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Original Research Article

Knowledge and self-management practices among type II diabetes patients: a study in Gatundu town in Kiambu, Kenya

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ABSTRACT

Background: Type-2 diabetes mellitus is recognized as a key non-communicable disease affecting over 425 million world-wide, with only half of them currently diagnosed. The most crucial risk factor for mortality associated with type-2 diabetes is poor adherence to the prescribed medication.
Methods: A cohort study design was used to study 98 type 2 diabetes patients in Kiambu County. Consecutive sampling method was used. The collection of data utilized a pre-designed and piloted structured questionnaire. Quantitative data analysis was conducted using SPSS version 26.0 and correlation between the total count of the remaining diabetic medication and the blood sugar after one month follow-up was assessed. Univariate logistic regression was conducted in assessing the association between each of the predictor variables and the two main outcome variables (adherence to medication and glycemic control). A multiple logistic regression model was constructed for each of the two outcome variables.
Results: 31 (31.6%) of the study subjects were between 60-69 years, 70 (71.4%) were married and 66 (67.3%) were female. In addition, 37 (37.8%) had diabetes for more than 8 years, 70.6% had hypertension and 83.7% were prescribed oral hypoglycaemic agents as initial treatment. Majority of the respondents constituting 80.7% had high adherence to prescribed diabetes medication regimen, knowledge on diabetes treatment (p=0.009) and detecting low blood sugar levels through signs and symptoms and manage (p=0.001) had significantly association with adherence to antidiabetic.
Conclusions: Diabetic patients who have knowledge on diabetes and its management, those who stop alcohol and cigarette smoking and those who understand hypertension are more likely to adhere to diabetic treatment.

Keywords: Type 2 diabetes mellitus, Medication adherence, Self-management practices

INTRODUCTION

Globally, diabetes affects 425 million people at a prevalence of 8.8% and will rise to approximately 700 million people by the year 2040.[1] Currently, one in every 11 adults worldwide is living with the condition with 90% of these being type II diabetes patients[1]. The past three decades has recorded a distressing rise in the cases of diabetes mellitus, resulting in quadrupling of the cases. In 2015, it was estimated that diabetes caused an approximate 1.6 million deaths globally while in 2017 an approximate 2.2 million fatalities are linked to high blood glucose.[2] In 2018, it was ranked the 7th leading causes of death globally.[2] Currently, Kenya experiences a high disease burden, with NCDs contributing to 20.3%.[3] More than 50% of the total adult admissions to hospitals and

deaths therein in Kenya are as a result of non-communicable diseases, with diabetes ranked among the top three causes. Its prevalence in Kenya is 6%, with one in every 17 Kenyans having diabetes. There were 498,500 known cases of diabetes reported in Kenya in 2017.[1-3] This rise is significantly higher compared to 3.3% in 2011. This is occasioned by changes in social and demographic situation in the country, with people adopting lifestyles that negatively impact on their health. Community studies have established that the prevalence of diabetes mellitus stands at 4.2% in the general population with variations between rural and urban communities (2.2% in the rural and 12.2% in urban.[4] However, these estimates are likely higher due to under diagnoses and missed opportunities at screening. It is also reported that approximately 20% of Kenya's populace have impaired glucose tolerance. In Kenya, T2DM affects a younger and productive population compared to developed countries. Kenyans' peculiar health-seeking behaviours leads to delayed diagnosis, resulting in advanced disease at diagnosis. This poses a high risk for life-threatening complications.[5] Diabetes demands long-term follow up through regular access to specialized services and medication. Health workers who lack specialized training are charged with managing T2DM patients and exposing them to suboptimal management[19]. There is also a lack of routine screening for complications during management of care due to high costs of tests as well as lack of access to the same.[6] Globally, studies show that adherence levels to diabetes treatment regimen ranges from 38.5% to 93% based on the methodological approach. Adherence to prescribed medication is key in ensuring glycemic control and lowering risk of developing complications as well as reduced hospitalization and mortality. WHO reports that in developed countries, adherence to long term-therapies for chronic illnesses, including medication, averages about 50%, with even lower rates experienced in the developing countries.[1] This poses a great risk in management of chronic illnesses like T2DM while impacting on the patient's perceived quality of life and increases their healthcare expenditure due to increased hospital admissions. It is important to understand the status of non-adherence to type II diabetes medication in Kenya, to qualify strategies that will enhance adherence among patients. The purpose of the study is to determine the prevalence of non-adherence to type II Diabetes medication and evaluate the level of knowledge as well as patient-level factors influencing adherence to medication in T2DM patients in Kenya.

METHODS

This study adopted a cohort study design. The study was conducted at Gatundu level 5 Hospital in Kiambu County between August and September 2020.The study recruited participants through consecutive sampling method at the hospital's medical outpatient clinic (MOPC). The study sample consisted of patients previously diagnosed with type 2 diabetes and on medication. For patients who reported a complication, the same was verified from the medical records. The collection of data utilized a structured questionnaire. The questionnaire adopted, in part, the Morisky medication adherence scale.[8] It covered demographics, clinical information as well as management practices on T2DM. The structured questionnaire was administered to the type II diabetes mellitus patients at baseline to collect demographic information, clinical characteristics of the patient and patient experiences in diabetes management. The patients were then followed up for one month from the recruitment date to track their adherence to the prescribed diabetes medication. This was done using an adherence card to be filed in by the patient as well as a pill count. Random blood sugar measurements were taken on recruitment and after one month of follow-up. Data was analysed using statistical package for social science (SPSS) version 26.0. Descriptive data was presented using frequencies, percentages, means and standard deviation while inferential statistics used chi-square test to measure associations, p values equal to or less than 0.05 were considered statistically significant.

RESULTS

Socio-demographic characteristics of study respondents

The respondents mean age was 62.3±15.28 with age ranging from 21 years to 98 years. The findings showed that 31 (31.6%) were between 60-69 years, 21(21.4%) between 70-79 years, 14 (14.3%) 40-49 years and 4 (4.1%) were between 20-29 years. The majority of the respondents 70 (71.4%) were married (Table 1).

Table 1: Socio-demographic characteristics of study respondents.

Characteristics		N	%
Age group (years)	20-29	4	4.1
	30-39	3	3.1
	40-49	14	14.3
	50-59	13	13.3
	60-69	31	31.6
	70-79	21	21.4
	≥80	12	12.2
Sex	Male	32	32.7
	Female	66	67.3
Marital Status	Single	8	8.2
	Married	70	71.4
	Widowed	20	20.4

Socio-economic characteristics of study respondents

Slightly less than half 43 (43.9%) of respondents had primary level of education with at least 5% of respondents having tertiary education. Approximately 60% were small scale farmers with more three-quarter 86

(87.8%) residing in rural areas and 41 (41.8%) travelled less than 10 km to the health facility (Table 2).

Table 2: Socio-economic characteristics of respondents.

Characteristics		N	%
Level of educational	Informal Education	22	22.4
	Primary	43	43.9
	Secondary	28	28.6
	Tertiary	5	5.1
Work status	Work around the homestead	11	11.2
	Small-scale farmer	59	60.2
	Self-employed but not as a farmer	18	18.4
	Formal employment	4	4.1
Residence	Urban	12	12.2
	Rural	86	87.8
Distance to health facility (km)	Less than 10	41	41.8
	10-19	7	7.1
	20-29	4	4.1
	30-39	14	14.3
	≥40	32	32.7

Adherence to prescribed diabetes medication regimen

Using the Morisky medication adherence scale to determine adherence level among respondents, it was observed that majority of the respondents constituting80.7% had high and medium adherence to prescribed diabetes medication regimen as shown in (Figure 1).

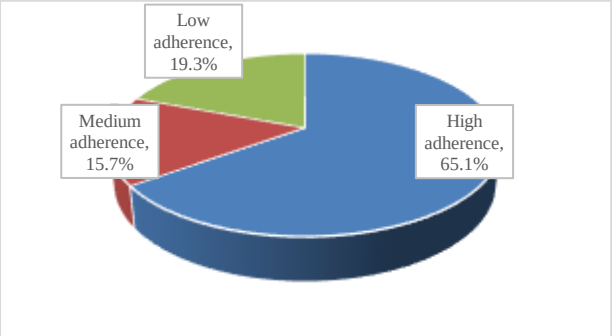

Figure 1: Adherence to prescribed diabetes medication regimen.

Knowledge of management of diabetes

Among the respondents who on adherence to diabetic management, 90.0% of the respondents said diabetes can be cured knowledge, 87.5% said they don't stop taking drugs when sugar is controlled, further, 90.2% would detect low blood sugar levels through signs and symptoms and manage. Knowledge on diabetes treatment (p=0.009) and detecting low blood sugar levels through signs and symptoms and manage (p=0.001) had significant association with self-management of diabetes (Table 3).

Correlation between knowledge and non-adherence to medication

From the analysis of (Table 4), there is a statistically significant relationship between knowledge on shaking and fast heart rate and effect of exercise on blood sugar level, as indicated by correlation coefficients of (r=0.246, p value=0.014). This indicates that the patients who exercise keep a keen eye on the changes of their body to take precautions of shaking and fast heart rate. Analysis has also revealed that there is a significant positive relationship between keeping appointment days and detecting low blood sugar levels through signs and symptoms and manage, as indicated by correlation coefficients of (r=0.283; p value 0.011). This indicates that patients with regular appointments gain knowledge on detecting sugar levels and managing the symptoms.

DISCUSSION

Evidence shows that adherence to medication in management of type II diabetes mellitus impacts on long-term health outcomes for patients and results in improved quality of life. Adherence lies heavily on the patient's self-management practices. Studies in both developed and developing markets use varied methods to determine the level of and factors influencing medication adherence. The current study, using in part Morisky medication scale together with pill count and consecutive random blood sugar readings revealed that majority of the respondents, constituting 65.1% had high adherence level to prescribed medication. This was followed by low adherence and medium level with proportions of 19.3% and 15.7% respectively. The prevalence of low adherence (19.3%) in this study is consistent with similar studies conducted at France and Brazil where the prevalence was 19%, and 18.3% respectively.[9,10] he findings are also in line with those of a study carried out in Yemen where poor adherence was 22%.[11] The rate of low adherence found in this study was higher compared to a similar study conducted in Ghana, where the prevalence was 8.5%.[12] The low adherence level found in this study was also greater than other studies conducted in Egypt where the rate was 8.9%and in Mexico the adherence rate was 11%.[13,14] Medication adherence is, however, not a limited responsibility of the patient. Health system inputs including trained healthcare personnel, access to correct treatment and management information, drugs as well as monitoring through laboratory tests can influence the level of adherence to medication. The study showed that 87.5% and 90.2% of the participants who adhered to medication were knowledgeable about continuing to take antidiabetic drugs even when sugar is controlled and how to detect low blood sugar levels through signs and symptoms and manage.

Table 3: Knowledge of management of diabetes.

Variables		High adherence N (%)	Low adherence N (%)	Statistics
Diabetes mellitus can be cured	No	17 (73.9)	6 (26.1)	C^2=9.517; df 2; p=0.009
	Yes	45 (90.0)	5 (10.0)	
	I don't know	5 (50.0)	5 (50.0)	
Stop taking drugs when sugar is controlled	No	42 (87.5)	6 (12.5)	C^2=4.660; df 2; p=0.097
	Yes	17 (77.3)	5 (22.7)	
	I don't know	8 (61.5)	5 (38.5)	
Detect low blood sugar levels through signs and symptoms and manage	No	7 (58.3)	5 (41.7)	C^2=13.426; df 2; p=0.001
	Yes	55 (90.2)	6 (9.8)	
	I don't know	5 (50.0)	5 (50.0)	
Beneficial to stop smoking or taking alcohol	No	7 (58.3)	5 (41.7)	C^2=12.028; df 2; p=0.002
	Yes	54 (90.0)	6 (10.0)	
	I don't know	6 (54.5)	5 (45.5)	
Checking blood pressure while being diabetes mellitus	No	5 (50.0)	5 (50.0)	C^2=15.983; df 2; p=0.0001
	Yes	57 (90.5)	6 (9.5)	
	I don't know	5 (50.0)	5 (50.0)	
Shaking and fast heartrate	Low blood sugar	14 (73.7)	5 (26.3)	C^2=1.446; df 2; p=0.485
	High blood sugar	36 (85.7)	6 (14.3)	
	I don't know	17 (77.3)	5 (22.7)	

Table 4: Correlation between knowledge and low adherence to medication.

Parameters		1	2	3	4	5	6	7	8
DM can be cured	r	1	0.102	0.123	0.056	0.065	-0.074	-0.014	0.011
	2-tailed-S		0.317	0.228	0.586	0.526	0.469	0.889	0.911
	N	98	98	98	98	98	98	98	98
Shaking and fast heart rate	r	0.102	1	-0.080	0.067	0.032	-0.032	0.246*	-0.124
	2-tailed-S	0.317		0.434	0.515	0.753	0.755	0.014	0.223
	N	98	98	98	98	98	98	98	98
Stop drugs when sugar is controlled	r	0.123	-0.080	1	0.018	0.100	-0.030	0.185	0.102
	2-tailed-S	0.228	0.434		0.864	0.328	0.769	0.068	0.318
	N	98	98	98	98	98	98	98	98
Detect low blood sugar levels	r	0.056	0.067	0.018	1	-0.001	0.085	0.015	0.283*
	2-tailed-S	0.586	0.515	0.864		0.990	0.403	0.885	0.011
	N	98	98	98	98	98	98	98	98
Benefits of avoiding smoking/ alcohol	r	0.065	0.032	0.100	-0.001	1	-0.128	0.126	-0.068
	2-tailed-S	0.526	0.753	0.328	0.990		0.209	0.216	0.503
	N	98	98	98	98	98	98	98	98
Checking sugar while being DM	r	-0.074	-0.032	-0.030	0.085	-0.128	1	-0.086	0.069
	2-tailed-S	0.469	0.755	0.769	0.403	0.209		0.399	0.502
	N	98	98	98	98	98	98	98	98
Effect of exercise on sugar level	r	-0.014	0.246*	0.185	0.015	0.126	-0.086	1	-0.147
	2-tailed-S	0.889	0.014	0.068	0.885	0.216	0.399		0.148
	N	98	98	98	98	98	98	98	98
Keep appointment days	r	0.011	-0.124	0.102	0.283*	-0.068	0.069	-0.147	1
	2-tailed-S	0.911	0.223	0.318	0.011	0.503	0.502	0.148	
	N	98	98	98	98	98	98	98	98

*Correlation is significant at the 0.05 level (2-tailed); S-significance.

These variables were significantly associated with adherence to medication. When patients have access to the right information and knowledge on self-management through their health worker son their appointment clinic days, they are more likely to adhere to medication and detect any changes in their physical symptoms. In Brazil, a study conducted found that increase in the level of knowledge of respondent to be associated to improve in anti-diabetic medication adherence, and this finding is consistent to this study. There was a positive relationship between knowledge on shaking and fast heart rate and effect of exercise on blood sugar level. This was consistent with other studies by Tiv et al and Krass, Schieback, Dhippayom.[15] Educated patients are more knowledgeable about the consequences of diabetes and the complications associated with diabetes and as such tend to adhere to their medications better. Another study by Rajak et al on knowledge, attitude and practices regarding diabetes medication adherence in parts of India found that poor knowledge affected medication adherence.[16] These findings underscore the critical role that increased awareness and knowledge has on adherence to antidiabetic medication. Efforts to reinforce the knowledge levels among type II diabetes mellitus patients are key in enhancing adherence to medication. It will encourage T2DM patients to understand the chronic condition better and be able to appropriately care for themselves by taking their medication as prescribed. Improved medication adherence will result in improved glycemic control and consequently improved quality of life for the T2DM patient.

Limitation of the study

While the study was able to achieve its objectives, the small sample size as well as short follow-up duration restricts transferability of the study findings to the general population of persons living with T2DM in similar areas.

CONCLUSION

The study results revealed that almost a quarter of the respondents constituting 19.3% had low level of adherence to prescribed diabetes medication regimen. Patients with knowledge on taking drugs when sugar is controlled, detecting low blood sugar levels through signs and symptoms and able to manage, stop smoking or taking alcohol and checking blood pressure while being diabetic are more likely to adhere to their antidiabetic medications. Education and information empowerment for T2DM patients is critical in enhancing medication adherence. Educational programs that adopt a wide range of learning strategies should be implemented to reach various population groups. This can be achieved through use of and distribution of information, education and communication materials. With the penetration and use of mobile phones for communication, there is an opportunity to use digital health tools like messaging and applications to educate and check on patients and improve adherence to medication. The National and County governments should enhance training of the health personnel to ensure access to quality care and dissemination of correct management information to T2DM patients during their facility consultation visit.

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