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Awareness and Adherence to Self- Care Activities of Adult Type 2 Diabetic Patients attending Clinics at two tertiary hospitals in Imo–State, Nigeria.

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ABSTRACT
The purpose of this study was to determine awareness and adherence to self- care activities among type 2 adults diabetic patients attending clinics at two tertiary hospitals in Imo–state Nigeria. A cross sectional descriptive design was used for the study. The objectives are as follows (i) determine the awareness of self-care activities among adult type2 diabetic patients attending diabetic clinic at 2 tertiary hospitals in Imo State, (ii) identify diabetic patients' knowledge of complications associated with neglect of diabetic self -care activities, (iii) determine how adherent these diabetic patients are to their self-care activities, The target population for the study was 550. A sample size of 231 was used for the study. Two sampling procedures were used for this study. They were stratified and convenient sampling procedures, where Males and females respondents were stratified to provide easy avenue for proportionate representation.
Inclusion and exclusion criteria were considered for this study. Questionnaire was instruments for data collection. Validity of test instrument was face and content validity. Reliability of instrument was test retest method. Data collection procedure, the researcher was able to get both verbal and written administrative permission/approval to carry out data collection. Data Analyses was done by the use of SPSS version 20. Ethical approval was obtained from the ethical committee of the two tertiary institutions used for the study. Findings revealed there is no significant relationship between patients awareness and adherence with self-care activities. $X^2 = 0.057$, $P = .811$. There is no significant relationship between adherence and social demographic variable $P > 0.05$.

Words; Diabetes, Self-care, adherence, Monitoring of Blood Sugar, Self-care awareness, awareness diabetic self-care actions, Diabetic self-care activities.

I. BACKGROUND OF THE STUDY.

Diabetes mellitus (DM) is a chronic progressive metabolic disorder characterized by high blood glucose `mainly due to absolute or relative lack of a hormone known as insulin (Shrivastava and Ramasamy, 2013). The Centre for Disease Control and Prevention (CDC, 2012) defined it as a group of diseases characterized by high blood glucose. Diabetes mellitus is a systemic disease that is chronic and severe. The disease occurs when the body cannot use the insulin it produces effectively or when the pancreas cannot produce enough insulin (World Health Organization About 6.3% of world population lives with diabetes. Type 2 diabetes accounts for 90-95% of the diagnosed cases. Nigeria is reported to have up to 7% of its population as diabetics. Such chronic progressive disease requires daily self-care management and long term therapies. In order to achieve management goals, retard complications, and improve quality of life, diabetic patients need to be aware of their disease and adhere to their drugs, diet modification, physical exercise, monitor their glucose level and other instructions. Regimen adherence poses a unique challenge for such patients resulting to uncontrolled plasma glucose levels, repeated hospital admissions, amputations and death. It is therefore necessary to assess the awareness and adherence to self-care needs of type 2 adult diabetes mellitus patients. This will help in directing better care for diabetics. Awareness in this study is defined as having relevant information

about the disease that can enable the patients to make an informed decision about is disease. Adherence is defined in this study as the extent to which patients follow the instructions they are given for prescribed treatments.

Self-care concept . There are seven essential self-care behaviour in people with diabetes which predict good outcomes. These include healthy eating, being physically active, monitoring blood glucose, taking medications as directed, good problem solving skills, healthy coping skills and risk reduction behaviors (American Association of Diabetic Educators (AADE, 2013). Self- report is by far the most practical and cost effective approach to self-care assessment (AADE, 2008). All the seven behaviors have been found to be positively correlated with good glycaemic control, reduction of complications and improvement in quality of life (Povey& Clark-Carter, 2007). Diabetes self-care requires the patient to make many dietary and lifestyle modifications supplemented with the supportive role of health care staff for maintaining a higher level of self-confidence leading to a successful behaviour change (Shrivastava et al, 2013). **Self-care** is an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of diabetes in a social context. Diabetic Self-care is the activities an individual initiates and perform on his/her own behalf in maintaining life, health and well-being without seeking help. Diabetes Self Care requires the patient to make many dietary and lifestyle modifications, supplemented with the supportive role of health care providers for maintaining a higher level of self–confidence leading to a successful behavior change. Most of the risk factors in diabetes can be prevented by lifestyle changes for people at high risk. These changes in lifestyle include weight loss for people with obesity, healthy food habits, regular exercise and regular meeting with health care providers (Tuomiletho et al, 2005).The health care providers are important for people who already have type 2 diabetes, as they are the main source of information. The health care provider's education for people with diabetes is important for their self-care of the disease. If the information is not clear, the patient will miss out important facts, forget it or may not understand it which will cause lack of Self-Care or ignorance of healthy life style to prevent diabetes complications. The vast majority of day-to-day care in diabetes is handled by the patient and/or his family members in the context of self-care. Self-care is the most important treatment of the disease. Self-care is very important in many aspects, both for the individual well-being and also from the socio-economic perspective. Non implementation of self-care can lead to various complications and increase the patients' sufferings from the disease (Quittenbaum, 2007) Therefore, there is an important need for reliable and valid measures for self-management of diabetes in order to meet the self-care needs. (WHO, 2009). **Statement of the Problem;** In Nigeria, the incidence and prevalence of diabetes have continued to increase, despite a great deal of research and resources (Chinenye, 2011). Also, as stated by Adebayo (2012), more Nigerians die of diabetes than HIV/AIDS. Chinenye (2014) stated, also, that diabetes disease has reached an epidemic proportion in Nigeria and has resulted in permanent disabilities like blindness, amputation of limbs, impotence, kidney failures, still births, pregnancy wastages etc. The prevalence of diabetes is due to shift in dietary habits, developments and urbanization. Non-adherence to diabetes self-care activities has led to many death and complications of diabetic patients in Nigeria. The low adherence to self-care is a source of worry to the researcher, and he wonders what could account for the non – adherence to self-care. There is paucity of data on the awareness and adherence to self-care activities of type 2 adult diabetic patients attending clinics at two tertiary hospitals in Imo State, Nigeria. It was against this background that the researcher wants to know the patient's level of awareness of these essential self-care activities and their adherence. The **purpose of the study** was to determine the awareness and adherence to self-care activities of type 2 adult diabetic patients attending clinics at two tertiary hospitals in Imo state, Nigeria. The **specific objectives** of the study were to:

(i) determine the awareness of self-care activities among adult type 2 diabetic patients attending diabetic clinic at 2 tertiary hospitals in Imo State, (ii) identify diabetic patients' knowledge of complications associated with neglect of diabetic self -care activities, (iii) determine how adherent these diabetic patients are to their self-care activities, (iv) identify factors that might affect diabetic patients adherence behavior with self-care activities and (v) determine if relationships exist between patients' awareness, their demographic characteristics and performance of self-care activities.

The researcher formulated four **research questions**; i. To what extent are adult type 2 diabetics patients aware of their self-care activities. ii To what extent could they elicit the

complications that are associated with neglect of self-care activities. iii Are the diabetics patients adherent with their self-care activities. iv. What factors affect their adherence behaviour with self-care activities. **Research hypothesis include; i.** H_{Oi} There will be no significant statistical relationship in the level of awareness of self-care needs of type 2 adult diabetic patients and the practice of self-care activities. ii. HOii There will be no significant statistical relationship between the knowledge of type 2 adult diabetic patients and self-care adherence. Ii. Ho iii; There will be significant relationship in the level of awareness of self-care needs of type 2 adult diabetic patients and the practice of self-care activities. iii. HO iv. There will be significant relationship between the knowledge of type 2 adult diabetic patients and self-care adherence. **Significance of the Study;** The information generated from this study will serve as -Baseline data on self-care for use in the formulation of policy and strategy in the management of type 2 adult diabetes mellitus patients. The data will also be available for use in the development and conduct of studies in the academia. Findings from this study will add to the existing body of knowledge about self-care needs of type 2 adult diabetic patients. It will further buttress how non practice of self-care activities has resulted to too frequent hospital visit, even in very bad conditions like comatose state etc. This study will help health care givers to prioritize patient's education on self-care, as this will reduce morbidity and mortality of the disease. To the society, practice of self-care activities by the patients will reduce disability due to diabetes thereby affording the patients more opportunity to live more productive lives and contribute to national economic growth. **Scope of the Study;** The study was delimited to the awareness and adherence to self-care activities practice by adults who have been diagnosed with Type-2 diabetes mellitus and who were attending clinic at the Imo state university Teaching Hospital Orlu, and the Federal Medical Centre Owerri, Imo-state. Both of them are teaching hospitals and run diabetic clinic in their setting. The researcher **reviewed literature** under Conceptual review, describing various concepts of the variables used in the study. Theoretical framework underlying the study was based on Orem's theory of self-care and Empirical works in the area of study was carried out.

II. METHODS

A cross sectional descriptive design was used for this study. This design was used successfully to determine the prevalence and factors in non- adherence to diabetes treatments in Uganda by Kalyango et al (2008). Chang et al (2007). It was also used to study non adherence behaviors of Taiwanese children with type 1 diabetes. Shrivatava (2013) used this design to study the role of self-care in management of diabetes mellitus in Tamil Nadu, India. Therefore it was deemed fit for this study. This design is considered appropriate for this study because it allows one to give a detailed description of the phenomenon under study and also allows an orderly collection of data, analysis, interpretation and report of findings about the phenomenon, under study.

Area of study The study was carried out in two tertiary hospitals in Imo-State Nigeria. Imo state is one of the 36 states of the Federal Republic of Nigeria. The study was carried out at the Out-Patient Department of these tertiary Hospitals. The two health facilities run diabetic mellitus clinic. By this, sufficient number of patients was expected from the two health facilities. Secondly, although the two health facilities are tertiary institutions, they are owned and managed by two different tiers of Government i.e. Federal Government owns Federal Medical Centre while Imo state University Teaching Hospital is owned and managed by the Imo State Government. Using the two health facilities allowed for comparison in the service rendered in the hospitals.

Population of the Study The target population for the study was all the type 2 adult diabetic patients attending diabetic clinic at the two tertiary health facilities Imo – State.

. The researcher used inclusion and exclusion criteria to get his population of the study. The researcher excluded these who were no longer using the two tertiary health facilities for their clinics for more than a year. The researcher used only those attending the diabetic outpatient clinic during the study period between January to December 2021 from the medical records of the two centers.

The total population for the study was 550. Out of this, 295 were from State Teaching Hospital while 255 were gotten from FMC. On gender bases FMC have 136 (46%) males and 159 (54%) females. IMSUTH have 145 (59%) males and 100 (41%) females.

Sample Size

The sample size of 231 was calculated from the known population of people diagnosed of diabetics mellitus attending FMC and IMSUTH Orlu diabetic clinic. Researcher used Yara

Yommen formular. Two hundred and twenty seven (227) respondents were selected for FMC and one hundred and four respondents were selected from IMSUTH. This was derived from the target population (550) and calculated using Yaro Yommen formular

Sampling Procedure

Two sampling procedures were used for this study. They were stratified and convenient sampling procedures. Males and females respondents were stratified to provide easy avenue for proportionate representation.

In FMC, the researcher selected 54 males and 67 females, given a total of 118. In IMSUTH 66 males were selected and 47 females given a total of 113. This gave a total of 231 respondents in both centers. This was made possible by creating attendance registers for males and females in each center where selection was done. From the created patients lists, as per attendance register, the researcher call first patients either no 1 or 2, chance to pick one by random sampling, (either by tossing a coin for 1 or 2 or by wrapping a piece of paper for 1 or 2. If number one is picked, then subsequence ones occupies no 3, 5, 7, 9, 11… nth will be selected). **Stratified random sampling procedures:** The respondents were stratified into males and females. This stratification provided easy avenue for equal gender treatment in the selection procedure of the subjects for three months. i. **Simple Random Sampling (SRS):** From each category or stratum of male and female scheduled to attend clinic, SRS was used to select 66 males and 47 females from IMSUTH, and 54 male and 47 females from FMC. The selection activities took 11 week. (IMSUTH 66 +47 = 113) (FMC 54+47 = 118) (Total 113+118 = 231). ii. **Convenience sampling** procedures**:** was used for the study. This is a type of non-probability sampling where the researcher works with only the subjects that were accessible and available at the time when questionnaires were served. This method relies on data collection from respondent who are conveniently available to participate in the study. **Inclusion Criteria** Respondents must have been diagnosed of having type -2 diabetes mellitus by a medical officer for at least one year.

The patient was 18yrs of age and above. He/she must be attending the diabetic out-patient clinic during the study period. He/she must be coherent and alert and willing to participate in the study through informed consent. The respondents must be availability at the time of data collection. **Instrument for Data Collection;** A 33 item structured questionnaire, was developed by the researcher in line with the objectives of the study for data collection. The questionnaire was divided into five Sections. Section A, focused on demographic data with six (6) questions. Section (B), addressed what the diabetic patients know about self-care activities with 3 questions. Section (C) focused on what they know about complication of diabetes due to self- care activities negligence. Section (D) contained information on diabetic adherence with self- care activities and Section (E) contained information on factors that affect the adherence behaviors with self -care activities.

Questionnaire was closed ended type of response pattern where the respondents were asked to answer Yes or No. Only two questions in section A, were open ended. Because respondents were not given options and the patients had to write in their responses.

Validity of the Instrument

The face and content validity of this questionnaire was carried out by submitting the instrument to the researcher's supervisor and two Senior Lecturers in the Department of Nursing Science, who are experts in nursing research and clinical practice. They were asked to examine the items in line with the objectives and the hypothesis set for the study. They assessed the language used in developing the items. They made necessary modifications and their inputs and suggestions were effected. Items were rearranged according to the response group. The final draft of the instrument was submitted to the researcher's expert who approved it after effecting corrections. The approved instrument was subjected to pilot testing to establish its reliability.

Reliability of Instrument

The reliability of the questionnaire was determined by the use of test re-test method. The two sets of scores were correlated using Pearson Product Moment Correlation (R) and a coefficient of reliability of 0.98 was obtained which showed the instrument as reliable for the data collection.

Ethical consideration

The researcher got both verbal and written ethical approval for permission to collect data from the two research settings. Assurance of confidentiality and anonymity were assured to respondents before data collection.

Procedure for data collection

IMSUTH. The researcher will visit the FMC on Wednesdays which are their diabetic clinic days to recruit 118 respondents for 6 weeks. The researcher also will selected 100 respondents

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within 5 weeks, [selecting 20 respondents each week]. He will also recruited 18 respondents at the sixth (6th) week. (100 + 18 = 118).
At IMSUTH the researcher will visit there on Thursdays which are their diabetic clinic days to recruit 113 respondents for 11 weeks. He will recruit 100 respondents [at 10 respondents per week]. 13 respondents at the last 1 week. (100 + 13 = 113).

Method of data analysis

The data generated from the questionnaires checked manually for completeness and correctness, then it was collated and entered into SPSS (Statistical Package for Social Sciences) version 18 for analysis. The analyzed data results were presented on Tables, percentages, frequencies. The inferential statistics was carried out using Chi-square to test the association between variables under study. All hypotheses were tested at 0.05 probability level.

III. RESULTS

The respondents had high level (70.9%) of awareness of self-care activities. The self-care activities information was obtained mostly through their doctors/nurses (93.9%) while the least source was the internet (36.4%). The four most known complications associated with neglect of self-care activities were: hyperglycemia (82.0%), cardiovascular problems which can lead to stroke (75.4%), hypoglycemia (73.7%) and foot damage/ulcer that can lead to amputation (73.7%) while the least known complication was kidney damage (44.3%). On the overall, the adherence level to self-care activities was relatively high (63.0%). Patients' adherence to self -care activities were hindered mostly by the frustration of taking drugs for life (77.3%), cost (72.6%), forgetfulness (71.4%), cost of maintaining the diet (70.2%), forgetfulness (76.5%), tiredness doing it every day (76.1%), fear of pricking oneself (79.2%) and the cost of buying strips (78.6%). There was no significant relationship ($p > 0.05$) between patients' awareness, their demographic characteristics and adherence to self-care activities.

Table 3: Respondents demographic characteristics
n = 228

Variable		Frequency	Percent
Age	40-49 yrs	42	18.5
	50-59 yrs	62	27.3
	60-69 yrs	61	26.9
	70-79 yrs	36	15.9
	80+ yrs	26	11.5
	Range	4	
	Mean Age	62.17±13.49	
Gender	Male	128	56.4
	Female	99	43.6
Marital Status	Single	17	7.7
	Married	162	73.0
	Divorced	25	11.3
	Widowed	18	8.1
Religious Affiliation	Christianity	182	82.0
	Islam	36	16.2
	Traditional	4	1.8
Highest Education Attainment	No formal	43	19.2
	Primary	27	12.1
	Secondary	55	24.6
	Tertiary	99	44.2
Family history of diabetes	Yes	104	49.3
	No	107	50.7

Years living with diabetes	< 5 yrs	71	31.6
	6-10 yrs	90	40.0
	11-15 yrs	37	16.4
	16-20 yrs	27	12.0
	Range	2-20	
	Mean±SD	8.61±5.00	
Patients' treatment modality	Injection	5	2.2
	Oral Hypoglycemic Agent	23	10.1
	Injection & Oral Hypoglycemic Agent	197	86.4
	Diet only	3	1.3

Some items have total frequency less than the sample size; Percentage and Means are computed based on the total frequency for the item

The result on Table 3 shows the respondents' demographic characteristics. The age range of the patients was 40-100 years, the mean age and standard deviation were 62.17±13.49 years while the predominant age group was 50-69 years 123 (54.2%). Predominantly among them were males 128 (56.4%), married 162 (73.0%), Christians 182 (82.0%) and those with tertiary education 99 (44.2%).

Approximately 107 (50.0%) of the patients had family history of diabetes. The range of years they have lived with the disease was 2-20 years, the mean and standard deviation were 8.61±5.00 (mean= 8.61: SD=5.00) while the predominant group were those with the disease for 6-10 years 90 (40.0%).

The predominant treatment modality was the combination of injection and oral hypoglycemia agent 179 (86.4%).

Objective 1: To determine the awareness of self-care activities among adult type 2 diabetic patients attending diabetic clinic at 2 tertiary hospitals in Imo state.

Table 4: Respondents awareness of diabetic self-care activities
N=228

Item	Frequency	Percent
Self-care activities		
Diet modification or eating as prescribed	199	87.3
Doing exercise daily	167	73.2
Checking blood sugar at home	139	61.0
Inspecting the feet daily	47	20.6
Not/stop smoking	158	69.3
Taking drugs as prescribed	201	88.2
** Eating only protein food	14	6.1
Coming to check when booked	165	72.4
Frequency at which exercise should done		
Daily	136	65.7
Twice per week	37	17.9
When I feel like	31	15.0
Not at all	3	1.4
Total	207	100.0
Sources of self care activities information		
Radio/TV	180	78.9
Their doctors/nurses	214	93.9
Seminars	176	77.2
Church	118	51.8
Internet	83	36.4

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Overall awareness level		
Low	60	29.1
High	146	70.9

**** implies incorrect self-care activity; Percentages of item 1 & 3 were computed based on sample size due to possibility of multiple responses**
Percentages of item 2 were computed based on the total frequency for the item

The result on Table 4 shows the respondents awareness of diabetic self-care activities. The four most identified self-care activities were: taking drugs as prescribed 201(88.2%), diet modification 199(87.3%), doing exercise daily 167(73.2%) and coming to check when booked 165 (72.4%) while the least identified was daily inspection of teeth 47(20.6%). Few patients wrongly identified eating only protein food 14 (6.1%) as a self-care activity. The self-care activities information was obtained mostly through their doctors/nurses 214 (93.9%) while the least source was the internet 83(36.4%). On the overall, the respondents had high level of awareness of self-care activities 146 (70.9%).

Objective 2: To elicit diabetic patients knowledge of complications associated with neglect of diabetic self-care activities.

Table 5: Respondents awareness of complications associated with neglect of self-care activities

Item	Frequency	Percent
Complications		
Cardiovascular problems which may lead to stroke	172	75.4
Poor vision/blindness	147	64.5
Hyperglycemia	187	82.0
Hypoglycemia	168	73.7
Foot damage and ulcer that may lead to amputation	168	73.7
Hypertension	144	63.2
Kidney damage	101	44.3

Responses not mutually exclusive

The result in Table 3.3 shows the respondents' knowledge of complications associated with neglect of self-care activities. The result shows that four most known complications associated with neglect of self-care activities were: hyperglycemia 187(82.0%), cardiovascular problems which can lead to stroke 72(75.4%), hypoglycemia 168 (73.7%) and foot damage/ulcer that can lead to amputation 168 (73.7%) while the least known complication was kidney damage 101(44.3%).

Objective 3: To determine the level of adherence of diabetic patients to their self-care activities

Table 5: Level of adherence to self-care activities among the respondents

N=228

Diet Item		Frequency	Percent
No of times responders eat per day	Once	2	0.9
	Twice	55	25.2
	Three times	*135	61.9
	Four times	25	11.5
	Five times	1	0.5
Inclusion of snacks in between meal	Yes	75	34.6
	No	*142	65.4
Mixing food from the six diet classes	Consistently	*74	36.6
	When I have the available food stuffs	113	55.9
	Rarely	13	6.4
	Not at all	2	1.0
Exercise			

Frequency of engagement in exercise such as having a walk	15-30 minutes daily	*131	60.1
	3-4 times per week	39	17.9
	Twice per week	23	10.6
	When I feel like	18	8.3
	Not at all	7	3.2
Type of work engaged in	Sit down up to 6 hours a day doing daily work	54	23.7
	Trekking to work	*19	8.3
	Walking around while working	*91	39.9
Blood glucose test			
Possession of a glucometer	Yes	*166	74.1
	No	58	25.9
Testing oneself blood glucose level	Yes	*186	85.7
	No	31	14.3
Frequency of checking blood glucose level	Daily	*77	36.5
	Once per week	42	19.9
	Once per month	10	4.7
	When I feel sick	24	11.4
	Once per two weeks	7	3.3
	When I come for check-up	51	24.2
Foot care			
Frequency of feet inspection	Daily	*123	55.2
	Once per week	54	24.2
	Anytime I feel like	44	19.7
	Once per month	2	0.9
Inspection in between the toes after washing	Daily	*104	46.6
	Once per week	69	30.9
	Anytime I feel like	50	22.4
Preferably worn Foot wear	Cover shoes	*190	83.3
	Slippers	173	75.9
	Tight shoes	19	8.3
	Boots	*53	23.2
	None above	1	0.4
Smoking habit			
Smoking cigarette	Yes	56	24.8
	No	*170	75.2
Last time the non-smokers smoked	Never smoked	*123	72.4
	Last 1-2 months	6	3.5
	1-2 years ago	22	12.9
	More than 2 years	11	6.5
	No response	8	4.7
No. of days per week recommended diabetic drug are taken	None	2	0.9
	1-2 days	11	5.1
	3-4 days	43	20.0
	5-6 days	50	23.3
	7 days	*109	50.7
Overall adherence level			

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Low	60	37.0
High	102	63.0

Foot note: the responses with * in the table are the appropriate responses.

The result on Table 5 shows the level of adherence to self-care activities as regards to adherence to eating foods, majority 135(61.9%) eat 3 times in a day, majority 142(65.4%) do not include snacks in between meals. However, the adherence to consistent mixing of food from the six diet classes was poor 74(36.6%).

In exercise, the adherence daily exercise of 15-30 minutes was a bit high 131(60.1%). Other forms of exercise such as trekking to work 19(8.3%) and walking around while working 91(39.9%) were poorly adhered.

In blood glucose test, the adherence to possession of a glucometer 166 (74.1%) and testing of one's blood glucose level 186 (85.7%) was high, however most patients did not practice daily checking of the blood glucose level 77(36.5%).

In foot care, the adherence to daily inspection of feet was a bit above average 123(55.2%) while inspection in between the toes was a bit below average 104(46.6%). Also adherence to wearing of cover shoes was high 190(83.3%) while that boots was poor 53(23.2%).s

In cigarette smoking, the adherence level to abstinence was high 170(75.2%). However, out of these only 22.9% quitted smoking. Majority never smoked 123(72.4%).

On the overall, the adherence level to self-care activities was a bit high 102(63.0%).

Objective 4: To identify factors that affect diabetic patients adherence behaviour with self -care activities.

Table 6: Factors that hinder adherence to self -care activities (medication, diet, foot care and monitoring plasma glucose level)

		N=228	
		Yes	No
Medication	Cost	151 (72.6)	57 (27.4)
	Forgetfulness	140 (71.4)	56 (28.6)
	Frustration for taking drugs for life	143 (77.3)	42 (22.7)
	Felt better	59 (29.8)	139 (70.2)
	Too much drugs to drink daily	119 (65.7)	62 (34.3)
	During fasting programme	140 (69.3)	62 (30.7)
Reasons for not following medication regularly	No money to buy	83	36.4
	Forgetfulness	83	36.4
	No knowledge	5	2.2
	Fear of side effects	71	31.1
	Tired of taking the drugs	77	33.8
Diet	Not sweet to taste	75 (35.7)	135 (64.3)
	Monotonous	100 (52.9)	89 (47.1)
	Costly to maintain	146 (70.2)	62 (29.8)
	Causes confusion in family	85 (44.3)	107 (55.7)
Foot care	Forgetfulness	163 (76.5)	50 (23.5)
	Tired of doing it every day	159 (76.1)	50 (23.9)
	Nobody to assist	81 (40.5)	119 (59.5)
	Not necessary	54 (26.7)	148 (73.3)

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	Makes uncomfortable	118 (59.3)	81 (40.7)
Monitorin g of glucose level	Cost of buying strips	173 (78.6)	47 (21.4)
	Fear of pricking self	160 (79.2)	42 (20.8)
	Inability to interpret result	122 (60.7)	79 (39.3)
	Frustration of doing it all the time	71 (34.6)	134 (65.4)

Results in Table 5 show the factors that hinder adherence to self care activities. In medication, the patients were hindered mostly by the frustration of taking drugs for life 143(77.3%), cost 151(72.6%) and forgetfulness 140(71.4%). In diet, it was the cost of maintaining the diet 146(70.2%). In foot care, the factors were mostly forgetfulness 163(76.5%) and tiredness doing it every day 159(76.1%) while in glucose level monitoring, they were fear of pricking oneself 160(79.2%) and the cost of buying strips 173(78.6%).

In medications, the adherence to 7 days per week taking of recommended drugs was average 109(50.7%) and the most hindering factors were forgetfulness and lack of money 83(36.4%).

Hypothesis 1: There is no significant statistical relationship between level of awareness of self-care activities and the practice of self -care activities among adult diabetic patients.

Table 7: Relationship between awareness and practice of self- care activities among the respondents

		Adherence Level		Chi-Square	Df	p-value
		Low	High			
Level of awareness	Low	13(36.1)	23(63.9)	.057	1	.811
	High	38(33.9)	74(66.1)			

Results on table 7 show relationship between awareness and adherence to self- care activities among the respondents. Adherence level for patients with low awareness of self- care activities was 23(63.9%) and for those with high awareness level 74(66.1%). Comparing, a Chi-Square Test of Association revealed no significant difference between awareness and adherence ($p>0.05$). This implies that the adherence to self-care activities was the same for both groups. Hence, no significant relationship existed between patients' awareness and adherence to self -care activities. The null hypothesis was therefore accepted.

Hypothesis 2: There is no significant statistical relationship between demographic characteristics (of type 2 diabetic patients) and performance of self- care activities.

Table 8: Relationship between Patients' Demographic Characteristics and Adherence to Self Care Activities

		Adherence Level		Chi-Square	df	p-value
		Low	High			
Age	40-49 yrs	16(47.1)	18(52.9)	3.283	4	.512
	50-59 yrs	17(39.5)	26(60.5)			
	60-69 yrs	15(35.7)	27(64.3)			
	70-79 yrs	7(30.4)	16(69.6)			
	80+ yrs	5(25.0)	15(75.0)			
Sex	Male	29(33.3)	58(66.7)	1.105	1	.293
	Female	31(41.3)	44(58.7)			
Marital Status	Single	7(63.6)	4(36.4)	-	-	.241
	Married	42(35.6)	76(64.4)			
	Divorced	5(29.4)	12(70.6)			
	Widowed	6(46.2)	7(53.8)			

Highest educational attainment	No formal	12(37.5)	20(62.5)	2.124	3	.547
	Primary	3(20.0)	12(80.0)			
	Secondary	17(38.6)	27(61.4)			
	Tertiary	27(39.7)	41(60.3)			
Religious affiliation	Christianity	47(35.9)	84(64.1)	-	-	1.000
	Islam	9(37.5)	15(62.5)			
	Traditional	1(33.3)	2(66.7)			
Year living with diabetes	< 5 yrs	20(37.7)	33(62.3)	.928	3	.819
	6-10 yrs	25(40.3)	37(59.7)			
	11-15 yrs	8(29.6)	19(70.4)			
	16-20 yrs	7(36.8)	12(63.2)			
Family history of diabetes	Yes	28(38.9)	44(61.1)	.101	1	.750
	No	28(36.4)	49(63.6)			

Result on Table 3.7 shows the relationship between patient's demographic characteristics (Age, sex, marital status, educational level, yearly living with diabetes, family history of diabetes) and adherence to self-care activities among the respondents. The result of the Chi square analysis of the relationship between age and adherence shows no significant relationship between the age variables and adherence. ($p>0.05$), the null hypothesis is therefore accepted.

IV. DISCUSSION

Demographic data of the respondent- The result showed that the age range of the patients was 40-100 years and the mean and standard deviation were 62.17 ± 13.49 while the predominant age group was 50-69 years (54.3% approximately 50.0%) of the patients had fairly history of diabetes. The range of years they had lived with the disease was 2-20 years, the mean standard deviation were 8.61-5.50 while the treatment modality was injection and oral hypoglycemic agent (86.4%). There is no relationship between performance of self-care and social demographic variables such as age. ($p> 0.05$).

Awareness of self-care among adult type 2 diabetes mellitus patients

The four most identified self-care activities were: taking drugs as prescribed (88.2%), diet modification (87.3%), doing exercise daily (73.2%) and coming to check up when booked (72.4%) while the least identified was daily inspection of foot (20.6%). Few patients wrongly identified eating only protein food (6.1%) as self-care activities. The self-care activities information was obtained mostly through their doctor/nurses (93.9%) while the least source was the internet (36.4%).This result revealed that many adult type 2 diabetic patient in Imo state were aware of their self-care activities, only very few still needs more information on foot inspection daily and proper choice of diet.

This finding is in agreement with the study carried by Dorothea Orem's Theory who stated that an individual should have practical skills to organize and perfume self-care activities. It also agrees with the opinion of (Kirkevoid, 2000) who said that self-care skills can be developed spontaneously by practice and true instructions from their health care givers and this has made the diabetics self-care activities relatively high. This is also supported by Chan et el, (2008) who admitted that informing the patients about self-care activities will make diabetic patients to take an informed decision on their self-care activities that will prevent diabetics complications. This made the adult type 2 diabetic patient awareness of self-care activities in Imo state to be high (70.9%). However, there was no relationship between awareness level and adherence with self- care activities, $p > 0.05$.

Awareness of complications associated with neglect of self- care activities.

Four major known complication of self-care neglect were: hyperglycemia (82.0%), cardiovascular problems which can lead to stroke (75.4%), hypoglycemia (73.7%) and foot damage/ulcer (73.7%) and the least kidney damage (44.3%).

This finding is in concordance with the opinion of Tuomiletho at el, (2005) who stated that diabetic self-care activity is an evolutionary process of development of knowledge or awareness by learning to survive with the complex nature of diabetics in a social context. He said that most risk factors in diabetics can be prevented through self-care practices. This revealed that the awareness

level of adult type 2 diabetic patients that attend clinics at the two tertiary hospitals in Imo state is high. Their high knowledge of complications of self-care neglect makes them to avoid complications and have a better living.

Adherence with self-care activities:

Diet In diet, the respondents adherence to eating food three times in a day was a bit high (61.9%) and non-inclusion of snacks in between meals (65.4%). However, the adherence to consistent mixing of food from the six diet classes was poor (36.6%). The result on adherence to eating 3 times a day was a bit high (65: 4%). This means that the respondents have followed a healthful eating plan. This result agreed with IDI (2005) recommendations concerning food planning, which stated food planning will help the patients to get a well- balanced diet. Stable glucose level and reduce the cardiovascular risk factors. The result is also in agreement with the findings of Miyata &Ypersele (2009) who stated that following a daily meal plan with the right amount of carbohydrate (50 – 60 %), Protein (10 – 20 %), fat (20 – 30 %), dietary cholesterol less than 300mg daily and modifying calorie to achieve and maintain a modest weight loss is one of the most important step one should take to manage his type2 diabetes. of Gopichandran et al (2012) which stated that self-care activities in respect to diet and exercise are poor in Urban Community in Southern India. On non- inclusion of snacks in between meals, the result is in agreement with the recommendations of IDI (2005) that diabetic patients should eat food high in dietary fibre, reduce the number of calories, follow a low fat eating plan. Similarly the result is consistent with WHO (2009) recommendations that diabetic patients should moderate sweaty fruits but eat more of vegetables, fruits, legumes and whole grain products as they have effect on blood fat and blood sugar control. On poor adherence to consistent mixing of food from the six classes of food, the result was in disagreement with the findings of Miyata &Ypersele (2009) which stated that diabetic patients should follow a daily meal plan with the right amount carbohydrate, protein and fat. In Imo State, there is good adherence to dietary self-care activities among adult type 2 diabetic patients but adequate targeted health education should be intensified to improve more self-care behaviour on consistent mixing of food from the six classes of food and non-inclusion of snacks in between meals.

Exercise

The result on adherence to daily exercise of 15 – 30 minutes is in agreement with the recommendation of ADA (2009) which stated that exercise promotes uptake of glucose in the muscles for a period of time, thereby reduces blood glucose level in the body. Similarly, the results agreed with the findings of American College of foot and Ankle Surgeons (2009) whose studies revealed that daily exercise increases blood circulation in the body and reduced body weight. The poor adherence to trekking to work ,and walking around while working was similar to the findings of Cockram (2000) on Vietnamese men and women who have become more inactive due to Urbanization, Westernization and changing lifestyle. He observed that few Vietnamese participate in specific exercise sessions. Also the result is on disagreement with the recommendations of ADA (2005) which stated that it is important to adopt a healthy lifestyle to lower the mortality rate and to improve the body's insulin sensitivity and glycemic control. Such healthy lifestyle includes, walking in the park daily, walking instead of taking a motor bike. It also did not agree with the stipulation of ADA,[2013]which stated that for overall fitness of the body. The result revealed that adult type 2 diabetic patients that attend clinic at the two tertiary hospitals in Imo state adhere to daily exercise. The result also revealed that few patients need some additional support or education to encourage the adherence to walking around while at work.

Blood glucose test

(i) The adherence to possession of a glucometer (74.1%), and testing of oneself blood glucose level (85.7%) was high. Most patients did not practice daily checking of blood glucose level (63.5%). The adherence level to possession of a glucometer and testing of one's blood glucose was high. This result is in agreement with the result of Guerci et al (2002) who stated that monitoring of glucose level should be done regularly at home before each meal and at bed time which is associated with better improvement of the metabolic control. The result also agreed with the recommendations of IDI (2005) which states that monitoring of blood glucose depends on the availability of resources in the country and availability of resources for the individual, this entails that patients who were prescribed insulin should check their blood glucose on daily bases at least three times as it helps to prevents hyperglycemia. Those patients who do not practice daily checking of blood glucose level (63.5%). Shows that most patients do not have control over

their blood glucose level. The patient needs more information concerning blood glucose control for those patients who were prescribed daily insulin. This study indicated that the adult type 2 diabetes mellitus patients in Imo State do check their blood glucose regularly as prescribed.

Foot care

The adherence to daily inspection of foot was a bit above average (55.2%) while inspection in between the toes was a bit below average. Also adherence to wearing of cover shoes was high (83.3%) while that of boots was poor (23.2%). The result shows that participants had a good adherence to foot Care, even though it was not optimal. The adherence to foot inspection and wearing of cover shoes were high. This result agreed with the findings of American College of foot and Ankle Surgeon's [ACFAS],(2009) who stated that patients need to inspect their shoes and feet daily to see if the shoes are broken, or if there are any blister, cuts, nail problem or swelling, since the disease can cause neuropathy, which will make patients not to have sensation. The adherences to wearing of boots were poor (23.2%). This disagreed with the ACFAS, (2009) recommendations that patients should wear protective materials or take preventive measures to avoid cuts on the skin to reduce foot and skin injuries. This shows that some patients have not fulfilled these recommendations since the wearing of boots was poor. If the foot care is not optimal it can lead, in worst cases to amputation and loss of quality of life. Similarly, this result on foot care is in concordance with recommendation of AADs, (2013) which stated that through effective reduction of behaviors such as regular foot inspection and dental examination, a diabetic type 2 patients can reduce diabetic complications and also maximize health and quality of life. This result revealed that all adult type 2 diabetic patients in Imo state adhere to their self- care activities to reduce their diabetic's complications.

Medications

The adherence to 7 days per week taking of recommended drugs was average (50.7%) and the most hindering factors were forgetfulness and lack of money (36.4%). The adherence to taking of recommended drugs 7 times per week was average (50.7%). The treatment adherence in diabetes is an area of interest and concern to health professionals and clinical researchers. The result shows that many diabetic patients were not taking their medications and this is in disagreement with ADA, (2011) recommendation which stated that healthy lifestyle choices can lower the blood glucose level, reduce the risk of diabetic complications and produce other clinical benefits. The adherence rate at Imo State (50.7%) is lower than 72.5% adherence rate found in under resourced environment in Eastern Nigeria, Iloh G.U et al (2013), it is also lower than 51.3% reported in Ethopia and 93% reported in another study in Ibadan, South Western Nigeria by Yusuf et al (2008). If diabetic patients adhere with their appropriately prescribed anti diabetic medication, glycemic control outcome will be expectedly improved. The study observed that the most common cause of non -adherence to taking recommended drugs were forgetfulness and lack of money. This result indicated that in Imo State, the adherence to prescribed diabetic drugs by adult type 2 diabetic mellitus is high. This implies that type 2 diabetic patients in Imo State take their medications as prescribed.

Factors that hinder adherence with self-care activities

In medications, the patients were hindered mostly by the frustration of taking drugs for life (77.3%), cost (72.6%) and forgetfulness (71.4%). In diet it was the cost of maintaining the diet (70.2%), in foot care the factors were mostly forgetfulness (76.5%) and tiredness doing it every day (76.1%) while in glucose level monitoring, they were fear of pricking oneself (79.2%) and the cost of buying strips (78.6%). There is no significant relationship between the adherence and social demographic data/variables such as age ($p > 0.05$) and also there is no significant relationship between awareness and adherence X^2 (1) = 0.57, P = .811.

This result is in agreement with the result of Shrivastava&Ramasamy (2013) which stated that cultural barriers such as poor access to drugs, high cost, patient provider relationship, degree of symptoms, unequal distribution of health providers between urban and rural areas have restricted self-care activities in developing countries. This result is similar to the reports from Ibadan by Adisa et al (2009) and Iloh et al (2012) in Eastern Nigeria.

Their findings have showcased the health care costs, involved in the management of type 2 diabetic patients as a major hindrance. Result revealed that financial variables both direct and indirect costs of care and forgetfulness have been reported to influence, diet, medication, foot care and glucose level monitoring adherence among type 2 diabetic patients in Imo State. Cost of diabetic care therefore play an important role in non adherence to diabetic medication, foot care and

glucose monitoring etc. there is need for adequate education / health information on factors that influence adherence to diabetic self-care activities.

Implication of the study

The result of the study has shown that most of the studies reported are mostly from overseas, I feel it will be interesting if extensive research on diabetic self-care activities should be carried out in all the rural areas in Nigeria. Secondly, there is urgent need for health care givers to provide more adequate information that will motivate those patients with low adherence to cope. Efforts should be made not to compromise the standard of the self-care education and its practices. Health care providers should be able to recognize patients who are prone for non - adherence and awareness of self -care activities and give them special attention.

Limitations of the study

The study was conducted in tertiary hospitals in Imo state and there may not be much room for generalization because diabetic patients in other private hospitals in Imo may have different perception of the diabetic self-care in their hospital. Also there was strike action by resident doctors in FMC Owerri during the study period which affected collection of data used for the study.

V. SUMMARY/CONCLUSION

The main purpose of this study is to access the awareness and adherence of adult type 2 diabetic patients that attend clinics at the 2 tertiary health facilities in Imo state. The study was guided by few research questions and 3 hypotheses. The hypotheses were tested at $\alpha = 0.05$ level of significance.

A cross sectional descriptive study design was used for the study. Power analysis was used to determine the sample of 231 respondents then stratified sampling procedures were used for the study. Instruments used for the study was researcher developed questionnaire. Data were analyzed in line with the research questions and formulated hypothesis. The research questions were statistically analyzed using frequencies and percentages. Chi-Square Test of Association and Fishers Exact Test were the statistics used to test the hypothesis using SPSS (statistical package for social sciences) version 20. The results were presented in table. The finding of the result showed, there is no significant relationship between patients awareness and adherence with self-care activities. X^2 (1) = 0.057, P = .811. There is no significant relationship between adherence and social demographic variable $P > 0.05$, such as age (P = .512), sex (P = .293), marital status (P = .241) etc.

Based on the findings, the researcher therefore concluded that both awareness and adherence with self-care activities among adult type 2 diabetic patient at the 2 tertiary health facilities in Imo state are high. This show that the respondents have good knowledge of their diabetic self- care activities and practices that will prevent complications.

VI. RECOMMENDATIONS:

Based on the findings, the following recommendations were made:

- There is need for a sustained community/public awareness programme which is geared towards maintaining this trend of 'good knowledge of and good adherence to self- care activities'. The general public not only the sufferers, also need to improve their knowledge of the management of DM and the implications of defaulting.
- .The government need to look into making substantial allocation of funds to the area of management of diabetes mellitus in terms of subsidies for clients in some of the treatment modalities that are very costly; in terms of grants for researches to improve the management of people with diabetes mellitus.
- The health professionals need to take advantage of the social structures and support systems that have been shown to help people cope better with chronic health issues such as the much celebrated extended family system, our community churches and local school systems to form a strong basis for innovative efforts aimed at providing strong support for people with this chronic disease.

VII. SUGGESTIONS FOR FURTHER STUDY

The following areas are recommended for further studies/research: similar studies on self-care activities of type 2 diabetics should be carried out in other private hospitals and rural health in every state. Studies should be carried out on prevalence of adherence with diabetic self-care activities in rural primary health centers where many rural people (both diabetic and non-diabetic) report sick.

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