

## Quality of Care among Patients with Diabetes Mellitus in A Tertiary Hospital In Jos, North Central Nigeria.

Odoh G<sup>1</sup>, Edah J.O<sup>1</sup>, Ojobi J.E<sup>2</sup>, Uwakwe J.N<sup>1</sup> Puepet FH<sup>1</sup>.

1. Department of Internal medicine, Jos University Teaching Hospital, Jos, Nigeria.

2. Department of Internal Medicine, Federal Medical Center Markudi.

Corresponding Author: Dr Odoh, Gabriel,

Department of Internal medicine, Jos University Teaching Hospital, Jos, Nigeria.

### Abstract

#### Background.

Diabetes Mellitus (DM) is a chronic progressive disease condition which results in significant morbidity, premature death and increase economic burden to any health care system. Worldwide about 5 million DM related deaths in person aged 20-79 years were recorded in 2015, which is equivalent to a person dying every 6 seconds from DM. This makes DM more deadly than the combine deaths from HIV/AIDS, Tuberculosis and Malaria. Despite the high and rising prevalence of diabetes with its associated morbidity and mortality, access to and quality of health care for patients with diabetes is very low in developing countries, leading to compromise quality of life and premature deaths.

**AIM:** To determine the quality of care provided to patients with diabetes attending the Medical Out Patients Department (MOPD) of the Jos University Teaching Hospital (JUTH).

**METHODS:** This was a cross-sectional descriptive study carried out among 148 patients with type 2 DM aged 30 years and above over a period of 6 months. Information on socio-demographic data, process indicators (basic test and examination required to be done in a diabetic patients), outcome indicators (outcome of treatments offered the patients) and questions to assess knowledge of study patients on the concept of diabetes was obtained from the patients using a structured questionnaire.

**RESULTS:** The study revealed that over 70% of study subjects knew that DM treatment is for life, diet and exercise are important in DM management; DM can affect the heart and kidneys. However, only 50% and 4.1% respectively knew what their target fasting blood glucose and HbA1c should be. All study subjects had their blood pressure checked every clinic visit, while Eye exam, foot exam, measurements of LDL-c, HbA1c and kidney function were less commonly done at 22.9, 18.3, 34.8, 48.6 and 56.8% respectively. While percentage of study subjects with HbA1c and LDL-c at goal was 55.4 and 34.5% respectively.

**CONCLUSION.** We advocate for increase education of DM patients on the concept of DM, testing and examination of our patients based on prescribed standards by our physicians. Treatment of our DM patients to goal is still relatively poor, we advocate for improve coverage of health insurance scheme to cover treatment and testing of our DM patients by the government and training of more specialist to cope with the rising prevalence of DM.

**Key words:** Diabetes Mellitus, Quality of care, standards, Jos.

Date of Submission: 13-07-2021

Date of Acceptance: 29-07-2021

### I. Introduction

Diabetes Mellitus has been described as one of the largest health emergencies of the 21<sup>st</sup> century. It is estimated by the International Diabetes Federation (IDF) to have affected about 415 million adults aged 20-79 years in the year 2015. This is projected to increase to 642 million by the year 2040<sup>1</sup>.

Chronic Non Communicable Diseases (CNCD) including diabetes is estimated to cause about 60% of all deaths world-wide; nearly 80% (29 million) of the deaths occur in Low and medium income countries<sup>2</sup>. Diabetes is estimated to be the 3<sup>rd</sup> largest risk factor for premature death after high blood pressure and Tobacco use<sup>3</sup>. It is said to have accounted for over 5 million deaths in 2015 which is higher than combine deaths from HIV/AIDS, tuberculosis and Malaria; accounting for 1.5, 1.5 and 0.6 million deaths respectively<sup>4</sup>.

Despite the high and rising prevalence of diabetes with its attendant morbidity and mortality, access to and quality of health care for patients with diabetes is very low in developing countries leading to compromise quality of life and premature deaths<sup>5-8</sup>.

This study determine the extent of quality of care for diabetes patients attending the endocrine clinic of the Jos University Teaching Hospital (JUTH). It is hoped that findings from the study will identify gaps in

quality of care for our diabetes patients and factors affecting the quality of care. And measures taking to correct identified gaps will help in improving overall quality of life and reduction in morbidity and mortality in our diabetes patients.

## **II. Materials And Methods**

This was a cross-sectional descriptive study involving 148 patients with type 2 DM aged 30 years and above who consented to participate in the study. The audit was carried out over a period of 6 months, from January to June 2018 at the Medical Out Patient Department(MOPD) of the Jos University Teaching Hospital(JUTH).All patients with type 2 DM aged 30 years and above, without co-morbidities and diagnosed with at least 1 year history of type 2 DM satisfied the inclusion criteria.

Information on socio-demographic data, process indicators ( i.e test and examinations carried out on study patients based on prescribed standard), outcome indicators( i.e outcomes of treatment offered study patients compared to prescribed standards) and questions to access knowledge of study patients on diabetes was obtained from the patients.

Quality of care indicators recommended by the American Diabetes Association (ADA) and American Association of Clinical Endocrinologist (AACE) was used for this study.

Process indicators consist of basic test that are required to be done for patients with type 2 diabetes. These include;

- Percentage of type 2 diabetes with one or more HbA1c done annually.
- Percentage of patients who receive one dilated eye examination or evaluation of retinal photography by an ophthalmologist or optometrist during the current year or previous year if the patient is at low risk of retinopathy.
- Percentage of patients with at least one Low Density Lipoprotein Cholesterol (LDL-c) done annually.
- One foot examination done annually.
- One test for microalbuminuria during the year or evidence of medical attention for existing nephropathy.

Out comes measures include;

- Percentage of patients with recent HbA1c <7%.
- Percentage of patients with LDL-c < 2.6MmoL/L.
- percentage of patients with recent BP <140/90mmHg.

### **Diabetes Knowledge**

This was assessed by used of a semi-structured questionnaire which measured knowledge in 4 key areas. These include questions on

- Diabetes chronicity.
- Knowledge on target blood glucose.
- Knowledge about life style modification (diet and exercise) in DM management.
- Knowledge about complications (hypoglycaemia, complications related to the kidneys and heart)

Study subjects answered 9 questions; each correct answer carried 1 mark. Knowledge scores was graded as poor, average and good ( if scores are 4, 4-6 and >7 respectively).

### **STATISTICAL ANALYSIS**

This was done using Epi-info version 3.5.3 Center for Disease Control Atlanta Goergia. Continous variable was express as mean  $\pm$ SD, while categorical variables was express as proportions. The student t-test was used to compare means and Chi-square test was used to find association of quality of care indicators with variables like gender, age , education and duration of diabetes. In all cases, p-value of < 0.05 was considered statistically significant.

### **ETHICAL CONSIDERATION**

Ethical approval was obtained from the Ethical review committee of the Jos University Teaching Hospital. Information concerning all study patients was treated with utmost confidentiality. Study Patients were educated appropriately about the study.

### III. Results

One hundred and forty-eight subjects with Type 2 DM were recruited into the study. With eighty-three (56%) females. The mean (SD) age of the study subjects was 56(10.52). Females were slightly older with a mean (SD) age 56(10.31), this difference was not statistically significant( $X^2=0, 7297, p=0.3937$ ). More than half of the study subjects were within the age group of 30-60years. Socio-demographic characteristics of study subjects is shown in table 1 below.

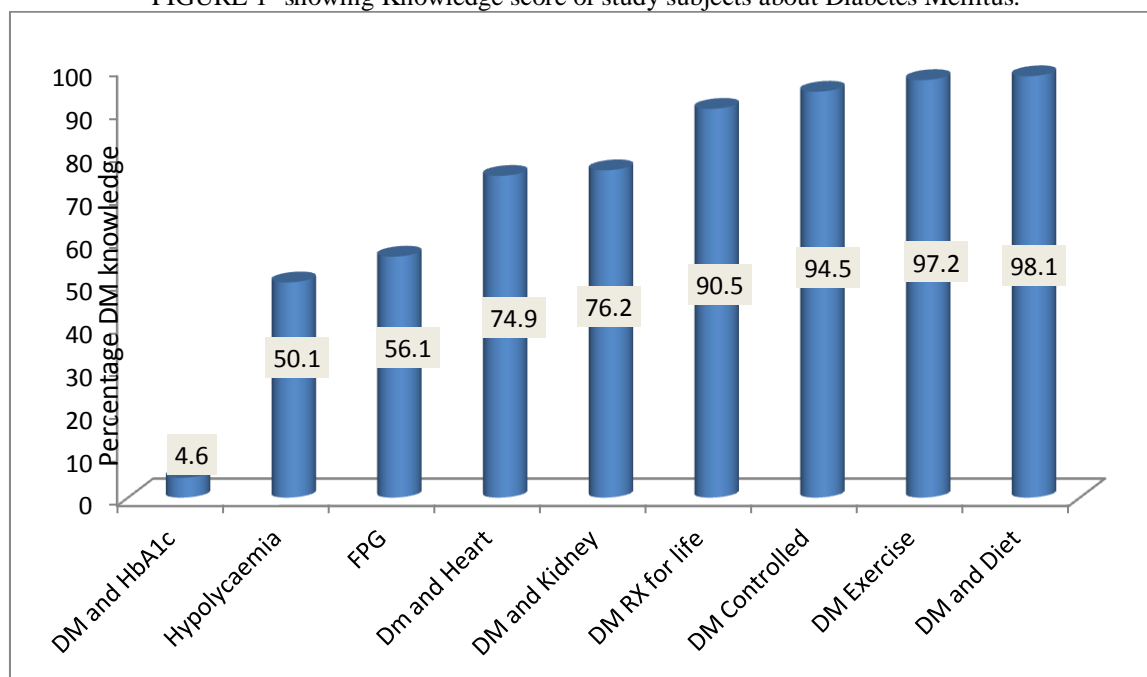
**Table 1:Shows the Socio-demographic characteristic of study subjects**

Variables	Frequency (number)	Percentage
<b>Age</b>		
30-39	9	6.08
30-49	33	22.43
50-59	48	32.43
60-69	44	29.73
70-79	14	9.46
<b>Gender</b>		
Female	84	56.8
Male	64	43.2
<b>Educational level</b>		
Informal	18	12.2
Primary	31	21.6
Secondary	47	31.2
Tertiary	49	33.0
None	3	2.0
<b>Marital status</b>		
Single	44	29.7
Married	100	67.6
Divorced	4	2.7

Results of the Knowledge of concept of Diabetes mellitus showed that most ( 98.6%) of the study subjects knew that dietary measures are useful in the management of diabetes. While over 90% of study subjects knew that diabetes treatment is for life and exercise is an important measure in the management of diabetes. One hundred and ten ( 74.1%) and 76.2% knew that diabetes can affect the heart and kidneys respectively. A little above half (54.1%) knew what their target Fasting plasma glucose should be.

Knowledge about what target glycated haemoglobin should be was poor low at 4.1%. Knowledge score of study subjects is shown in figure 1 below. Overall knowledge about all the concept of Dm showed that; 77(52.1%) had poor overall knowledge score, 60(45.5%) had average scores, while only 7.4% had good scores.

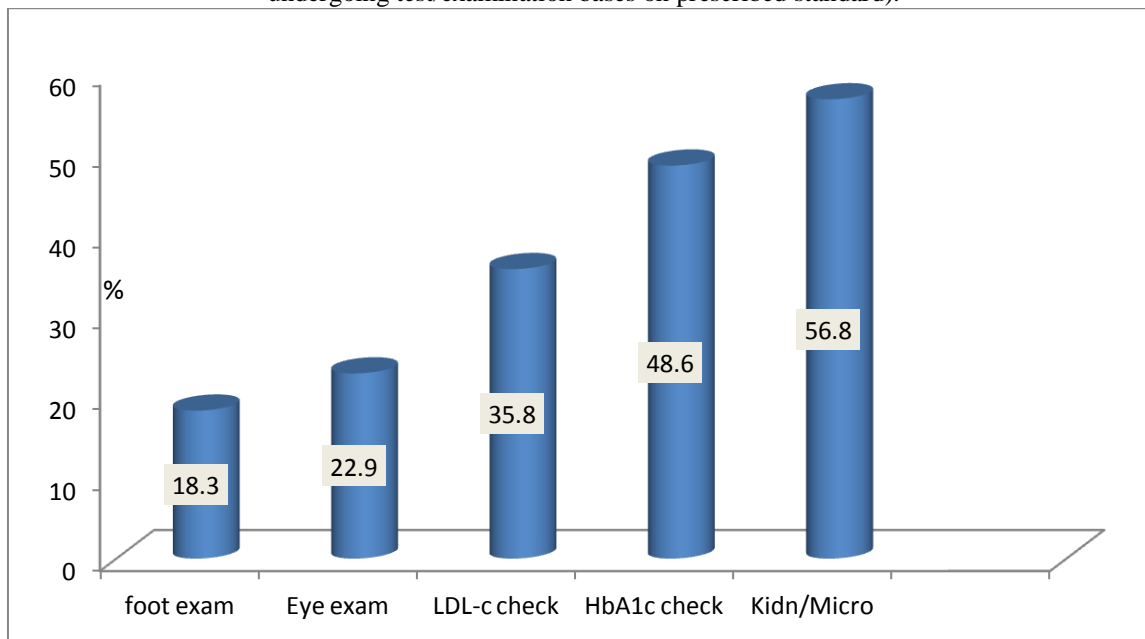
FIGURE 1- showing Knowledge score of study subjects about Diabetes Mellitus.



For the process measure (i.e standard of care offered study subjects based on prescribed standard).

All the study subjects had their blood pressure checked every clinic visit, about half (48.6%) had their HbA1c done at least once a year, about a (34.8%) had their LDL-c checked at least once a year, while just over half (56.8%) of the study subjects had their kidney function done in the past one year. The proportion of study subjects who had an eye or feet examination in the past one year was low at 22.9% and 18.3% respectively. The process measures are shown in figure 2 below.

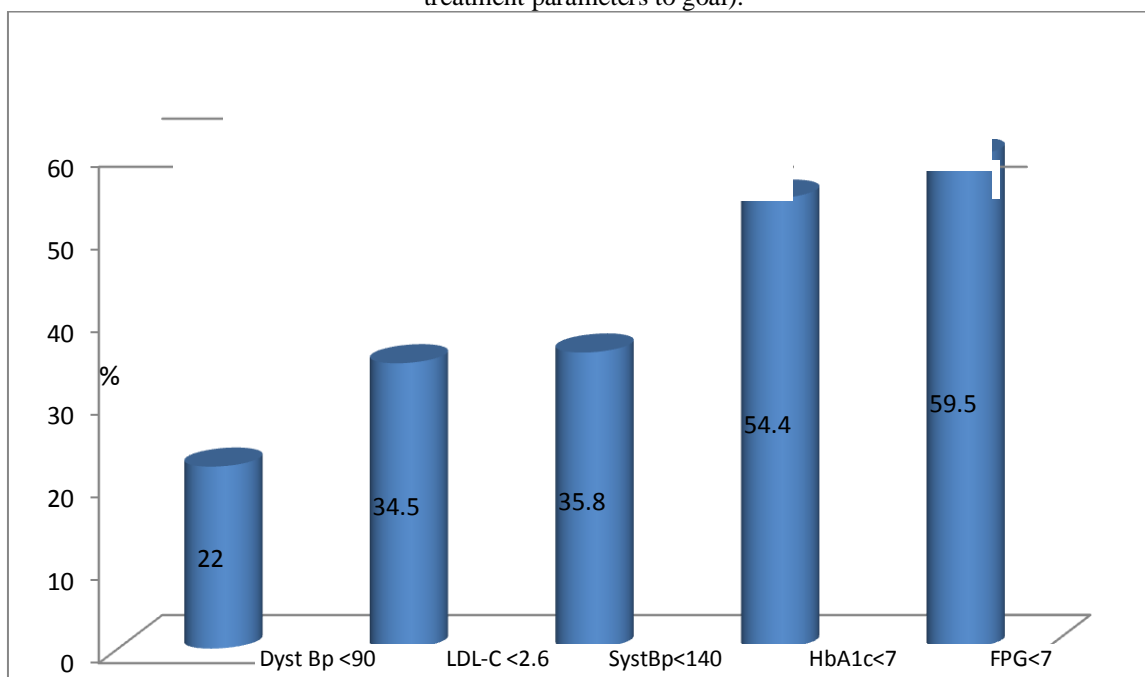
Figure 2: Showing proportion of study subjects undergoing the process measures( proportion of study subjects undergoing test/examination bases on prescribed standard).



For the outcome measures( i.e outcome of test done on study subjects).

Eighty two (55.%) of study subjects showed good glycaemic control( HbA1c <7%) while a slightly higher proportion of study subjects 88(59.5%) showed good short term glycaemic control ( FPG < 7 mMol/L). The proportion of study subjects with LDL-c at goal was lower 51(34.5%) while systolic and diastolic blood pressure control was also low at 35.8 and 22.0% respectively. These is shown in figure3 below.

Figure 3: showing outcome measures of study subjects (percentage of study subjects achieving various treatment parameters to goal).



Comparison of outcome measures with some of the socio-demographic parameters.

The proportion of study subjects with good glycaemic control HbA1c<7% (60.7%) was better in the older age group (60-79) years compared to 57.6% in the younger age group (30-59) years, this difference was however not statistically significant ( $X^2=0.040$ ,  $p=0.844$ ). The relative frequency of male study subjects with good glycaemic (56.2%) control is higher compared to 54.9% in females, this difference is significant ( $X^2=0.989$ ,  $p=0.002$ ). Study subjects who had a positive family history of DM had a relatively higher (59.0%) good glycaemic control compared to 51.0% in those without family history of DM, this difference was not Significant ( $X^2=0.0023$ ,  $p=1.00$ ). The proportion of Study subjects that had DM for less than 14 years with good glycaemic control is higher 55.6% compared to 52.5% in those with DM for 14 years and above. This difference was not statistically significant ( $X^2=0.0212$ ,  $p=0.884$ ). These are shown in table 2 below.

Comparison of knowledge scores with Outcome measures; Study subjects with good knowledge scores had relatively better outcome measures (i.e. relative percentage with HbA1c, FPG, LDL-c and BP at control levels) compared to those with poor knowledge scores. These differences were however not statistically significant.

**Table 2. showing relationship between some clinical variables and outcome of glycaemic control**

Parameter Number (%)	HbA1c n(%)		Chi-square $X^2$	p-value
	Controlled	Not Controlled		
<b>Age</b>				
30-59 92(62.2)	53(57.6)	39(42.4)		
60-79 56(37.8)	34(60.7)	22(39.3)	0.137	0.716
<b>Gender</b>				
Male 64(43.2)	36(56.2)	28(43.8)		
Female 84(56.8)	46(54.8)	38(45.2)	0.879	0.023
<b>Family History of DM</b>				
Present 61(42.2)				
Absent 87(58.8)	36(59.0)	25(41.0)		
	51(58.6)	36(41.4)	0.002	1.000
<b>Duration of DM</b>				
1-14 years 108(73.0)	60(55.6)	48(44.4)		
15-35 years 40(27.0)	21(52.5)	19(47.5)	0.0212	0.884

#### IV. Discussion

Despite good outcome to diabetes patients when the assess care based on prescribed standard in terms of good knowledge/education about the disease, regular examination and test offered and achieving good outcomes in assessed parameters. A wide gap exists between actual care offered and desired/standard of care required. This deficiency in care leads to increase risk of micro and macrovascular complications associated with DM<sup>1-3</sup>.

In this knowledge about individual parameters assessed about the concept of DM was generally good in our study subjects as over 90% of our study subjects knew that exercise and dietary measures are vital in the management of diabetes and that diabetes treatment is for life. While just over 70% knew that diabetes can affect the heart and kidneys. However, Knowledge about target value for fasting plasma glucose was just over 50%, while that of HbA1c is very poor at 4.1%. This shows that we need to do more in terms of educating our patients on what target values for glycaemia should be, as this will help patient know when to alert his/her doctor and when to adjust medications appropriately. Such knowledge will help in keeping control at optimal levels which will help to prevent or reduce associated morbidity and mortality.

All the study subjects had their blood pressure measured at every clinic visit. While the percentage of study subjects who had their HbA1c, LDL-c, Kidney function, eye examine and feet examine at least once in the past one year was 48.6%, 34.8%, 56.8%, 22.9% and 18.3% respectively. Although our findings on proportion of our study patients who had their HbA1c checked at least once a year is comparable to reports by George et al<sup>4</sup> in India but lower than reports from Gomes et al<sup>5</sup> and Suwatee et al<sup>6</sup>. Monitoring of our patients in terms of the process measures (carrying out test and examination based on prescribed standard) is generally poor especially for eye and feet examinations. This need to be optimised, as frequent examination/test will aid in early detection of inappropriate controls and/ or complications which will help in early intervention to prevent or retard progression of complications.

For the outcome measures (i.e. number of study subjects achieving controls), 55.4% of our study subjects had their HbA1c at optimal levels. This is better than reports of 27% by Akbar et al<sup>7</sup> in Saudi Arabia, 39% by George et al<sup>5</sup> in India, and 37% by the CODE-2 study in Europe<sup>8</sup>. However, the proportion of our study subjects achieving good glycaemic control was lower than reports of 62.6% by Pedros de Pablos et al<sup>9</sup> from the PANORAMA study in Europe and 58% by Goudswaard et al<sup>10</sup> in Netherlands. The differences in glycaemic control may be due to differences in study methodologies employed by the different studies. The better outcome for glycaemic control by the PANORAMA study from Europe and the study from Netherlands may be related to their better economies when compared to ours. Access to care, availability of trained specialists and better health insurance schemes might contribute to the better outcome in their environment.

Just over a 3<sup>rd</sup> of our study subjects had their LDL-c at control levels; this is comparable to reports by George et al<sup>5</sup> in India but lower than reports by Pedro-de Pablos<sup>9</sup> from the PANORAMA study in Europe. This may again be related to the better economic environment in Europe when compared to ours.

Our study subjects with better knowledge scores about the concept of DM had better outcome measures in terms of proportion of subjects achieving control for fasting plasma glucose, HbA1c, LDL-c and Blood pressure when compared to subjects with poor knowledge scores. hence we advocate detail counseling of our Dm diagnosis as this was demonstrated in our study to affect outcomes in terms of achieving control.

## **V. Conclusion.**

Our study subjects' knowledge about the concept of DM was generally good, except for knowledge about what target Fasting plasma glucose and HbA1c should be.

Findings on the process measures (i.e. performing test and examination by physicians based on prescribed standard) was generally low compared to findings from developed countries. The outcomes of care offered to our patients was comparable to other developing countries but lower than findings in developed countries. These findings are related to barriers to health care and underperforming health systems in most developing countries like ours. Some of these barriers include the double burden of communicable and non communicable diseases on our health care system, shortage of specialist to cope with the increasing need, limitations in health insurance scheme in terms of coverage and availability of medications.

## **VI. Recommendations**

Findings from the study of low levels of adherence to standards in monitoring of parameters of care-suggest that standard of care has to be re-enforced among doctors and patients to meet up with the prescribed standards. Health care providers should engage in detail education on concept of DM as this was related to improve outcomes in our study. Increase advocacy to government to provide measures that will help improve the number and quality of trained specialist for diabetes care to meet up with the rising burden of disease. Enhanced political will from the government to improve coverage; laboratory investigations and availability of medications under the health insurance scheme will also improve the outcome of diabetes care.

## **References**

- [1]. The United Kingdom Prosective Diabetes Study(UKPDS) Group. Intensive blood glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 DM (UKPDS 33). *Lancet* 1998;352:837-853.
- [2]. Holman RR, Paul SK, Berthel MA, Mathews DR, Neil HA. A 10 year follow up of intensive glucose control in type 2 Diabetes. *N Eng J Med.* 2008;359:1577-1589.

- [3]. Amod A, Ascott-Evans BH, Berg GL et al. The 2012 SEMDSA Guidline for the management of type 2 diabetes. JEMDSA 2012;17(1) S1-S95.
- [4]. George CE, Mathew S, Nomel G et al. Quality of Diabetic care in a Tertiary hospital in Bangalore, south India: a cross sectional study. Journal of Clin and Diag Research. 2015;9(7):LC07-LC10.
- [5]. Gomes MB, Gianella D, Faria M, et al. Prevalence of Type 2 Diabetic patients within the targets of care guidelines in daily clinical practice: A Multi-centre study in Brazil. Rev Diabet Stud. 2006;3(2):82-7.
- [6]. Suwatee PJ, Lynch C, Pendergrass ML. Quality of Care for Diabetic Patients in a Large Urban Public Hospital. Diabetes Care. 2003;26(3):563-58.
- [7]. Akbar DH. Low rates of diabetes patients reaching good glycaemic control targets. Eastern Mediterranean Health Journal. 2001;7:761-778.
- [8]. Liebl A, Mata M, Eschwege E. Evaluation of risk factors for the development of complications in type 2 diabetes in Europe. Diabetologia .2002;45:S23-S28.
- [9]. Pedro-dePablos V, Klaus GF, Clare B, et al. Current glycaemic control and its associated factors in patients with type 2 diabetes mellitus across Europe. Clin Endocrinol. 2014;80(1):47.56.
- [10]. Goudswaard . Patients Characteristics do not predict poor glycaemic control in type 2 diabetes treated in primary care. European Journal of Epidemilology. 2004;19:541-545.

Odoh G, et. al. "Quality of Care among Patients with Diabetes Mellitus in A Tertiary Hospital In Jos, North Central Nigeria." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(07), 2021, pp. 60-66.