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Adherence To Diabetes Care Management and Quality of Life Among Diabetic Persons in Ibadan, Oyo State, Nigeria

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ABSTRACT

Diabetes is a challenging health problem that threatens the quality of life of an affected person. It is a progressively increasing metabolic disorder that demands global attention due to its interference with quality of life (QOL). While existing knowledge has established that, diabetes impairs an individual's well-being and overall QOL; not many studies have focused on the impact of treatment adherence to diabetes management on QOL. Information about QOL and treatment adherence is useful in implementing and evaluating interventions in the management of diabetes.

A descriptive cross-sectional study, with approval obtained from the ethical review committee of the Oyo State Ministry of Health, Nigeria. Purposive sampling was used to select 300 respondents. The interviewer-administered questionnaire contains information on socio-demographics, clinical determinants, adherence to treatment, and QOL. The QOL instrument was adapted from the WHO–QOL bref questionnaire, adherence to treatment from the Morisky treatment adherence tool, and reviewed literature. The data was analyzed using SPSS, with p-value <0.05. Descriptive statistics such as frequencies and percentages explained socio-demographic variables. Associations between selected variables and QOL were explained with inferential statistics. The mean QOL scores were calculated in domains according to the WHOQOL scale. Respondents consisted of 15 type I diabetic patients and 285 type II diabetic patients. Respondent's mean age was 58.77 + 8.51 predominantly females (79.7%) and 58% were Christians. Majority of the respondents were employed (59%) and earned more than 20,000 naira (17.6%). Most of the respondents had uncontrolled blood sugar (58%). The respondents' mean age at onset of diabetes is between age 30 and 60 years (53.28+9.55) with more cases of type II diabetes. Domain-specific quality of life scores is higher in the environmental domain (58.04+ 11.01) as compared to other QOL domains. Also, the study identified forgetfulness as the main reason for non-compliance to drug prescriptions among the respondents.

About 20% skipped their appointment with the physician, while 86.7% followed a diabetic routine diet, and 28.6% engaged in mild to moderate exercise. Generally, patients who adhered to their treatment had controlled blood glucose with higher mean QOL scores in all the domains. The predictors of the QOL domains were identified as: medication adherence and psychological domain (p-value-0.018), age of the respondents and social domain (p-value-0.004), environmental domain and age at onset of diabetes (p-value-0.032); and monthly income is a significant predictor of all the domains of QOL. Conclusively, the mean quality of life domain scores informed average scores relating to patients' adherence to treatment. As such, treatment adherence predicts a good perception of QOL. Also, glycemic control amongst other clinical determinants is capable of influencing a good perception of QOL.

Keyword

Diabetes, quality of life, treatment adherence, predictors of quality of life, glycemic control

INTRODUCTION

Diabetes mellitus, a common disorder of the endocrine system, belongs to the group of non-communicable diseases (NCDs). It is characterized by changes in metabolism, which is evident in other parts of the body (Rahnuma., 2021). Diabetes is implicated in other non-communicable diseases; its impact and burden are characterized by nephropathy, complications of the heart, blood vessels, and peripheral nervous system; nevertheless, the reduction in life expectancy (Ivek et al., 2017). Diabetes is a major public health concern that creates a threatening situation to the global health care and economy of affected populations in both developed and developing countries (Abegunde et al., 2007, Ivek et al., 2017).

The three main classifications of diabetes mellitus are Type 1, Type 2, and Gestational diabetes.

Type 1 diabetes is caused by the auto-immune destruction of the insulin-producing islets of Langerhans in the pancreas which makes the body incapable of producing insulin (Melissa., 2014). Symptoms associated with type 1 diabetes include frequent urination, thirst, constant hunger, and weight loss among others (WHO., 201O; Hermann et al., 2010).

However, when beta cells fail to produce an adequate amount of insulin to meet body needs, it is an indication of Type 2 diabetes mellitus. Type 2 diabetes can be attributed to a sedentary lifestyle or behavioral factors such as physical inactivity, poor diet, and urbanization. Type 2 diabetes is responsible for about 90% of all cases of diabetes (WHO.,2013, Rahnuma., 2021).

Gestational diabetes results from high blood sugar levels and insulin resistance or glucose intolerance during pregnancy. Gestational diabetes can occur in about 2-10% of all pregnancy conditions. (WHO., 2013; NIDDK., 2014).

In diabetic patients, the focus of quality of life (QOL) is aimed at the individual's physical, psychological, social, and environmental functioning. It had been established that QOL domains could be evaluated in the management of diabetes. QOL measures the overall well-being of patients and consequently, measures the perception of an individual's satisfaction with life (WHO.,2023; Pouya et al., 2019).

Also, quality of life encompasses the perceived level of treatment as received by the patient. According to WHO., 2021, quality of life is affected by compliance or adherence to treatment, which describes the extent to which patients adhere to the instructions given by their healthcare provider. Non-compliance with the treatment of diabetes is capable of negatively influencing and impairing the overall quality of life (Abdul et al., 2021; Adil et al., 2016). Therefore, it is important to practice good adherence to treatment in other to achieve good glycemic control as well as improved quality of life.

Globally, over the last decade, the prevalence of diabetes has reached its climax with about 422 million people affected and 1.5 million deaths attributable to diabetes in developing and developed countries (Ogurtsova et al., 2015, Pouya et al.,2019, Adil et al., 2016).

The increase in diabetes prevalence was recorded in Asia and Africa due to the trend of urbanization and lifestyle changes. In Asian countries, a prevalence of 8.5% of diabetes was estimated among elderly persons with type 2 diabetes. Also, in sub-Saharan Africa, with Nigeria not being an exception, the burden of diabetes is on the increase (IDF., 2014).

According to the International Diabetes Federation (IDF), 463 million people worldwide had diabetes in

2019, of which 77 million belong to India (International Diabetes Federation,2019). The global trend of rising diabetes prevalence was observed in countries like India and Ukraine, with a pooled prevalence of about 7% of the population (Ogurtsova et al., 2015; Pouya et al.,2019; Adil et al.,2016).

In Africa, the data provided by the International Diabetes Federation (2015), reported more than 321,000 diabetes-attributable deaths with the burden estimated as 49%. In Nigeria, the overall pooled prevalence of diabetes was about 5.8%. According to the International Diabetes Federation (2017), the number of affected persons in Nigeria is expected to rise to 4.8 million by 2030 which corroborates the projection at the World Health Assembly (2021).

However, studies have shown that diabetes impairs quality of life, which is why the global initiative to combat diabetes is focused on diabetes support, prevention, and care in developing countries like Nigeria (World Health Assembly, 2021). This strategy is imperative to create awareness among diabetic individuals about the existing relationship between diabetes and quality of life.

Although literature abounds on the prevalence of diabetes in Nigeria, few studies have established the association between treatment adherence, clinical determinants, and its impact on quality of life. This study assessed compliance with treatment and clinical predictors of quality of life among persons with diabetes attending secondary health facilities in Ibadan, Nigeria. Having a good understanding of compliance with treatment and sustained glycemic control gives a positive perception of the quality of life of persons living with diabetes. This study would inform appropriate decisions on diabetes management and quality of life. Also, it would influence possible interventions by promoting positive perceptions toward treatment adherence among diabetic patients.

MATERIALS AND METHODS

Description of the Study Setting

The study was conducted in Ibadan South-West Local Government Area, one of the LGAs in Ibadan. Ibadan is located in South Western Nigeria. Ibadan is the capital city of Oyo State in Nigeria and one of the largest and most populous city metropolises in Nigeria with a population of over four million people. Ibadan has a tropical wet and dry climate with a relatively constant temperature throughout the year. It has a total area of 1,190squaremetre (3,080km2). The location of the state makes it suitable for commercial, educational, and administrative purposes. Ibadan is mostly dominated by the Yoruba tribe. Christianity, Islam, and Traditional religions are the most practiced.

Ibadan South West LGA which was created in 1991, is one of the five urban local Governments in Ibadan metropolis. There are eleven (11) local governments in Ibadan consisting of five urban local governments in the city and six semi-urban local governments in the fewer cities. There are 12 political wards and four government-owned secondary health facilities in the local government. The secondary health facilities include Adeoyo State Hospital, Oni Memorial General Hospital, Jericho Specialist Hospital, and Maternal and Child Health Hospital (NPC, 2006).

This study was carried out at the Medical Outpatient Clinic of the two major secondary health facilities-Adeoyo State Hospital and Jericho Specialist Hospital, Ibadan. These two centres fix appointments with their patient every month. On average, both clinics attend to 45 old and 31 new patients.

Study Design and Study Population

The study was a descriptive cross-sectional survey. It investigated adherence to diabetes care management and quality of life among diabetic persons in Ibadan, Oyo State, Nigeria.

Eligibility Criteria

Diabetic patients diagnosed via WHO criteria aged between 18 years and 70 years, who were in stable condition in the last three months before the study, were included in the study. Non-consenting and critically ill diabetic patients were excluded from the study.

Sample size determination

This study made use of the sample size formula for a single cross-sectional survey

$$N = \frac{(Z_\alpha + Z_\beta)^2 \delta^2}{d^2}$$

A standard normal deviation of 7.98 was used (Oguntibeju et al., 2012), while adjustment was made for a 10% non-response rate among respondents. The

minimum sample size for this study was estimated at 300 respondents.

Sampling technique

Having selected two major referral centres in Ibadan using purposive sampling. A systematic sampling technique was used to select the respondents. The register in which patients' data are recorded during their visit to the medical outpatient clinic served as the sampling frame.

Also, the proportion of patients recruited at each health facility was estimated using the proportionate allocation technique. nh = ($\boldsymbol{ni}$×n) /$\boldsymbol{N}$

Where: nh = Estimated sample size for the health facility

ni is the record of each health facility:

n is the estimated sample size for diabetic patients (300).

N is the total population of diabetic patients from the two secondary health facilities based on the record.

The sampling fraction "1/k" is estimated as the total population of diabetic patients, N-1130 / estimated sample size for diabetic patients (300). Therefore, simple random sampling was used to select the first respondent from each referral centre, subsequently, every 4th patient in the sampling interval who met the eligibility criteria was recruited for this study.

Data collection techniques and management

A pretested interviewer-administered semi-structured questionnaire was adopted for this study. The questionnaire had four sections which adapted the 26-item WHOQOL-bref questionnaire, modified Morisky medication adherence scale, and questions from relevant literature.

Section A: covered questions on respondents' socio-demographic characteristics.

Section B: included questions on clinical determinants of quality of life

Section C: consisted of questions on treatment adherence- medication, diet, exercise, and appointment adherence.

Section D: included 24 questions that measured the four domains of QOL-physical (7), psychological (6), social (3), and environmental (8) domains. Two questions assessed the overall perception of QOL and satisfaction with their health.

Measurement of key variables

The data was analysed using SPSS and a p-value <0.05 is considered statistically significant. Descriptive statistics such as frequencies and percentages were used to explain socio-demographic variables. Inferential statistics such as t-test, correlation, and multiple linear regression were used to find out the association between selected variables and QOL. T-test was used for the difference and comparison of mean values. The mean QOL scores were calculated in domains according to the WHOQOL scale.

Ethical Consideration

The approval to conduct this study was obtained from the ethical review committee of the Oyo State Ministry of Health. All the respondents recruited for this study were duly informed and voluntarily gave their consent to participate.

RESULTS

Respondent's Socio-demographic characteristics

Table 1 presents the socio-demographic characteristics of the respondents. The diagnosis of diabetes mellitus informed the grouping of 300 participants into type I (15) and type II diabetes (285). The study reported more females (79.7%) than males (20.3%) with a mean age of 58.77+8.51 with an age range of 31 and 70 years. Almost a quarter (32.0%) of the respondents had no formal education. Majority of the respondents were married (70.3%). 84.8% of the respondents do not earn more than 20,000 as their monthly income. The majority of the respondents were Christians (58%) and the Yoruba ethnic group was predominant (55.4%) in the study population

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Table 1: Socio-demographic characteristics of diabetic patients.

Variable	Type I Diabetes Mellitus(N=15)	Type II Diabetes	TOTAL(N=300)
Age (years)			
31-40	3(20.0)	10(3.5)	13(4.3)
41-50	4(26.7)	40(14.0)	44(14.7)
51-60	7(46.7)	97(34.0)	104(34.7)
61-70	1 (6.7)	138(48.4)	139(46.3)
Mean ± SD	**51.53 ± 8.58**	**59.15 ± 8.34**	**58.77±8.51**
Gender			
Male	2(13.3)	59(20.7)	61(20.3)
Female	13(86.7)	226(79.3)	239(79.7)
Marital Status			
Married	10(66.7)	201(70.5)	211(70.3)
Divorced/separated	1(6.7)	22(7.7)	23(7.7)
Widowed	4(26.7)	62(21.8)	66(22.0)
Highest Educational level			
None	5(33.3)	91(31.9)	96(32.0)
Primary	5(33.3)	82(28.8)	87(29.0)
Secondary	2(13.3)	61(21.4)	63(21.0)
Tertiary	3(20.0)	51(17.9)	54(18.0)
Occupation			
Government establishments	1(6.7)	14(4.9)	15(5.0)
Private establishments	2(13.3)	17(6.0)	19(6.3)
Self-employed	8(53.3)	139(48.8)	147(49.0)
Retired	4(26.7)	115(40.4)	119(39.7)
Monthly Income (per thousand)			
<10000			
10,000-20000	10(66.7)	207(72.6)	217(72.3)
21000-30000	2(13.3)	35(12.3)	37(12.3)
31000-40000	1(6.7)	14(4.9)	15(5)
410000-50,000 above	1(6.7)	1(0.4)	2(0.7)
	1(6.7)	28(9)	29(9.7)
Religion			
Christianity			
	8(53.3)	166(58.2)	174(58.0)
Islam	7(46.7)	118(41.4)	125(41.7)
Traditional	0 (0.0)	1(0.4)	1(0.3)
Ethnic group			
Yoruba	13(86.7)	254(89.1)	267(55.4)
Igbo	1(6.7)	30(10.5)	31(10.3)
Hausa	1(6.7)	1(0.4)	2(0.7)

Respondent's clinical characteristics and blood glucose control practices

Table 2 presents the information relating to clinical predictors. The age at onset of diabetes in most respondents is found between ages 30 and 60 years (68%), with more reported cases of type II diabetes. Diabetes condition is implicated in other disease conditions like hypertension, low back pain, and arthritis. These co-morbidities are frequent in type II diabetes patients with a prevalence of 98%. The majority (56.7%) of the respondents had been diagnosed with diabetes condition and had lived with the condition for more than two years. Some symptoms identified with diabetes condition include fatigue

(23.7%), excessive urine (10.3%), and breathlessness/chest pain (8.9%). The majority (58.4%) of the respondents had uncontrolled blood sugar.

Table 2: Clinical characteristics of diabetes

Variable	Type I Diabetes Mellitus	Type II Diabetes Mellitus	TOTAL
Age at onset of disease (years).			
30-39	3(20.0)	14(4.9)	17(5.7)
40-49	6(40.0)	78(27.4)	84(28.0)
50-59	6(40.0)	101(35.4)	107(35.7)
60-69	0(0.0)	91(31.9)	91(30.3)
70	0(0.0)	1(0.4)	1(0.3)
Mean ± SD	**47.33 ± 7.73**	**53.72 ± 9.08**	**53.28±9.55**
Duration of diabetes diagnosis(months)			
≤ 24			
25 – 48	5(33.3)	125(43.9)	130(43.3)
49 – 72	5(33.3)	48(16.8)	53(17.7)
73 – 96	1(6.7)	38(13.7)	39(13.0)
97 – 120	2(13.3)	18(6.3)	20(6.7)
>120	1(6.7)	20(7.0)	21(7.0)
Median	1(6.7)	36(12.6)	37(12.3)
	36.0 months	**36.0 months**	**36.5months**
Co-morbidities *			
Hypertension	3(100.0)	80(72.7)	83(73.5)
Arthritis	0	7(6.4)	7(6.2)
Low back pain	0	6(5.5)	6(5.3)
Eye cataract	0	1(0.10)	1(0.01)
Others	0	16(14.5)	16(14.2)
Diabetes symptoms?			
Yes	5(33.3)	151(53.0)	156(52.0)
No	10(66.7)	134(47.0)	144(48.0)
Prevalence of symptoms. *			
Blurry vision and Headache	0(0.0)	49(32.5)	49(31.4)
Fatigue	2(0.4)	35(23.2)	37(23.7)
Excessive urine and appetite	1(0.2)	15(9.9)	16(10.3)
Breathlessness /chest pain	1(0.2)	13(8.6)	14(8.9)
Swelling foot/leg pain/foot ulcer	1(0.2)	13(8.6)	14(8.9)
Dizziness and vomiting	0(0.0)	12(8.0)	12(7.7)
Itchy skin	0(0.0)	7 (4.6)	7(4.5)
Increased thirst	0(0.0)	7(4.6)	7(4.5)

Respondent's compliance/adherence to medication

Table 3 contains information on treatment adherence among the respondents. The majority (80%) of type I diabetic patients adhere to their medication, by taking it timely and adequately (93.3%). However, about 23% of type 2 diabetic patients fail to comply with their treatment. The patients highlighted the following reasons for non-compliance forgetfulness (18.46%), finished drugs (16.9%), perception of feeling better (13.9%), financial constraint (12.3%), and unintentional dose omission (10.8%).

Table 3: Compliance/Adherence to medications among diabetic patients

Variable	Type I Diabetes Mellitus	Type II Diabetes Mellitus	Total
Do you have difficulty in complying with drug prescriptions?			
Yes	1(6.7)	64(22.5)	65(21.7)
No	14(93.3)	221(77.5)	225(78.3)
If Yes, Reasons for difficulty in complying with medicine prescriptions.			
1. Social and Economic factors			
a. Financial constraint	1(100.0)	7(10.94)	8(12.3)
2. Therapy-related factors			
a. Side effects of drugs	0(0.0)	5(7.81)	5(7.69)
b. Difficulty in swallowing drugs	0(0.0)	2(3.12)	2(3.08)
3. Patient-related factors			
a. **Forgetfulness**	0(0.0)	12(18.75)	12(18.46)
b. Finished drugs	0(0.0)	11(17.9)	11(16.92)
c. When patients felt better	0(0.0)	9(14.01)	9(13.85)
d. Dose omission	0(0.0)	7(10.94)	7(10.76)
e. Others*	0(0.0)	10(15.63)	10(15.39)
4. Healthcare-related factors			
a. Unavailability of health care services due to strike		1(1.56)	1(1.54)

Others- Busy schedule-4(6.25), emotional disturbance-2(3.13), tired of taking drugs-2(3.13), lack of appetite- 1(1.56), Unplanned journey-1(1.56).

Respondent's compliance /adherence to diet

Table 4 contains information on adherence of both type 1 and type II diabetic patients to a routine diet which is important in the management of diabetes. More than 86% of the patient strictly adhered to their routine diet and oftentimes (48%) made consistent efforts to carefully choose foods that promote and maintain blood sugar level.

Table 4: Diet adherence

Variable	Type I Diabetes Mellitus	Type II Diabetes Mellitus	TOTAL
Currently following a diabetic diet			
Yes	15(100.0)	245(86.0)	260(86.7)
No	0(0.0)	40(14.0)	40(13.3)
Reasons for difficulty in choosing foods that help maintain blood sugar			
Uncomfortable eating the same kind of food/Change of taste.	1(50.0)	29(56.86)	30(56.6)
Patient's preference for a certain kind of food.	1(50.0)	4(7.84)	5(9.3)
Financial constraint.	0	10(19.61)	10(18.9)
Depending on what the family prepares.	0	3(5.88)	3(5.7)
Social occasion.	0	3(5.88)	3(5.7)
Not properly informed by the doctor	0	2(3.92)	2(3.8)
How often do you choose foods that help you maintain blood sugar?			
Almost always	3(20.0)	60(22.4)	63(22.3)
Very often	10(66.7)	126(47.0)	136(48.1)
Sometimes	1(6.7)	50(18.7)	51(18.0)
Not very often	1(6.7)	32(11.9	33(11.7)

Respondent's compliance or adherence to Exercise and appointment adherence

Table 5 presents information on adherence to exercise and appointment with the physician. Most patients followed a regular physical exercise routine (67.7%) as reported in this study. Weekly, the majority of the patients (68.67%) engage in mild to moderate exercise Also, keeping up with physician's appointments is important in diabetes treatment. As reported in this study, patients who fail to meet up with their physician's appointment attributed this to reasons such as perception of feeling better (35.0), unplanned journey (18.3%), and forgetfulness (11.7%) among others.

Table 5: Exercise and Appointment adherence among diabetic patients.

Variable	Type I Diabetes Mellitus	Type II Diabetes Mellitus	TOTAL
Exercised in the last two weeks			
Yes	11(73.3)	192(67.4)	203(67.7)
No	4(26.7)	93(32.6)	97(32.3)
Number of days used to walk per week			
1-3	8(72.7)	130(68.45)	138(68.67)
4-6	1(9.1)	31(17.4.)	34(16.85)
7	2(18.2)	27(14.2)	29(14.43)
How often do you walk a mile?			
Not very often	5(33.4)	104(36.6)	108(36.24)
Sometimes	5(33.3)	161(56.7)	171(57.38)
Very often	5(33.3)	19(6.7)	19(6.36)
Appointment adherence			
Ever skipped an appointment with your physician for treatment?			
Yes	2(1.3)	58(20.4)	60(20.0)
No	13(86.7)	227(79.6)	240(80.0)
Reasons for skipping an appointment with your physician for treatment?			
a. When I feel better	1(50.0)	20(34.48)	21(35.0)
b. Unplanned journey	0(0.0)	10(17.24)	11(18.3)
c. Financial constraints	1(50.0)	7(12.06)	7(11.7)
d. Forgetfulness	0	7(12.06)	7(11.7)
e. Others	0	14(24.14)	14(23.3)

Others- Busy schedule 5(8.62), social occasions 1(1.72), unfinished drugs 2(3.45), unavailability of health services 6(10.35)

Respondent's QOL domain scores of type 1 and type 2 diabetes

Table 6 contains information on the QOL domain scores. This study reported that the environmental domain has higher mean QOL scores (58.04 + 11.01) in both types of diabetes, while the social domain reported lower mean QOL scores (46.56 + 16.46) respectively.

Table 6: QOL domains of persons with diabetes

QOL domains	Diabetic patients(n=300)		
	Type I diabetes(15)	Type II diabetes (285)	TOTAL
	MEAN QOL SCORE±SD	MEAN QOL SCORE ±SD	MEAN QOL SCORE ±SD
Physical	56.90±8.69	56.35±13.80	56.38±13.58
Psychological	58.06±6.95	57.84±11.59	57.84±11.39
Social	44.44±18.81	46.67±16.36	46.56±16.46
Environmental	58.54±9.34	58.02±11.11	58.04±11.01

Association between treatment adherence and Quality of life

This study established a positive correlation between medication adherence and QOL domain scores; the association was statistically significant with the psychological domain of quality of life. Also, higher mean scores in the QOL domains are an indication of high adherence to diet, exercise, and appointment with the physician.

Table 7: Socio-demographic characteristics and Quality of life

Socio-demographic Characteristics		QOL DOMAINS			
		MEAN± SD			
		Physical	Psychological	Social	Environmental
Gender					
Male	n =61	55.97±14.25	58.61±13.15	46.72±15.61	57.99±12.24
Female	n=239	56.49±13.43	57.65±10.92	46.51±16.70	58.05±10.71
Total	N=300				
T-test		0.263	0.583	0.088	0.040
P-value		0.793	0.561	0.930	0.968
Level of Education					
No formal	n =96	53.42±14.03	55.03±10.96	42.88±16.88	55.59±11.23
Formal	n =204	57.77±13.17	59.17±11.37	48.28±16.01	59.19±10.76
Total	N =300				
T-test		2.613	2.972	2.679	2.661
P-value		0.009	0.003*	0.008	0.008
Employment status					
Employed	n =177	57.04±13.59	58.57±11.13	48.21±16.50	57.91±10.98
Unemployed	n =123	55.43±13.57	56.81±11.73	44.17±16.18	58.23±11.12
Total	N=300				
T-test		1.011	1.318	2.101	0.249
P-value		0.313	0.189	0.036	0.804
Age	Mean±SD	58.77±8.51	58.77±8.51	58.77±8.51	58.77±8.51
Pearson correlation(r)		-0.038	-0.091	-0.166	-0.105
P-value		0.516	0.114	0.004*	0.071
Income	Mean±SD	13646±22660	13646±22660	13646±22660	13646±22660
Pearson correlation(r)		0.127	0.202	0.137	0.210
P-value		0.028*	0.000*	0.018*	0.000*

Table 8: Association between medication, diet, appointment, exercise adherence, and QOL

Adherence		QOL DOMAINS			
		Physical	Psychological	Social	Environmental
Medication Adherence Spearman rank correlation coefficient(rho)-High, medium, and low medication adherence p-value		0.099 0.088	0.181 0.002*	-0.070 0.228	0.103 0.076
		MEAN± SD			
Diet adherence Yes No Total	 n =247 n=53 N=300	 55.93±15.58 56.48±13.15	 57.23±11.73 57.98±11.34	 48.58±16.23 46.12±16.51	 56.72±13.56 58.32±10.40
T-test P-value		0.266 0.790	0.432 0.666	0.989 0.323	0.961 0.337
Exercise adherence Yes No Total	 n =203 n =97 N =300	 58.27±12.95 51.77±14.05	 58.69±10.66 55.79±12.84	 46.43±16.94 46.83±15.32	 59.19±11.43 55.21±9.40724
T-test P-value		3.848 0.000*	2.004 0.046*	0.190 0.849	2.881 0.004*
Appointment adherence Yes No Total	 n =240 n =60 N=300	 58.079±14.88 55.95±13.22	 56.35±12.86 58.23±10.98	 47.81±16.80 46.23±16.40	 58.19±11.34 58.00±10.96
T-test P-value		1.095 0.275	1.149 0.252	0.668 0.504	0.123 0.902

* Correlation is significant at p<0.05(2-tailed)

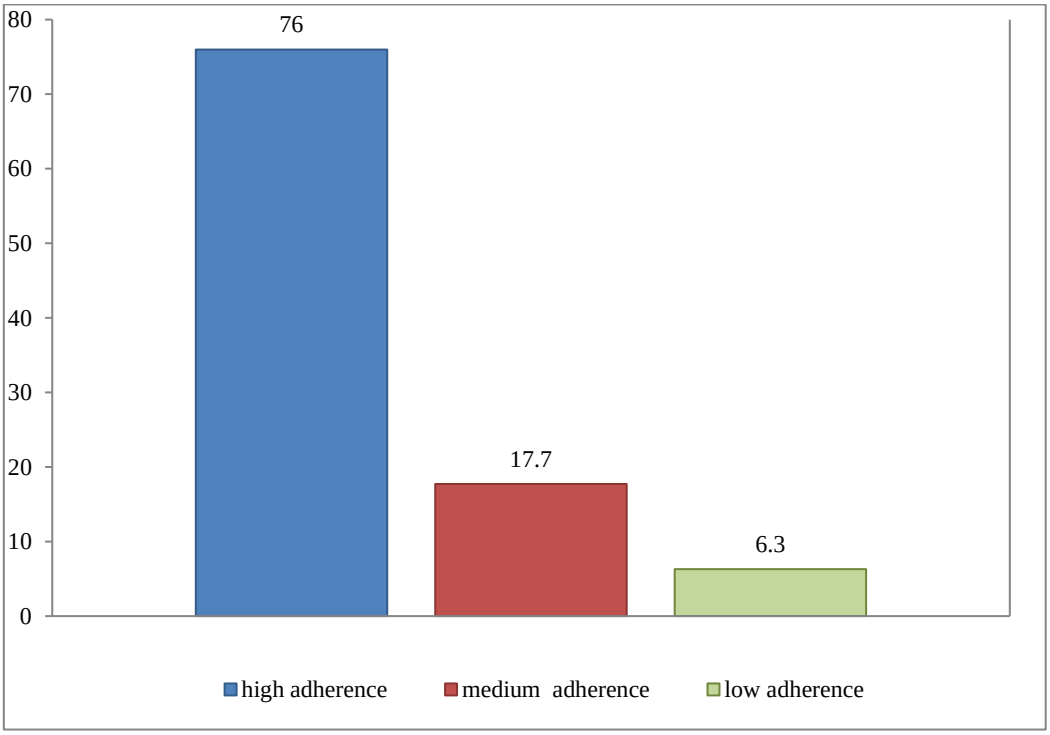

Figure 1: Medication adherence among diabetes patients. (Patients that regularly take their medications in the last two weeks as instructed by the physician)

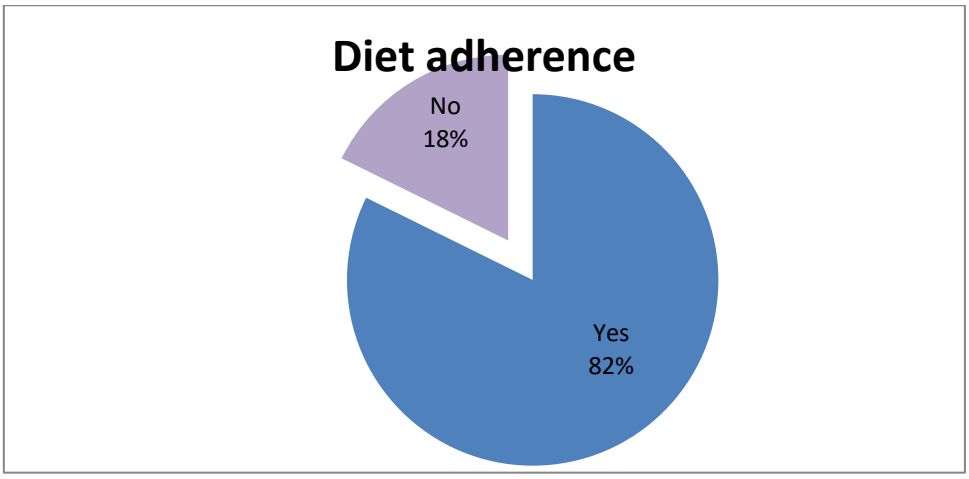

Figure 2: Diet adherence among diabetic patients (Patients who are currently following a special meal plan as instructed by their physician)

DISCUSSION

The study assessed the socio-demographic factors, clinical factors, and adherence to treatment factors associated with quality of life among diabetic patients in Ibadan, Nigeria. This study ascertained that a good response to treatment determines the extent of deterioration of the patient's condition and overall well-being. Also, the extent of the patient's condition determines the perception of their QOL by evaluating both the positive and negative aspects of life.

The results of this study enlighten us that the majority of the respondents were between age group 61-70 years of age. This category of people belongs to the elderly population, an indication that older age is associated with a higher proportion of diabetes.

A study conducted by Abdul et al., 2021 and Adil et al., 2016 established that diabetes is common among older individuals and is a co-morbid condition of other chronic diseases. Also, this study corroborates a prior study conducted by Maryam et al., 2008, the prevalence of diabetes is related to an increase in the ages of respondents. Hence, we can deduce that diabetes is termed the disease of the elderly.

However, this study reported a higher proportion of female respondents compared to male respondents which could be attributed to factors like the level of resilience of females to life issues and low socio-economic status as corroborated by Liu et al., 2009 and Odili et al., 2008.

Also, the income of the respondents is a major predictor of all the domains of QOL. Tang et al 2006 observed that socio-economic factors like income, level of education, and employment status of respondents are significant in assessing the satisfaction of patients with their overall quality of life. Generally, there is usually a positive correlation between the income of the respondents and QOL domains.

Also, this study deduced that the mean QOL domain scores informed an average perception of quality of life. The environmental domain reported higher quality of life scores, this could be attributed to factors such as satisfaction with living conditions and physical surroundings of individuals, and access to information. Prior studies have established that settling in rural areas determines the access to health care services and the well-being of individuals. This study shows that all these factors affect the quality of life of persons with diabetes, similar to a previous study conducted by Odili et al., 2008. All these factors positively impact the quality of life of persons living with diabetes. Therefore, the fairly good environmental domain scores informed patients higher perception of the environmental domain of QOL.

Furthermore, it is now established that clinical determinants such as glycemic control are associated with quality of life in persons with diabetes. Previous studies conducted by Jurgen et al., 2013, Collins et al., 2009, Aman et al., 2009 and Graue et al., 2004 documented the effect of glycemic control in the management of diabetes. A study conducted by Sajith et al., 2014 established the findings from this study, diabetic patients with controlled blood glucose reported higher perception of their quality of life. Glycemic control is related to treatment adherence and reduces the incidence of diabetes complications

(Gerstein et al., 2011; Adisa et al., 2009; Anan et al., 2014).

Generally, adherence or compliance to treatment is related to improved quality of life. Patients who adhered to their medication, and dietary regimen, increased physical activity, and in good relationships with their healthcare provider had average mean QOL scores which indicates a better perception of their quality of life. (Acharya et al., 2014)

In diabetes patients, adherence to treatment medication, diet, exercise, and appointment adherence is highly important in its prevention and management; it promotes improved quality of life (Yolanda et al., 2008). Therefore, patients' adherence or compliance to treatment is indicative of hope of survival and better management of the condition. Consequently, poor glycemic control was significantly higher among patients who failed to adhere to treatment as corroborated by Anan et al., 2014.

Also, a positive correlation exists between adherence to medications and QOL domains, especially in patients with type 2 diabetes which implies that patients who adhered to their anti-diabetic medications had better QOL as represented in the domain scores (Yolanda et al., 2008; Acharya L et al., 2014). The interference of diabetes causes impairment of all domains of quality of life. Not only does diabetes lead to poor health, but it also reduces the life expectancy of the affected individual.

CONCLUSION AND RECOMMENDATIONS

Diabetes being a prevalent disease and a major public health concern both in developed and developing countries affects quality of life. The complications and co-morbidities of diabetes are known to negatively affect the quality of life of patients, amongst other clinical factors, treatment adherence, socio-economic conditions, and so on. Non-compliance to treatment is capable of affecting all domains of quality of life. Therefore, with the increasing number of diabetic patients, timely initiation of treatment is important in prevention and control as it is related to the quality of life. It is imperative to create awareness among diabetic individuals about the existing relationship between diabetes and quality of life.

Similarly, adherence to treatment and glycemic control are major predictors of quality of life. Patients should be encouraged to strictly adhere to treatment to enjoy a good life. It entails the modification of lifestyle factors –diet, physical activity, medication, and patient's timely visit to their physician.

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