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FACTORS INFLUENCING MEDICATION ADHERENCE AMONG PATIENTS WITH DIABETES MELLITUS AND HYPERTENSION IN NIGERIA

Raimi T. H.

Department of Medicine, Ekiti State University, Ado-Ekiti, Ekiti State, P.M.B. 5363 Ado-Ekiti, Nigeria

ABSTRACT: *Medication non-adherence results in increased morbidity, mortality and financial loss. Reasons for medication non-adherence are multifactorial. This cross-sectional study was conducted to determine the prevalence of, and factors contributing to medication non-adherence among patients with diabetes mellitus and hypertension attending some secondary and tertiary health care facilities in Lagos, Nigeria. Of the 100 patients, 32% were compliant with their medications. Most (39%) respondents were noncompliant because of lack of funds and cost of medication, 19% due to forgetfulness, 16% because they felt well, and 15% due to non-availability of drugs at the pharmacy. Other reasons for non-compliance include illnesses (9%), side effects of medications (1%) and misinterpretation of prescription (1%). Among the socio-demographic variables studied, only male gender was positively associated with medication compliance. Adherence to anti-diabetics and anti-hypertensives was low. Both health system and patients' related issues contributed to poor compliance and these should be addressed to improve medication adherence.*

KEYWORDS: Adherence, Diabetes mellitus, Hypertension, Nigeria

INTRODUCTION

In medical practice, the major therapeutic approach to patient's health problem is the use of drugs. The significant advances that have been made in the understanding of the aetiology of many disease states, and the development of new therapeutic agents, have made it possible to cure or provide symptomatic control of many clinical disorders. However, in many circumstances, drugs are not being used in a manner conducive to optimal benefit and safety (Banerji and Dunn, 2013).

With regard to the provision of health care, the concept of adherence can be viewed broadly, as it relates to instructions concerning diet, exercise, rest, return appointment etc; in addition to the use of drugs. However, it is in discussions concerning drug therapy that the designation "patient compliance" is employed most frequently. Adherence can be defined as the extent to which an individuals' behaviour agrees or coincides with medical or health advice (WHO, 2003).

Medication adherence is especially important in the setting of chronic diseases such as diabetes mellitus and hypertension, where multiple therapeutic regimens are employed. Studies have revealed adherence rate of 26.4%-95.6% among these group of patients (Jing and Naliboff, 2011; Currie, Peyrot, and Morgan, et al., 2012; Fadare, Olamoyegun, and Gbadegesin, 2015; Abdulazeez, Omole, and Ojulari, 2014; Gelaw, Mohammed, and Tegegne, et al., 2014). Medication non-adherence results in increased morbidity and mortality, among patients with type 2 diabetes mellitus (Banerji and Dunn, 2013; Currie, Peyrot, and Morgan, et al., 2012).

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Additionally, it leads to greater or higher healthcare costs (Kennedy-Martin, Boye and Peng 2017).

Reasons for medication non-adherence are multifactorial and may vary with different settings and populations, and addressing these factors have been shown to improve adherence (Garcı´a-Pe´rez, lvarez, and Dilla et al., 2013; Nau, 2012; Jha, Aubert, and Yao et al., 2012; Márquez-Contreras, Vegazo Garcia, and Claros et al., 2005).

The aim of this research was to determine the prevalence of and factors contributing to medication non-adherence among patients with diabetes mellitus and hypertension attending some secondary and tertiary health care facilities in Lagos, Nigeria.

METHODOLOGY

Study Design: Cross-sectional

Setting: Medical outpatient department of Lagos State and Lagos University Teaching Hospital, and Gbagada General Hospital. Approval was obtained from relevant authorities before the study. The purpose of the study was also explained to the patients.

Data Gathering: Patients were interviewed with a questionnaire, which was designed to assess the respondents' socio-demographic status, type and duration of illness, pattern of drug utilization and reasons of noncompliance.

Patients who did not know the names of their drugs were assisted by providing samples of the drugs for identification. The questionnaires were administered by trained assistants and by the principal investigator. A pilot study was carried on 11 patients to field test the questionnaire which was then modified to accommodate the new information.

The case notes of the patients were examined for any disparity between the information gathered from the interview and the doctor's prescription as a check. The criteria for non-compliance include failure to take the drugs according to the prescribed dosages and failure to take the drugs regularly.

Descriptive statistics was used to analyse the variables. Chi square statistic was employed to analyze the relationship between medication compliance and participants' socio-demographic characteristics. The level of significance was taken as $p<0.05$

RESULTS

One hundred patients (50 with diabetes and 50 with hypertension) were selected from 110 patients who were interviewed. The other patients were dropped because of the inadequate information given. There were 44(44.0%) males. Most (88%) of the participants were more than 40years in age, and 27% were more than 60years. Among the patients, 25.5% had no formal education, while those with primary, secondary and post-secondary education were 26.5%, 21.4%, and 26.5% respectively. Thirty seven patients (37.4%) of the respondents have had their illness for 1-5years, 18.2% for 6-10years and only 1% for more than 20years. The other socio-demographic factors are shown in **Table 1**. Twenty two (44%) of the patients

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with diabetes comply with medications while 20% of those with hypertension were compliant **(Table 2)**. Most (39%) respondents were noncompliant because of lack of funds and cost of medication, 19% due to forgetfulness, 16% because they felt well, and 15% due to non-availability of drugs at the pharmacy. Other reasons for non-compliance are shown in **Figure 1**. Among the socio-demographic variables studied, only male gender was positively associated with medication compliance **(Table 3)**.

Table 1: Socio-demographic characteristics of the participants

Characteristics		Number	%
Sex	Male	44	44
	Female	56	56
Age (years)	21-30	3	3
	31-40	9	9
	41-50	27	27
	51-60	34	34
	≥ 60	27	27
Educational level	No formal education	25	25.5
	Primary	26	26.5
	Secondary	21	21.4
	Post secondary	26	26.5
Occupation	Senior Professional	6	6.1
	Intermediate category	15	15.3
	Junior category	9	9.2
	Semi-skilled	9	9.2
	Unskilled	42	42.9
	Others	17	17.3
Duration of disease (years)	1-5	37	37.4
	6-10	18	18.2
	11-15	10	10.1
	16-20	10	10.1
	≥20	1	1.0

TABLE 2: RATE OF COMPLIANCE AMONG THE DIABETICS AND HYPERTENSIVES

Disease	Number	Compliance	
		Frequency	**Percentage (%)**
Diabetes	**50**	**22**	**44**
Hypertension	**50**	**10**	**20**
Total	**100**	**32**	**32**

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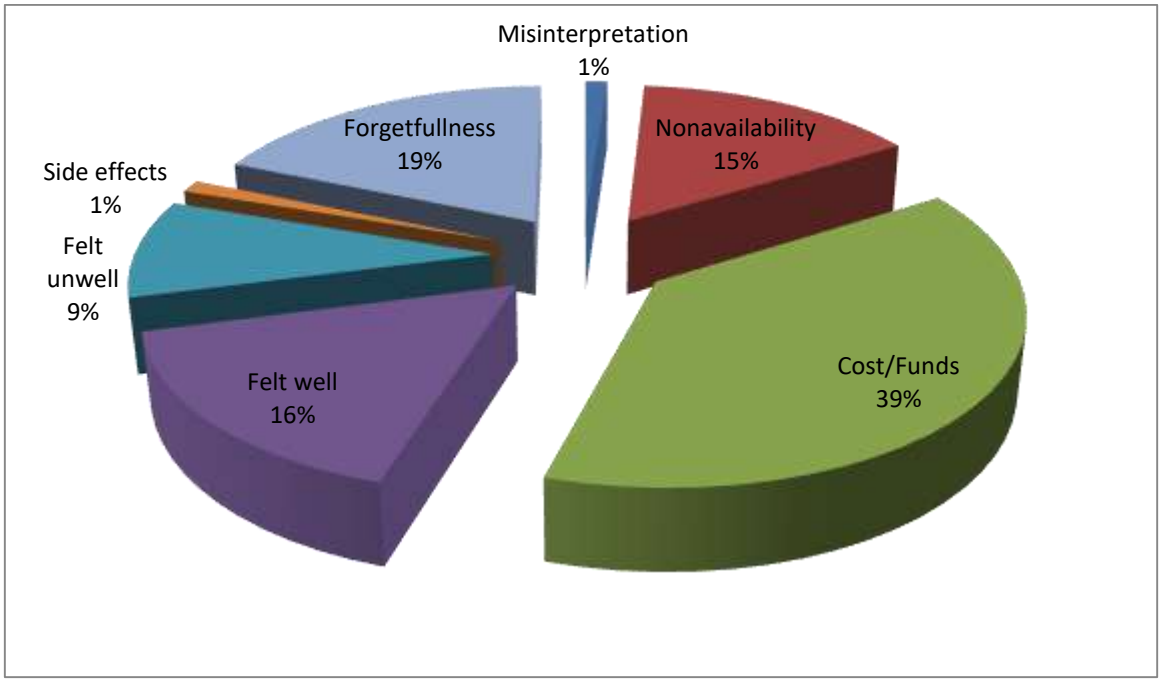

FIGURE 1: REASONS FOR NON-COMPLIANCE WITH ANTIDIABETICS AND ANTIHYPERTENSIVES

Table 3: RELATIONSHIP BETWEEN SOCIODEMOGRAPHIC FEATURES & COMPLIANCE

Variables	All patients	Compliant n(%)	Noncompliant n(%)	X^2	P
Sex				8.89	<0.05
Male	44	21(47.7)	23(52.3)		
Female	56	11(19.6)	45(80.4)		
Age(years)				1.1	>0.05
<50	39	12(30.8)	27(69.2)		
51-60	34	13(38.2)	21(61.8)		
>60	27	7(25.9)	20(74.1)		
Education				5.65	>0.05
No formal education	25	6(24.0)	19(76.0)		
Primary	26	7(26.9)	19(73.1)		
Secondary	21	11(52.4)	10(47.6)		
Post- secondary	26	8(30.7)	18(69.2)		

DISCUSSION

Adherence to antihypertensives and antidiabetics is important in order to ensure adequate blood pressure and glycaemic or glucose control. This in turn will improve quality of life, prevent complications and hospitalizations, and save cost (Jha, Aubert, and Yao et al.,

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2012). Unfortunately, not all patients with the aforementioned chronic diseases adhere to their therapy, with the attendant sequalae.

Rates or Prevalence of Medication Non-Compliance

The overall prevalence of non-compliance in this study was 68% (56% in patients with diabetes and 80% among patients with hypertension). This is similar to previous report by Fatima et al, (78.64%) (Abdulazeez, Omole, and Ojulari, 2014). Similarly, Fadare et al. also reported that only 40.3% patient with T2DM had good adherence to medication (Fadare, Olamoyegun, and Gbadegesin, 2015).

Unlike the findings in this study, workers from United State of America, (Jing and Naliboff, 2011), United Kingdom (Currie, Peyrot, and Morgan, et al., 2012), and Ethiopia (Gelaw, Mohammed, and Tegegne, et al., 2014) reported a lower rate of medication non-adherence of between 4.4% - 35.6%. Higher rate of medication adherence in the developed countries may be due to existence of health insurance. Fax, phone and email reminders have also contributed to improved compliance in those countries (Márquez-Contreras, Vegazo Garcia, and Claros et al., 2005). Most patients with diabetes and hypertension in Nigeria self-finance their healthcare expenditure directly, and medication constitutes the major cost. Furthermore, reminder strategies or systems are almost non-existent in public hospitals except in research settings. Apart from the attributable effect of health education, reasons for lower rate of poor adherence in the study from Ethiopia is unclear, since their participants were not reported to be enjoying health insurance.

Reasons for Noncompliance

The most common reason for non-compliance in this study was cost of medication/lack of funds. Other common or important reasons include forgetfulness, feeling of wellbeing, and non-availability of drugs at the pharmacy. Fewer patients failed to comply with their medications due to illness, side effects and misinterpretation of prescriptions.

Cost of medication was the dominant reason for poor medication compliance by previous authors in some African countries, including Nigeria (Fadare, Olamoyegun, and Gbadegesin, 2015; Gelaw, Mohammed, and Tegegne, et al., 2014; Awodele and Osuolale, 2015). In one of the studies, 51.32% of patients believed that management of type 2 DM was not affordable (Awodele and Osuolale, 2015). Income status was also found to be associated with adherence in another study (Abdulazeez, Omole, and Ojulari, 2014). In Nigeria, most antidiabetics and antihypertensives are not manufactured locally. The need to import these drugs at high exchange rate may make them to be out of reach for many patients. Furthermore most patients were not on health insurance, necessitating out-of-pocket drug expenditure. In developed nations, adherence challenges also include monetary issues (Walker, Shmukler, and Ullman et al., 2011).

Forgetfulness was the second most common reason for noncompliance in this study. Unlike our finding, it was reported to be the commonest reason for noncompliance by some workers (Abdulazeez, Omole, and Ojulari, 2014; Gelaw, Mohammed, and Tegegne, et al., 2014). Most of the participants in these studies were in their seventh to eighth decade and aging may sometimes be associated with memory impairment. A study on medication adherence among persons with Type 2 Diabetes also showed that frequent telephone as a reminder improved adherence (Márquez-Contreras, Vegazo Garcia, and Claros et al., 2005; Odegard and Gray, 2008). As noted earlier, institutionalized reminder systems are not common in

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Nigeria. However, self reminder strategies with the aid of (such as) alarm clock, mobile phone and family members exist and were shown to be positively associated with adherence in a Nigerian study (Adisa, Alutundu and Fakeye, 2009).

About 16% of our patients failed to comply with their medications because they felt better. Gelaw et al identified this as a contributing factor for non-adherence among 8.5% of non-adherers (Gelaw, Mohammed, and Tegegne, et al., 2014) . This may be due to lack of education about the chronic nature of their illness. It is not uncommon for patients with diabetes and hypertension to stop using medications as soon as the initial symptoms that brought them to the healthcare giver or hospital abate.

Non-availability of medication at the pharmacy was responsible for non-compliance in 15% of the participants. Previous report from a Nigerian study revealed that it was responsible for poor adherence in 10% of the patients (Fadare, Olamoyegun, and Gbadegesin, 2015). The fact that most antidiabetics and antihypertensives are imported into the country may contribute to this development. Furthermore, drug distribution in Nigeria is plagued with many challenges and out-of-stock syndrome is not uncommon (Mohammed, Magaji and Lawal et al., 2007; Ogbonna 2016). This scenario is a rarity in the developed nations**.** In this study few patients (9%) were noncompliant because they felt worse. Other workers reported this in 3% of their patients (Gelaw, Mohammed, and Tegegne, et al., 2014). This again may be due to poor knowledge of the disease especially in the insulin treated patients who should not stop the drug because of ill health.

Consistent with previous studies side effects of medications were the reason for noncompliance in some patient (Abdulazeez, Omole, and Ojulari, 2014; Gelaw, Mohammed, and Tegegne, et al., 2014). In contrast nearly half of the patients in another study from south-west Nigeria gave this as reason for noncompliance (Adisa, Alutundu and Fakeye, 2009). A review on medication adherence among people with diabetes identified safety and tolerability as one of the key issues affecting adherence (Garcı´a-Pe´rez, lvarez, and Dilla et al., 2013).

Finally, misinterpretation of prescription contributed to poor compliance in 1% of the respondents in this study. Misinterpretation of therapy accounted for poor compliance in 10% in a study by Fadare et al (Fadare, Olamoyegun, and Gbadegesin, 2015). This calls for greater interaction between caregivers and the patients on the correct/appropriate use of medications.

Relationship Between Compliance and Socio-Demographic

Among the socio-demographic factors studied only gender was significantly associated with drug compliance. Specifically, male gender was positively associated with adherence. Reports on the impact of socio-demographic variables on adherence have been inconsistent or yielded mixed results. In a Nigerian study none of the socio-demographic factors such as age, sex, income and level of education had any significant association with adherence (Fadare, Olamoyegun, and Gbadegesin, 2015). Contrariwise, some authors reported that age, sex, marital status and occupation were significantly associated with adherence (Gelaw, Mohammed, and Tegegne, et al., 2014; Awodele and Osuolale, 2015; Adisa, Alutundu and Fakeye, 2009). Notably, (and unlike our findings) most workers that reported positive association between sex and adherence found the female participants to be better adherers.

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The health seeking behaviour of women appear to better than that of men. One study found that men tend to omit medication doses more than women Adisa, Alutundu and Fakeye, 2009. Also, men being the breadwinner, tend to be busier than women. The reason for better adherence among the men in this study is not clear. It is possible that these men enjoyed great support from their spouse or other relations. Similar to the result of this study, Craig et al. found that women were more likely to be non-compliers (Currie, Peyrot, and Morgan, et al., 2012).

It is expected that higher level of education should correspond to better understanding of the nature chronic diseases (such as diabetes and hypertension), and hence better adherence. Significantly, most studies did not however reveal positive association between level of education and adherence (Fadare, Olamoyegun, and Gbadegesin, 2015; Gelaw, Mohammed, and Tegegne, et al., 2014; Awodele and Osuolale, 2015; Adisa, Alutundu and Fakeye, 2009). Reasons for this need to be explored in future studies. Nevertheless, in addition to wealth and treatment satisfaction, a study by Abebe et al. found that predictors of good medication adherence include higher education (Abebe, Berhane and Worku 2014). But it should be noted that health literacy is different from general education which most authors tested, although the former may aid the latter. Diabetes self management education (DSME) is part of the standards of care for patients with T2DM (American Diabetes Association, 2017).

LIMITATIONS

The sample size in this study is small. Therefore the findings should be confirmed in a larger study. The co-morbid illnesses, impact of income, smoking, poly-pharmacy, family size and support on medication compliance were not determined.

CONCLUSIONS

Adherence or compliance with anti-diabetics and anti-hypertensives was low in this study. Both health system and patients' related issues contributed to poor compliance. The commonest reason for poor compliance was lack of funds/cost of medications. The National Health Insurance Scheme should be strengthened to accommodate all patients with diabetes and hypertension, reminder strategies should be institutionalized and patients-caregiver interaction strengthened. For those who have been enrolled in the National Health Insurance Scheme, its impact on adherence should be explored.

REFERENCES

Abdulazeez FI, Omole M, Ojulari SL. (2014) Medication Adherence Amongst Diabetic Patients in a Tertiary Healthcare Institution in Central Nigeria. Trop J Pharm Res; 13(6): 997-1001

Abebe, SM, Berhane Y, Worku A. (2014) Barriers to diabetes medication adherence in North West Ethiopia. SpringerPlus;3:195. http://www.springerplus.com/content/3/1/195

Print ISSN: ISSN 2053-406X, Online ISSN: ISSN 2053-4078

Adisa R, Alutundu MB, Fakeye TO. (2009) Factors contributing to nonadherence to oral hypoglycemic medications among ambulatory type 2 diabetes patients in Southwestern Nigeria. Pharmacy Practice (Granada);7(3):163-169.

American Diabetes Association. (2017) Standards of Medical Care in Diabetes. Lifestyle Management. Diabetes Care;40 (Suppl. 1): S33-43

Awodele O, Osuolale JA. (2015) Medication adherence in type 2 diabetes patients: study of patients in Alimosho General Hospital, Igando, Lagos, Nigeria. African Health Sciences;15(2): 2015

Banerji MA, Dunn JD. (2013) Impact of Glycemic Control on Healthcare Resource Utilization and Costs of Type 2 Diabetes: Current and Future Pharmacologic Approaches to Improving Outcomes. Am Health Drug Benefits;6(7):382-392

Currie CJ, Peyrot M, Morgan CL, Poole CD, Jenkins-Jones S, Rubin RR.et al. (2012) The Impact of Treatment Noncompliance on Mortality in People With Type 2 Diabetes. Diabetes Care;35:1279–1284.

Fadare J, Olamoyegun M, Gbadegesin BA. (2015) Medication adherence and direct treatment cost among diabetes patients attending a tertiary healthcare facility in Ogbomosho, Nigeria. Malawi Medical Journal;27 (2): 65-70

Garcı´a-Pe´rez L-E, lvarez MA, Dilla, Gil-Guille´n, Orozco-Beltra´n D. (2013) Adherence to Therapies in Patients with Type 2 Diabetes. Diabetes Ther; 4:175–194.

Gelaw BK, Mohammed A, Tegegne GT, Defersha AD, Fromsa M, et al. (2014) Non Adherence and Contributing Factors among Ambulatory Patients with Anti Diabetic Medications in Adama Referral Hospital. Adv Pharmacoepidemiol Drug Saf 3(4): 169. doi:10.4172/2167-1052.1000169

Jha AK, Aubert RE, Yao J, Teagarden JR, Epstein RS. Greater Adherence To Diabetes Drugs Is Linked To Less Hospital Use And Could Save Nearly $5 Billion Annually. Health Affairs 2012;31(8): 1836–1846

Jing S, Naliboff A. (2011) Descriptive Analysis of Mail Interventions with Physicians and Patients to Improve Adherence with Antihypertensive and Antidiabetic Medications in a Mixed-Model Managed Care Organization of Commercial and Medicare Members. J Manag Care Pharm;17(5):355-66

Kennedy-Martin T, Boye TK, Peng X. (2017) Cost of medication adherence and persistence in type 2 diabetes mellitus: a literature review. Patient Preference and Adherence;11: 1103–1117

Márquez Contreras E, Vegazo Garcia O, Claros NM, et al. *(*2005) Efficacy of telephone and mail intervention in patient compliance with antihypertensive drugs in hypertension. ETECUM-HTA study. *Blood Press*;14(3):151-58.

Mohammed S, Magaji MG, Lawal G, Masoud MG. (2007) Medicine Supply Management In Nigeria: A Case Study Of Ministry Of Health, Kaduna State. Nig. Journ. Pharm. Sci.;6(2):116 - 120

Nau DP. Recommendations for Improving Adherence to Type 2 Diabetes Mellitus Therapy—Focus on Optimizing Oral and Non-Insulin Therapies. Am J Manag Care. 2012;18:S49-S54

Odegard PS, Gray SL. (2008) Barriers to medication adherence in poorly controlled diabetes mellitus. Diabetes Educ.; 34:692–7.

Ogbonna, BO. (2016) National Drug Distribution In Nigeria; Implications For The Goals Of National Drug Policy. EJPMR;3(1): 01-04

Walker EA, Shmukler C, Ullman R, Blanco E, Scollan-Koliopoulus M, Cohen HW. (2011) Results of a successful telephonic intervention to improve diabetes control in urban adults: a randomized trial. Diabetes Care;34:2–7.

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World Health Organization, Geneva. (2003) Adherence to long term therapies: evidence for action. www.who.int/chp/knowledge/publications/adherence_report/en/ accessed September 2017

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