

## Barriers to Lifestyle Modification Compliance among Type 2 Diabetic Patients in Lesotho

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### ABSTRACT

*Diabetes mellitus (DM) has been considered a serious long-term condition which is one of the top 10 causes of death among adults and it has got a major impact on lives and well-being of individuals, families and societies. The most common type of DM in Africa is Type2 (T2DM). Diabetes being a major problem worldwide, healthy eating coupled with regular physical activity help in achieving a good glycemic control as well as delaying and reducing the onset of commonest diabetes complications. The current study aimed at exploring the barrier to lifestyle modification compliance among type 2 diabetic clients at Paki health center Lesotho. In this study, a quantitative descriptive design was applied in exploring the barriers of compliance to lifestyle modifications (diabetes self-management) among adults with type 2 diabetes. Data was collected using semi-structured questionnaires, which were administered to 40 study participants who were purposively selected for inclusion into study.*

*The study revealed that among other factors, financial constraints 21participants (52.5%) is associated with non-compliance to healthy eating habits. Other reasons from non-compliance to healthy eating were identified as absence of written instructions, sickness, lack of stamina to exercise, laziness and lack of access to physical activity facilities with percentages 85%, 65%, 50% and 40% respectively. Thus, study findings reveal needs for continuous health education on health benefits of healthy eating habits and physical activity.*

### Keywords

Barriers, Lifestyle modification, Compliance, Diabetes Mellitus.

### Abbreviations

DM: Diabetes Mellitus, T2DM: Type2 Diabetes Mellitus, ADA: American Diabetic Association, HDL: High density lipoproteins, HbA1c: Glycated Hemoglobin, IDF: International Diabetes Federation, UN: United Nations, T2DM: Type 2 Diabetes Mellitus, WHO: World Health Organization.

### Introduction

The World Health Organisation (WHO) [1], referred to diabetes mellitus as a metabolic disorder marked by chronic high levels of blood glucose level also called hyperglycemia. This hyperglycemic state is accompanied by disturbances to metabolism

of carbohydrates, fats as well as that of proteins secondary to insulin deficiency, insulin resistance or both. Diabetes mellitus is classified into type 1, type 2, other specific types and gestational diabetes where Type 2 Diabetes Mellitus (T2DM) is the most common type. Type 2 Diabetes Mellitus results from a combination of factors such as resistance to the action of insulin and inadequate insulin response among others [2]. Diabetes mellitus management is unique for each type, for type 1 diabetes the focus is on insulin replacement in order to achieve optimal glucose control, which is measured by glycated hemoglobin (HbA1c) value while that of T2DM is based on dietary adjustments, weight loss and regular exercise [3].

Saeedi et al. further elaborated that diabetes has reached alarming levels with nearly half a billion people (9.3% of adults aged 20-

79) living with diabetes in the world and half of people with diabetes are not diagnosed [4]. Diabetes prevalence has been increasing over the past years and the increase is mostly in low and middle-income countries [5]. As emphasized by Nor et al., a good glycemic control is achieved when the insulin or oral therapy is coupled with diet and exercise [6]. This healthy diet, regular exercise and tobacco avoidance have been classified as lifestyle modifications that are considered cornerstone of diabetes mellitus management by Nor et al. As stated by Vencio, et al., it is important to make patients diagnosed with diabetes mellitus aware of several strategies to achieve a good glycemic control [7]. Type2 Diabetes Mellitus is the most common type in Africa representing over 90% cases of diabetes as in other parts of the world. Prevalence of diabetes is expected to increase globally and with more diabetic cases are in the developing countries [8]. A study conducted in Lesotho on type 2 diabetes were more concerned with knowledge, attitudes and practices related to diabetes among T2DM patients the results of study conducted by Van den Berg, Mokhehle and Raubenheimer in 2019, indicated that type 2 diabetic participants 98.3% were knowledgeable on what are considered the basic lifestyle recommendations for diabetes [9]. Despite that knowledge, participants were still not complying with diabetes self-management. These findings raised a concern on the barriers to the DM lifestyle modification. Therefore, this current study aims at exploring the lifestyle modification barriers to compliance among type 2 diabetic clients at Paki health center Lesotho.

### Methodology

A quantitative descriptive design was used in exploring the barriers of compliance to lifestyle modifications among adults with type 2 diabetes attending diabetic clinic follow ups. Numerical data, which was obtained through the pre-tested questionnaires, assessed the demographic information of study participants as well as the barriers to lifestyle modification compliance among type 2 diabetes patients. The population entailed all adult patients with type 2 diabetes receiving their outpatient services at Paki health center in Maseru, Lesotho. The facility offers outpatient services such as routine refill of diabetes medications, review of patients on Anti-Retroviral treatment, maternal and child services as well as cervical cancer screening services on Tuesdays and Thursdays among others. The study was conducted on a sample size of 40 adult patients with type 2 diabetes, who were purposively selected for inclusion into the study.

On the data collection day, the purpose of the study was explained to the study participants. Then from those who agreed to participate consent was obtained through the signing of the consent form. The Lesotho Ministry of Health through its Research ethical committee approved the study. The semi-structured questionnaire entailed closed ended questions as well as open-ended questions. Information obtained through the semi-structured questionnaire was entered on the excel spreadsheet, the descriptive statistics including frequencies and percentages were calculated. Findings were then presented on tables, charts and pie charts.

## Result

### Results of Demographic Characteristics

The table 1, below summarizes the socio-demographic characteristics of study participants and they include gender, age, marital status, level of education and marital status.

**Table 1:** Socio-demographic characteristics of study participants (n=40)

Socio-demographic characteristics		Frequency	Percentage
Gender	Male	4	10%
	Female	36	90%
Age	30-49	2	5%
	50-69	20	50%
	70-89	18	45%
Marital status	Married	20	50%
	Single	0	0%
	Separated	0	0%
	Divorced	1	2.5%
Educational status	Widowed	19	47.5%
	No school	1	2.5%
	Primary	21	52.5%
	Secondary	11	27.5%
	High school	4	10%
Employment status	Tertiary	3	7.5%
	Unemployed	28	70%
	Employed	3	7.5%
	Self-employed	9	22.5%

Table 1 above illustrates that, for the total number of 40 type2 DM patients who participated in the study, female participants constituted (34) 90% of the study sample population while the rest were males. Participants' age ranged from 30 to 89 years and 50% of participants were aged between 50 and 69 years. Majority 20(50%) of respondents were married while only 2.5% was divorced. The median level of education was secondary education and 2.5% of participants did not go to school while the other 21(52.5%), 11(27.5%), 4(10%) and 3(7.5%) attended primary school, secondary school, high school and tertiary respectively. A total of (28)70% of respondents were unemployed, 7.5% were employed and 22.5% were self-employed.

### Relationship between Socio-Demographic Factors (Gender, Age, Educational Status and Employment Status) and Physical Activity

The table 2 below summaries the relationship between physical activity and the following socio-demographic factors: gender, age, level of education and employment status. In this study, respondents who were least likely to engage in physical activity are males (75%), those aged between 70 and 89 (72%), whose highest level of education is high school (100%) and those who are unemployed (64%). In this study, females 95% were more likely to exercise than males. Participants aged between 50 and 69 years were more physically active 65% than age groups 30 and 49 (10%) as well as 70 to 89 (25%). Participants whose highest level of education is tertiary and secondary school are the least likely to exercise as their rate of physical activity are 15% and 30% respectively. Unemployed people were the most (50%) physically active while the employed respondents were the least (15%) to engage in physical activity.

**Table 2:** Relationship between socio-demographic factors and physical activity of 40 participants

Socio-demographic factors		Physically active	Not physical activity
Gender	Male	1	3
	Female	19	17
Age	30-49	2	0
	50-69	13	7
	70-89	5	13
Educational status	No school	0	1
	Primary	11	10
	Secondary	6	5
	High school	0	4
	Tertiary	3	0
Employment status	Unemployed	10	18
	Employed	3	0
	Self-employed	7	2

**Relationship between Socio-Demographic Factors; (Gender, Age, Employment Status and Level of Education) and Healthy Eating Habits**

In the current study, males 66% and females 44% are least likely to consume more fruits. Those without educational background were non-adherent to fruits and removal of visible fat off meat. On the other hand, all respondents who are employed were adherent to vegetables, fruits and removal of visible fat off the meat.

**Table 3:** Relationship between socio-demographic characteristics and healthy diet.

Socio-demographic factors		Vegetables	Fruits	Trimming fat off meat	A lot of sweets
Gender	Male	3	2	3	1
	Female	27	16	23	0
Age	30-49	2	1	1	0
	50-69	15	11	20	0
	70-89	13	3	5	0
Educational status	No school	1	0	0	0
	Primary	4	1	6	0
	Secondary	6	5	7	0
	High school	4	4	8	0
	Tertiary	3	3	5	0
Employment status	Unemployed	10	5	6	0
	Employed	3	3	3	0
	Self-employed	9	3	5	0

Majority (87.1%) of participants who adhered to vegetables were females while on the other hand 51.6% of adherence to fruits composed of only females. Lastly 74.4% of females were adherent to trimming fat off meat while the remaining percentage was that of males. Regarding adherence to vegetables, fruits and trimming fat off meat, the age, 50 to 69 years was the compliant group with percentage distributions of 48.4%, 35.5% and 64.5% respectively.

As indicated above Participants who completed their primary, secondary and high school education were more adherent to vegetables, fruits and trimming fat off the meat than those who completed their tertiary and those without school attendance. In this study it has been found that, 35% of unemployed respondents are adherent to vegetables while, compliance of those who are employed to vegetables, fruits and removal of visible fats from meat has been found to be 100%. On the other hand, most of

self-employed are adherent to vegetables (100%) and removal of visible fat off meat (56%).

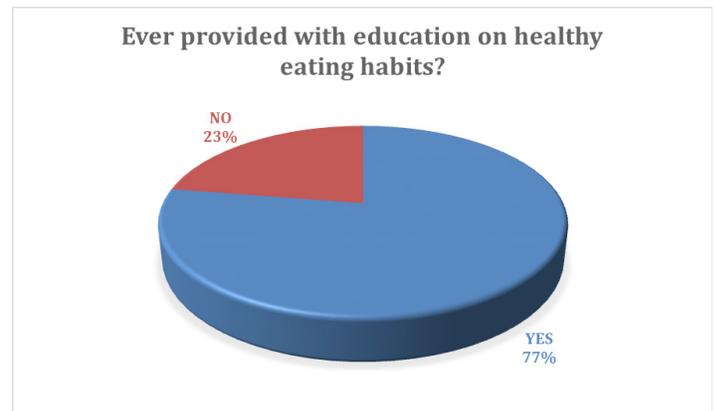
**Challenges That Hinder Adherence to Healthy Eating Habits and Physical Activity among Type 2 Diabetes Clients**

**Participants’ understanding of recommended healthy eating habits**

Type 2 DM patients’ understanding of recommended healthy eating habits was assessed by first inquiring if they were ever taught about healthy eating habits at the health facilities. Then those who responded ‘YES’, were provided with a list of eating habits from which they selected healthy eating habits.

**Education on Healthy Eating Habits**

Participants were asked to whether they have received any form of education on healthy eating habits and their responses were presented on the pie chart.



**Figure 1:** Respondents’ responses on provision of health education regarding healthy eating habits.

Figure 1 above indicates that, with regard to provision of health education on healthy eating habits, the majority (31) 77% of the study participants had received education on healthy eating habits while only (9) 23% had not.

**Patients’ Understanding of Healthy Eating Habits**

Respondents’ understanding of healthy eating habits was assessed by asking participants to select healthy eating habit from a list that was provided. Then the frequency with which each type of food was selected.

Figure 2 above reflects the percentage distribution of participants’ understanding of healthy eating habits. Vegetables were the most 96.8% selected component of healthy eating habit while 1 (3.2%) selected eating a lot of sweets, 26(35%)trimming away visible fat off meat, 18(24%) fruits and none have selected options “milk products high in fat as well as lots of salt”.

**Adherence to Healthy Eating Habits**

In order to find out the level of adherence of T2DM patients, they were asked to write down the healthy food that they consume at

## Which of these are the healthy eating habits?

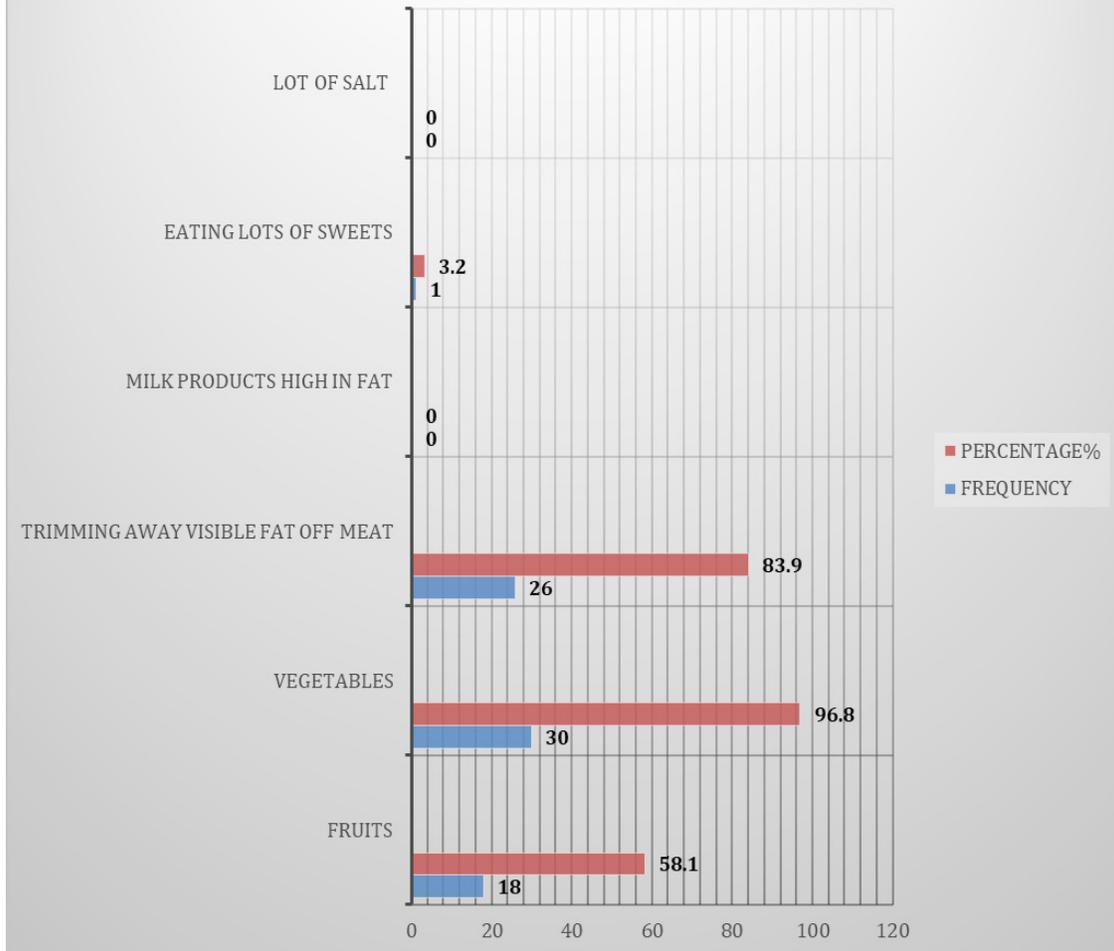


Figure 2: Participants' understanding of healthy eating habits.

## Which healthy eating habits are you adherent to?

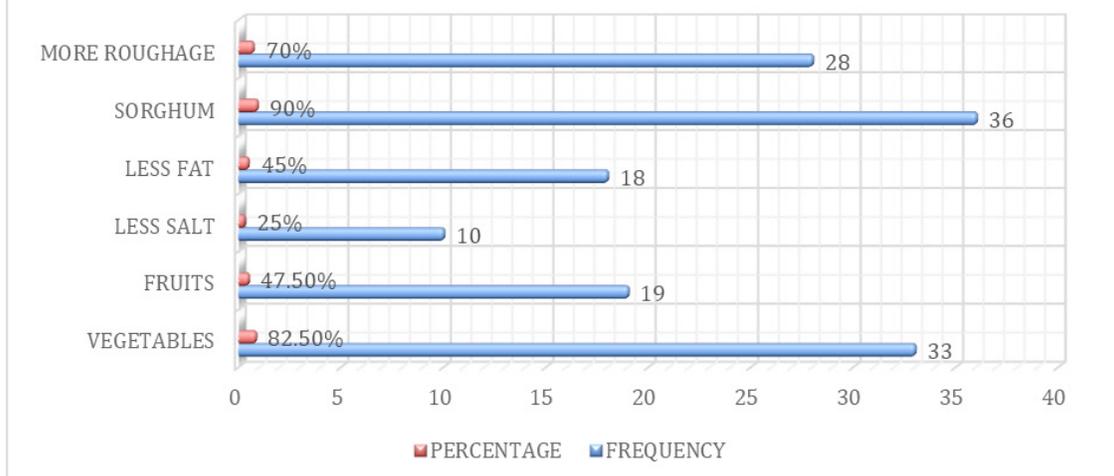
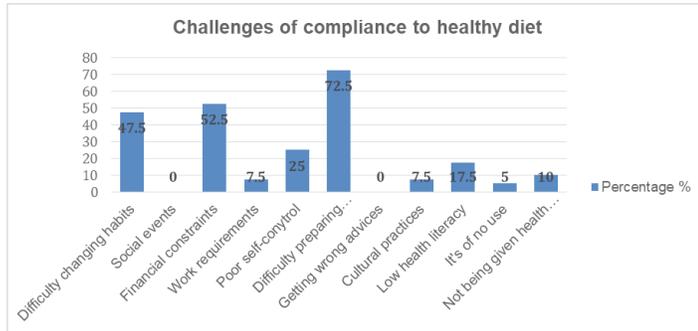


Figure 3: Respondents' adherence to healthy eating habits.

home and the frequency with each food occurred was recorded and percentages calculated.

From the figure 3 above, most (36) 90% of participants consume sorghum while 82.5% adhere to vegetables. Adherence to less fat, fruits were; 45% and 47.5% respectively. A quarter percentage (10) 25% was adherent to less salt.

### Reasons for Non-Compliance to Recommended Healthy Eating Habits

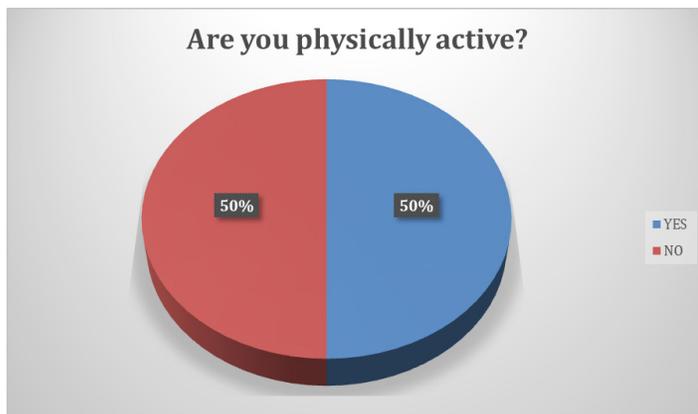


**Figure 4:** Reasons for participants' non-compliance to recommended healthy eating habits.

Some respondents reported that they failed to adhere to healthy eating guidelines because of financial constraint 52.5% and because they find it difficult to prepare separate and different food from that of the rest of the family 72.5%. Other respondents are unable to comply due to difficulty changing their habits 47.5% and others was secondary to poor self-control 25%. On the other hand, none of the participants indicated attending social events as well as getting wrong advice concerning healthy eating habits to be a barrier to their compliance.

### Compliance to Physical Activity

Respondents were asked to state whether they are physically active or not by answering 'yes' or 'no'. The number of times each response occurred was calculated and percentages were presented on pie chart.

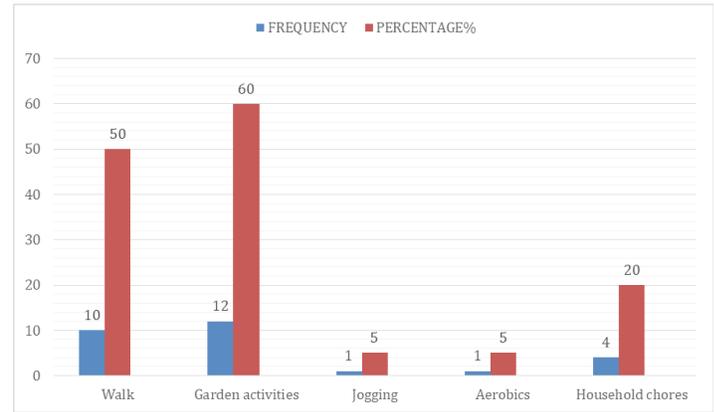


**Figure 5:** Compliance to physical activity of 40 participants.

The figure 5 above indicates that half of the respondents 20(50%) reported to have been physically active while the other half 20(50%) ported that they were not physically active.

### Which Form Of Physical Activity Are You Adherent To?

Participants' responses on form of physical activity that they regularly practice was counted and then percentages calculated.



**Figure 6:** Percentage distribution of various forms of physical activity.

Most participants considered garden activities 60% and walking 50% as forms of physical activities that they are adherent to. Only 5% selected jogging and aerobics as physical activities they adhere to.

### Challenges of Compliance to Physical Activity

Respondents were asked to select barriers of compliance to physical activity from list provided and to state some of their own. Then the frequency with which each barrier was selected were counted and presented on the table 4 below.

**Table 4:** Reasons for non-compliance to physical activity.

Reasons of non-compliance	Frequency	Percentage%
Absence of written instructions on form of activity	17	85
Sickness	13	65
Lack of access to physical activity facilities	8	40
Lack of stamina to exercise	13	65
Lacking support and company while exercising	4	20
Physical activity is tiring and uncomfortable	5	25
Physical activity exacerbates other illnesses	2	10
Laziness	10	50
Busy work schedule	6	30
Not getting advices and motivation	2	10

According to table 4, most participants indicated that they were not exercising because they were not given written instructions on forms of physical activity 85%, due to illness 65% and because they lack the stamina to exercise 65%. Half of the participants considered laziness to physical activity 50% while 40% mentioned lack of access to physical activity facilities as a barrier to their compliance.

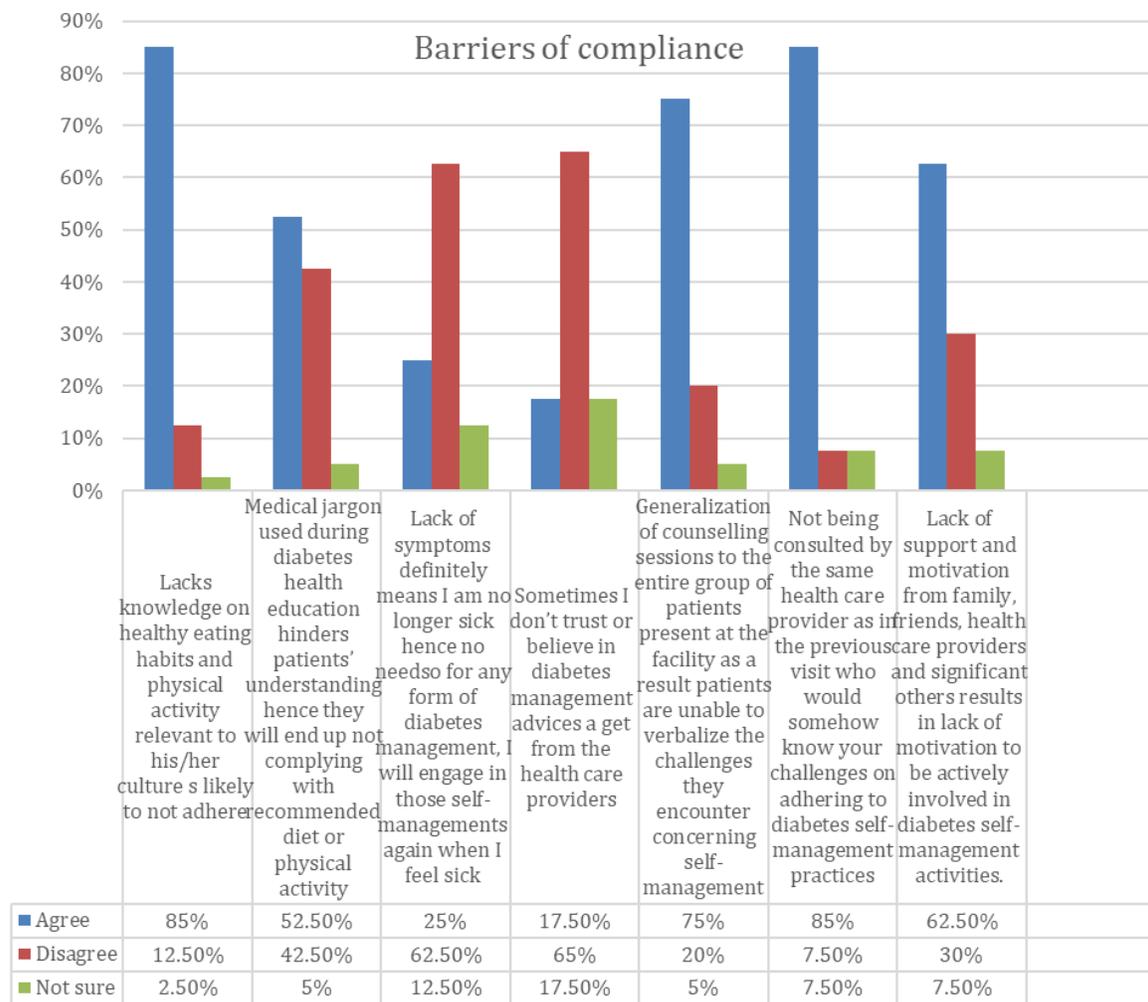


Figure 7: General challenges of con-compliance to healthy eating habits and physical activity.

### General Challenges of Non-Compliance to Healthy Eating Habits and Physical Activity

As reflected on Figure 7 above, most (85%) of the respondents agreed that lack of knowledge on healthy eating habits and physical activity as well as not being consulted by the same health care provider every time of a visit to health facility hinders one's compliance whereas, 65% indicated that lack of trust or believe diabetes management advices given by health care providers does not hinder compliance. They further indicated that, lack of support from family and friends 62.5% and counselling sessions that are generalized to all people present instead of one-to-one sessions 75% are barriers of compliance.

### Discussion

In this study, about half (20) 50% of the respondents reported to have been physically active, and this finding is lower than those of the study carried in Lesotho of 322 type 2 diabetes patients [10] and 124 T2DM patients [9], which indicated 64.3% and 98% physical activity among respondents respectively. On the other hand, respondents' consumption rate of vegetables and fruits were 82.7% and 47.5% respectively. There is a marked reduction in consumption of fruits as compared with the findings from a

study conducted in Lesotho [9], which reported 65.3% fruits consumption, which is higher than that of the current study, which is 47.5%. This could be linked to the employment status, which is better in Van den Berg, Mokhehle and Raubenheimer, (2019) study where 57.3% were unemployed whereas in the current study, 70% of participants were unemployed.

### Barriers to Self-Management

Top most identified barrier to both physical activity and healthy eating compliance, "that patients forget instructions that they were given on healthy eating habits as well as physical activity because they are not given any written instructions from the health facilities" was also noted by Ayele, Emiru, Tiruneh et al.; Van den Berg, Mokhehle and Raubenheimer [9,11]. This indicates a need for a continuous health education on every encounter with a patient as a reminder. Also providing patients with information booklets written in local, easy to read language that they understand could assist them while at home.

Most participants indicated lack of knowledge on healthy eating and physical activity as a hindrance to compliance and this is comparable to the findings of Adhikari, Devkota, and Cesuroglu;

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Saunders; Whittemore, Vilar-Compte & De La Cerda et al. [5,11,16]. In order to combat the challenges of diabetes self-management, in particular lack of knowledge, improved and strengthened outreach programs are needed so that health care providers can reach out to that population in remote areas. In addition, participants agreed that use of medical jargon during health education hinders their understanding hence they fail to comply and this finding coincided with the literature that, low health literacy is associated with failure of compliance to lifestyle modification [1,12,13]. The use of confusing and complicated terms while communicating to patients with diabetes should be avoided, as indicated on our educational level findings of above; half participants had only achieved primary education.

In contrary to the findings from the studies conducted by Saunders and Whittemore, Vilar-Compte & De La Cerda et al., study at hand showed that, perceived lack of symptoms does not makes patients feel like they do not need any form of management because they do not feel sick [9,13]. On the other hand, lack of trust or belief in diabetes management advice given by healthcare providers was not considered a barrier of compliance in this study and this finding is dissimilar to the report by Adhikari, Devkota and Cesuroglu; Adu, Malabu, Malau-Aduli et al. that identified patients' trust issues with healthcare provider a discrepancy on the diabetes home-based management [5,14].

Moreover, non-compliance to diabetes self-management could be attributed to the belief that healthcare providers lack time to communicate with patients individually rather they generalize their counselling sessions to the entire group present at the given point in time. This is in line with the finding that type 2 diabetes clients fail to comply with lifestyle modifications because of insufficient counselling secondary to deficits in communication between clients and health care professionals as well as due to lack of individualized communication [5,9,12].

Similar to Adhikari, Devkota & Cesuroglu; Whittemore, Vilar-Compte & De La Cerda et al., the current study found that lack of support and motivation from family, friends, healthcare providers and significantly others results in lack of motivation to be actively involved in diabetes self-management [5,13]. While it has been noted that lack of symptoms definitely means one is no longer ill so does not need any form of diabetes management, the current study found that participants engage in diabetes self-management even if they feel healthy [12,13].

### **Barriers to Healthy Eating**

For this study participants, having to change their already established eating habits makes it difficult for them to adhere to healthy eating habits and this coincides with the literature [5,11,13]. Similar to the previous findings from other studies majority of the participants (36) did not comply with healthy eating habits because of financial constraints [5,9,11,15]. This is an indication of lack of knowledge and awareness that healthy diet does not necessarily have to be those food that are bought therefore, a detailed and more focused health education is needed with more emphasis on

healthy foods that are culturally based that is those, that can easily be obtained for instance those from the gardens and fields but still providing adequate nutrients in correct proportions.

Lack of self-control whereby people get tempted to eat unhealthy food appeared to be one of reasons for non-compliance to healthy eating habits and this finding is similar to that of existing literature [9,12,16].

Similar to the existing evidence, the current study found that poor self-control and difficulty following diet that is different from that of the rest of the family were challenges of compliance to healthy eating [9,12,16]. It is therefore important that patients be encouraged to come with at least one family member who will assist in enforcing and implementing the education provided at home.

This study revealed that, social events or carnivals do not offer a person an opportunity to eat poorly and this finding is inconsistent with other studies [11,13]. On the other hand, literature showed that cultural beliefs were the barriers of compliance to healthy eating and in this study, only a few participants 7.5% mentioned cultural beliefs as a reason for non-compliance [12,14,15].

For majority (92.5%) of the study participants, work requirements including schedules that require a person to travel did not hinder their adherence to healthy eating and this is inconsistent with results of Banerjee, Chakraborty and Pal; Adu, Malabu, Malau-Aduli et al.; Whittemore, Vilar-Compte & De La Cerda et al. Some of the participants mentioned that they are always given many tablets on every visit without their blood glucose levels being monitored so this makes them lose hope in self-management, as they are unable to see if self-management that they practice is effective.

### **Barriers of Compliance to Physical Activity**

Three physical activity challenges common to the participants were: lack of stamina, illness from co-morbidities and diabetes complications as well as laziness. These findings correspond with the results from several other studies [8,12-14,16]. The current study also reported that lack of access to physical activity facilities and lack of social support affects one's motivation to exercise hence hinders compliance to physical activity and this coincides with what Adhikari, Devkota and Cesuroglu discovered [5]. Furthermore, there were respondents who considered physical activity tiring and uncomfortable while others considered busy working schedules as challenges of physical activity compliance. These findings were consistent with studies by Kadariya and Aro [8].

### **Conclusion**

The current study looked into barriers to lifestyle modification compliance among type 2 diabetic clients at Paki health center Lesotho. T2DM patients are faced with various challenges with regard to compliance to lifestyle modifications. The study findings revealed that, participants are knowledgeable about healthy eating habits as well as physical activity and majority of participants indicated to have been educated on those lifestyle modifications at

the health facilities though a number of them still fail to comply. Therefore, this signifies a need for reinforcement of education as well as regular individualized nutritional counseling by nutritionists.

The study also found that T2DM patients' blood glucose level was not monitored on every monthly visit and this implies that patients are not served adequately and the services they are given are below WHO recommendations. Participants felt burdened by costs of the healthy food, preparation of food that is separate from that of the rest of the family as well as changing their already established eating habits. On the other hand, they complained of absence of written instructions on appropriate forms of physical activity, being sick and lack of stamina as their major cause of their compliance to physical activity.

The barriers of compliance to lifestyle modification compliance should be taken in to consideration by the health care multi-disciplinary team in order that appropriate approach to combat these challenges can be taken. In order to promote compliance to healthy eating and physical activity health education and as well as open discussions with clients may provide a clearer understanding of what happens when one eats unhealthy food or what happens when exercises are not done and this in return may result in a more genuine choice of whether to comply or not. Being knowledgeable may also assist T2DM in making more informed decisions instead of just doing what healthcare providers say.

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