
Patients' adherence to diabetic therapeutic regimen in Nigeria

Ibitoye O.F^{1*}, Ibitoye R.B², Alako J³ & Adamolekun M.M⁴

1. Senior Lecturer, School of Nursing ,Islamic University of Uganda
2. Chief Medical Director, State Specialist Hospital ,Ikare Akoko, Ondo State,Nigeria
3. Technical Assistant Fellow, Oxford Policy Management, Nigeria
4. Lecturer II ,Faculty of Nursing ,University of Medical Sciences ,Ondo State

*Correspondence: bisitoye04@yahoo.co.uk

Abstract

Introduction: Diabetic Mellitus (DM) is a major public health concern globally with developing countries accounting for over 70% of people with DM. Management of DM requires continuous use of medication and lifelong lifestyle modifications; however, adherence to diabetes therapeutic regimen remains enormous task. The aim of the study was to assess level and factors influencing adherence to therapeutic regimen among people living with diabetes.

Methods: A cross-sectional study was carried out among 150 randomly selected diabetic patients attending the outpatient department of Wesley Guild Hospital Ilesa, Osun State, Nigeria. Data was collected through a structured questionnaire which assessed the patients' understanding of diabetic treatment regimen, level of adherence to treatment regimen as well as the factors influencing patient adherence. Data collected were analyzed using descriptive statistics in SPSS version 20.

Findings: Majority of the respondents n=126 (86%) had good knowledge of the nature of diabetics and treatment regimen. Level of adherence to diabetic medication was high n-131 (87%). However, compliance to dietary modification was very low, while factors associated with low adherence rate to therapeutic regimen were related to financial constraints, cultural beliefs, and distance of health facilities, family and health care provider's support.

Conclusion and recommendation: The patients had good knowledge of diabetic and treatment regimen, but the level of adherence to treatment and lifestyle changes was low. There is a need to develop interventions to resolve restraints to optimal adherence to DM treatment.

Keywords: Adherence, Diabetes, Patients, Therapeutic Regimen

Introduction

Non- communicable diseases, particularly Diabetic Mellitus (DM) are major public health concerns globally. DM prevalence was estimated at 415 million in 2015, with the developing countries account for over 70% of cases. Projected prevalence may reach 642 million by 2040 (World Health Organisation, 2016; International Diabetes Federation (IDF, 2015; Ogberra & Kuku,

2012; Khan, Lateef, Al Aithan, et al, 2012; Al-Qazaz, Sulaiman, et al Hassali, 2011).

Empirically, all countries either rich or poor, suffer from the impact of diabetes epidemic and its complications (Gelaw et al 2014). Diabetes remains the foremost cause of non-traumatic amputation, blindness in working-age adults, renal disease and cardiovascular disease (IDF Diabetes Atlas, Chaudhury, et

al, 2017). Hospitalization rates for people with diabetes are 2.4 times greater for adult and 5.3 times greater for children than for the general population (Lee, 2010; Brunner, 2010).

Diabetic management and optimal glucose control have an association with strict adherence to medications, diet, and lifestyle modifications (Al-Qazaz, Sulaiman, et al Hassali, 2011; Rickles et al., 2010). WHO(2003) defined adherence as the extent to which a person's behaviour with respect to taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a healthcare provider (World Health Organization, 2003). Patients with chronic diseases such as hypertension, asthma, diabetes, etc. have been reported to be non-adherent to their treatment regimen with less than 50% of DM clients achieving recommended glycemic goals (Khan, Lateef, Al Aithan, et al, 2012; Bailey, Barner, Weems, Leckbee, et al, 2012; Bailey &Kodack, 2011; Cutler & Everett, 2010).

Adherence refers to the percentage of patients taking a minimum of 80% of their prescribed medication. Factors connected to non-adherence has been classified into patient-centred, therapy-related, or healthcare system related (Pollack, Purayidathil, Bolge, &Williams, 2010; van Bruggen, Gorter, et al, 2009). The patient-centered factors include age, gender, educational level, and marital status and psychological (patients beliefs and motivation towards the therapy, negative attitude, patient-prescriber relationship, understanding of health issues, and patients knowledge) (Wong, Kong et al, 2011; Jin, et al, 2008). The therapy-related factors comprise route of medication, duration of treatment, the complexity of treatment, type of medication and the side effects of the medicine (Rwegerera, Moshomo, et al 2018;

Rwegerera, 2014; Nau, 2012; Nam S, Chesla, 2011; Monahan, et al, 2009). Healthcare system factors include the availability and accessibility of health care, and health provider-patient interactions (Hutchins V, Zhang, 2011).

Most clinical studies were focused on medications while compliance with dietary modification and other treatment regimen remain largely under-studied in Africa, particularly, Nigeria. Moreover, Diabetic Mellitus is a long life chronic disease that needs close monitoring between clients and health care providers. This study investigated the adherence to diabetic therapeutic regimen in relation to medication use, hospital appointments and dietary recommendations.

Methods

This cross-sectional study was conducted among diabetic patients at Wesley Guild Hospital Ilesa, Osun State, Nigeria.

The study population included Type 2 diabetic mellitus follow up patients attending the outpatient department of Wesley Guild Hospital Ilesa, Osun State, Nigeria. The medical out-patient department operates thrice a week with an average attendance of 50 patients per clinic day. The inclusion criteria: All diagnosed patients on diabetic treatment for at least six months in the hospital. Newly diagnosed patients were excluded. List of diabetic patients was obtained through the case file and every 3 of 5 eligible patients was enlisted for the study.

The sample size was calculated using the formula of a descriptive cross-sectional study of the prevalence of non-adherence to chronic medication study of 67% with a standard score of 95% confidence level and margin of error of 5% giving a minimum sample size of 150 patients

Data was collected through an adapted structured questionnaire. Socio-demographic characteristics and knowledge and understating of diabetes treatment regimen were obtained. Adherence was assessed on medication use, hospital appointments and dietary compliance with factors influencing adherence were also measured. Descriptive was done using the Statistical Package for Social Science (SPSS) version 20 with cross tabulation and inferential statistics was analysed using cross-tabulation and chi-square. The study was approved by the Ethics Review Committee of the Wesley Guild Hospital, Ilesa, Nigeria. Informed consent was sought from participants.

Findings

Characteristics of study participants

The study included a total of 150 diabetic patients with a median age of 41years. Over 50% n = 82 of the studied patients were males. About 42% (n= 63) of the patients (51.4%, n= 111) had post-primary education while over 30% had university education. Most of the patients (86.7%, n=130) were married. The majority (74.7%, n= 120) was on drugs and dietary management while only a few were on insulin treatment.

Table 1: Socio-demographic characteristics

| Demographic factor | Frequency | Percentage |
|---------------------------|-----------|------------|
| Age | | |
| 25 years to 35 years | 2 | 1.3 |
| 36 years to 45 years | 11 | 7.3 |
| 46 years to 55 years | 29 | 19.3 |
| 56 years and above | 108 | 72.0 |
| Sex | | |
| Male | 82 | 54.7 |
| Female | 68 | 45.3 |
| level of education | | |
| Primary | 17 | 11.3 |
| Secondary | 63 | 42.0 |
| Tertiary | 50 | 33.3 |
| Non-formal | 20 | 13.3 |
| Occupation | | |
| Public/civil servant | 20 | 13.3 |
| Trading | 65 | 43.3 |
| Artisans | 58 | 38.7 |
| Others | 7 | 4.7 |
| Marital status | | |
| Single | 6 | 4.0 |
| Married | 130 | 86.7 |
| Divorced | 3 | 2.0 |
| Widow/widower | 11 | 7.3 |
| Current management | | |
| Drug only | 29 | 19.3 |
| Diet only | 6 | 4.0 |
| Insulin only | 3 | 2.0 |
| Diet and drug | 112 | 74.7 |

Patients' Level of Adherence to medication use

This study showed a high prevalence of medication adherence largely among patients 50 years and above (n= 103). Male patients (n = 80(97.6%) were also found to comply with medication use than female patients.

There was no significant relationship between the patients' religion and medication use as adherence level was high in all patients despite their different religious beliefs at P – 0.489.

Table 2: Patients' Level of Adherence to medication use

| Characteristics of patients | Adherence to medication use | | X2 | P value |
|---|-----------------------------|------------|-----|---------|
| | Good N (%) | Poor N (%) | | |
| Age | | | | |
| 25 - 35 years | 2(100%) | 0(0. %) | 3.6 | 0.811 |
| 36 - 45 years | 11(100%) | 0(0. %) | | |
| 46 - 55 years | 27(93.1%) | 2(6.9%) | | |
| >56 | 103(95.4%) | 5(4.6%) | | |
| Sex | | | | |
| Male | 80(97.6%) | 2(2.4%) | 1.4 | 0.155 |
| Female | 63(92.6%) | 5(7.4%) | | |
| Religion | | | | |
| Christians | 91(95.8%) | 4(4.2%) | 1.4 | 0.489 |
| Islam | 47(94.0%) | 3(6.0%) | | |
| Others | 5(100%) | 0(0%) | | |
| level of education | | | | |
| Primary | 14(82.4%) | 3(17.6%) | 2.4 | 0.031 |
| Secondary | 60(85.2%) | 3(4.8%) | | |
| Tertiary | 50(100%) | 0(0%) | | |
| Non-formal | 19(95.0%) | 1(5.0%) | | |
| Occupation | | | | |
| Public/civil servant | | | 2.3 | 0.003 |
| Trading | 16(80.0%) | 4(20.0%) | | |
| Artisans | 62(95.4%) | 3(4.6%) | | |
| Others | 58(100%) | 0(0%) | | |
| | 7(100%) | 0(0%) | | |
| Marital status | | | | |
| Single | 6(100%) | 0(0%) | 2.1 | 0.819 |
| Married | 124(95.4%) | 6(4.6%) | | |
| Divorced | 3(100%) | 0(0%) | | |
| Widow/widower | 10(90.9%) | 1(9.1%) | | |
| Ethnicity | | | | |
| Yoruba | 132(95.0%) | 7(5.0%) | 1.0 | 0.581 |
| Hausa | 9(100%) | 0(0%) | | |
| Igbo | 2(100%) | 0(0%) | | |
| Good = adherence of \geq 80%, Poor=adherence <80% | | | | |

Level of medication adherence was good in all patients irrespective of educational status,

however, 100% adherence was recorded among patient with post-secondary

education, and there was also a significant association between educational status, patient occupation and medication use at P- 0.031 and P- 0.003. Majority of married patients (n= 124) showed a high tendency to diabetic medication use than the patient who is not married or has lost their spouses.

Patients' Level of Adherence to hospital appointments and dietary recommendation

Low adherence to hospital appointments and the dietary recommendation was generally observed across all age groups, sexes, different educational status, and religious status. However, rate of adherence was higher among patient age >56 years (n =51), male group (n= 37,) Christians (n= 45) and patients with post-primary education (n= 38).

Similarly, there was a significant association with the patient education and medication use at P- 0.013. The respondents' occupation type and ethnicity gave positive association (P- 0.034 and P- 0.033) with hospital appointments and dietary recommendation compliance with higher adherence rate among the traders (n=, 30), patients of Yoruba ethnicity (n= 69) as well as married patients (n= 61)

Table 3: Patients' Level of Adherence to hospital appointments and dietary recommendation

| Characteristics of patients | Adherence to hospital appointments and dietary recommendation | | X ² | P value |
|--|---|------------|----------------|---------|
| | Good N (%) | Poor N (%) | | |
| Age | | | | |
| 25 – 35 years | 1(50.0%) | 1(50.0%) | 3.6 | 0.191 |
| 36 – 45 years | 8(72.7%) | 3(27.3%) | | |
| 46 - 55 years | 10(34.5%) | 19(65.5%) | | |
| >56 | 51(47.2%) | 57(52.8%) | | |
| Sex | | | | |
| Male | 37(45.1%) | 45(54.9%) | 1.4 | 0.677 |
| Female | 33(48.5%) | 35(51.5%) | | |
| Religion | | | | |
| Christians | 45(47.4%) | 50(52.6%) | 1.4 | 0.261 |
| Islam | 21(42.0%) | 29(58.0%) | | |
| Others | 4(80.0%) | 1(20.0%) | | |
| level of education | | | | |
| Primary | 4(23.5%) | 13(76.5%) | 2.4 | 0.013 |
| Secondary | 38(60.3%) | 25(39.7%) | | |
| Tertiary | 22(44.0%) | 28(56.0%) | | |
| Non-formal | 6(30.0%) | 14(70.0%) | | |
| Occupation | | | | |
| Public/civil servant | | | 2.3 | 0.034 |
| Trading | 14(70.0%) | 6(30.0%) | | |
| Artisans | 30(46.9%) | 35(53.8%) | | |
| Others | 21(36.2%) | 37(63.8%) | | |
| | 5(71.4%) | 2(28.6%) | | |
| Marital status | | | | |
| Single | 2(33.3%) | 4(66.7%) | 2.1 | 0.820 |
| Married | 61(46.9%) | 69(53.1%) | | |
| Divorced | 1(33.3%) | 2(66.7%) | | |
| Widow/widower | 6(54.5%) | 5(45.5%) | | |
| Ethnicity | | | | |
| Yoruba | 69(49.6%) | 70(50.4%) | 1.0 | 0.033 |
| Hausa | 1(11.1%) | 8(88.9%) | | |
| Igbo | 0(0%) | 2(100%) | | |
| Good = adherence of $\geq 80\%$, Poor=adherence $<80\%$ | | | | |

Factors Influencing Patients Adherence to Diabetic Therapeutic Regimen

Assessment of factors that may influence adherence to the diabetic therapeutic regimen (medication use, hospital appointments and dietary recommendation) revealed that the cost of diabetic medication

(n= 140 (93.3%) and diet 137(91.3%), as well as the duration of treatment, affect patients adherence. Similarly, distance and easy access to health facilities and care providers along with family support were reported to influence adherence in this study.

Table 4: Factors Influencing Patient Adherence to Diabetic Therapeutic Regimen

| Characteristics | Agree | Disagree |
|---|-------------|-----------|
| Diabetic diet is expensive | 137(91.3%) | 13(8.7%) |
| Diabetic diet is time consuming | 137(91.3%) | 13(8.7%) |
| It is difficult to take medication on daily basis | 140(93.3%) | 10 (6.7%) |
| Diabetic drug are expensive | 140(93.3%) | 10(6.7%) |
| Health care provider are not accessible | 86(57.3%) | 64(42.7%) |
| Lack of family support contribute to non-compliance to with treatment regimen | 140(93.3%) | 10 (6.7%) |
| Diabetic patient usually forget to take their medication | 84(56.0%) | 66(44%) |
| Compliance rate is low among low income earners | 99 (66.0%) | 51(34%) |
| Closeness to health facility increases compliance rate | 107 (71.3%) | 43(28.7%) |
| The duration of my medication determines the level of my adherence | 120(80%) | 30(20.0%) |
| I prefer single dose to combination of drugs | 137(91.3%) | 13(8.7%) |
| I find it easier taking medication than changing my lifestyle | 107 (71.3%) | 43(28.7%) |
| I find it difficult to cope with my new dietary regimen | 104(70.7%) | 44(29.3%) |
| I only take my drug when I have some symptoms of the disease | 84(56.0%) | 66(44%) |
| I don't believe the drug can cure the disease | 86(57.3%) | 64(42.7%) |
| I feel better when I follow my healthcare provider instruction | 137(91.3%) | 13(8.7%) |

Discussion

The prevalence of anti-diabetic drug adherence in this study was relatively high. Overall, more than 90% of patients adhered to their prescribed medications. This is similar to Uganda report in which level of adherence to anti-diabetic medication was 83.3 % (Bagonza, Rutebemberwa & Bazeyo, 2015). However, a study in Tanzania recorded 60.2% and 71.2% at one week and three months to anti-diabetic drugs (Rwegerera et al, 2014), while over forty percent (41.8%), (46.1%) and 45% of patients were non-adherent to anti-diabetic medications in Botswana, Jordan and Sudan respectively (Rwegerera, Moshomo, et al, 2018; Basheti, et al, 2016; EI-Hadiyah, et al, 2016). A previous study reported 60% adherence with prescribed medication among patients in a tertiary hospital in the south-west, Nigeria (Adisa, Fakeye, & Fasanmade, 2011).

There have been variations in the sociodemographic relationship with medication adherence in different studies. In

this study, higher medication adherence was found among patients of 50 years above who are mostly male patients compared to the females. Related high medication adherence was also established among elderly patients in Tanzania; but, there was no association between gender and adherence (Rwegerera et al, 2014). In Uganda, the majority of non-adherent patients were in the age group of 36-50 years (Kalyango, Owino & Nambuya, 2008).

This study also revealed a significant association between educational status, occupation and marriage, with married patients showing a high tendency to diabetic medication use than patients who are not married or have lost their spouses. Equally, sex, age, marital status and occupation were identified to be significantly associated with adherence/non-adherence in a previous study in Nigeria (Uchenna et al, 2010). Nevertheless, social demographic characteristics were not associated with anti-diabetic drug adherence in other studies (Rwegerera, Moshomo, et al, 2018;

Rwegerera, 2014; Kalyango et al, 2008). The differences might be related to the methodology adopted, sample size as well the socio-cultural background of the study participants.

Assessment of adherence to hospital appointments and the dietary recommendation was generally low across all age groups, sexes, different educational status, and religion status in this study. Similarly, 87.5% were non-adherent to diabetic diet in Nepal (Parajuli, Saleh et al, 2014). The rate of adherence was higher among elderly patients, males and a significant association with patients' education and medication use at $P = 0.013$. Similar discoveries between increased educational status and adherence to dietary recommendations were made at Joslin Center for Diabetes, Pittsburgh, Pennsylvania and another study done in Mexico (Paes, et al, 1997, cited in Uchenna et al, 2010). In conformity with this study findings, dietary adherence was also found to be higher in males than females in Nepal (Parajuli, Saleh et al, 2014), while another study done in Nigeria revealed greater tendencies to forget dietary regimen in male diabetic patients than their female counterparts (Adisa, Fakeye, & Fasanmade, 2011)

This study also shows a positive association between other socio-demographic characters such as occupation, marital status and ethnicity with hospital appointments and dietary recommendation. Uchenna et al, (2010) also gave a relatively significant statistical association with marital status and occupation in their study in Nigeria (Uchenna et al, 2010). Congruently, widows were found to be more adherent to dietary advice than the married and separated in Nepal as the author believed reduced responsibilities load on the widowed coupled with concerns about their health

might be the reason behind the increase adherence to diet (Parajuli, Saleh et al, 2014).

Several factors have been linked with good or poor adherence to anti-diabetic treatment by different scholars. Cost of diabetic medication and diet, as well as the duration of treatment, were highlighted to affect adherence in this present study. In agreement with the study finding, high cost of medication and non-affordability of prescribed diet was significantly associated with anti-diabetic non-adherence in other studies (Rwegerera, 2014; Uchenna et al, 2010, 2010; Kalyango, Owino, Nambuya, 2008), higher number of medications and duration was also related to therapeutic adherence in Jordan (Basheti, et al, 2016)

Distance and easy access to health facilities and care providers along with family support were reported to influence adherence in this study. Adherence to a hospital appointment and other diabetic treatment was higher among patients leaving nearer to the hospital than those who are far (Parajuli, Saleh et al, 2014; Kalyango, Owino, Nambuya, 2008).

Health care facility related factors such as poor attitude of health workers, irregular diabetes education in clinics, limited number of nutrition education sessions/inability of the patients to estimate the desired quantity of food, no reminder postcards or phone calls about upcoming patient appointments and delayed start of appointment/time wasting in clinics were revealed as obstacles to adherence in Nigeria (Uchenna et al, 2010, 2010). Likewise, poor knowledge of medications, drug brand unavailability and forgetfulness, frustration due to diet restriction, limited spousal and family support as well as feelings of deprivation were identified to influence diabetic regimen adherence (El-Hadiyah et al, 2016; Uchenna et al, 2010).

Conclusion and recommendations

The findings of the study indicated a high level of adherence medication use among diabetic patients, while adherence to dietary recommendations and hospital appointment were suboptimal. The high cost of medication and non-affordability of prescribed diet coupled with poor medication knowledge, forgetfulness, and frustration due to diet restriction, limited family support and most importantly, negative health care providers to patients among others, were identified as obstacles to effective diabetic therapeutic adherence.

Complete adherence to lifestyle modification is the major key to achieving normal glycemic control, lessens the disease burden and reduces the morbidity and mortality associated with diabetic complications. Therefore it is highly imperative to develop policies and other interventions in order to subsidize the cost of diabetic medications and also incorporate the practice of cost-free medication for indigent patients. The health care providers need to step up health promotional education to increase awareness on healthy living in order to reduce the prevalence of diabetic and also improve on the support system for people living with diabetics.

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