Journal of Research in Nursing and Midwifery (JRNM) (ISSN: 2315-568) Vol. 5(1) pp. 011-020, January, 2016
Available online http://www.interesjournals.org/JRNM
DOI: http:/dx.doi.org/10.14303/JRNM.2015.130

Full Length Research Paper

Non-compliance with treatment regimens among clients with diabetes mellitus in university of Maiduguri teaching hospital, North-Eastern Nigeria

[1]Chutiyami Muhammad, [2]Umar N Jibril, [3]Salihu Dauda*

[1]Department of Nursing Services, Yobe State Hospitals Management Board, Nigeria
[2]Department of Nursing Science, University of Ilorin, Nigeria
[3]Department of Nursing Services, Yobe State Hospitals Management Board, Nigeria
Corresponding author's E-mail: barebaris@gmail.com, +447443076385

Abstract

This study investigates into factors responsible for non-compliance of treatment regimens among clients with diabetes mellitus in University of Maiduguri Teaching Hospital (UMTH), Borno State, Nigeria. A descriptive study design was adopted. 135 clients were sampled using a convenient sampling technique. A structured questionnaire was administered to 135 clients, and analysis was based on 125 clients that participated fully in the study. The instruments sought information on socio-demographic, knowledge and attitude towards compliance and factors responsible for non-compliance to diabetic treatment regimen. Null hypotheses were set and tested using chi-square (X^2) at 0.05 level of significance. The result showed that 57.6% of clients opined that non-compliance to treatment regimens was as a result of high cost of drug, while, lack of family support and poor attitude of health personnel was expressed by 37.6% and 51.2% of clients respectively. The study concluded that financial, family support and poor attitude of health care personnel which hindered client's compliance to diabetes mellitus treatment regimen be remedy, thus recommendations were made to enhance compliance and improve the lives of the diabetic clients.

Keywords: Attitudes, Diabetic Mellitus, Knowledge, Non Compliance, Treatment Regimen.

INTRODUCTION

Diabetes mellitus is one of the major health problems worldwide and a principal cause of death in developing countries especially Nigeria. Diabetes mellitus is an endocrine disorder in which there is deficiency or lack of insulin production, leading to metabolic disorders of carbohydrates, protein and fat characterized by high sugar level in the blood (hyperglycemia), degenerative vascular changes and neuropathy (Mustapha, 2002). Diabetes mellitus according to Famakinwa, (2002) can be categories into two, based on their etiology. The primary diabetes that is, insulin-dependent diabetes mellitus (IDDM) and non-insulin dependent diabetes mellitus (NIDDM). While, secondary diabetes is associated with recognizable pathological process which may be secondary to the treatment of other conditions. The prevalence of diabetes mellitus in Nigeria has not been uniform over the years, in 1971, a hospital survey by Osuntokun in Ibadan estimated a prevalence of 0.4%, Ohwovoriole in 1989 while screening for diabetes during a world diabetes day celebration in Lagos metropolis, reported a prevalence rate of 1.6%. A national survey in 1992 by Non-communicable Disease Expert Committee recorded a prevalence rate of 2.2% (nationally) with lowest 0.5% in Mangu, Plateau State and highest 7% in Lagos Island. In a similar survey by Puepet in Jos metropolis in 1994 discovered a prevalence rate of 3.1%, by 2004, a second survey in Jos recorded a prevalence of 10.3% and of recent it was reported that about three million Nigerians live with diabetes and the figure is growing daily (Alebiosu et al. 2013). This implies that; the progressive increase in the prevalence rates of diabetes is associated with lifestyle changes, overweight/obesity,

physical inactivity, alcohol consumption, dietary changes and cigarette smoking-factors that are potentially modifiable.

In spite of advanced technology in the medical field and the management of diabetic clients in terms of drugs and diet, the problem of non-compliance to prescribed therapy continues to occur among diabetic clients. This attitude of non-compliance has called for a greater concern in the follow- up of clients to treatment and the overall response to the diabetic management in our hospitals. In 2000, WHO reported that, at least 171 million people worldwide suffer from diabetes, that is; 2.8% of the population and it was estimated that by 2030, this number will almost double. Diabetes mellitus occurs throughout the world but is more common (especially type 2) in the more developed countries. The greatest increase in prevalence is however, expected to occur in Asia and Africa, where most clients will probably be found by 2030**.** Despite several approaches and strategies taken to tackle the problem of non-compliance of client to diabetic treatment, noncompliance to diabetes treatment remains a public health challenge. Several factors such as educational status as well as occupation of patient are important in the daily compliance with prescribed regimen in chronic conditions like diabetic mellitus. Improving patient compliance should therefore be of particular interest to all health care providers in health institutions.

The knowledge of diabetes clients about the diabetes disease was a complex one, the understanding of the disease concept depends on the client access to good health care and health education programmes. However, many studies have shown positive impact of diabetes health education programmes on the knowledge of diabetes client although not all agreed based on the outcome of their studies. Al-Maskari et al. (2013) in a study on Knowledge, attitude and practices of diabetic patients in the United Arab Emirates, observed that thirty-one percent of patients had poor knowledge of diabetes. Seventy-two had negative attitudes towards having the disease and 57% had HbA_{1c} levels reflecting poor glycemic control. Only seventeen percent reported having adequate blood sugar control, while 10% admitted non-compliance with their medications. Knowledge, practice and attitude scores were all statistically significantly, but none of these scores was significantly correlated with HbA_{1c}. Adejoh (2014) also observed in a study which examined the association and influence of diabetes knowledge and health beliefs on diabetes management among the Igala, Nigeria. The study revealed that almost half of the respondents had low diabetes knowledge. Significant relationship existed between level of diabetes knowledge and diabetes management (N = 152) = 8.456, p= .004. There was a significant positive relationship between perceived severity (0.549, p = .000), perceived benefits (12.383, p = .000), and diabetes management. Nwanko, Nandy and Nwanko (2010) study on factors Influencing Diabetes Management Outcome among Patients Attending Government Health Facilities in South East Nigeria, opined that majority of respondents (93.6%) lacked basic knowledge of diabetes management or care and reported inability to visit the doctor except when manifesting serious symptoms or complications. The study also recorded 0% interaction rate between health care workers and diabetes patients outside the health facility.

Barriers to non-compliance according to World Health Organization (2005) include attitude and belief of individuals which explains the health behaviours of such individuals. The perceived benefits of such health behaviours are greatly influenced by culture, religion and level of education among other factors. Ajibade, Abdullahi and Oyedele (2010) in a study on factors militating against compliance with medical regimen among diabetic clients in Osun State Teaching Hospital, south-western Nigeria, as well as findings of Brides et al. (2011) on compliance of treatment management among diabetes patients in Saudi Arabia found that, the level of compliance with drug regimen among diabetics is neither influenced by their educational status nor the sex of the clients, but may be influenced by extent of family and financial support. Ataur et al. (2012) opined that among factors found to be significantly associated with non-compliance on bi-variate analysis were: female gender, level of education (Illiteracy), urban population, irregularity of the follow-up, non-adherence to drug prescription, non-adherence to exercise regimen, insulin, and insulin with oral Metformin. While Nahla et al. (2010) argued that there is no significant relationship between various aspects of compliance and the demographic characteristics of the clients such as age and gender but discovered that the level of compliance to regimens is increased with the improvement of the patient's level of knowledge about diabetes. They established that good and adequately educated diabetes client achieved better metabolic control than fair to poorly educated diabetes. The result of the study also found that 57% of the diabetic clients always took their medications as prescribed and on time, and 27% of the clients identified financial problem as a reason for non-compliance.

In Nigeria, studies have shown that several factors affect treatment compliance in type 2 diabetes specifically. Nwaokoro et al. (2014) and Abdulazeez, Omole & Ojulari, (2014) opined that, there was significant association ($P \leq 0.05$) between number of prescribed medications, side effects, patients' level of education, patients' belief of efficacy of medication and compliance.

Non-compliance to treatment regimens possesses a great threat to patient's recovery as well as maintenance of good health. The successful management of diabetes mellitus depends to a great extent upon strict compliance with treatment regimens. Most clients with diabetes mellitus came back for re-admission soon after they were discharged from the hospital, such clients usually come back with complications (e.g. hyperglycemic coma) which

mainly result from non-compliance with their treatment regimens. This makes diabetes mellitus one of the most common causes of hospitalization as evidenced in University of Maiduguri Teaching Hospital. We therefore found it necessary to investigate into factors responsible for non-compliance with treatment regimens among clients with diabetes mellitus in University of Maiduguri Teaching Hospital, Borno State.

Research Objectives

The purpose of this study is to assess the;

- Knowledge of diabetes client about diabetes mellitus
- Level of Non-Compliance to treatment regimens among clients with diabetes mellitus
- Factors that are responsible for non-compliance to diabetes treatment
- The attitude of health workers on diabetes clients who attended University of Maiduguri Teaching Hospital for treatment.

The following research questions were formulated to guide the conduct of this research;

- What is the knowledge level of clients about the diabetes disease?
- Will the clients be willing to comply with diabetic treatment regimen?
- What are the factors responsible for non-compliance with diabetic treatment regimens among diabetic clients?
- How does the attitude of health workers influence the compliance of diabetes clients to treatment regimen?

Hypothesis

Ho_1There is no significant relationship between clients' educational status and compliance to diabetic treatment regimen

Ho_2There is no significant relationship between cost of drug and compliance to diabetic treatment regimen

Ho_3 There is no significant relationship between family support and compliance to diabetic treatment regimen

Ho_4 There is no significant relationship between attitude of health care personnel and non-compliance of patient to diabetes treatment.

METHODOLOGY

Design

A descriptive research design was used to determine factors responsible for non-compliance among diabetes clients receiving treatment in University of Maiduguri Teaching Hospital (UMTH), Borno State. UMTH is a tertiary health institution located in a densely populated north eastern state of Nigeria. The hospital consists of 26 wards of 530 bed spaces. Out of which, diabetic clients are admitted and managed in 7 wards, while the out-patient clients are seen on Tuesdays (Endocrine clinic day). This study comprises of 204 diabetic clients receiving treatment from which convenient sampling technique was used to sample 135 clients using the Slovin's formula;

n = $\frac{N}{1+N(e)^2}$ (Slovin, 1960)

Where **n=** Sample size

N= Total number of diabetic clients on admission in the hospital = 204

e= level of significance (5% error) = 0.05

Sample size= $\frac{204}{1+204(0.05)^2} = \mathbf{135}$

Data for this study was obtained by a structured questionnaire from both the in-patient and out-patient (diabetic clients) that can read and write in English Language. The same questionnaire was transcribed into a questionnaire schedule which was used to interview diabetic clients that cannot read nor write in English Language. The questions were in 3 sections. Section A obtained Socio-demographic data of the clients, Section B on knowledge and attitude of the clients, and Section C; sought information on factors responsible for non-compliance to treatment regimens. The instruments used were also reviewed for face and content validity. The reliability of the instruments was determined through a pilot test using section B and C of the questionnaire/schedule among 20 diabetes clients in Borno State Specialist Hospital, Nigeria. The result showed the instruments reliability at a coefficient of 0.83 for section B and 0.94 for section C.

Data Collection

Formal permission was obtained from the research and ethical committee of the University of Maiduguri teaching Hospital and an approval letter was given to the heads of the wards/unit under study. An informed consent was obtained from the clients to participate in the study. Data collection was completed in September 2014 from the respondents. About 86 questionnaires were distributed to the literate clients from whom 76 were retrieved, and 49 questionnaire schedules were used to interview the illiterate clients. A total number of 125 questionnaire/questionnaire schedule was fully completed and retrieve for analysis.

Data Analysis

The data collected was analyzed and presented in tables, simple percentages was used to analyzed demographic characteristics and chi-square used with the aid of statistical package for social sciences (SPSS) version 16.0.

Table 1: Socio-Demographic variables of the respondents

Variables	Categories	Frequency	Percentage (%)
Age	Below 20years	12	9.6
	20-29	7	5.6
	30-39	58	46.4
	40-49	25	20
	50 years and above	23	18.4
	Total	**125**	**100**
Sex	Male	95	76
	Female	30	24
	Total	125	100
Occupation	Farming	43	34.4
	Civil servant	41	32.8
	Business	20	16
	Student	12	9.6
	Pensioner	9	7.2
	Total	125	100
Marital status	Single	15	12
	Married	93	74.4
	Divorced	3	2.4
	Widow	13	10.4
	Widower	1	0.8
	Total	125	100
Religion	Islam	100	80
	Christianity	24	19.2
	Others	1	0.8
	Total	125	100
Level of education	No formal education	19	15.2
	Primary	10	8
	Secondary	22	17.6
	Certificate/diploma	54	43.2
	HND/Degree/Higher Degree	20	16
	Total	125	100

RESULT

Age, sex, occupation and marital status

A total number of 135 sampled for the study, 125 clients participated fully in the study, that is, 50 in-patients and 75 out-patients respectively. This gives a response rate of 93%. Majority (76%) of the clients were males and a large number of clients 58 (46.4%) have average age of 35 years and (34.4%) of them were farmers while, more than half (74.4%) were married (Table1).The clients had various levels of educational qualification with 43.2% of them holders of diploma and degree, study further revealed the knowledge of clients about diabetes mellitus that almost half (47.2%) of them defined diabetes mellitus correctly as a disease characterized by high blood sugar level, as against various opinions by other clients. Clients' attitude towards compliance with medication was demonstrated by 48.8% of client who take their prescribed medications regularly while; about 32 percent forget to take their medications and 20 percent take medications only in response to signs of the diabetes disease. More than half of the total number of Clients (57.6%) considered lack of money as the major barrier to compliance with medical regimen while, others opined that lack of family support and dietary restriction impede

Table 2: Respondents General Knowledge on Diabetes

Variables	Categories	Frequency	Percentage (%)
Opinion about diabetes mellitus	High blood sugar level disease	59	47.2
	Disease due to pancreatic problem	36	28.8
	Disease that affect elders	22	17.6
	All	8	6.4
	None	0	0
	Total	125	100
Cause of diabetes	Excessive sugar intake	56	44.8
	Lack of insulin secretion	33	26.4
	Hereditary	23	18.4
	All	13	10.4
	None	0	0
	Total	125	100
Signs of diabetes	Frequent urination	42	33.6
	Excessive thirst	37	29.6
	Extreme hunger	25	20
	All	21	16.8
	None	0	0
	Total	**125**	**100**
Best treatment of diabetes	Regular drug intake	36	28.8
	Dietary modification	32	25.6
	Regular checkups/medical advice	42	33.6
	All	15	12
	None	0	0
	Total	**125**	**100**

Table 3: Attitude of Diabetes Clients toward Compliance to Diabetes Treatment Regimen

Variables	Categories	Frequency	Percentage (%)
How often patients take their medications?	Regularly as prescribed	61	48.8
	In response to the signs of disease	25	20
	I do forget to take my medication	39	31.2
	Total	**125**	**100**
Do you adhere to the recommended dietary regimen?	Always	38	30.4
	Sometimes	84	67.2
	Not at all	3	2.4
	Total	**125**	**100**

Table 4: Factors responsible for poor compliance to medication and diet

Variables	Categories	Frequency	Percentage (%)
Factors responsible for poor compliance to medications?	Unavailability of drug	40	32
	Drugs are so expensive	72	57.6
	Side effects of drugs	13	10.4
	Total	**125**	**100**
Factors responsible for poor compliance to dietary regimen?	Diet not palatable	66	52.8
	Diet is so expensive	56	44.8
	Diet does not improve the condition	3	2.4
	Total	**125**	**100**

compliance to treatment regimen respectively. The study also revealed that majority (55.2%) of the clients considered poor attitude of health personnel as the major barrier for irregular visit to the hospital as against (38.4%) who claimed that transportation and (6.4%)who belief on traditional medicine as obstacle to return to health centers for treatment. The findings of this study identified various factors responsible for poor compliance to

Table 5: Educational Status * Level of Compliance Cross tabulation

		Level of Compliance		
		Complied	**Not Complied**	**Total**
Educational Status	No formal education	6	4	10
		60.0%	40.0%	100.0%
	Primary education	2	2	4
		50.0%	50.0%	100.0%
	Secondary education	7	1	8
		87.5%	12.5%	100.0%
	Certificate/Diploma	14	6	20
		70.0%	30.0%	100.0%
	HND/Degree/Higher education	3	5	8
		37.5%	62.5%	100.0%
Total		32	18	50
		64.0%	36.0%	100.0%

X^2=5.078< 9.488; df 4; P=0.05

Table 6: Drug Expensiveness * Level of Compliance Cross tabulation

		Level of Compliance		
		Complied	**Not Complied**	**Total**
Drug Expensiveness	Yes	13	15	28
		46.4%	53.6%	100.0%
	No	19	3	22
		86.4%	13.6%	100.0%
Total		32	18	50
		64.0%	36.0%	100.0%

x^2 =8.528> 3.842; df 1; P= 0.05

Table 7: Family Support * Level of Compliance Cross tabulation

		Level of Compliance		
		Complied	**Not Complied**	**Total**
Family Support	Deeply Involved	13	2	15
		86.7%	13.3%	100.0%
	Fairly Involved	10	5	15
		66.7%	33.3%	100.0%
	Not Involved	9	11	20
		45.0%	55.0%	100.0%
Total		32	18	50
		64.0%	36.0%	100.0%

X^2=6.525>5.991;df 2; P= 0.05

treatment regimen; drugs expensiveness (57.6%), diabetic diet not palatable (52.8%) and 44.8% of the clients opined that the food recommended was expensive, hence making it difficult to complied strictly to

Table 8: Attitude of health personnel and Level of Compliance Cross tabulation

		Level of Compliance		
		Complied	**Not Complied**	**Total**
Attitude of health person	Good	9	1	10
		90.0%	10.0%	100.0%
	Satisfactory	11	4	15
		73.3%	26.7%	100.0%
	Poor	12	13	25
		48.0%	52.0%	100.0%
Total		32	18	50
		64.0%	36.0%	100.0%

$X^2 = 6.279$> 5.991; df 2; P= 0.05

dietary regimen. The involvement of families in the care of the diabetes client was observed as key to compliance by the clients, 37.6 percent of them claimed that their families were deeply involved in their care while, others indicated that, their families did not participate in their care at all.

The analysis of level of compliance to diabetes mellitus showed the cross tabulation of various variables as barrier to compliance to diabetes Mellitus treatment regimen, the educational level (X^2) 5.078 at 4 degree of freedom (df) is less than the critical value of 9.488 at 0.05 level of significance (P); hence the null hypothesis which state that there is no significant relationship between clients' educational status and compliance to diabetic treatment regimen is accepted. The level of compliance with treatment regimen among diabetic clients is not probably influenced by their educational status. The drug cost (X^2) 8.528 at 1 degree of freedom (df) is greater than the critical value of 3.842 at 0.05 level of significance (P); the null hypothesis which state there is no significant relationship between cost of drug and compliance to diabetic treatment regimen is hereby rejected. This implies that level of compliance with treatment regimen among diabetic clients is influenced by price of diabetic drugs. The family support chi-square (X^2) 6.526 at 2 degree of freedom (df) is greater than the critical value of 5.991 at 0.05 level of significance (P); the null hypothesis which state that, there is no significant relationship between family support and compliance to diabetic treatment regimen is however rejected considering the role family support played in the care of client with diabetic mellitus.

Finally, the attitude of health workers (X^2) 6.279 at 2 degree of freedom (df) is greater than the critical value of 5.991 at 0.05 level of significance (P); the null hypothesis which states that there is no significant relationship between attitudes of health personnel and non-compliance of clients to diabetes treatment regimen was rejected. The poor attitudes of health care personnel hindered client visits to health centers for continuity of care as well as follow-up visits. On the measures to address the problem of the diabetes mellitus, quite number (33.6%) of clients consider regular check-ups and seeking medical advice as the best treatment for diabetes compare to others who opined that regular drug intake and dietary modification are remedies to cob the disease.

DISCUSSION

It is evidence from the finding of this study that, majority of the clients were between the ages of 30-39 years and are predominantly males who were mainly farmers. This implied that majority of clients attended to and diagnosed as type 2 diabetes mellitus in University of Maiduguri Teaching Hospital were males. This finding support Rapadas et al. (2011) findings in terms of diabetes type, age and gender prevalence among the clients but contradict Akinkugbe (1997), who reported that more women develop diabetes mellitus than men due to the fact that more women have tendency to become obese than men. These views that prevalence of type 2 diabetes mellitus implied that could either be male or female depending on the occupation, age and life style of the individual. The level of education in quite a large number of diabetes clients who were literate does not have significant difference in terms of compliance to diabetes treatment regimen from those who are illiterate and thus, the calculated chi-square of 5.079 at 4 degree of freedom was less than the table value of 9.488 and thus, the null hypothesis which state that client's educational status has no significant effect on their level of compliance was accepted.

Research Question 1; what is the knowledge of clients about diabetes mellitus?

On the knowledge of diabetes client about the condition,

this study revealed the positive impact of clients' educational level on their knowledge about diabetes mellitus. This was demonstrated by more than half of the clients who defined diabetes mellitus correctly and able to identified causes and major sign of diabetes mellitus. This finding indicated that quite a high percent of the clients are knowledgeable about diabetes mellitus which by implication enhances compliance to diabetes treatment regimens. Nahla et al. (2010) study on Physicians' therapeutic practice and compliance of diabetic clients attending rural primary health care units in Alexandria found that, the level of compliance increased with the improvement of the patient's level of knowledge about diabetes. Nahla et al Furthermore, opined that good to adequately educated diabetes achieved better metabolic control than fair to poorly educated diabetic clients, these implies that knowledge play a significant role on the compliance of treatment regimen among either in-patient or out-patient. This implies that knowledge of clients about the disease process enhances their willingness to comply with the treatment regimen.

On the contrary, Al-Maskari, et al. (2013) and Adejoh, (2014) studies in Saudi Arabia and in Nigeria respectively opposed this study finding, that almost half of the respondents had low diabetes knowledge. Nwaokoro et al, (2014) also disagreed that majority of respondents (93.6%) lacked basic knowledge of diabetes management or care.

Research Question 2; will the clients be willing to comply with diabetic treatment regimen?

The finding of this study on willingness of clients to comply with medication and diet revealed that, clients with high mean scores takes their medications as well as diet regularly as prescribed, which means majority of them complied with their drug and dietary regimen. This finding corroborate the study of Nahla et al. (2010) who found that 57% of the diabetic clients always took their medications as prescribed and on time against other factors. The slight differences between this study and that of Nahla and his colleagues may be due to differences in awareness level about the importance of compliance with diabetic medications. Their results further showed that good number of clients complied with dietary regimen; this finding is supported also by Khattab, et al., (1999) and Alberta et al. (2010) study, on the level of compliance with diet and activity control among clients with congestive heart failure in University of Calabar teaching hospital Nigeria, they reported that 40% of the clients always complied with dietary regimens and 66.2% of the clients strictly complied with the diet regimen. However, this study result contradict Justina and Daniel (2010) findings in a study on Nurses experiences in the care of clients with diabetes mellitus, who reported that 26% of the Nurses indicated that there diabetic clients had difficulty in complying with both drug and dietary regimens.

Research Question 3; what are the factors responsible for non-compliance to diabetic treatment regimens among diabetic clients?

Various factors were identified to be responsible for the non-compliance of clients to diabetes treatment regimen; principal among them was drug expensiveness as determined by the calculated chi-square of 8.527 which was greater than the critical value of 3.842 at 1 df and 0.05 level of significance. In other words, drug expensiveness has negative effect on clients' compliance to diabetes treatment regimen. Similarly, out of the 28 clients that expressed their opinion on the drug expensiveness as a factor responsible for non-compliance to treatment regimen, 54% did not comply with treatment regimen compare with only 13.6% of 22 clients who did not considered drug expensiveness as a factor responsible for non-compliance. This is probably due to the fact that they can still have the means to purchase these drugs even though they agreed to drug expensiveness. This means that cost of diabetes drugs in most cases contributed to non-compliance of clients to diabetes regimen. Another major factor responsible for non-compliance with treatment regimens according to this study was lack of family support with a chi-square of 6.526 greater than the critical value of 5.991 at 2 df and 0.05 level of significance. The null hypothesis was rejected as family support has influence on clients' level of compliance. In other words, out of the 15 clients that had their family deeply involved in their care, 86% complied with their treatment regimen while, only 45% complied among 20 clients that had no family support. This finding agree with the study by Nahla et al. (2010) who reported that, 27% of the clients identified financial problem as a reason for non-compliance.

In addition, WHO; (2005), Ajibade, Abdullahi and Oyedele, (2010), Brides et al (2011) and Ataur et al. *(2012*) findings also supported the findings of this study that barrier to diabetes medication and dietary regiment includes knowledge, attitude and educational level of individual, other factors as identified are lack of family and financial support, gender, Nwaokoro, et al (2014) and Abdulazeez, Omole and Ojulari (2014) findings also in agreement with this study.

Research Question 4: Do attitude of health workers influence the compliance of diabetes clients to treatment regimen?

The finding of this study observed poor attitude of health personal as a major factor responsible for non-

compliance to treatment regimen. In this study majority of client opined that poor attitudes of health personnel was responsible for their non-compliance to diabetes treatment regimen. This mean that few number of health worker with positive attitude to diabetes clients had high percent of their clients complied with treatment regimen. The report by WHO; (2005) and Al-Maskari et al. (2013) support the findings of this study that Knowledge, practice and attitude scores were all statistically significantly positive.

Implication to Nursing Practice

This study revealed that, cost of drugs, lack of family support and poor attitude of health personnel were some of the factors responsible for non-compliance to treatment regimens among diabetic clients. It is therefore, necessary that all nurses in clinical practice should take these factors into cognizance when caring for clients and specifically the diabetic patients. This study findings will give nurses opportunity to collaborate with dieticians and social welfare workers to make efforts to link clients of low socio-economic status with organizations (government and non-governmental) that can give financial assistance to the clients. Nurses and other health workers in the care of diabetes clients should modify their behaviours and have an attitudinal change towards caring for client and also advocates to the government to provide free or subsidized drugs to diabetic patents. This study findings will enable nurses plan to make an effort to include family members in the care of their relatives' right from admission and throughout the period of hospitalization. Importance of family support should also be emphasized to clients' relatives or family at the time of the client's discharge from the hospital, with special emphasis on encouraging the clients to take their drugs and dietary regimen at home.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, we concluded that non-compliance with treatment regimens among diabetic clients admitted in UMTH is mainly due to cost of drugs, lack of family support and poor attitudes of health personnel. It is evidenced that non-compliance to treatment regimens among diabetic clients exposes them to secondary disease and a great threat to their recovery. In view of the out-come of the study, the following recommendations were made:

- Encouragement of patient's compliance through conduct of educational and training programs. The education program should be directed towards improving patient's knowledge about diabetes, its prevention, treatment and compliance in order to promote sound practice in the management of the disease.
- Clients family members should be encouraged to participate in clients care during the period of hospitalization and importance of family support should be clearly explained to the relatives at the time of client discharge.
- All health care providers should make more effort to improve on the health care services rendered to the diabetic clients. This in-return will encourage the clients towards compliance with their treatment regimens.
- The government should employ more diabetic management nurses in addition to the existing ones in order to reduce the workload of the nurses in the wards, thereby improving the nursing care rendered to the diabetic clients in hospitals.
- The government should also provide free or subsidized diabetic drugs to the citizens in order to reduce the hardship faced by the less privileged clients.
- Nurses, dieticians and social welfare workers should try as much as possible to link the less privileged clients to NGOs and Philanthropic organizations for help.
- Community leaders and religious leaders should be specifically enlightened about the importance of compliance with diabetic treatment regimens. This in return will have a positive impact on the diabetic clients' attitude to treatment regimens.
- More research studies should be conducted on similar topic in different settings in order to identify additional factors responsible for non-compliance with diabetic treatment regimens.

ACKNOWLEDGEMENT

We sincerely appreciate the contributions of the respondents and the staff of the University of Maiduguri teaching Hospital, Nigeria, This study would not have been possible without the approval of the research and ethical committee of the University of Maiduguri teaching Hospital and the head units of the study area, We commend their efforts and cooperation given throughout the study period

REFERENCES

Abdulazeez FI, Omole M, Ojulari SL (2014) *Medication Compliance amongst Diabetic Patients in Ilorin, Nigeria*. J. of Dental and Med. Sci; 13(3)96-99. Retrieved on 19/07/2015 from http://www.iosrjournals.org/iosr-jdms/papers/Vol13-issue3/Version-2/W013329699.pdf

Adejoh SO (2014) Diabetes Knowledge, Health Belief, and Diabetes Management Among the Igala, Nigeria. Retrieved on 19/07/2015 from http://sgo.sagepub.com/content/4/2/2158244014539966

Ajibade BL, Abdullahi H, Oyedele EA (2010). *Factors militating against compliance with medical regimen among diabetic clients*. *Intl. professional Nursing J*. 8(1), p13-18.

Akinkugbe OO (1997) National expert committee on non-communicable diseases (NCD) in Nigeria. Final report of a national survey, Lagos: 64-90

Alberta DN, Mildred J, Ekaette FA, Mgbeken MA, Ndiok A (2010). *Diet and activity control regimens: Compliance among congestive cardiac failure clients. Nigerian J, of Nursing*, 1(3), P15-20.

Albert IW (2011). An estimation of the effect of 100% Compliance with Diabetes Treatment: Can we reduce cost of illness with higher compliance rates; Vol. 2, No. 2, Article 45. Retrieved on 1/10/2015 from www.pharmacy.umn.edu/innovations/prod/.../cop_article_344357.pdf

Alebiosu OC, Familoni OB, Ogunsemi OO, Raimi TH, Balogun WO, Odusan O, Oguntona SA, Olunuga T, Kolawole BA, Ikem RT, Adeleye JO, Adesina OF, Adewuyi PA (2013). Community based diabetes risk assessment in Ogun state, Nigeria (World Diabetes Foundation project 08-321) Indian Journal of Endocrinology and Metabolism; 17(4): 653–658. Retrieve on 19/07/2015 from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3743365/

Al-maskari F, El-Sadig M, Al-Kaabi JM, Afandi B, Nagelkerke N, Yeatts KB (2013) *Knowledge, attitude and practices of diabetic patients in the United Arab Emirates.* Retrieved on 19/07/2015 from www.ncbi.nlm.nih.gov/pubmed/23341913

Ataur RK, Zaki NA, Mohammad AA, Montaser AB, Ibrahim A, Shabbir Ak (2012). *Factors contributing to non-compliance among diabetics attending primary health centers in the Al Hasa district of Saudi Arabia;*J Family Community Med. 2012 Jan-Apr; 19(1): 26–32. Retrieved on 10/07/2015 from www.ncbi.nlm.nih.gov/pubmed/ 23341913

Barcetto AC, Isaac DL, Yusuf S (2001). *Acute precipitations of congestive heart failure exacerbations*, Arch Intern Med. 161:2337-2342.

Belfiore F, Mogensen CE (2000).*New Concept in Diabetes and its Treatment.* Basel, Karger.

Brides V, Ann MJ, Rapadas W, Rose S, Adyth S, ThelShorette JM (2011) Compliance of Treatment Management Among Diabetes Patients; Asian Scientific J. 4(1). Retrieved on 19/07/2015 from http://asianscientificjournals.com/publication/index.php/anrj/article/view/204

Famakinwa TT (2002). Diabetes Mellitus;*Textbook of medico-surgical Nursing* (2nd edition).Agbor: Bayosoye printing services.

Justina NO, Daniel KA (2010).Nurses experiances in the care of clients with diabetes mellitus*. Nigerian J. of Nursing*, 1(3), 21-25.

Khattab MS, Aboifotouh MA, Khan MY, Humaidi MA, Al-Kaldi YM (1999). Compliance and control of diabetes in a family practice setting, Saudi Arabia. East Mediterr Health J.ournal;5(4):755-65. Retrieved on 1/10/2015 from http://www.ncbi.nlm.nih.gov/ pubmed/11338698

Logue J, Walker JJ, Colhoun HM, Leese GP, Lindsay RS, McKnight JA, Morris AD, Pearson DW, Petrie JR, Philip S, Wild SH, Sattar N (2011). Do men develop type 2 diabetes at lower body mass indices than women? Diabetologia Journal; 54:3003–3006. Retrieved on 10/07/2015 from http://link.springer.com/article/10.1007%2Fs00125-011-2313-3

Michel T, Jean-François V, Frédéric M, Eveline E, Alain W, Cécile F, Anne FC, Alfred P (2012*). Medication Adherence in Type 2 Diabetes*: The ENTRED Study 2007, a French Population-Based Study; retrieved from *www.ncbi.nlm.nih.gov ›* Journal List on Januarry 2014

Mustapha RO (2002). *Path to success for student nurses up to final qualifying Nursing council examination*(2nd edition). Ilorin: George bullet ltd.

Nahla KRI, Saeid GA, Sunny AS, Ebtisam MF, Fatihey E (2010). *Physicians' therapeutic practice and compliance of diabetic clients attending rural primary health care units in Alexandria*, Egypt. *J. of family and community med.* 17(3).

Nwaokoro JC, Okokon BE, Nwaokoro AA, Emerole CO, Ibe SNO, Onwuliri VA, Oputa RN, Chukwuocha UM (2014). *Problems associated with treatment compliance among type 2 diabetic patients at a tertiary health institution in Nigeria*; African Journal of diabetes medicine. 22(1).

Nandy, B. and Nwanko, B.O.(2010) *Factors Influencing Diabetes Management Outcome among Patients Attending Government Health Facilities in South East, Nigeria,* IntL. J. of Tropical Med. 5(2), pp.28-36. Retrieved on 19/07/2015fromhttp://www.medwell journals.com/fulltext/?doi=ijtmed.28.36

Oluwaseye I (2012). *Constant skipping of breakfast increases the risk of type 2 diabetes mellitus*. (Retrieved Feb 1st, 2012 from http://www.allAfrica.com/stories/201201311003.html)

OXFORD University Dictionary (2004).*Concise Oxford English Dictionary* (11th edition). London: Oxford university press.

Tabora JD (2005). *Acute and Long term complications of diabetes mellitus* (Retrieved from http://www.healthypinoy.com/.../diabetes/ complications.html). Manila: Philippines.

Vidal R, Waldo AL (2008). *Non-compliance In Patients With Type 2 Diabetes Enrolled In Local Diabetes Education Program*. Ethnicity & Disease j. Volume 18, Spring

World Health Organisation, (2005).*Management of Peripheral Arterial Disease*,Geneva,12,10-14.

.