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*Research article*

# **Knowledge, Attitude and Compliance to Dietary Recommendation Among Type-2 Diabetes Patients Attending Medical Outpatient Clinic at the University College Hospital, Ibadan, Southwest Nigeria**

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## **ABSTRACT**

Dietary management is important in preventing complications associated with diabetes mellitus and enhancing quality of life. However, compliance to dietary recommendations among Diabetes Patients (DPs) remain unknown. This study was designed to assess the Knowledge, Attitude and Compliance (KAC) of Type 2 diabetic patients to dietary recommendation. This cross-sectional study involved 101 DPs attending Medical Outpatient Clinic at University College Hospital, Ibadan, Nigeria. A semi-structured, interviewer-administered questionnaire was used to obtain information on socio-demographic characteristics, diabetes history and KAC to dietary recommendation. Knowledge was assessed on a 26-point scale and categorized as good ( $\geq 18.0$ ) and poor ( $< 18.0$ ). Attitude was assessed on a 34-point scale and considered as positive and negative at  $\geq 27$  and  $< 27$ , respectively. Compliance was assessed on a 42-point scale and classified as good ( $\geq 29$ ) or poor ( $< 29$ ). Data were analyzed and summarized as descriptive statistics and association among variables was determined using Chi-square test at  $p < 0.05$ . Age of respondents was  $56.9 \pm 11.6$  years, 58.4% were female, 72.2% were married, and 11.9% had no formal education. About half (49.5%) of the participants had normal body mass index, 30.7% were overweight and 16.8% were obese. Diabetes duration was  $9.4 \pm 5.7$  years, 46.4% had family history of diabetes mellitus, and 93.1% relied on Dietitians for dietary plans. Patients on diet and drug, diet alone, and diet and insulin constituted 79.2%, 14.9% and 5.9%, respectively. Only 8.9% had normal blood glucose level and 31.7% were pre-diabetic. Mean fasting blood glucose value was  $108.94 \pm 19.54$  mg/dL and 42.6% had co-morbidities including hypertension (25.7%), eye problem (7.9%), renal problem (5.0%) and ulcer (4.0%). Respondents with good knowledge, positive attitude and good compliance were 53.5%, 63.4%, and 77.2%, respectively. Compliance to dietary recommendation was higher than observed knowledge and attitude levels of the respondents. Efforts should be intensified to strengthen compliance to reduce diabetes complications

**Keywords:** *Diabetes mellitus, Dietary management, Compliance to dietary recommendation*

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## **INTRODUCTION**

Diabetes mellitus is a chronic metabolic disease characterized by chronic hyperglycemia because of insufficiency of pancreas in insulin production or inability of the body to use the insulin produced effectively leading to disorders in macronutrients metabolism (Silnik 2007). Diabetes exists in three major forms, these are Type 1 diabetes (insulin deficiency), Type 2 diabetes (where body cells are not responding effectively to the insulin produced) and gestational diabetes (pregnancy induced diabetes). Of all the three, diabetes Type 2 accounts for majority of diabetes cases (WHO 2016; Silnik 2007).

Over the last forty years, the number of people with diabetes has increased about five folds and as at 2019, diabetes caused about four million deaths and estimated US\$760 billion in health expenditure (WHO 2018a; IDF 2019). Though the prevalence of diabetes is lower in Africa compared to other regions, it has the highest number of deaths due to diabetes, 34 per 100,000 (Arokiasamy et al 2021; Kengne et al 2013). In Nigeria, the direct cost of management of diabetes is about \$1.071 billion to \$1.639 billion annually while the estimated monthly direct medical costs per individual varied from \$262 to \$400 (Mapa-Tassou et al 2019) to \$1.639 billion per year while the estimated monthly direct medical costs per individual. High mortality among people

living with diabetes in Africa has been largely attributed to poor investment and fragile health systems with priority on infectious disease and weak response to the diabetes burden (IDF Diabetes Atlas). Furthermore, diabetes predisposes to an increased risk of developing other chronic health complications thus increasing medical care costs and lowering quality of life.

Medical nutrition therapy is an integral part of management for both Type 1 and Type 2 diabetes to improve glycaemic control and reduce the risk of complications. (Barclay *et al.*, 2010) Monitoring the pattern and amount of carbohydrate in diabetics' diet is key to achieving glycemic control, a key strategy to prevent chronic diabetes complications and achieve an appropriate metabolic control (Sheard *et al* 2004). Dietary management is a key cornerstone modality in management of Type 2 diabetes and attainment of good glycemic control (WHO 2003; ADA 2003)

Despite the availability of this strategy, the diabetics often suffer health complications because of misinformation and inability to seek dietary advice from proper source (Dietitians). The dietitians are responsible for giving evidence-based nutrition recommendation that are tailored to client's needs in an easily understood way that can be translated into everyday life. The current general recommendation for carbohydrate is between 45-65% of daily calorie intake; fat should be 20-35% and protein 15-20% of total daily calories (Franz *et al* 2010)

Nigerian diabetics have been reported to have poor knowledge of diabetes, with pervasive fallacies (Jasper *et al* 2014). There is also erroneous belief amongst many people that diabetes results from eating carbohydrates hence the popular view that people with diabetes should either completely avoid carbohydrate or at best take minimal quantity. This has resulted into taking monotonous meal by most of the people with this condition. One of the commonly prescribed by the well-meaning non-health professionals and uninformed medical personnel include unripe plantain and beans.

Poor knowledge, attitude and compliance to recommended diet can easily result to acute or long-term complication in the diabetics. Study has shown that about half of subjects who ate a monotonous diet of mainly unripe plantain did not necessarily attain good glycemic control (Abioye-Kuteyi *et al* 2005). Even some that seem to have high knowledge still have low management status (Bustista-Martinez *et al* 1999). This implies that acquisition of knowledge is not sufficient to increase compliance with diabetes diet, it wrongly presumes changes in behaviour, habits and attitude (Norris *et al* 2001). Though medical nutrition therapy for diabetes patients is widely provided in secondary and tertiary health facilities in different countries including Nigeria; poor knowledge, attitude and practices of dietary recommendation among diabetic patients remain suboptimal (ADA 2017; Evert *et al* 2014). Understanding the level and gap in knowledge, attitude and compliance to dietary recommendation among the Type 2 diabetic patients will enable a more efficient process of awareness creation which will prompt a tailored solution in dietary management of diabetes. This study was therefore conducted to assess the knowledge, attitude and compliance to dietary recommendation among Type 2 diabetic patients

attending Medical Outpatient (MOP) clinic in University College Hospital, Ibadan, Nigeria.

## MATERIALS AND METHODS

**Study design, location and Participants:** This cross-sectional study was conducted among Type 2 diabetic patients aged 30 years and above attending the Medical Outpatient (MOP) clinic of University College Hospital, Ibadan, Nigeria. A total of 101 patients were recruited for the study using purposive sampling technique based on age and expressed willingness to participate in the study. The study site, University College Hospital with coordinates 7.3565oN, 3.8748oE is located in the heart of Ibadan, one of the largest cities in Africa which houses the secretariat of Diabetes Association of Nigeria, Oyo state chapter hence, the reason for study site.

**Data collection:** Data were collected using semi-structured, interviewer-administered questionnaires developed from the diet sheet and other resources and face validated by three practicing dietitians. The questionnaire included information on basic characteristics of the respondents, history of diabetes, knowledge on dietary recommendation, attitude toward dietary recommendation, compliance of patients to dietary recommendation and anthropometric measurements. Knowledge was assessed on a 26-point scale and defined as good ( $\geq 18.0$ ) and poor ( $< 18.0$ ) knowledge. Attitude toward dietary recommendation was assessed on a 30-point scale and categorized as negative ( $< 27.0$ ) and positive ( $\geq 27.0$ ). Compliance to dietary recommendation was assessed on a 42-point scale and classified as good compliance ( $\geq 29.0$ ) and poor compliance ( $< 29.0$ ). Weight and height were assessed using a bathroom weighing scale (Hana, analogue) and a stadiometer, respectively to determine the body mass index categorized as underweight ( $< 18.5 \text{ kg/m}^2$ ), normal weight ( $18.5 - 24.9 \text{ kg/m}^2$ ), overweight ( $25 - 29.9 \text{ kg/m}^2$ ) and obesity ( $\geq 30 \text{ kg/m}^2$ ) (WHO 2004).

**Data analysis:** Data obtained were cleaned and analysed using IBM Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive statistics of frequency counts, simple percentage, mean and standard deviation were used to summarize and present the results. Chi-square test was used to investigate associations between variables at  $p < 0.05$ .

**Ethical consideration:** Ethical approval for the study (UI/EC/17/0540) was obtained from the University of Ibadan/University College Hospital Research and Ethics committee at the Institute of Advanced Medical Research and Training (IAMRAT - NHREC/05/01/2008a).

## RESULTS

**Socio-demographic characteristics of the respondents:** The socio-demographic characteristics of the respondents is presented in Table 1. Of the 101 respondents, 58.4% were females and 41.6% were males. The mean age of respondents was  $56.94 \pm 11.63$  years with 27.7% each in the 50-59 years and 60-69 years age categories. Most of the respondents (75.2%) were married, 16.8% were widowed and 5.0% were

divorced/separated. In addition, 45.5% had tertiary education, 28.7% had not more than secondary education, 13.9% had primary education only and 11.9% had no formal education. Likewise, 23.8% of the respondents were artisans, 21.8% were civil servants, 12.9% were businessmen/women, 16.8% were retirees, and 3.0% were farmers. About 63% of the respondents were low-income earners, 25.7% were middle-income earners, and 10.9% were high-income earners. Majority (90.1%) lived with their family and 9.9% lived alone.

**Table 1:**  
Social-demographic characteristics of respondents (N=101)

Variable	N	%	
<b>Age group (years)</b>	30–39	4	4.0
	40–49	24	23.8
	50–59	28	27.7
	60–69	28	27.7
	≥70	17	16.8
	<i>Mean = 56.94±11.63</i>		
<b>Sex</b>	Male	42	41.6
	Female	59	58.4
<b>Marital status</b>	Single	3	3.0
	Married	76	75.2
	Divorced/separated	5	5.0
	Widowed	17	16.8
<b>Ethnicity</b>	Yoruba	89	88.1
	Ibo	10	9.9
	Hausa	1	1.0
	Others	1	1.0
<b>Level of Education</b>	No formal education	12	11.9
	Primary school	14	13.9
	Secondary school	29	28.7
	Tertiary school	46	45.5
<b>Occupation</b>	Farmer	3	3.0
	Petty trader	14	13.9
	Artisan	24	23.8
	Civil servant	22	21.8
	Business man	13	12.9
	Retiree	17	16.8
	Others	8	7.9
<b>Earnings/month (₦)</b>	Low income (< 50,000)	64	63.4
	Middle income (50,000 -79,000)	26	25.7
	High income (≥ 80,000)	11	10.9
<b>Living arrangement</b>	Living alone	10	9.9
	Living with family	91	90.1

**Clinical characteristics of the respondents:** The clinical characteristics of the respondents are presented in Table 2. The duration of diabetes among the respondents was 9.53±5.72 years, 58.4% had experienced diabetes for 1 to 9 years, 32.7% for 10 to 19 years and 8.9% for years and above. About 46 percent of the respondents had family history of diabetes mellitus comprising 29.7% of first-degree relatives and 26.7% of second degree relatives. About 49 percent of the respondents' diagnosis of diabetes status were symptomatic, 23.8% were diagnosed incidentally and 27.7% were identified at screening. Most respondents (93.1%) relied on dietitians for dietary plan recommendation and 6.9% depended on medical

doctors. Treatment approach was largely based on diet and drug (79.2%), while respondents using diet alone, and diet and insulin constituted 14.9% and 5.9%, respectively. Only 51.5% of the respondents had the last blood glucose values available, of which 8.9% had normal blood glucose level, 31.7% were pre-diabetic, and 10.9% were diabetic. Mean body mass index of the respondents was 25.72±3.99 kg/m<sup>2</sup>, and the prevalence of underweight, overweight and obesity was 2.0%, 36.6% and 11.6%, respectively. Majority of the respondents (57.4%) had no other health complications, 25.7% had hypertension, 7.9% had eye problem, 5.0% had renal problem and 4.0% had ulcer.

**Table 2:**  
Clinical characteristics of the respondents

Questions	N= 101	%	
<b>Duration of diabetes (years)</b>	1 – 9	59	58.4
	10 – 19	33	32.7
	20 and above	9	8.9
	<i>Mean = 9.53±5.72</i>		
<b>Family history of diabetes</b>	First degree relatives	30	29.7
	Second degree relatives	27	26.7
	None	44	43.6
<b>Mode of diagnosis</b>	Incidental	24	23.8
	Symptomatic	49	48.5
	At screening	28	27.7
<b>Professional who gave dietary plan</b>	Doctor	7	6.9
	Dietitian	94	93.1
<b>Type of treatment</b>	Diet alone	15	14.9
	Diet & drug	80	79.2
<b>Had last blood glucose reading available</b>	Diet & insulin	6	5.9
		52	51.5
<b>*Last blood glucose level (FBG) (N=52)</b>	Normal FBG (<100 mg/dl)	9	8.9
	Prediabetic (100 – 125 mg/dl)	32	31.7
	Diabetic (≥ 126 mg/dl)	11	10.9
		<i>Mean = 108.94±19.54 mg/dl</i>	
<b>Body Mass Index (BMI) of respondents</b>	Underweight	2	2.0
	Normal weight	50	49.5
	Overweight	37	36.6
	Obesity	12	11.9
	<i>Mean = 25.72±3.99 (kg/m<sup>2</sup>)</i>		
<b>Other health conditions</b>	None	58	57.4
	Hypertension	26	25.7
	Eye problem	8	7.9
	Renal problem	5	5.0
	Ulcer	4	4.0

**Knowledge, attitude and compliance of respondents to dietary recommendation:** The knowledge, attitude and compliance of respondents to dietary recommendation are as shown in Tables 3, 4 and 5, respectively while the summary of the scores for these variables is presented in Figure 1. Most of the respondents knew diabetes affects the body's use of sugar (98.0%), increases sugar level in urine (97.0%) and that regular checking of blood glucose is important (99.0%). Only 56.4% knew the normal range for blood glucose and 66.3% knew diabetes cannot be cured. There were variations in the knowledge of complications that could arise from diabetes

including kidney disease (76.2%), eye disease (74.3%), food problem (66.3%) and heart disease (43.6%). Among the respondents, diabetes was associated with body weakness by 92.1%, to dizziness by 75.2%, and to sweating by 37.6%.

**Table 3:**  
Knowledge on dietary recommendation (N=101)

Questions	No		Yes	
	n	%	N	%
Knew diabetes affects the body's use of sugar	2	2.0	99	98.0
Knew diabetes increases sugar in urine	3	3.0	98	97.0
Knew regular checking of blood glucose is important	1	1.0	99	99.0
Knew normal range for blood glucose	44	43.6	57	56.4
Knew diabetes cannot be cured	34	33.7	67	66.3
<b>Knew symptoms of diabetes include:</b>				
Excessive hunger	47	46.5	54	53.5
Frequent thirst	46	45.5	55	54.5
Frequent urination	13	12.9	88	87.1
<b>Knew complications of diabetes include:</b>				
Heart disease	57	56.4	44	43.6
Eye disease	26	25.7	75	74.3
Kidney disease	24	23.8	77	76.2
Foot problem	34	33.7	67	66.3
<b>Knew signs of low blood sugar include:</b>				
Dizziness	25	24.8	76	75.2
Sweating	63	62.4	38	37.6
Body weakness	8	7.9	93	92.1
<b>Knew diabetes diet should be:</b>				
Low in fat	6	5.9	95	94.1
<b>Foods/fruits of high glycemic index:</b>				
Knew 'eba' is a food with high glycemic index	9	8.9	92	91.1
Knew 'fufu' is a food with high glycemic index	9	8.9	92	91.1
Knew white bread is a food with high glycemic index	40	39.6	61	60.4
Knew pineapple is a food with high glycemic index	43	42.6	58	57.4
Knew white rice is a food with high glycemic index	38	37.6	63	62.4
<b>Vegetables to be taken whenever hunger sets in before main meal:</b>				
Knew cucumber should be taken to fill the stomach in hunger	22	21.8	79	78.2
Knew cabbage should be taken to fill the stomach when hungry	46	45.5	55	54.5
Knew garden egg should be taken to fill the stomach when hungry	31	30.7	70	69.3
Knew substitution of rice with beans could facilitate controlled sugar level	48	47.5	53	52.5
Knew the diabetics require adequate dietary fibre intake	6	5.9	95	94.1

Most of the respondents (94.1%) knew fat intake need to be moderated, 91.1% each identified "eba" and "fufu" as high glycemic foods; however only, 62.4%, 60.4%, and 57.4% identified white rice, white bread and pineapple as high

glycemic foods. In addition, most respondents (94.1%) knew that diabetics require adequate dietary fibre intake, however, fewer respondents recognized the roles that common vegetables like cucumber (78.2%), garden egg (54.5%) and cabbage (54.5%) could play in facilitating controlled sugar levels. Overall, 53.5% of the respondents had good knowledge about dietary recommendation in diabetes and 46.5% had poor knowledge (Figure 1).

**Table 4:**  
Attitude to dietary recommendation among the respondents

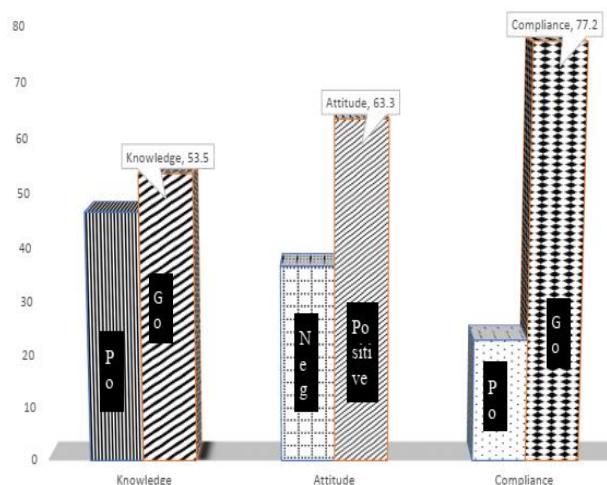
Variables	Response	Point	N	%
Regular checking of my blood glucose level is important.	SD	1	0	0.0
	Disagree	2	1	1.0
	NAD	3	2	2.0
	Agree	4	32	31.7
I need to follow my diet plan religiously	Strongly Agree	5	66	65.3
	SD	1	0	0.0
	Disagree	2	0	0.0
	NAD	3	5	5.0
H Replacing honey with sugar controls my blood glucose	Agree	4	48	47.5
	Strongly Agree	5	48	47.5
	SD	1	4	4.0
	Disagree	2	4	4.0
I must engage in exercise to enhance glucose uptake	NAD	3	17	16.8
	Agree	4	30	29.7
	Strongly Agree	5	46	45.5
	SD	1	1	1.0
Proper weight management helps glucose uptake	Disagree	2	0	0.0
	NAD	3	2	2.0
	Agree	4	46	45.5
	Strongly Agree	5	53	52.5
Timely consumption of meal improves plasma glucose level	SD	1	0	0.0
	Disagree	2	1	1.0
	NAD	3	5	5.0
	Agree	4	30	29.7
	Strongly Agree	5	65	64.4

SD= Strongly Disagree; NAD = Neither Agree nor Disagree

The attitudes of the respondents to dietary recommendations are presented in Table 4. Most respondents agreed that regular checking of blood glucose levels is important including 65.3% that strongly agreed and 31.7% that agreed. About 48 percent each of the respondents strongly agreed and agreed to the need to religiously follow diet plan. About 46 percent strongly agreed that replacing honey with sugar aided in controlling blood sugar, 29.7% agreed and 16.8% neither agree nor disagree. Most respondents including 54.5% strongly agreed and 42.6% agreed to engage in exercise to enhance glucose uptake. Likewise, 52.5% strongly agreed to and 45.5% agreed to the need for proper weight management in regulating glucose uptake. About 94 percent of the respondents including 64.4% strongly agreed and 29.7% agreed to the use of timely meal consumption to improve plasma glucose level.

Overall, 63.4% of the respondents had positive attitude towards the recommended diet, while 36.6% had negative attitude.

Respondents' compliance to dietary recommendation is presented in Table 5. Only 40.6% always followed dietary counselling, 68.3% ate outside three or more times weekly, 14.9% skipped meals, 27.7% consumed less than 4-5 portion sizes of vegetables per day, only 58.4% measured their carbohydrate intake, and only 46.5% were involved in daily physical activities. Snacking was common among the respondents, however 78.2% consumed unhealthy snacks and only 83.2% kept to the recommended mealtimes. In addition, only 32.7% consulted the Dietitian regularly, and about 20 percent ate carelessly at parties.



**Figure 1.** Overall knowledge, attitude and compliance score among the respondent

**Table 5:** Respondents compliance to dietary recommendations (N=101)

Questions	Response	Point	N	%	Questions	Response	Point	N	%	
Frequency of compliance to dietary counseling	Seldom	1	3	3.0	Respondents smoke	No	1	101	100.0	
	Sometimes	2	11	10.9		Respondents' frequency of exercise per week	Never	0	1	1.0
	Usually	3	46	45.5		Once/week	1	7	6.9	
	Always	4	41	40.6		2x/week	2	15	14.9	
Respondents cooked own meal	No	0	3	3.0		3x/week	3	25	24.8	
Rate at which food was ate outside	Yes	1	98	97.0	>3x/week	4	6	5.9		
	Everyday	0	2	2.0	Everyday	5	47	46.5		
	3x/week	1	67	66.3	Type of milk usually consumed	Full cream	0	2	2.0	
	2x/week	2	14	13.9	Skimmed	1	99	98.0		
Respondents skipped meal	Once/week	3	14	13.9	Respondents consumed alcohol	No	1	96	95.0	
	Never	4	4	4.0	Yes	0	5	5.0		
	Respondents consumed fruits	Yes	1	98	97.0	Respondents consumed snacks	Yes	1	78	77.2
	No	0	3	3.0	No	0	23	22.8		
How respondents consumed fruits	Varieties	1	83	82.2	Type of snacks consumed	Healthy	1	22	21.8	
	Varieties & Quantified	2	10	9.9	Unhealthy	0	79	78.2		
	Average portion of vegetable per meal	<2 tablespoons	0	2	2.0	Respondents used alternative sweeteners	No	1	99	98.0
	2 – 3 tablespoons	1	26	25.7	Yes	0	2	2.0		
Respondents drank bottle of coke to normalize blood glucose	4 – 5 tablespoons	2	38	37.6	Diet consumed at recommended time	Yes	1	84	83.2	
	>5 tablespoons	3	35	34.7	No	0	17	16.8		
	Respondents took two cubes of sugar to normalize blood glucose	Yes	1	79	78.2	Timely breakfast intake	Yes	1	73	72.3
	No	0	22	21.8	No	0	28	27.7		
Respondents measured own carbohydrate intake	Respondents visits to clinician/dietitian	Seldom	0	7	6.9	Timely lunch intake	Yes	1	78	77.2
	Sometimes	1	18	17.8	No	0	23	22.8		
	Usually	2	43	42.6	Timely dinner intake	Yes	1	80	79.2	
	Always	3	33	32.7	No	0	21	20.8		
Respondents ate at parties	Respondents had ever discontinued diet	Yes	0	91	90.1	Respondent had ever discontinued diet	Yes	0	91	90.1
	Had difficulty to part with some foods	No	1	10	9.9	No	1	10	9.9	
	Intake of carbonated drinks (past 3 months)	Multiple	0	14	13.9	Yes	0	8	7.9	
	Never	2	69	68.3	Intake of carbonated drinks (past 3 months)	Once	1	18	17.8	
Respondents ate at parties	Carelessly	0	20	19.8	Always	3	33	32.7		
	Cautiously	1	81	80.2						

Overall, 77.2% of the respondents had good compliance and 22.8% had poor compliance. There was significant relationship between knowledge and attitude of respondents towards dietary recommendation ( $X^2=3.921$ ,  $P=0.048$ ). Likewise, there was significant correlation between knowledge and compliance of respondents to dietary recommendation ( $X^2=8.973$ ,  $P=0.003$ ) (Table 6).

**Table 6**  
Relationship between knowledge, attitude and compliance

Variables	Knowledge			X <sup>2</sup>	P-value
	Poor	Good	Total		
<b>Attitude</b>					
Negative	22(21.8)	15(14.9)	37(36.6)	3.921	0.048
Positive	25(24.8)	39(38.6)	64(63.4)		
<b>Compliance</b>					
Poor	17(16.8)	6(5.9)	23(22.8)	8.973	0.003
Good	30(29.7)	48(47.5)	78(77.2)		

\*\*Significant at  $P<0.05$

## DISCUSSION

Compliance to dietary recommendations have been shown to improve glycemic control and reduce likelihood of health complications in diabetes (Fasil *et al.*, 2018). In this study, respondents with good knowledge of dietary recommendation in diabetes constituted about half, two-third had positive attitude and three-quarter had good compliance. Knowledge and attitude to dietary management of diabetes in the current study is high compared to earlier studies which largely reported poor knowledge (Abioye-Kuteyi *et al.*, 2005; Olatona *et al.* Ubajaka 2019) and attitude to treatment recommendations (Muhammad *et al* 2021, Ubajaka 2019) in Nigeria. Though practice has always been high, sustainability of the recommended practice was largely poor. The increased knowledge and attitude can be attributed to the rising burden of diabetes and increased awareness on prevention and management of non-communicable diseases in Africa and Nigeria in particular.

In this study, the weak points in the knowledge of the diabetes patients include self-monitoring of blood glucose, ignorance of the incurability of diabetes, glycemic index of fruits and typical local vegetables that are useful in controlling blood sugar level. These gaps could predispose to delayed care seeking, adoption of unorthodox approaches to diabetes care and unhealth food choices and dietary practices which could aggravate health condition. Poor knowledge and awareness have been identified as the bane of negative health seeking behaviours and consultation of traditionalists following diabetes health challenge among Nigerians (Ogunlana *et al* 2021) Earlier studies have also documented poor practice of self-monitoring of blood glucose among Nigerians (Adisa *et al.*, 2009; Stephani *et al* 2018). In addition, the use of complementary and alternative medicine in the management of diabetes is high in southwest Nigeria (Ala *et al* 2020). This could be attributed to ignorance of the fact that diabetes is a lifetime disease, high cost of diabetes care, among others.

In this study, poor compliance to recommended lifestyle changes is characterized with failure to abide with dietary counselling, high frequency of eating-out, low vegetable intake, high snacks intake, poor physical activity level and poor meal timing. Earlier studies have reported similar poor compliance in Africa and other low-and middle-income countries (Mogre *et al* 2019). The observed departure from helpful lifestyle changes may be an outcome of ineffective dietary counselling, lack of confidence in dietary component of diabetes care or difficulty in meeting the often rigid and unfriendly dietary recommendations in diabetes care. Knowledge and positive attitude do not translate to healthy dietary decision. This calls for the need for improved diabetic education including context-based dietary counselling and effective follow-up to clarify understanding of key messages in diabetic counselling and education. Counselling needs to be made context-specific and personalized for ease of adaptation (Wareham, 2022). Though these facts are generally known in theory, demonstration in practice is generally poor. This calls for the need for the practicing dietitian to be innovative and work closely with clients to create diet plan that are not only effective but easy to follow. Such skills may require re-training based on feedbacks from the diabetes patients. Presently such on the job training are limited in Nigeria and the professional bodies can play leading roles in this respect. Furthermore, the low percentage of respondents that follow dietary counselling calls for the need to simplify and create enabling environment to enhance compliance. Eating-out is a common practice in Nigeria with increasing frequency as urbanization and development evolve (Henry-Unaeze and Ugwu 2020; Omega & Omuemu 2018). Frequent eating-out has been linked to increased risk of cardiovascular diseases (Ang *et al.*, 2022) and may also complicate existing health issues such as diabetes. The high number of respondents that regularly eat outside reflect that dietary practices among the respondents may be complex than envisaged and catering services need to be moderated to promote healthy dietary practices. Such moderation may be focused on promoting recommended dietary components that are often consumed in quantities below the adequate levels such as fruits and vegetables. The high reliance on unhealthy snacks also calls for the need to invest in the development and promotion of healthy snack options. Most Nigerian snacks are pastry-based, energy-densed and rarely contribute to diet quality (Utham *et al* 2020). Likewise, meal timing represented one of the most flouted recommendations among the respondents, it is therefore necessary to emphasise the meal timing and its significance in diabetic education and counselling.

In conclusion, compliance to dietary recommendation was higher than observed knowledge and attitude levels of the respondents. Areas of knowledge that need to be strengthened include the self-monitoring of blood glucose, understanding of the incurability of diabetes, and glycemic indices of foods especially fruits and vegetables. Poor compliance among the respondents is characterized with failure to abide with dietary counselling, high frequency of eating-out, low vegetable intake, high snacks intake, poor physical activity level and poor meal timing. Efforts to increase patients' knowledge and strengthen compliance to reduce diabetes complications

should incorporate context-based, individualized, easy to adopt recommendations

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