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Factors Affecting Treatment Compliance Among Type 2 Diabetes Patients on Follow-Up at Moi Teaching and Referral Hospital

Koech C*, Nguka G**, Oloo AJ**

Institution
*Moi University, Usain Gishu County, Academic Highway, Eldoret, Kenya
**Masinde Muliro University of Science and Technology, P. O. BOX 190-50100, Kakamega, Kenya

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Abstract
Best practice in management of chronic diseases such as diabetes, which requires long duration of treatment and multiple therapies, remains a major challenge in primary health care settings worldwide. By the year 2014, global prevalence of diabetes was estimated to be 9% among adults aged eighteen years and above. which is quite a large number, compared to other non-communicable diseases. Diabetes accounted for 2% of deaths in 2010 and it is estimated that the prevalence of diabetes in Kenya is at 3.3% and predicted to rise to 4.5% by 2025. An essential component of evaluating and improving diabetic care is the assessment of factors that affect drug compliance standards and quality of care. Factors such as internal/external environment, healthcare system factors and factors related to medication use system are believed to affect or cause changes in the way patients take their medicine. It is in this context that this study will be conducted. The main objective is to document the factors affecting treatment compliance for diabetic patients in Moi Teaching and Referral Hospital, Eldoret Kenya. A descriptive cross-sectional study design was used in which data was collected. Data collection tools included a structured questionnaire with Morisky's eight question instrument. A total of 139 diabetic patients were requested to participate in the study, where questionnaires were given out to those willing by a trained research assistant, after which data was entered, cleaned and analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. Univariate analysis was used to summarize data, describe social demographic characteristics of study respondents and determine level of adherence. Bivariate and multivariate analysis models were used to examine the relationships among the various independent factors.

Key Words
Adherence; Compliance; Diabetes Mellitus; Factors and Treatment

Corresponding Author:
Mr Caleb Koech; E-mail: calebkoech07@gmail.com

Introduction

1.1. Background of the Study

Diabetes type 2 occurs when the body doesn't produce enough insulin to function properly, or the body's cells don't react to insulin. This means that glucose stays in the blood and isn't used as fuel for energy. By the year 2014, global prevalence of diabetes was estimated to be 9% among adults aged 18 years and above[1].

Internationally in 2012, an estimated 1.5 million deaths were directly caused by diabetes. More than 80% of diabetes deaths occur in low- and middle-income countries. WHO projects that diabetes will be the 7th leading cause of death in 2030.

The incidence of diabetes, especially type 2, is rapidly growing in the world. In 1985, an estimated 30 million people suffered with this chronic disease, which, by the end of 2006, had increased to 230 million, representing 6% of the world population. Of this number, 80% are found in the developing world. It is estimated that, during the next 35 years, diabetic world-wide prevalence will reach 25%, with India being the hardest hit. For a long time, Africa was considered safe from many of the diseases that are called "diseases of affluence," which plague the Western world.

Similarly, there was a time when Africa was thought to be a continent, relatively free of diabetes mellitus. Today, however, diabetes is very common in Africa, a situation that seemed to have remained virtually static until the 1990s and more recently. From 1959 to the mid-1980s, medical statistics showed that the prevalence rate of diabetes in Africa was equal to or less than 1.4%, with the exception of South Africa, where the rate was estimated to be as high as 3.6% in 2001.

In Kenya, diabetes accounted for 2% of deaths in 2010 and it is estimated that the prevalence of diabetes in Kenya is at 3.3% and predicted to rise to 4.5% by 2025. (WHO, 2010)

Most studies on diabetes have taken place in Kenya's teaching and national referral hospitals: Moi Teaching and Referral Hospital in Eldoret and Kenyatta National Hospital (KNH) in Nairobi[2]. These studies have focused mainly on the complications of diabetes. As the Ministry of Health devolves the management, planning and implementation of health policy to the districts, the need for rural health facility–based research has become a necessity to guide health policy at the local level.

Management of diabetes mellitus and its complications presents an increasing challenge to healthcare systems throughout the world, although substantial resources have been invested in diabetes mellitus in several developed and developing countries[3]. Diabetes management and outcomes remain unsatisfactory and Kenya, as a developing country, is not an exception.

Studies have been conducted in various countries and have been used in various clinical settings, the results of which have identified inappropriate drug therapy and gaps in adherence to clinical guidelines[4]. There is uncertainty, however, regarding the extent to which these guidelines are adhered to. With the devolution of Kenya's Ministry of Health (MOH), there should be clear guidelines on standards of diabetes care in the delivery of health services and the interventions need to be laid down according to evidence-based guidelines and best practices to improve outcomes of diabetic patients. This study will identify both met and unmet standards in diabetes care.

Diabetes Mellitus (DM) is a widespread disease which has affected both young and old worldwide and is a major cause of morbidity and mortality.

According to previous studies from the literature, polypharmacy (prescription of several drugs to be used by a patient at ago) is associated with a higher cost, increased risk of side effects, drug interactions and non-compliance[5]. There is no existing data on treatment compliance in management of diabetes mellitus in Kenya. However, a study in the neighboring Eastern Uganda indicates that about four in five patients adhere to anti-diabetic treatment[6]. Strategies aimed at improving anti diabetic drug availability and providing health education could improve adherence.

This study aims to provide information concerning compliance to anti-diabetic drugs which may be useful to policy makers in development of protocols governing prescribing, patient education, and ways to eliminate the factors hindering drug compliance for diabetes patients.

Methodology

This was a descriptive cross-sectional study. Information on both the independent and dependent variables were collected at the same point in time after approval by the Institutional Review Board.

The study was conducted at Moi Teaching and Referral Hospital; a government run hospital that is located 310 km North West of Nairobi in Uasin Gishu County (Eldoret). A number of specialist clinics are run at the hospital and the diabetes outpatient clinic is one of these clinics. Average number of patients seen per clinic day is 16: that is on Tuesdays, Thursdays and Friday. This brings to a total of 192 patients per month.

This study area was chosen because the majority of patients in this region come to seek medical care here because of the available facilities and the advantage of serving the neighboring counties. All patients with a diagnosis of diabetes type 2 who presented at Moi Teaching and Referral Hospital diabetic clinic during the period of study constituted the study population.

Sample size calculations were made based on the following formula[7]:

$n = Z^2 p (1-p)/ e^2$

Whereby n = the required minimum sample size
e = margin of error (5%)
p = estimated proportion of compliance 9% at MTRH- Eldoret
z = standard normal deviate corresponding to 95% confidence level=1.96
Considering a margin of error of 5% and a 95% confidence level, then the minimum required sample size will be 139.

Convenience sampling procedure was used to select patients attending the Diabetic clinic from 8:00am through 5:00pm on Monday, Thursday and Friday for the period of study. These patients who met the criteria and were eligible for inclusion in the sampling list for the study until such a time that the required sample has been collected.

Data was collected by the researcher and one assistant trained in data instrument. A questionnaire consisting of closed ended questions was used during the interviews. Morisky's eight question instrument was used. The structured data collection instrument information regarding patient's social

demographic characteristics was used. The estimated time used to complete one form is approximately 20 minutes; data was collected within a period of one month at MTRH diabetic clinic during clinic days.

The structured questionnaire containing the Morisky Adherence Predictor Scale (MAPS) was utilized to collect information necessary to assess medication adherence. The questionnaire has three parts. Part I collected information on basic socio-demographic variables. Part II consisted of questions required to gather information on factors affecting antidiabetic treatment compliance. Part III was the eight question Morisky scale which was used to assess the levels of antidiabetic medication adherence.

Data was disseminated through illustrations, graphs and figures; electronic and web-based tools; and oral presentations at community, hospital meetings and scientific conferences.

The raw data was cleaned to ensure completeness, consistency and checked for normality and coded. After entry into a data base, SPSS was used to analyze the data. Descriptive statistics i.e., mean, mode, median, range, standard deviation and frequency distributions were used to summarize the data. Univariate analysis was used to summarize data, describe social demographic characteristics of study respondents and determine level of adherence. Bivariate and multivariate analysis models were used to examine the relationships among the various independent factors.

Table 1: Measurement of Variables

S. No	Objective	Statistical Tool	Scales of Measurement	Output
1	To determine the mean effect of factors on anti diabetic drug compliance	ANOVA	Ordinal	Mean table, mode, variance Degree of freedom
2	To establish the association between the factors and the frequency of hospital admission and occurrence of complications	Chi Square	Nominal scale	Levels of chi square
3	To establish the association between the factors, compliance and frequency of hospital admissions and frequency of complications	Chi Square	Nominal scale	Values of chi square

Results

This chapter has presented the findings based on the study objectives. A total of 139 respondents participated in the study, representing 100% of the sample size. Thus 'n' for the study was 139.

From the table below, it can be deduced that the majority 52 (37 %) of the respondents were aged between 40-49 years, whereas the lowest 16 (12 %) were between 18-24 years. A higher number 80 (58%) of the respondents were female, while a lower number 59 (42%) were male. The prevalence of type 2 diabetes was high 95 (68%) among married respondents, whereas it was low 4 (3%) among those who had divorced. The period suffered by the respondents was high 44 (32%) between 1-2 years and low 9 (7%) above 10 years. The study also established that most 63(43%) of the respondent had diploma level of qualification while the least 1 (1%) was a master's degree. The respondents who were employed were the majority 60 (43%) while the lowest 36 (27%) were unemployed. The findings further indicated that the respondents who had a monthly income of 10,000-50,000 were highest, whereas the lowest 12 (9%) had over 50,000.

Table 2: Socio-demographics

Variable	Highest	Frequency/%	Lowest	Frequency/%
Age in years	40-49 years	52 (37%)	18-24 years	16 (12%)
Gender	Female	80 (58%)	Male	59 (42%)
Marital status	Married	95 (68%)	Divorced	4 (3%)
Period of diabetes type 2	1-2 years	44 (32%)	Above 10 years	9 (7%)
Highest educational qualification	Diploma	63 (48%)	Masters' degree	1 (1%)
Occupation	Employed	60 (43%)	Unemployed	36 (27%)
Monthly income	10000 -50000	51 (38%)	Over 50000	12 (9%)

Use of Medicine

Majority 64 (46%) of the respondents indicated that they used pills, followed by both pills and injection that is 50 (36%), and injections 25 (18%) in that order as illustrated in the chart below:

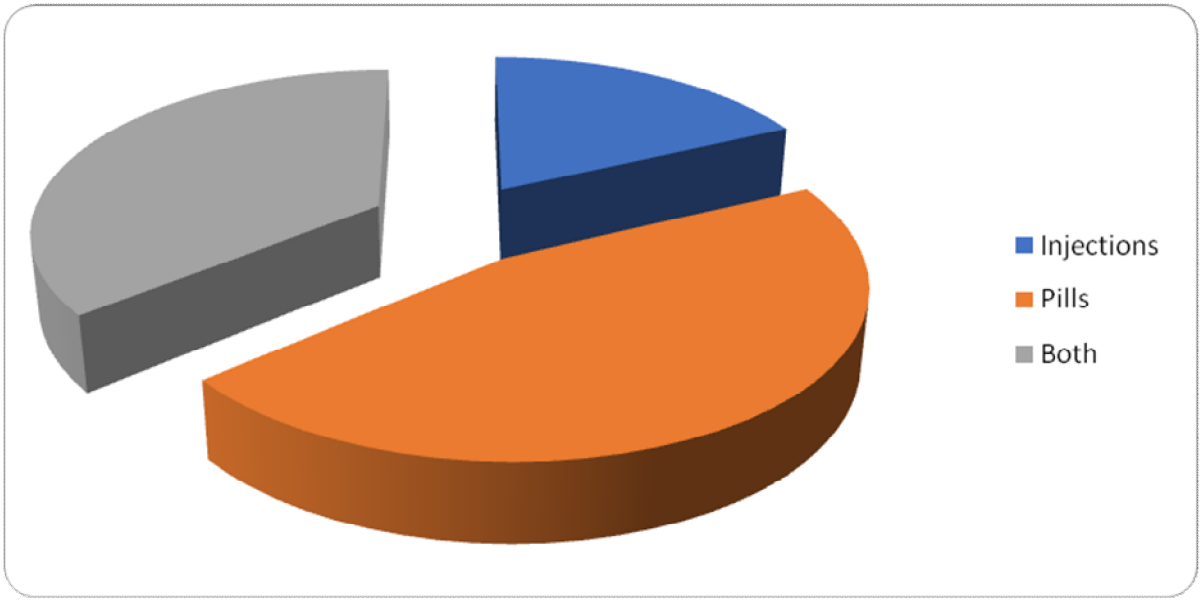

Figure 1: Use of medicine

The study recorded a mean glycated haemoglobin level of 8.3+3.045 with a minimum value of 3 and a maximum of 20.

Influence of External Environment on Treatment Compliance

From the table below, 71 (51%) of the respondents were in agreement that they were encouraged by family members to take medicine, while 8 (6%) disagreed. On the effect of work, home or hospital environmental settings on drug compliance most 59 (42%) of disagreed, followed by agree 44 (32%), whereas 6 (4%) strongly disagreed. Lack of money can cause non-compliance to medication was recorded high in 62 (45%) of the respondents while those who strongly disagreed were observed in 4 (3%) of the respondents attending the clinic.

Table 3: Socio-demographics

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I get encouraged by family members to take medicine	58 (42%)	71 (51%)	2 (1.4%)	8 (6%)	0
Work/ home/ hospital environmental settings affect my drug compliance	8 (6%)	44 (32%)	22 (15.8%)	59 (42%)	6 (4%)
Lack of money can cause non compliance to medication	62 (45%)	55(40%)	2 (1%)	16 (12%)	4 (3%)

Influence of the Healthcare System on Compliance

The study results depicts that majority 75 (54%) of the respondents disagreed that accessibility to the hospital affects drug compliance negatively, followed by 36 (26%) who agreed, whereas the lowest 7 (5%) of the respondents neither agreed nor disagreed. Long waiting time at the hospital affected compliance negatively where 67 (48%) of the respondents were in agreement whereas 5 (4%) neither agreed nor disagreed. The study also indicated that 64 (47%) of the respondents agreed that difficulties in getting a physician affected the respondent's compliance negatively, while 10 (7%) neither agreed nor disagreed. However, 65 (47%) of respondents disagreed that unsatisfied clinic visits affected treatment compliance negatively while 8% was cited both in strongly agree and disagree. This is demonstrated in the table below:

Table 4: Influence of the healthcare system on compliance

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Accessibility to the hospital affects drug compliance negatively	12(9%)	36(26%)	7 (5%)	75(54%)	9 (7%)
Long waiting time at the hospital affects my compliance negatively	26(19%)	67(48%)	5 (4%)	32(23%)	9 (7%)
Difficulties in getting a physician affects my compliance negatively	11 (8%)	40(29.2%)	10(7%)	64(47%)	12(9%)
Unsatisfied clinic visits affects treatment compliance negatively	8 (6%)	48 (35%)	10(7%)	65(47%)	8 (6%)

Influence of Internal Environment on Compliance

During the study, 90 (65%) of the respondents disagreed that age affected treatment compliance negatively whereas 4 (3%) neither agreed nor disagreed. About 76 (55%) of the respondents disagreed that level of education influenced compliance to treatment positively. In addition, 60 (43%) disagreed that attitude and beliefs negatively influenced treatment compliance. The study also recorded 71 (51%) of the respondents disagreed that marital status can influenced treatment compliance positively, as illustrated in the table below:

Table 5: Influence of internal environment on compliance

	Strongly agree	Agree	Neither agree nor	Disagree	Strongly disagree
My age affects treatment compliance	13 (9%)	10 (7%)	4 (3%)	90 (65%)	22 (16%)
My level of education influences compliance to treatment positively	12 (9%)	25 (18%)	22 (16%)	76 (55%)	4 (3%)
My attitude and beliefs can negatively influence treatment compliance	22 (16%)	34 (25%)	16 (12%)	60 (43%)	7 (5%)
My marital status can influence treatment compliance positively	18 (13%)	30 (22%)	12 (9%)	71 (51%)	7 (5%)

Summary of Medication Adherence (Morisky's Eight Question Instrument)

From the table below, high adherence to medication was recorded in 93 (67%) of the respondents who said that they did not forget to take medicine, while low adherence was witnessed in 46 (33%) who forgot to take medicine. About 122 (88%) of the respondents recorded that people sometimes miss taking medicine other than forgetting while 17 (12%) disagreed. Hence there was low adherence among patients in missing to take medicine. From the table below, low adherence to medication was recorded in 103 (74%) of the respondents who agreed that there were days they failed to take medicine, whereas high adherence was seen in 36 (26%) who mentioned that they did not miss taking medicine. High adherence to medication was observed in 124 (88%) of the respondents who indicated that they did not stop taking medicine after feeling bad without consulting their doctor as opposed to 15 (11%) who agreed that they did not consult while 1 (1%) neither agreed nor disagreed. The study results revealed that 110 (79%) of the respondents adhered to medication by not forgetting their medicine when leaving home, followed by low adherence of 28 (20%) indicated that they forgot their medicine when leaving home while 1 (1%) neither agreed nor disagreed. The study recorded high adherence rate 133 (96%) among respondents, who took medicine the previous day, 5 (3%) mentioned that they didn't take their medicine while 1 (1%) neither agreed nor disagreed. The findings of the study indicated low adherence rate of 86 (63%) were recorded on the respondents who disagreed that they stopped taking medicine when the felt like the symptoms were under control, 48 (34%) agreed while 4 (3%) neither agreed nor disagreed. The study indicated high adherence rate of 74 (53%) among respondents who didn't feel hassling about sticking to their treatment plans when taking medication, followed by 64 (46%) who agreed while 1 (1%) was undecided.

Table 6: Medication adherence measurement (Morisky's eight question instrument)

Indicator	High adherence	Medium adherence	Low adherence
Forgetting to take medicine	93 (67%)	0	46 (33%)
People sometimes miss taking their medicine other than forgetting	17 (12%)	0	122 (88%)
Thinking over the past two weeks, if there were any days you did not take medicine	36 (26%)	0	103 (74%)
Failure to take medicine without telling your doctor because you felt worse when you took it	124 (89%)	1 (1%)	14 (10%)
Taking medicine the previous day	132 (95%)	1 (1%)	5 (4%)
Stopped taking medicine when feeling like symptoms are under control	86 (62%)	4 (3%)	48 (35%)
Feeling hassled about sticking to your treatment plan when taking medicine daily	74 (53%)	1 (1%)	64 (46%)

Summary of Independent Testing

Effects of Medication System on Treatment Compliance

The study revealed that the route of administration of antidiabetics influenced treatment compliance negatively correlated with the following; medication side effects affecting compliance to treatment negatively, duration of treatment to influence compliance negatively and treatment complexity affected the compliance negatively, that is, at 0.00 (2 -tailed). Medication side effects affected compliance to treatment negatively which correlated with; duration of treatment to influence compliance negatively and treatment complexity affecting the compliance negatively, that is, at 0.00 (2-tailed). Duration of treatment can influence compliance negatively correlated with; my medication side effects affected compliance to treatment negatively, that is, 0.00 (2-tailed).

Association between negative influence of attitude and beliefs on treatment and when travelling or leaving home do you sometimes forget to bring along your medicine

Chi-square results indicates that the negative influence of attitude and beliefs on treatment was strongly associated with forgetting to bring medicine when travelling or leaving home, that is, $\chi 2 = 26.291$, df = 4, p<0.000.

Encouragement by family members and forgetting to bring medicine when travelling or leaving home

ANOVA results revealed a relationship between encouragement by family members and forgetting to bring medicine when travelling or leaving home, thus, F=7.305, df = 3, p<0.000.

Discussion

Levitt et al, (2000) observed that there is evidence that complications resulting from late diagnosis, late presentation, lack of access to essential medications and services, and poor management of diabetes are common and combine to create a heavy socio-economic burden for Africa[8]. A recent study suggested that direct costs such as medical care and treatment of diabetes are usually met by the patients, family and health sector. This study shows that 64 (465) of the respondents indicated that they used pills whereas 25 (18%) used injections.

In a study done by Haynes et al, (2002), adherence of 36% was seen when a person is prescribed an antibiotic to be taken as one tablet four times a day for a week for an infection, but takes only two tablets a day for five days[9]. This disagreed with my findings where 93 (67%) of the respondents said that they did not forget to take medicine.

According to the WHO (2003), non-compliance with long-term medication for conditions such as hypertension, dyslipidemia and diabetes is a common problem that leads to compromised health benefits and serious economic consequences in terms of wasted time, money and uncured disease. Contrary, there results indicates that medication side effects affected compliance to treatment negatively which correlated with; duration of treatment to influence compliance negatively and treatment complexity affecting the compliance negatively, that is, at 0.00 (2-tailed).

Health care system factors that affect treatment include; lack of accessibility, long waiting time, difficulty in getting prescriptions filled and unhappy clinic visits.

However, the findings revealed 75 (54%) of the respondents agreed that inaccessibility to the hospital affects drug compliance negatively. Long waiting time at the hospital affected compliance negatively, where 67 (48%) of the respondents were in agreement. The study also indicated that 64 (47%) of the respondents agreed that difficulties in getting a physician affected their compliance to treatment.

Glanz et al, (2002) indicated that internal factors including age, genetics, physical, spiritual, cognition, attitude and personality can influence a patient to have an urge to take medicine or to comply with treatment[10]. However, during the study, 90 (65%) of the respondents agreed that age affected treatment compliance negatively whereas 4 (3%) neither agreed nor disagreed. About 76 (55%) of the respondents agreed that level of education influenced compliance to treatment positively. In addition, 60 (43%) agreed that attitude and beliefs negatively influenced treatment compliance. The study also recorded 71 (51%) of the respondents agreed that marital status can influence treatment compliance positively.

Conclusions

Negative influence of attitude and beliefs on treatment was strongly associated with forgetting to carry medicine when travelling or leaving home.

There is a relationship between encouragement by family members and forgetting to carry medicine when travelling or leaving home.

Recommendation

National government, county hospitals, relatives and family members should put in place mechanisms to encourage diabetes type 2 patients to take drugs and have the patients fully understand the detrimental health effects of skipping drugs and cost of treating complications among other losses.

References

1. WHO. Diabetes fact sheet No. 312. Geneva, Switzerland URL: http://www who int/ mediacentre/factsheets/fs312/en/index html [accessed 2013-02-12][WebCite Cache ID 6ENYIOJ6e]. 2014.
2. Chege MP. Risk factors for type 2 diabetes mellitus among patients attending a rural Kenyan hospital. African journal of primary health care & family medicine. 2010;2(1).
3. Fitzsimons B, Wilton L, Lamont T, McCulloch L, Boyce J. The Audit Commission review of diabetes services in England and Wales, 1998–2001. Diabetic Medicine. 2002;19:73-8.
4. Elliott RA, Barber N, Clifford S, Horne R, Hartley E. The cost effectiveness of a telephone -based pharmacy advisory service to improve adherence to newly prescribed medicines. Pharmacy World & Science. 2008;30(1):17-23.
5. Bailey C, Kodack M. Patient adherence to medication requirements for therapy of type 2 diabetes. International journal of clinical practice. 2011;65(3):314-22.
6. Kalyango JN, Owino E, Nambuya AP. Non-adherence to diabetes treatment at Mulago Hospital in Uganda: prevalence and associated factors. African health sciences. 2008;8(2).
7. Kirkwood BR, Sterne JA. Essential medical statistics: John Wiley & Sons; 2010.
8. Levitt N, Unwin N, Bradshaw D, Kitange H, Mbanya JC, Mollentze W, et al. Application of the new ADA criteria for the diagnosis of diabetes to population studies in sub-Saharan Africa. Diabetic medicine. 2000;17(5):381-5.
9. Haynes RB, McDonald HP, Garg AX. Helping patients follow prescribed treatment: clinical applications. Jama. 2002;288(22):2880-3.
10. Glanz K, Rimer BK, Viswanath K. Health behavior and health education: theory, research and practice: Jossey-Bass San Francisco; 2004.

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