



## Effect of Diabetic Educational Programme on Glycemic Control among Clients at Tertiary Hospitals of Kaduna State

Kure, M.<sup>1</sup>, Tukur, B.M.<sup>2</sup>, Mba, C.J.<sup>3</sup>, Abubakar, S.<sup>3</sup>, Bayero, B.<sup>3</sup>.

<sup>1</sup>National hospital FCT, Abuja

<sup>2</sup>Department of Nursing Science, Ahmadu Bello University, Zaria

<sup>3</sup>Department of Nursing Science, Bayero University Kano

**Corresponding Author:** Mba Chioma Judith

**Corresponding Email:** chomjud3679@gmail.com

### Abstract

**Background:** Diabetes Mellitus (DM) is the commonest endocrine-metabolic disorder in Nigeria similar to the experience in other parts of the world. About 95.4% of the DM cases diagnosed are of type 2 in Nigeria. Client education enhances self-monitoring with improved glycemic control which is the ultimate goal of diabetic care. **Aim:** This study was conducted to determine the effect of diabetic educational programme on the glycemic control among adults with type 2 DM at tertiary hospitals in Kaduna State. **Methodology:** A quasi experimental design was used to study 242 Participants who were selected using multi-stage sampling technique. Data for the study were collected using structured interview questionnaire. Data obtained were analysed using SPSS Statistical package, version 23. **Results:** Findings from the study revealed that most of the respondents (67.6% and 60.0%) had poor knowledge of the causes and management of diabetes mellitus respectively. Results also showed that more than half (57.9%) of the respondents had poor glycemic control before intervention. A significant relationship existed between the level of knowledge of causes and management of diabetes mellitus and glycemic control level ( $P < 0.05$ ). **Conclusion:** The study concluded that diabetic educational programme has a positive effect on glycemic control and a vital tool in the management of type 2 DM. Therefore, it is recommended that comprehensive diabetic education be considered by all health personnel as a treatment modality in the management of type 2 DM.

**Keywords:** *Effect, Educational programme, Glycemic Control, Diabetes Mellitus.*

### Introduction

#### Background of the Study

Diabetes mellitus (DM) is a major public health problem worldwide, requiring continuing medical care and ongoing patient self-management education and support to prevent acute complications and to reduce the risk of long-term complications (Khan, Cooper & Del Prato, 2013). Diabetic complications contribute to the decreased quality of life for affected individuals and

their families, with a devastating long-term effect on their financial and social well-being. Thus, DM ultimately affect the economy of the country as a whole through the loss of productivity, morbidity and mortality (Islam, Louis, Jochen, Utan, Tuhin, Anwar, & Andreas, 2013).

About 5 million people are living with diabetes mellitus, with 40,815 deaths in adults due to diabetes mellitus recorded in Nigeria in

2015( International Diabetic Federation (IDF), 2015). Nigeria is the third most affected country in the region, after South Africa and the Democratic Republic of Congo (IDF, 2015). The management of DM largely depends on the affected person's ability to pursue self-care in daily living. Patient education, therefore, is considered as an essential tool to control DM as shown through research findings (Islam *et al.*, 2015). Management for type 2 DM is mostly the use of oral antidiabetic agents and insulin. An insulin-requiring individual on a minimum wage would spend 29% of his monthly income on insulin. Quality of life is an important health outcome in its own right, representing the ultimate goal of all health interventions (American Diabetes Association (ADA); 2015).

Kaduna State has a prevalence rate of 23.3% from a recent study in a District General Hospital in Kawo, Kaduna North Western Region of Nigeria (Bello-Ovosi *et al.*, 2018). The prevalence of Type 2 DM in relation to Diabetic Foot Ulcer (DFU) development was studied, indicating a prevalence rate of 6.5% of people with type 2 Diabetes Mellitus in ABUTH, Kaduna State, Northern Nigeria (Danmusa, Terhile, Nasir, Ahmed & Muhammad, 2016). From the researcher's observation; most of the clients who visited the outpatient clinic have type 2 DM. Although diabetic clients visit clinics regularly, and most of them were on treatment, their blood glucose levels still remain high despite the treatment they receive. A good number of the clients also report to the hospital with life-threatening complications, like foot gangrene that may lead to amputation and premature death, this might be because of a lack of appropriate self-care practises .

Assessment of the level of knowledge of diabetes among persons with diabetes can assist in targeting public health efforts to reduce diabetes-related complications (Hall, Thomsen, Henriksen, & Lohse, 2011). Studies

have shown that patients with newly diagnosed diabetes should participate in a comprehensive diabetes self-management education programme, which includes instruction on nutrition, physical activity, optimising metabolic control, and preventing complications (Mc Culloch, & Munshi, 2016). Optimal management of diabetes involves patients measuring and recording their blood glucose levels. By keeping a diary of their blood glucose measurements and noting the effect of food and exercise, patients can modify their lifestyle to control their diabetes better. For patients on insulin, patient involvement is important in achieving effective dosing and timing (Okaghene & Ekpebegeh, 2015).

Furthermore, although the studies cited above have begun to illuminate our understanding on some of the predictors of differences in diabetes self-care; we currently lack an in-depth understanding or information on the effect of diabetes clients' knowledge on glycemic control among type 2 diabetes mellitus clients, especially in the northern part of Nigeria where the prevalence rate of diabetes is observed to be above the global estimate. Therefore, this study was conducted in northern Nigeria to determine the effect of diabetic educational programme on glycemic control among adult with type 2 DM in Kaduna State.

### **Aim of the Study**

The study aims to determine the effect of diabetic educational programme on glycemic control among adult clients with type 2 DM in tertiary hospitals of Kaduna State.

### **Methodology**

#### **Study Design**

A quasi-experimental design was used for the study. This design allowed the researcher to test the respondents before and after the intervention, as well as to determine the effect of the intervention on the clients.

### Sampling Technique

Multi-stage sampling technique was used in selecting the sample for the study as follows;

**Stage One;** Two Teaching Hospitals were purposively selected; Barau Dikko Teaching Hospital, (BDTH) Kaduna State, with a total of 1008 Registered Type 2 DM Clients and Ahmadu Bello University Teaching Hospital, (ABUTH) Shika- Zaria, Kaduna State with a total 1410 Registered Type 2 DM Clients, making a total of 2418 Registered Type 2 DM Clients.

**Stage Two:** Proportionate allocation was done in accordance with the percentage of the clients registered

### Instrument For Data Collection

Data was collected using a structured interview questionnaire adapted from the Stanford Patient Education Research Centre and modified to suit the respondents' easy understanding.

A Diabetic Education Module was used to guide the diabetic education given during the intervention adapted from the American Association of Diabetic Educators (2017). The module was designed in six parts covering education on; overview of DM, glycemic control, safe and effective use of medication, diet plan and nutrition, exercise and self-care skills/ quality of life. Data obtained were analysed using Statistical Package for Social Sciences SPSS (version 23) and were presented using frequency distribution, mean values and simple percentages.

### Results

#### Demographic Characteristics of the Respondents N= 235

Variables	Frequency	Per centage
<b>Gender</b>		
Male	88	37.4
Female	147	62.6
<b>Total</b>	<b>235</b>	<b>100.0</b>
<b>Age</b>		
18-37	33	14.0
38-57	130	55.3
58-77	58	24.7
78-97	14	6.0
<b>Total</b>	<b>235</b>	<b>100.0</b>
<b>Highest School Completed</b>		
Primary	28	11.9
Secondary	63	26.8
Tertiary	65	27.7
None	79	33.6
<b>Total</b>	<b>235</b>	<b>100.0</b>
<b>Ethnicity</b>		
Hausa	101	43.0
Igbo	9	3.8
Yoruba	29	12.3
Others	90	38.3
<b>Total</b>	<b>235</b>	<b>100.0</b>

<b>Occupation</b>		
Housewife	65	27.7
Self-employed	78	33.2
Civil servant	28	11.9
Retiree	30	12.8
Farmer	24	10.2
Student	10	4.2
<b>Total</b>	<b>235</b>	<b>100.0</b>
<b>Income per month</b>		
Less than ₦10,000	144	61.3
₦10,000 – ₦50,000	61	26.0
Above ₦50,000	30	12.7
<b>Total</b>	<b>235</b>	<b>100.0</b>

**Respondents' Information on Medical History N=235**

<b>Items</b>	<b>Frequency</b>	<b>Per centage</b>
Duration of Diabetes		
<b>Less than 5yrs</b>	40	17.0
<b>5 – 10</b>	69	29.4
<b>10 – 20</b>	101	43.0
<b>Above 20</b>	25	10.6
Total	235	100.0
Co-morbidities/other disease condition		
<b>High blood pressure</b>	140	59.5
<b>Heart diseases</b>	31	13.2
<b>HIV/AIDS</b>	6	2.6
<b>Peptic ulcer</b>	54	23.0
<b>Headaches</b>	4	1.7
Total	235	100.0
History of Diabetes Mellitus in the family		
<b>Present (yes)</b>	138	58.7
<b>Absent (no)</b>	97	41.3
Total	235	100.0
Respondents present medication/Drugs		
<b>Anti-diabetic tablets</b>	110	46.8
<b>Anti-diabetic injection (insulin)</b>	79	33.6
<b>Both anti-diabetic tablet/injection combined</b>	46	19.6
Total	235	100.0
Respondents exercise duration per/week		
<b>Adequate exercise</b>	92	39.1
<b>Moderate exercise</b>	22	9.4
<b>Inadequate exercise</b>	121	51.5
Total	235	100.0
<b>Aggregate mean score</b>		<b>1.9123</b>

**Respondents' Level of Knowledge Pre and Post Intervention (Diabetic Education)**

Category	Pre-Test			Post-Test		
	Poor	Good	Total	Poor	Good	Total
Knowledge Domain	Frequency (%)	Frequency (%)	100%	Frequency (%)	Frequency (%)	100%
Causes of DM	159 (67.6)	76 (32.4)	235	82 (35.0)	153 (65.0)	235
Management of DM	141 (60.0)	94 (40.0)	235	99 (42.1)	136 (57.9)	235
Knowledge of DM Diet	138 (58.7)	97 (41.3)	235	104 (44.0)	131 (55.7)	235
Signs/Symptoms of DM	145 (61.7)	90 (38.3)	235	71 (30.2)	164 (60.8)	235
Complications of DM	127 (54.0)	108 (46.0)	235	34 (14.5)	201 (85.5)	235

Variables	Frequency	Per centage
Have you received health education on Diabetes Mellitus		
<b>Yes</b>	150	63.8
<b>No</b>	85	36.2
Total	235	100.0
Did you benefit from the health education		
<b>Yes</b>	150	63.8
<b>No</b>	85	36.2
Total	235	100.0
Areas covered by health education		
<b>Inadequate</b>	143	60.8
<b>Moderate</b>	58	24.7
<b>Adequate</b>	34	14.5
Total	235	100.0
<b>Aggregate mean score</b>		<b>1.7385</b>

**Respondents' Education Status on Diabetes Mellitus before Intervention**

**A Summary of Paired Sampled t-Test of Respondents' Family History of Diabetes with the Level of Knowledge**

Variables	N	Mean	SD.	t-cal.	t-crit.	Df	P
Family history of diabetes	235	2.4681	.8125	28.765	1.96	234	0.000
The level of knowledge	235	1.3234	.4687				

t (235)=1.96 P<0.05

**A Summary of Chi-square Test on the Respondents' Level of Knowledge of Diabetes and the Glycemic Control (Fbg Levels Less than <7.0mmol/dl or 126mg/dl)**

Variables	N	$\chi^2$ -Cal	$\chi^2$ -Crit	Df	P
Knowledge of Diabetes Mellitus	235	56.884	3.841	1	.000
Glycemic Control/Sugar level <7.0mmol/l	235				

t(235)=3.841 P<0.05

**A Summary of Paired Sampled t-test on the Respondents' Glycemic (FBG) Levels Pre-Test and Post-Test in the Two Tertiary Hospitals.**

Variables	N	Mean	SD.	t-cal.	t-crit.	Df	P
Pre-test Glycemic level	136	11.7493	2.9296				
Post-test Glycemic level	136	9.4250	2.2932	9.938	1.98	135	0.000

t(136)=1.98P<0.05

**Discussion of Findings**

The study aimed at finding out the effect of diabetic educational programme on the glycemic control of adults with type 2 Diabetes Mellitus in Kaduna State.

This study revealed that more than half of the respondents were aged between 35-57 years, a significant number of them were also overweight/obese, and half of them engaged in inadequate exercise weekly. This finding is in agreement with WHO (2013) classification of Type 2 DM, which is said to be common among adult with the primary cause being excessive body weight and not enough exercise. Findings from this study also revealed that a good number of the respondents earn less than ₦10,000 monthly and most 52.7% spend above ₦10,000 monthly on anti-diabetic medication/investigations monthly.

This showed the enormous financial burden of the disease. This finding is in agreement with the study of Okaghene and Ekpebegh (2015), who stated in a related study on DM that the economic burden of diabetes is enormous in terms of the direct cost of intensive monitoring and control of blood glucose and

management of complications. It also tallied with the International Diabetes Federation report that currently; more than 80% of people with diabetes live in Low and Middle-Income Countries (IDF, 2012). This study revealed the high burden of diabetes mellitus in the state which may be due to the poor exercise and adoption of western dietary pattern and the poor level of education.

Findings from this study showed that most of the respondents had poor knowledge of the causes and management of diabetes mellitus before the intervention. Although 63.8% of the respondents agreed to have received a form of health education on the disease, the areas covered by the health education were, however inadequate among most 60.8% of the respondents. This is closely linked to the findings of Islam *et al.*, (2015) in a related study on knowledge and glycemic control which revealed that patients with type 2 diabetes in a tertiary health institution in Bangladesh where majority had limited knowledge on the causes, management and risk factors for diabetes, despite receiving professional health education and care in a tertiary diabetic hospital. This finding does not tally with the findings from the study in

Ethiopia which revealed that 93.7% of the respondents had general knowledge about diabetes (Berhe, Gebru, Kahsay, & Kahsay, 2014). These findings were so because the majority (46.3%) of the respondents were uneducated in the study areas selected.

Findings from this study also revealed that more than half of the respondents studied had poor glyceemic control. This finding also tallied with that of Abebe, Berhane, Alemu & Mesfin, (2015) were 64.9% out of the 391 patients studied had poor glyceemic control in a related study to uncover factors affecting glyceemic control in Ethiopia. This study also showed that 66.3% of the 235 Clients who participated in this study do not practise self glucose monitoring. A palpable number of them depend on the routine laboratory Fasting Blood Glucose check. Findings from the study revealed that a significant difference existed between family history of diabetes and the level of knowledge of respondents on diabetes. Respondents with a family history of diabetes had better knowledge of causes, signs and symptoms as well as management and complication of diabetes than their counterpart without a history of the disease.

This finding is in line with the findings of Islam *et al.*, (2015) on a study of factors affecting glyceemic control. Knowledge of diabetes was significantly associated with education, gender, monthly income, duration of diabetes, body mass index, and family history of diabetes, and marital status. This study also revealed that a significant relationship existed between the level of knowledge and glyceemic control. Respondents with good knowledge of diabetes had good glyceemic control than those with poor knowledge of the disease. This finding is not unexpected because it tallied with the conclusions drawn by Berhe *et al.*, (2014) that the greatest weapon to fight against diabetes is knowledge; information according to them can help people assess their risk and seek proper care. This was so because members of family acquire some knowledge of a disease

from the client/health care providers and must have had some experiences on the management over time.

### Conclusion

The study concludes that clients attending Diabetic Clinics/Wards in Tertiary Hospital of Kaduna State have inadequate knowledge of the causes, signs and symptoms, management and complications of diabetes mellitus which may have contributed to their poor glyceemic control.

### Recommendations

Based on the findings from this study, the following recommendations were made;

1. Health Personnel should consider comprehensive diabetic education as a treatment modality in type 2 DM in Kaduna State
2. Government, Health Care Institutions, NGOs and other stakeholders in diabetic care should source for self glucose monitoring equipment/machines e.g. Glucometer for type 2 DM Clients free or at a subsidised price.
3. Government, Health Care Institutions, NGOs, WHO and other stakeholders in diabetic care should be considered DM as one of the common disorders that require similar assistance given to patients with Sickle Cell Disease, HIV/AIDS, etc. in the prevention, investigations and management of the disorder.

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