Determination of the role of patient satisfaction on glycaemic control among persons with diabetes attending the Family Medicine Clinic of Federal Medical Centre, Ido-Ekiti, Nigeria

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Abstract

Background: Diabetes mellitus in sub-Saharan Africa is a chronic and debilitating disease with increasing morbidity and mortality and health care costs.

Aim: This study focused on determination of the role of patient satisfaction on glycemic control among persons with diabetes attending the Family Medicine clinic of Federal Medical Centre, Ido-Ekiti, Nigeria

Materials and methods: A cross-sectional descriptive study was conducted on 156 adults with diabetes diagnosed in the hospital and had been attending the clinic for at least 6 months. Relevant data were collected using interviewer-administered semi-structured questionnaire and clinical parameters measured include fasting plasma glucose (FPG). Data were analyzed using statistical package for the social sciences (SPSS) software version 17.

Result: In this study, 127 (81.4%) of the participants were satisfied with services provided while 134 (86%) had good glycemic control. There was significant difference between the satisfied and dissatisfied participants with regard to age group, ethnicity, glycaemic control (based on FPG) as well as in the pattern of medication adherence (based on Morisky medication adherence scale MMAS). The age of participants is a predictor of satisfaction while the level of patient satisfaction and age of the patients are predictors of pattern of glycaemic control and medication adherence of the participants. A positive association existed between patient satisfaction, medication adherence and glycaemic control in persons with diabetes.

Conclusion: Therefore, physicians and health care providers ought to seek ways of improving patient satisfaction with a view to enhancing good glycemic control.

Keywords: *Diabetes mellitus, satisfaction, medication adherence, Fasting Plasma Glucose, Glycaemic control.*

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Résumé

Contexte : Le diabète sucré en Afrique subsaharienne est une maladie chronique et débilitante qui entraîne une morbidité et une mortalité croissantes, ainsi que des coûts en soins de santé.

But : Cette étude portait sur la détermination du rôle de la satisfaction du patient sur le contrôle glycémique chez les personnes atteintes de diabète fréquentant la clinique de médecine familiale du Centre Médical Fédéral, Ido-Ekiti, Nigéria.

Matériels et méthodes : Une étude descriptive transversale a été menée sur 156 adultes atteints de diabète diagnostiqué à l'hôpital et fréquentant la clinique depuis au moins 6 mois. Les données pertinentes ont été collectées à l'aide d'un questionnaire semi-structuré administré par intervieweur et les paramètres cliniques mesurés incluent la glycémie à jeun. Les données ont été analysées à l'aide du logiciel SPSS (Statistical Package for Social Sciences) version 17.

Résultat : Dans cette étude, 127 (81,4%) des participants étaient satisfaits des services fournis, tandis que 134 (86%) avaient un bon contrôle de la glycémie. Il existe une différence significative entre les participants satisfaits et insatisfaits en ce qui concerne le groupe d'âge, l'appartenance ethnique, le contrôle glycémique (basé sur la glycémie à jeun) ainsi que sur le schéma d'adhérence thérapeutique (basé sur l'échelle d'adhérence thérapeutique, MMAS de Morisky). L'âge des participants est un facteur prédictif de satisfaction, tandis que le niveau de satisfaction du patient et l'âge des patients sont des facteurs prédictifs du modèle de contrôle glycémique et de l'adhérence thérapeutique des participants. Une association positive existait entre la satisfaction du patient, l'adhérence thérapeutique et le contrôle glycémique chez les personnes atteintes de diabète.

Conclusion : Par conséquent, les médecins et les prestataires de soins de santé doivent rechercher des

moyens d'améliorer la satisfaction des patients afin d'améliorer le contrôle de la glycémie.

Mots-clés : *diabète sucré, satisfaction, adhérence thérapeutique, glucose plasmatique à jeun, contrôle glycémique.*

Introduction

Diabetes mellitus (DM) is an important cause of morbidity and mortality worldwide affecting approximately one in ten United States adults at an estimated cost in 2007 of 174 billion dollars [1] and is projected as the sixth leading cause of death globally [2]. Although a lower prevalence (about 1-7%) is reported in Nigeria, the burden associated with it is felt more with an overall mortality rate of 32.5% with mean age at death being 57.07± 14.29years [3] and it poses major public health and socioeconomic challenges in the face of scarce resources [2,4-6]. In 2008, global age-standardized adult diabetes prevalence was 9·8% in men and 9·2% in women [7]. Estimates from 2009 by the International Diabetes Federation (IDF) suggest that the number of adults with diabetes in the world will expand by 54%, while for Sub-Saharan Africa is 98%, from 2010 to 2030 [7]. Globally 366 million people had diabetes in 2011; by 2030 this will have risen to 552 million [4]. The number of people with type 2 diabetes is increasing in every country and 80% of people with diabetes live in low- and middle-income countries [8].

Health is the most precious of all things, and the foundation of all happiness [11]. Health care includes both clinical and non-clinical care. Traditionally, the practice of medicine and assessments of quality of care in hospitals had concentrated on the former which tend to look only at cure, but certain other non-clinical aspects of care such as amenities and accessibility of care are equally important in determining the outcome of health care [12]

Patient satisfaction has been defined as the degree of congruency between a patient's expectations of ideal care and his/her perceptions of the real care he/she receives [13]. It is a summation of all the patient's experiences in the hospital [12]. It is derived from the patient's evaluation of how well the provider meets his or her personal and emotional as well as physical needs. Glycaemic control remains the major therapeutic objective for prevention of acute and chronic complications related to the disease [49]. Operationally, a patient was defined to have good glycaemic control if his or her fasting blood glucose in the study visit was less than 110 mg/dL (6.1mmol/L). This ordering was based on the standard of the Diabetes Association of Nigeria (DAN) as desirable glycaemic targets [47]. A similar value was used as standard for the United Kingdom Prospective Diabetes Study Group definition of intensive control for diabetes patients [48]. Present study therefore focused on determination of the role of patient satisfaction on glycemic control among persons with diabetes attending the Family Medicine clinic of Federal Medical Centre, Ido-Ekiti, Nigeria.

A transformation of healthcare is underway, from a sellers' market to a consumers' market, where the satisfaction of the patients' needs is part of the definition of quality [21]. While the business community has been involved in assessing customer satisfaction for at least a much earlier, the medical community has lagged considerably in assessing patient satisfaction. More recent developments in the medical environment have prompted the health care profession to recognize patients as valuable customers [22]. Discussions about how the quality of health care should be measured increasingly include patient satisfaction, which may be a predictor of whether patients follow their recommended treatments, re-attend for treatment or change their provider of health care. This is one principal goal of this research to show if patient satisfaction has any influence on the glycemic control of diabetes patients

Materials and methods

Study area

The study was conducted in the Family Medicine department of the Federal Medical Centre; Ido-Ekiti, Nigeria which is a Federal Government owned tertiary health care facility. The facility is located in Ido-Ekiti, the semi-urban headquarters of Ido-Osi Local Government Area of Ekiti State, Nigeria. The facility provides qualitative and efficient health care services and is a referral centre for all the health institutions (Specialist Hospitals, General Hospitals, and Comprehensive Health Centres etc.) in Ekiti State and environs.

Study design

This was a descriptive cross-sectional hospital-based study. The study was conducted during the period from April to June 2013. All persons with diabetes aged 20 years and above attending the Family Medicine clinic at FMC, Ido-Ekiti were used for this study. Questionnaire and other instruments were used to collect data.

Inclusion criteria

All those aged 20 years and above [14], who had been diagnosed to have DM and were receiving

treatment in family medicine clinic for at least 6 months.

Exclusion criteria
1. Those too ill and/or with acute complication(s) of DM such as diabetic ketoacidosis (DKA) and hyperosmolar hyperglycaemic state (HHS)
2. Pregnant patients (due to presence of gestational diabetes of pregnancy as a confounder)
3. Mentally impaired persons [15].

Scoring system for assessment of overall satisfaction
Dimension
Satisfied with all dimensions- 4, Satisfied with at least 3 of the dimensions- 3, Satisfied with at least 2 of the dimensions- 2, Satisfied with at least 1 of the dimensions – 1, Satisfied with none of the dimensions- 0. Score of 2 and above is satisfied, Score of 1 and below is dissatisfied [16]

Social classification
Subjects were allotted into one of five social classes based on each individual's occupation, employment, monthly family income and educational level according to a scoring system designed by Olusanya and Okpere [17] for Nigeria and other African countries as follows.

Occupation score
1. Professionals, Top civil servants, Politicians and Businessmen.
2. Middle-level bureaucrats, Technician, Skilled artisan, and well-to-do traders.
3. Unskilled workers, those in general whose family income would be at or below the National minimum wage of N18, 000.00 per month and the unemployed.

Level of educational attainment Score
0. University Education
1. Secondary or Tertiary level below University (e.g. College of Education, Polytechnic etc.)
2. No schooling or primary level only.

Fasting plasma glucose determination
The patients routinely came fasting. Fasting was defined as no caloric intake for at least 8 hours. A patient who came to the clinic unfasted, was asked to return the next morning for collection of sample for FPG. Venous blood (2.5 ml) was collected by the researcher into fluoride-oxalate bottle and transported to the chemical pathology laboratory of the hospital within 30 minutes for the determination of fasting plasma glucose (FPG) by the glucose oxidase method [21].

Height and weight
The height and weight of subjects were measured using a combined weighing scale and stadiometer manufactured by Surgifield Medical England. The weight was calibrated in kilograms and height in centimeters. The subjects stood erect against the height scale, wore no shoes and looked straight ahead and had their arms hanging loosely by their sides [20]. Height and weight were measured to the nearest 1cm and 0.1kg respectively.

The Body mass index
The Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared and categorized according to World Health Organization classification.

Blood pressure
This was measured with an Accoson® brand mercury sphygmomanometer with appropriate cuff size and a Littman's stethoscope. At least 5 minutes after the patient had arrived the clinic, the BP was measured with an appropriately sized sphygmomanometer cuff (A cuff with bladder that is 12-13cm x 35cm and a larger one for obese individuals was used at the upper two-third (2/3) of the arm).

Assessment of blood pressure control
Measured systolic and diastolic blood pressure values were judged as either well controlled or uncontrolled based on systolic blood pressure (SBP) being <140mmHg or e"140mmHg and/or diastolic blood pressure (DBP) being <90mmHg or e"90mmHg respectively

Data analysis
All data collected were analysed using the statistical Package for the social sciences (SPSS) for windows software version 17.0. Means, modes medians, standard deviations, proportions and percentages were determined as appropriate. Test of significance was done using Pearson's Chi-Square and Student's t-test as appropriate. $P<0.05$ was taken to be statistically significant.

Ethical consideration
Ethical approval was obtained from the Ethical Review and Research Committee of the hospital. Informed verbal and written consent was obtained from the willing participants. To maintain confidentiality, no names appeared on the

questionnaires, but only numbers were used as identifiers. Confidentiality and privacy were respected during interview.

Results
Socio-demographic findings
One hundred and fifty-six adult patients with diabetes mellitus attending family medicine clinics of the FMC Ido-Ekiti, Nigeria from April to June 2013, who were aged 20years and above, satisfied the inclusion criteria, gave their consent and had completed data were studied. The mean age (SD) of participants was 58 (±12) years. There were more female subjects 92 (59.0%) than male subjects 64 (41%) with a male to female ratio of 1: 1.44.

(82.7%) of the participants were married, 42.3% were unskilled workers, 54.5% had secondary or tertiary level below university education and most participants in this study fell into the lower social class (53.2%). One hundred and fifty (96.2%) subjects were Yoruba and 85.3% were Christians.

Age and gender characteristics of the respondents
Table 2. Summarizes the age and gender characteristics of participants and shows that the disease is typically one of older adults, with a mean age of 58 (± 12) years. The table particularly demonstrates that females were significantly older than males and that the proportion 61 (39.1%) of the participants in the age group of 60 –

Table 1: Socio-demographic characteristics of the respondents. (N = 156)

Characteristics	Frequency	Percent
Age group (yrs)		
< 40	8	5.1
40 – 49	24	15.4
50 – 59	38	24.4
60 – 69	61	39.1
70 +	25	16.0
Gender		
Male	64	41.0
Female	92	59.0
Domicile		
Urban	46	29.5
Rural	92	59.0
Outside Ekiti	18	11.5
Marital status		
Single	7	4.5
Married	129	82.7
Widowed	14	9.0
Divorced/Separated	6	3.8
Occupation		
Professionals, etc.	28	17.9
Middle-level bureaucrats, etc.	62	39.7
Unskilled workers	66	42.3
Educational		
University Education	22	14.1
Secondary or Tertiary level below University	85	54.5
No schooling or primary level only	49	31.4
Religion		
Christianity	133	85.3
Islam	23	14.7
Ethnicity		
Yoruba	150	96.2
Non-Yoruba	6	3.8

Table 1 shows the socio-demographic characteristics of the participants. Majority (59.0%) dwelt in rural areas of Ekiti, a larger proportion

69 years was significantly higher (p<0.001) than their counterparts.

Table 2: Age and gender characteristics of the respondents

Age in years	Male (n = 64)	Female (n = 92)	Total	Statistic	Df	P value
Mean ± SD	53.78 ± 14.29	61.95 ± 9.37	58 .60 ± 12.28	-4.310	154	<0.001*
Age group, n (%)				17.974	4	0.001**
< 40 yrs	8 (12.5)	0 (0.0)	8 (5.1)			
40 - 49 yrs	14 (21.9)	10 (10.9)	24 (15.4)			
50 - 59 yrs	15 (23.4)	23 (25.0)	38 (24.4)			
60 - 69 yrs	20 (31.3)	41 (44.6)	61 (39.1)			
70 + yrs	7 (10.9)	18 (19.6)	25 (16.0)			
Total	64 (100.0)	92 (100.0)	156 (100.0)			

*Student t test applied** Chi-square test applied*

Table 3: Family and social characteristics of the respondents.

Characteristics	Frequency	Percent
Social class group		
Upper class	28	17.9
Middle class	45	28.8
Lower class	83	53.2
Type of Family		
Monogamy	101	64.7
Polygamy'	55	35.3
Family size		
5 or less	71	45.5
6 – 9	72	46.2
10 or more	13	8.3
Number of dependants		
< 5	86	55.1
5 or more	70	44.9
Family income (NGN)		
< 18,000	46	29.5
18,000 - 24,999	23	14.7
25,000 - 49,999	37	23.7
50,000 - 74,999	10	6.4
75,000 - 99,999	11	7.1
≥ 100,000	29	18.6

Family and social characteristics of the respondents. Table 3 shows the family and social characteristics of the participants. Most participants in this study were in the lower social class 83 (53.2%), from monogamous settings 101 (64.7%), had a family size of more than four members 112 (71.8%) and about a third of the participants 46 (29.5%) earned less than N18,000 monthly. More of the participants 86 (55.1%) had less than five dependants in their household.

Physical, psychometric and laboratory characteristics of participants
Table 4 shows that the median (IQR) of the systolic blood pressure of the participants was 135.0 (120.0 - 148.0) mmHg, of the BMI, 25.9 (22.8 - 28.9) kg/m2, of the overall SWOPS score,3.0 (2.0 - 4.0). The nursing care had the highest mean SWOPS score of 0.8 while the registration process had the least score of 0.5 among the dimensions of care. The median Morisky's medication adherence score was 1.0 (0.3

Table 4 Physical, psychometric and laboratory characteristics of participants

Variables	Mean	SD	Median (IQR)
Physical characteristics			
SBP (mmHg)	134.5	18.2	135.0 (120.0 - 148.0)
BMI (Kg/m²)	25.90	3.99	25.9 (22.8 - 28.9)
Psychometric score			
Overall SWOPS	2.7	1.3	3.0 (2.0 - 4.0)
Registration process	0.5	0.5	0.0 (0.0 - 1.0)
Nursing care	0.8	0.4	1.0 (1.0 - 1.0)
Physician care	0.7	0.4	1.0 (0.0 - 1.0)
Pharmacy services	0.7	0.5	1.0 (0.0 - 1.0)
MMAS-4	1.3	1.0	1.0 (0.3 - 2.0)
Laboratory characteristics			
Fasting plasma glucose (mmol/L)	6.4	3.6	5.3 (4.3 - 6.4)

IQR=Interquartile range
SBP= Systolic blood pressure

Table 5: Association between patients' satisfaction and socio-demographic characteristics

Characteristics	Satisfaction level Satisfied	Dissatisfied	Total	χ2	df	P value
Age group (yrs)						
< 40	2 (25.0)	6 (75.0)	8 (100.0)	21.357	4	<0.001
40 – 49	22 (91.7)	2 (8.3)	24 (100.0)			
50 – 59	32 (84.2)	6 (15.8)	38 (100.0)			
60 – 69	53 (86.9)	8 (13.1)	61 (100.0)			
70 +	1 (72.0)	7 (28.0)	25 (100.0)			
Gender						
Male	49 (76.6)	15 (23.4)	64 (100.0)	1.685	1	0.194
Female	78 (84.8)	14 (15.2)	92 (100.0)			
Domicile						
Urban	35 (76.1)	11 (23.9)	46 (100.0)	2.883	2	0.237
Rural	75 (81.5)	17 (18.5)	92 (100.0)			
Outside Ekiti	17 (94.4)	1 (5.6)	18 (100.0)			
Marital Status						
Single	4 (57.1)	3 (42.9)	7 (100.0)			0.207*
Married	107 (82.9)	22 (17.1)	129 (100.0)			
Widowed	12 (85.7)	2 (14.3)	14 (100.0)			
Divorced/Separated	4 (66.7)	2 (33.3)	6 (100.0)			
Religion						
Christianity	110 (82.7)	23 (17.3)	133 (100.0)			0.382*
Islam	17 (73.9)	6 (26.1)	23 (100.0)			
Ethnicity						
Yoruba	125 (83.3)	25 (16.7)	150 (100.0)			0.011*
Non-Yoruba	2 (33.3)	4 (66.7)	6 (100.0)			
Occupation						
Professionals, etc.	25 (89.3)	3 (10.7)	28 (100.0)	1.924	2	0.382
Middle-level bureaucrats, etc.	51 (82.3)	11 (17.7)	62 (100.0)			
Unskilled workers	51 (77.3)	15 (22.7)	66 (100.0)			
Educational						
University education	19 (86.4)	3 (13.6)	22 (100.0)	0.467	2	0.792
Sec. /Ter. below University	39 (79.6)	10 (20.4)	49 (100.0)			
None / Primary only	69 (81.2)	16 (18.8)	85 (100.0)			
Social class						
Upper class	24 (85.7)	4 (14.3)	28 (100.0)	1.143	2	0.565
Middle class	38 (84.4)	7 (15.6)	45 (100.0)			
Lower class	65 (78.3)	18 (21.7)	83 (100.0)			

*Fisher's exact test applied

Table 6. Association between patient satisfaction and family characteristics

Characteristics	Satisfaction level		Total	χ^2	df	P value
	Satisfied	Dissatisfied				
Type of Family						
Monogamy	79 (78.2)	22 (21.8)	101 (100.0)	1.929	1	0.165
Polygamy'	48 (87.3)	7 (12.7)	55 (100.0)			
Family size						
5 or less	58 (81.7)	13 (18.3)	71 (100.0)	3.918	2	0.141
6 – 9	61 (84.7)	11 (15.3)	72 (100.0)			
10 or more	8 (61.5)	5 (38.5)	13 (100.0)			
Number of dependants						
< 5	66 (76.7)	20 (23.3)	86 (100.0)	2.757	1	0.097
5 or more	61 (87.1)	9 (12.9)	70 (100.0)			
Family income (NGN)						
< 18,000	38 (82.6)	8 (17.4)	46 (100.0)	1.957	5	0.855
18,000 - 24,999	20 (87.0)	3 (13.0)	23 (100.0)			
25,000 - 49,999	30 (81.1)	7 (18.9)	37 (100.0)			
50,000 - 74,999	7 (70.0)	3 (30.0)	10 (100.0)			
75,000 - 99,999	8 (72.7)	3 (27.3)	11 (100.0)			
≥ 100,000	24 (82.8)	5 (17.2)	29 (100.0)			

Table 7: Association between satisfaction and some factors of diabetes health care

Variable	Satisfaction level		Total	χ^2	df	P value
	Satisfied	Dissatisfied				
Duration of anti-diabetic medication (yrs)						
< 3 yrs	70 (78.7)	19 (21.3)	89	1.042	1	0.307
> 3 yrs	57 (85.1)	10 (14.9)	67			
Number of consultations in past 6 month						
0 - 2 times	58 (84.1)	11 (15.9)	69	1.984	2	0.371
3 - 5 times	41 (83.7)	8 (16.3)	49			
6 or more times	28 (73.7)	10 (26.3)	38			
Healthcare coverage (Health insurance)						
Yes	9 (90.0)	1 (10.0)	10	0.091	1	0.763*
No	118 (80.8)	28 (19.2)	146			

* *Yates' correction for continuity*

- 2.0) while the median fasting plasma glucose was 5.3 (4.3 - 6.4) mmol/L.

Association between patients' satisfaction and socio-demographic characteristics
Table 5 shows the level of satisfaction based on socio-demographic characteristics. The proportion of the participants in the age group 40 – 49 years (p<0.001) and of the Yoruba ethnic group (p=0.011) had significantly higher levels of satisfaction when compared with their counterparts. The participants who were female (61.4%, p=0.194), domicile in rural Ekiti, 59.1%, p=0.237), married (84.3%, p=0.266) and Christians (86.6%, p=0.3l7) had higher levels of satisfaction compared to their counterparts however these differences were not statistically significant. Similarly, participants who had professional jobs were more educated and in the upper social economic class were more satisfied than their counterparts were. These relationships were not statistically significant.

Association between patient satisfaction and family characteristics
Table 6 illustrates the relationship between patients' satisfaction and family characteristics. The

**Table 8**: Relationship between patients' satisfaction and glycaemic control

| Satisfaction level | Glycaemic Control | | Total |
	Good	Poor	
Satisfied	114 (89.8)	13 (10.2)	127 (100.0)
Dissatisfied	11 (37.9)	18 (62.1)	29 (100.0)

$\chi 2$ = 39.835, df = 1; P value < 0.001

Table 9:   Differences in fasting plasma glucose by Satisfaction level

Satisfaction level	Fasting plasma glucose Mean ± SD (mmol/L)	t*	Df	P value
Satisfied	5.5 ± 2.1	-4.771	29.855	<0.001
Dissatisfied	10.5 ± 5.6			

* Student t test with assumption of unequal variances.
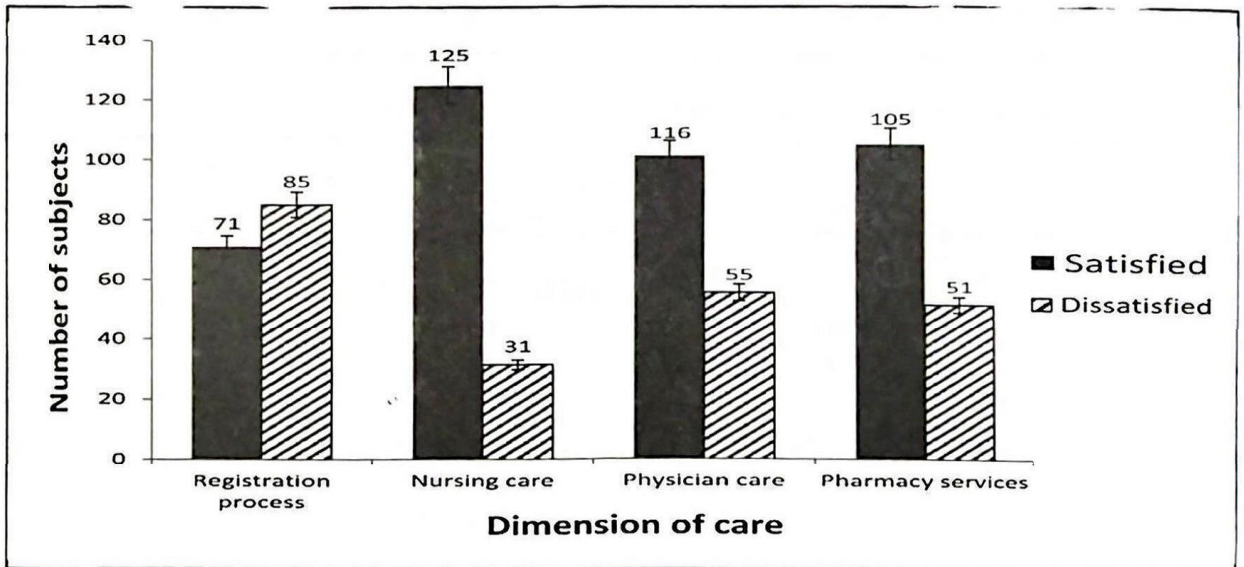
Fig. 1: Summary of patients' satisfaction by dimensions of care

participants from the polygamous setting 48 (87.3%) were more satisfied when compared to those from monogamous setting 79 (78.2%) but this difference was not statistically significant (p=0.165). Similarly, families with more than four members 93 (83.3%), more than 5 dependants 61 (87.1%) and monthly family income of N18,000 – 24,999, 17 (87%) were more satisfied than their counterparts. A significant difference does not exist between the satisfied and dissatisfied in terms of family size (p=0.141), number of dependants (p= (, 0.097) and family income (p= 0.694).

Association between satisfaction and some factors of diabetes health care

On table 7, the participants who had been on anti-diabetic medications for more than 3years, 57 out of the 67 participants accounting for 85.1% were found to be satisfied compared to the 70 of the 89 participants who have taken medications for less than 3years accounting for (78.7%) were found to be satisfied. Although this difference was not statistically significant (p = 0.307), it suggests that \satisfaction enhances medication adherence. Similarly, larger proportion of persons with diabetes who have health insurance, 9 out of 10 participants accounting for (90.0%) were satisfied compared to their counterparts who were not on health insurance,
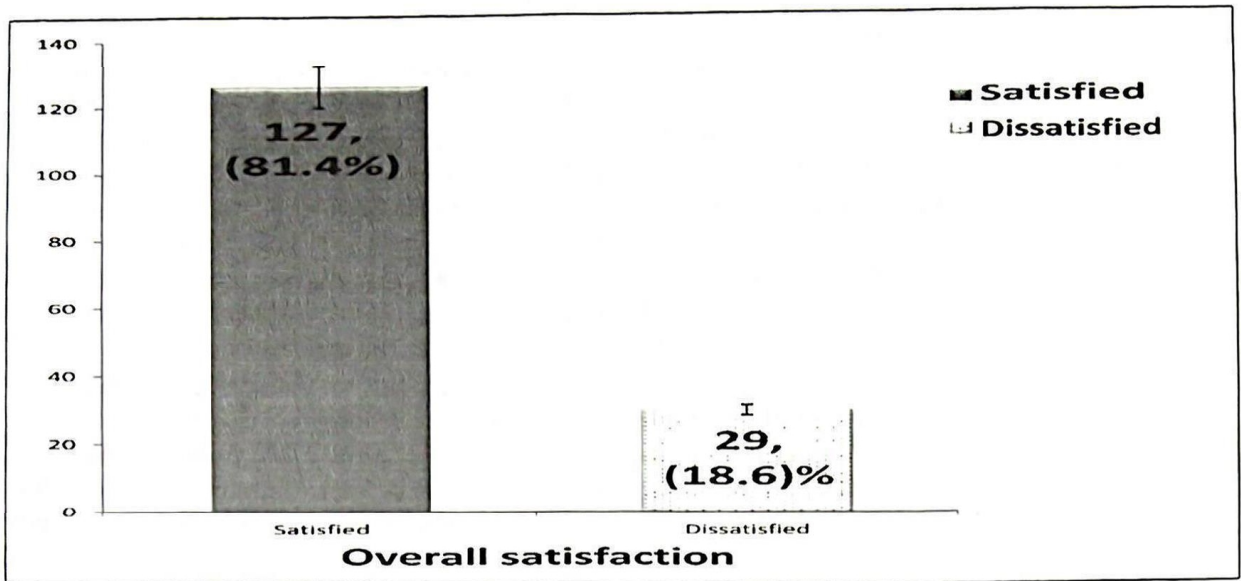
Fig. 2: Overall satisfaction of participants

118 out of 146 participants accounting for (80.0%). However, this difference was not statistically significant (p = 0.763). This also suggests that health insurance coverage is collateral to patient satisfaction and medication adherence.

Relationship between patients' satisfaction and medication adherence
In table 8, of the 127 participants who were satisfied, a larger proportion, seventy-nine (62.2%), had good adherence. There is a significant association, (p<0.001) between level of satisfaction and level of adherence. The satisfied participants are more likely to adhere to their anti-diabetic medications.

Patients' satisfaction by dimensions of care
Figure 1. Following the operational definition of overall satisfaction, the nursing care recorded the highest number of satisfied participants 125 (80.1%). This was followed by the dimension of physician care, 116 (74.4%) and pharmacy care, 105 (67.3%). In contrast, more of the participants (54.5%) were dissatisfied with the registration process compared to the number of satisfied participants.

Overall satisfaction of participants
Figure 2. Overall, 81.4% representing 127 of the participants were satisfied with the services received from the outpatient services of the Federal Medical Centre, Ido-Ekiti while the remaining (29) 18.6% were dissatisfied

Discussion
The socio-demographic profile of the participants showed that majority were in the age group 60-69 years with a mean of 58 (SD= 12.28). The mean age in this study was ranked higher than the mean age of 48.9 9 ± 9.2 years obtained in a study to assess the prevalence rates of type 2 diabetes in Port Harcourt Nigeria [21] and 53.9 ± 14.4 years in Lagos Nigeria [22] .In this study, there were more female participants than male. The percentage of females attending the family medicine clinic in this study was 59% which is greater than the percentage of males (41%) attending the same clinic and in the ratio of 1.4:1. This is similar to the observation of a cross sectional descriptive study by Udonwa and Okoi [23]among persons with T2DM in a tertiary Family Medicine clinic in Southern Nigeria in which there were more females 72 (57.2%) than males 54 (42.8%) with a sex ratio of 1.3:1. Furthermore this finding of a female preponderance is in agreement to the observations from a previous study in South-western Nigeria [19].

The age characteristic of participants shows that the mean age of females (62.0 ± 9.4) years was significantly higher than that for males (53.8 ± 14.3) years. This finding is congruent with results of previous studies and a most likely explanation for this observation is the combined effect of a greater number of elderly women than men in most populations and the increasing prevalence of diabetes with age [24]. Education and income have been identified as major socioeconomic determinants of health and lower education usually begets lower

income [2]. Although the educational level in the study was good (68.6%) yet this did not translate to a high income as only a minority (17.9%) was in the high social class. Majority of the participants were of the Christian faith (85.3%); this may reflect the most predominant religion in Ekiti State Nigeria. This is similar to a study by Badejoko et al., [25] in South-Western Nigeria.

In this study, the level of satisfaction of the patients with the services was generally very good as 126 (81%) of the participants were actually satisfied with the services in the Family Medicine clinics. This finding is similar to the results from previous studies where high levels of satisfaction with services accessed were observed [26]. Although, overall satisfaction in this study was very good, it was however lower than the overall satisfaction of 83% reported in Kano [27], 94.8% in Abuja [28] and 95-97% in India [29]. The reason for this variance may be due to the difference in the sample population. The patients satisfaction in this study was however higher than that recorded in Umuahia Nigeria 62% and Ethiopia where participants were similarly patients living with diabetes although the instrument for assessing patient satisfaction was different [26, 30, 31].

This study also revealed that the participants were rather dissatisfied with the registration process. A similar result was reported by Ogunfowokan and Iloh [32] in Abuja Nigeria where they also found that patients were dissatisfied with the medical records. The dimension of nursing care recorded the highest level of satisfaction. This finding is similar to the report from Benin City, Edo state [33], Sokoto [34], and Ibadan [35]. However, this is dissimilar to the low rating of the dimension of nurses as reported in Ilorin Nigeria [36] and Eastern Ethiopia [30] The higher rating of the nurses in current and previous studies could be attributed to the interactive activities of the nursing services with the patients in the author's place of practice. It was observed that the nurses regularly organize morning prayers and health talks each day before commencement of clinical activities. Oluwadiya et al.,[12] suggested that patient satisfaction is influenced by how well the provider meets his or her personal, spiritual, emotional as well as physical needs beyond the biomedical aspects of their care. There is also observed positive significant association between age and patient satisfaction. A similar cross-sectional study on the experience and satisfaction of patients in Ethiopia pointed out that the relationship of age

and patients' satisfaction was statistically significant [30]

Results of studies on the influence of gender on satisfaction with healthcare had been generally inconsistent [12]. Whereas a work in South Africa [37] showed that females significantly rated aspects of healthcare delivery higher than males, report in South-Western Nigeria observed that females significantly rated all indices of satisfaction lower than males in the Accident and Emergency Department of the hospital [12].

The profile of patient satisfaction with respect to different social classes indicated that the upper social class had the highest level of satisfaction while the lower class had the least level of satisfaction. The indices of social class (educational status and occupation) according to Olusanya and Okpar [17] also follow a similar pattern such that highly educated and high income professionals had a higher level of satisfaction when compared with other participants but these variations were not statistically significant in this study. However Bener et al., [38] and Myburgh et al.,[37] in Qatar and South Africa respectively reported a comparable finding that socio-economic status of participants was significantly related to levels of satisfaction with the health care provider [37,38]. The findings of this study indicated that married and widowed subjects had a slightly higher level of satisfaction than single and divorced/separated subjects. This difference though not statistically significant is ascribed to the presence of other family members which could have resulted in health benefitting interactions which served to render family support. Cramer et al.,[39] and Cramer [40] respectively recognized family influence as one of the patient related factors responsible for patients' satisfaction. However Bener et al.,[38] found even more important result that persons with diabetes who were staying alone were significantly more satisfied with treatment than their counterparts.

In our study, the level of glycaemic control was 80.1% while only 41.8% of the patient had adequate glycaemic control in a study in Ethiopia. The reason for this difference may be due to the adherence rates of participants in the two studies. While the rate of good adherence in this study was 57.7%, it was 49% in the Ethiopian study [41].

In this study, there was significant association between patients' satisfaction and medication adherence. This is in agreement with the findings of previous research that satisfied patients were more adherent to recommendations regarding medications

and follow-up visits [42]. The majority of studies, like in this study, demonstrated the significant relationship between overall satisfaction with care and medication adherence and ultimately good glycemic control [43,44,45].

This study also found that satisfied participants were significantly more likely to have better blood glucose control than dissatisfied participants. This finding is in keeping with the results in Umuahia Nigeria and Qatar where patients who had optimum levels of glycaemic control were adjudged to be significantly more satisfied with care [26,31,38]. This finding is however predictable from the foregoing results in this study where a positive association was found between patient satisfaction and glycemic control. This suggests that if healthcare providers are more committed to the principles of patient-centred clinical method that will make for patient satisfaction, glycaemic outcome will improve. Healthcare providers and administrators need to continually reinforce and emphasize the importance of patient satisfaction at every opportunity of rendering service or care to patients.

Conclusion
Based on the results of the current study, there is a positive relationship between patient satisfaction, medication adherence and glycaemic control. Therefore, we conclude that patient satisfaction with health care services rendered is a key factor in ensuring good glycemic control and ultimately good diabetes treatment outcome.

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