complications between the diabetic respondents in our study and those in the Malaysian study could also be traceable to the higher formal educational exposure of the Malaysian respondents. The aggregate knowledge score of diabetics on the symptoms and complications of DM is 57.2%, while the corresponding score for non-diabetics is 16.1%. The difference is statistically significant [$\chi^2 = 245.10$ ($P < 0.01$)]. Knowledge of our diabetic respondents on symptoms and complications of DM was reasonably higher than a recent finding in Pakistan where 37.5% was found [29]. This could be as a result of respondents in the Pakistani study being very poorly educated. Up to 76% of the diabetic respondents in that study had no formal education, whereas 53.0% of respondents in our study had no formal education.

The very huge knowledge gap on DM between diabetic and non-diabetic residents of a rural community in Enugu state, Southeast Nigeria, is a pointer to the compelling need to increase efforts towards health educating the rural dwellers on

DM. This will equip them with the knowledge of DM prevention and management, and ultimately reduce the incidence and prevalence of DM in the rural areas. It is not right for rural dwellers to develop DM before having access to information on essential DM prevention and management measures.

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