Adherence to Medications and Self-Care Management among Type II Diabetes Mellitus Patients in a Liberian Tertiary Hospital

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Abstract: Type 2 Diabetes mellitus (T2DM) is a complex clinical syndrome that requires a high standard of quality self-care behavior. Self-care behavior involves attending regular medical check-ups and adherence to medications and lifestyle changes. This study aimed to assess T2DM patients' adherence to anti-diabetic medications and Self-care i.e., diet, exercise, self-monitoring blood glucose (SMBG) and foot care. Forty-four T2DM patients were purposively recruited for this cross-sectional study. The adherence level of T2dm patients was assess using a standard three-part questionnaire. The data collated was analyzed by simple descriptive frequency. The results showed more females and city dwellers. Most of the respondents forgot to take their medications and had erratic medications and lifestyle adherence. Most of the participants were not adherent to foot care and did not practice SMBG. Enhancing patients' adherence through diabetes education will improve lifestyle changes which are in turn necessary to improve self-management.

Key words –*Diabetes mellitus; Blood pressure; Lifestyle changes; medication adherence, Self-monitoring blood glucose; foot care.*

I. INTRODUCTION

Type 2 Diabetes mellitus (T2DM) is a complex clinical syndrome that requires a high standard of quality of care in controlling glycaemia, blood pressure and blood lipid levels. Of recent, T2DM has emerged as an important non-communicable disease in Sub-Saharan Africa [1] with the number of cases and the prevalence steadily increasing up to about 445 million [3]. The global age-standardized diabetes prevalence increased from 4.3% to 9.0% in men and 5.0% to 7.9% in women [4]. T2DM triggers about 1.7 million deaths globally [3]. Alarge economic burden is caused by diabetes and most directly affecting patients in low-middle-income countries [5], including Liberia.

T2DM requires better self-care behavior [1]. Self-care behaviour involves attending regular medical check-ups and adherence to medications and lifestyle changes. These activities of treatment are expected to lead to a reduction in the afflictionand complications associated with T2DM. However best treatment outcomes are not consistently achieved in clinical practice [2] possibly due to poorpatients' adherence to treatment. To the best knowledge of the authors, there is, however, no data regarding the frequency of adherence to medications and self-care management among individuals with type 2 diabetes in Liberia. The study therefore aimed to assessT2DM patients' adherence to anti-diabetic medications and Self-care i.e., diet, exercise, self-monitoring blood glucose (SMBG) and foot care.

II. METHODS

This was across-sectional study assessing adherence to factors associated with medications adherence and self-care among T2DM patients receiving care at the diabetes clinic of the Eternal Love winning Africa (ELWA) Hospital's Out-Patient Department inPaynesville City, which is located a few kilometers on the outskirts of Monrovia. ELWA hospital provides daily diabetes mellitus care to diabetics and other patients with chronic medical conditions. The study was conducted September to December, 2019. Inclusion criteria included confirmed diagnosis of T2DM or self-reported healthcare professional diagnosis of T2DM and patient must be seeking care from the diabetes clinic at least twice during the last 3-months. Patient must have signed aninformed consent form. Exclusion criteria included patients with Type 1 Diabetes Mellitus and the terminally

ill.The study was approved by the Health Ethics Committee of the Eternal Love winning Africa (ELWA) and with written informed consent obtained from all participants before their enrollment in the study.Forty-four participants were recruited through a convenience sampling method. Demographic variables included age (years), gender, employment status and area of residence. Adherence was assessed by the Morisky Medication Adherence Scale – 8. An eight questions item scale was used in evaluating medication adherence among patients with chronic medical conditions. The other sections assessed patients' compliance with lifestyle changes and SMBG.

III. RESULTS

The sociodemographic characteristics of the participants showed there were 19 males and 25 females. 90% of the participants were ≤ 50 years of age (Table 1.0). The clinical characteristics of participants were assessed (Table 2.0).

SN	CATEGORY	FREQUENCY	PERCENT
	Sex		
	Males	19	43.2
	Females	25	56.8
	Marital status		
	Married	29	65.9
	Unmarried	15	34.1
	Area of residence		
	City	36	81.8
	Town	8	18.2
	Occupational status		
	Employed	20	45.5
	Unemployed	13	29.5
	Housewife	3	6.8
	Retired	8	18.2

Table 1 explains the socio-demographic characteristics of participants.

Table 2: Clinical characteristics

SN	Category	Frequency	Percent
	Forget to take medicines		
1	Yes	25	58.6
2	No	19	43.2
	Any day you did not take diabetes medicines?		
3	Yes	27	61.4
4	No	17	38.6
	Stopped taking diabetes medicines because you felt better?		
5	Yes	12	27.3
6	No	32	72.7
	Stopped taking diabetes medicines on your own initiative?		
7	Yes	16	36.4
8	No	28	63.6
	Taken ≥ 1 medicines on your own and felt worse?		
9	Yes	19	43.2
10	No	25	58.6
	Taking antihypertensive medicines?		
	Yes	40	90.9
	No	4	9.1
	Did you take your antihypertensive medicines yesterday?		
	Yes	28	63.6
	No	16	36.4
	Ever stopped taking your diabetes medicine because it ran out?		
	Yes	32	72.7
	No	12	27.3
	Ever stopped taking your diabetes medicines for other reason than physician's advice?		
	Yes	23	52.3
	No	21	47.7
	Do you always comply with nutrition recommendations?		
	Always	9	20.5
	Sometimes	34	77.3
	Never	1	2.2
	Do you always comply with exercise recommendations?		
	Always	7	15.9
	Sometimes	30	68.2
	Never	7	15.9
	Duration of illness/Diabetes		
	> 5 years	17	38.6
	≤ 5 years	27	61.4
	Adherence to SMBG/FOOTCARE		
	Yes	11	25.0
	Sometimes	18	40.9
	No	15	34.1

Table 2 explains the clinical characteristics of patients.

IV. DISCUSSION

There were more females than males in the current study. This is similar to a cross-sectional study in India that showed a higher prevalence of T2DM among women. Reasons for the higher prevalence were physical inactivity, obesity and sex [6].In many countries of sub-Saharan Africa, women of low socio-economic status were at higher risksof diabetes in that women were more likely to be obese or overweight than men and therefore expected to have higher prevalence of diabetes mellitus [7]. Another report also revealed women in Cameroon, South Africaand Ugandawere found to have higher prevalence of diabetes mellitus than males [8]. This could be due to the possibility that women in low-income countries have particularly poor access to health-care services and little chance of being diagnosed with diabetes[9].

Most of the respondents had some form of employment and resided in urban communities.Most respondents, even though in some form of employment, could not financially manage their medical conditions because of the costs attached to diabetes care. They verbally indicated that that they could not afford to purchase a diabetes kit or blood glucose monitoring device because their monthly income was insufficient. On the other hand, due to increasing urbanizationand its accompanying changes in lifestyle, there is an escalating epidemic of chronic medical conditions in sub-Saharan Africa as reported in some studies [10,8].

In the current study showed most of the respondents forgot to take their antidiabetic medications.These results are similar to a cross-sectional study in India where 47%-59% of the respondents forgot to take their anti-diabetic medications [11]. Diabetes patients reportedly forget to take their anti-diabetes medications due to several reasons. Some of the reasons could be deliberate skipping a dose, change of diet, moving from one place to another, or too many medications to take at different times [12].

Reported adherence in the current study is similar to previous findings reported from Iran (74.8%) and Nigeria (72.5%) [13]. The findings presented that majority of respondents in the current study adhered to the anti-diabetic medications. However, the information on adherence was based on patient's recall, therefore the actual and true level of adherence could be lesser than the findings presented in this study.Moreover, most respondents indicated that that they stopped taking their anti-diabetic medications because it ran out or stopped against doctor's recommendations either due to low finances or unpleasant side-effects of the medications. The costs of anti-diabetic medications are reportedly very high in Liberia hence some respondents verbally indicated that they have to save some money from their meager earnings to purchase their medications. Hence they often missed a dose in a day or two before obtaining a refill.

Findings from the current study revealed majority of the participants erratically adhered to lifestyle changes such as exercises and nutritional recommendations provided by healthcare providers. Respondents verbally indicated that lack of time, competing interests and difficulty in strictly following lifestyle changes were serious challenges. Hence adherence wason a "sometimes" or an "opportunistic" basis.

Most respondents did not practice SMBG nor foot care. The high cost of the blood glucose monitoring machine makes it difficult to afford by many respondents and so they resulted to waiting for their doctor's appointment before their blood glucose level can be measured. SMBG was recommended by the American Diabetes Association as part of multifactorial interventions. This suggests that SMBG is a key component of effective therapy. Moreover, the risk of foot ulceration has increased in people who have diabetes. Targeted patient and appropriate footwear have shown to reduce the risk of ulceration [14]. Hence patients should be educated about the benefits of foot care in the management of diabetes.

This study had some limitations: first the use of self-report method to evaluate patients' adherence to anti-diabetic medications and lifestyle changes. Self-report methods are often unreliable and over-estimate patients' adherence level. Secondly, reasons for non-adherence were not addressed in the current study. Finally, a very small sample size was used in the current.

V. CONCLUSION

The current study revealed that patients' adherence to self-care: lifestyle and foot care was poor. Enhancing patients' knowledge through diabetes education and adherence will improve lifestyle changes which are in turn necessary to improve self-management.

AUTHOR'S CONTRIBUTIONS

GFS and EAD developed the conception and design of the study, drafted the manuscript and analyzed and interpreted the data; JTP, KCS and JFG provided technical inputs.

REFERENCES

[1]. American Diabetes Association. Standards of medical care in diabetes. Diabetes Care. 2013;36 suppl 1: S11–66.

[2]. Sidorenkov, G., Haaijer-Ruskamp, F.M., De Zeeuw, D., and Denig, P. A longitudinal study examining adherence to guidelines in diabetes care according to different definitions of adequacy and timeliness. PLoS One. 2011;6(9): e24278.

[3]. World Health Organization Global Report on Diabetes; 2016.

[4]. Collaboration NR. Worldwide trends in diabetes since 1980: A pooled analysis of 751 populations-based studies with 4.4 million participants. Lancet 2016; 387:1513-30.

[5]. Seuring, T, Archangelidi O, and Suhrcke M. The economic costs of Type 2 diabetes: A global systematic review. Pharmacoeconomics 2015;33:811-31.

[6]. Imoisili, O.E., and Sumner, A.E. Preventing diabetes and atherosclerosis in sub-Saharan Africa: should the metabolic syndrome have a role? CurrCardiovasc Risk Rep 2009; 3: 161-7 http://dx.doi.org/10.1007/s12170-009-0026-7 pmid: 22368728

[7]. BeLue, R., Okoror, T.A., Iwelunmor, J., Taylor KD, Degboe AN, Agyemang C, et al., An overview of cardiovascular risk factor burden in sub-Saharan African countries: a socio-cultural perspective. Global Health 2009; 5: 10 http://dx.doi.org/10.1186/1744-8603-5-10 pmid: 19772644.

[8]. Hilawe, E.H. Yatsuya , H., Kawaguchi, L., and Aoyama, A.Differences by sex in the prevalence of diabetes mellitus, impaired fasting glycaemia and impaired glucose tolerance in sub-Saharan Africa: a systematic review and meta-analysis, Bulletin of the World Health Organization 2013;91:671-682D. doi: http://dx.doi.org/10.2471/BLT.12.113415

[9]. Agardh, E., Allebeck, P., Hallqvist, J., Moradi, T., and Sidorchuk, A. Type 2 diabetes incidence and socio-economic position: a systematic review and meta-

analysis. Int J Epidemiol 2011; 40: 804-18 http://dx.doi.org/10.1093/ije/dyr029 pmid: 21335614.

[10]. Dalal, S., Beunza, J.J, Volmink, J., Adebamowo, C.,Bajunirwe, F., Njelekela, M., et al. Non-communicable diseases in sub-Saharan Africa: what we know now. Int J Epidemiol 2011;40:885-901 http://dx.doi.org/10.1093/ije/dyr050 pmid: 21527446.

[11]. MuKherjee, S., SharMaSarKar, B., DaS, K.K., Bhattacharyya, A., and Deb, A. Compliance to anti-diabetic drugs: observations from the diabetic clinic of a medical college in kolkata, India. Journal of clinical and diagnostic research: JCDR. 2013;7(4):661.

[12]. Sapkota, S., Brien, J.A., and Aslani, P.

[13]. Nepalese patients' anti-diabetic medication taking behaviour: an exploratory study. Ethnicity & health. 2017; 25:1-9

[14]. Elsous, A., Radwan, M., Al-Sharif, H., and Mustafa, A.A. Medications Adherence and Associated Factors among Patients with T 2 Diabetes Mellitus in the Gaze Strip, Palestine. Front. Endocrinol. 8:100, doi: 10.3389/fendo.2017.00100

[15]. American Diabetes Association: Self-monitoring of blood glucose (Consensus Statement). Diabetes Care 17:81-86