



## NON-PHARMACOLOGICAL METHODS USED IN THE MANAGEMENT OF TYPE 2 DIABETES MELLITUS (T2DM) BY PATIENTS ATTENDING A DIABETIC CLINIC AT A TERTIARY CARE HOSPITAL IN COLOMBO, SRI LANKA

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### **Background**

Type 2 diabetes mellitus (T2DM) is a major public health problem with high morbidity and mortality. The latest findings, reported that Sri Lanka had the highest rate of diabetes in Asia with a prevalence of 23%. As control of T2DM is vital, this study aimed at assessing the awareness, practices, and associated barriers to using non-pharmacological methods in the management of T2DM in a selected group of diabetics.

### **Methods**

A mixed method study was conducted (quantitative and qualitative) among the patients who attended the diabetic clinic at University Hospital-KDU. A conveniently selected sample of 138 was recruited to the study. Data collection was done through a self-administered questionnaire and by one-to-one interview. Gathered data were analyzed by using SPSS 25.0 and by thematic analysis.

### **Results**

The majority (61.6%) of the sample were females. The mean blood glucose level of the sample was 138.40 mg/dl (SD  $\pm$  46.145). The mean duration of diabetes was 10.62 (SD $\pm$ 7.97) years while 34.8 % had a positive family history of T2DM. Around 61.6% had 'fair knowledge' of non-pharmacological management of T2DM. Diet control was followed by 62.2%, exercises (Aerobic, Stretching, etc.) by 16%, and stress management by 1.9% of the participants. The average duration of exercise is 10 minutes per session. No association was found between knowledge and gender whereas the duration of exercise was statistically significant with the gender ( $p=0.013$ ). In qualitative analysis, 'low income' and 'family-centered food culture' were identified as the most common barriers to diet control. 'Lack of time' and 'aging' were the main reasons for poor adherence to exercises while poor weight control was noted due to 'lack of mindful diet' and a 'busy lifestyle'.

### **Conclusion**

The practices were not up to the standards of current recommendations. It highlights the need to improve the motivation of participants to adapt to a healthy lifestyle by overcoming possible barriers.

**Keywords** Type 2 Diabetes Mellitus, Awareness, Practices, Barriers

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### **INTRODUCTION**

Diabetes mellitus is a major cause of high morbidity and mortality all around the world. Type 2 diabetes mellitus (T2DM) is one of the most common noncommunicable diseases with an increasing prevalence. Currently, Sri Lanka has been identified as a global hotspot for diabetes, having the highest diabetes prevalence in South Asia with a prevalence of 23% (Rannan-Eliya et al., 2023). Diet, exercise, weight reduction, and stress management have been highlighted as the most important areas of non-pharmacological management of T2DM (Siyabalapitiya et al., 2012).

Both regular exercise and dietary management are essential for patients with T2DM to improve insulin sensitivity (Asif, 2014). When people with T2DM are under psychological stress, they generally experience an increase in their blood glucose levels (Basina, 2022). It is equally important to identify the barriers of individuals and if so, the solutions to barriers need to be addressed (Kumar et al., 2013).

Therefore, this study aimed to determine the non-pharmacological methods used in the management of T2DM by the patients attending the diabetic clinic at University Hospital-KDU (UH-KDU), especially to assess the awareness, practices, and associated barriers in adherence to non-pharmacological management of T2DM.

### **METHODOLOGY**

A mixed-method study was conducted with both qualitative and quantitative aspects, among patients who attended the diabetic clinic at UH-KDU. A sample of 138 individuals with a diagnosis of T2DM was recruited for the study with a convenient sampling method. A pre-tested, self-administered questionnaire was given to all study participants to assess their awareness of non-pharmacological methods and to identify the non-pharmacological methods practiced by the patients attending the diabetic clinic at UH-KDU. A scoring system was used to categorize the level of awareness among patients based on the answers given for each question (i.e., poor awareness, fair awareness, good awareness, very good awareness). A one-to-one interview was conducted by the investigators for all the 138 participants to identify the barriers to adherence to non-pharmacological methods. Gathered data were analyzed by using the SPSS 25.0 version. The level of significance was set as  $p < 0.05$ . Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, KDU, Sri Lanka.

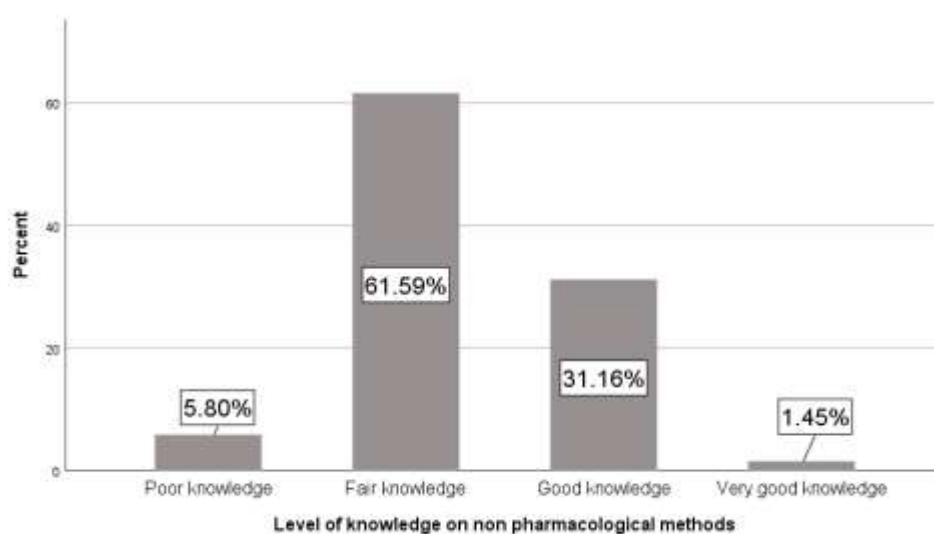
### **RESULTS AND DISCUSSION**

According to the results, the majority (61.6%) of the sample were females. The mean duration of diabetes was 10.62 years ( $SD \pm 7.97$ ), and the mean blood glucose level was 138.40 mg/dl ( $SD \pm 46.145$ ). According to the results, 81.2% of the participants were aware of dietary and exercise recommendations for diabetes. Almost equal responses of 15.3% and 14.2% were given about knowing adequate sleep and stress management respectively.



The knowledge assessment questionnaire revealed that 61.6% of the sample had ‘fair knowledge’ of the non-pharmacological management of T2DM while only 1.5% of the sample, had ‘very good knowledge’ of non-pharmacological management of T2DM. Based on the marks gradings, it showed that 5.8% of participants had a ‘poor knowledge’ regarding non-pharmacological management of T2DM (Figure 1).

A similar study conducted in a descriptive cross-sectional method in a diabetes outpatient clinic at a tertiary hospital in Colombo, Sri Lanka showed a higher percentage of overall knowledge score among participants (Wijesinghe et al., 2016). The authors mentioned that the Sri Lankan population had a good overall knowledge about diabetes. However, there is a huge knowledge gap specifically related to awareness of hypoglycemic symptoms and avoiding food problems (Wijesinghe et al., 2016). In the present study, a minimum percentage of participants had poor awareness and very good awareness regarding T2DM.



**Figure:1 Level of knowledge on non-pharmacological methods**

Regarding non-pharmacological practices, a greater proportion of participants, (n=97, 62.2%) mentioned that they practice diet control. Out of the responses, 16%, 1.9%, and 1.3% of participants practice any type of exercise (walking, running, stretching), stress management, and follow Ayurvedic treatment to control blood sugar levels respectively. Around 18.6% of the participants mentioned that they did not practice any other method of T2DM management other than having hypoglycemic medications.

Regarding physical activities, a greater proportion of (n=107, 47.8%) responses indicated that they engaged in household activities as physical activity, and very few of the responses indicated dancing, running, and swimming as percentages of 0.9%, 0.9%, and 0.4% respectively. There were only 9 (4%) participants who did not engage in any single physical activity. Moreover, 104 (75.4%) participants did not engage in any type of exercise. The results showed an average duration of exercise is 10 minutes per session among the participants who engaged in exercises. The maximum duration of an exercise session reported was 30 minutes (10.1%) among participants who engaged in exercises.

Analysis with the independent sample t-test showed that the gender and the duration of an exercise session were statistically significant (p=0.013), where males do more exercises than females. However, the average duration of exercise is very much less compared to the current exercise recommendations for diabetics. Though some participants engaged in exercises, it



could be assumed that the duration per session was not sufficient to produce a significant effect on health.

Another cross-sectional study conducted by using an interviewer-administered questionnaire in North Colombo Teaching Hospital, Sri Lanka by focusing on assessing the compliance with exercise recommendations and the barriers to exercise among patients with T2DM found that adhering to the exercise recommendation is poor (11.5%) irrespective of the clinical setting. Among the total sample (n=253), 72.4% who were following exercises used to walk as the commonest mode of exercise. The researchers have concluded that there is a poor adherence to regular exercise as part of diabetes management among patients with diabetes. Moreover, they have mentioned that the prevailing health promotional and health information-delivering techniques are insufficient to reach patients with T2DM and there is a need for novel approaches to address this issue (Siyambalapitiya et al., 2012).

Regarding the weight control methods, 25 (16.9%), and 23 (15.5%) of the sample followed diet control and exercises respectively and only one participant engaged in household activities as a weight control method according to the data. Regarding stress management based on the results, the least of 6 (3.6%) responses were on reading books and equal responses of 19 (11.2%) and 20 (11.8%) mentioned that they were following watching television and listening to music as stress management methods. Here it showed that diet control was also not done effectively as they have no better idea of reducing body weight. As per the results of stress management, most of the participants stated that they did not follow any method. Hereby the practices in stress management were not satisfactory.

As shown in Table 2, most of the participants (64.5%) mentioned that they have barriers to performing regular exercises.

**Table Barriers associated with practicing non-pharmacological methods of management of T2DM**

		No	Yes	Total
Have barriers to diet control	Frequency	75	63	138
	Percentage	54.3%	45.7%	100%
Have barriers to performing regular exercises	Frequency	49	89	138
	Percentage	35.5%	64.5%	100%
Have barriers to weight control	Frequency	97	41	138
	Percentage	70.3%	29.7%	100%
Have barriers in approaching relaxation techniques	Frequency	96	42	138
	Percentage	69.6%	30.4%	100%

The thematic analysis of qualitative data showed the following findings stated by participants. Regarding the barriers to diet control, the patient stated the following practical issues they have in diet control,

“When I eat a small quantity of meal, I still feel hungry and have no feeling of fullness”, “Because of the low income I cannot afford healthy food which is good for diabetes”, “I can’t prepare separate food for myself so that I eat the same food that my family members take”.



These statements revealed that low-income and family-centred food cultures are the most common barriers to diet control mentioned by the participants.

A mixed method parallel study design conducted by Mphasha et al., (2021) regarding the assessment of diabetes dietary knowledge and its impact on the food intake of patients in Senwabarwana, South Africa indicated that the patients consume large portions due to their family eating culture and findings confirmed that behaviors of family members may at times be unfavorable to diabetes care.

Further, in the current study, the participants mentioned that they cannot afford a diabetic diet, as they must spend more money on food because the income is low in the family. These facts suggest that family eating culture has become a major concern in the management of diabetes. Regarding the affordability of diet, the study proved that poverty and income inequality in Sri Lanka take a prominent place in dietary practices. The participants also stated that lack of time for food preparation at home was another concern. According to these statements, it reveals that the lack of family support for the respective patient and some degree of laziness are possible factors for poor glycemic control. In a similar study conducted as an internet-based survey of a panel of US primary care physicians, in November to December 2008 found most of the participants reported that the biggest barrier to treatment of T2DM was always or nearly always the patients' unwillingness to change their lifestyle (Marrett et al., 2012).

About the barriers to exercise, participants stated that "I have no time to do exercises due to my busy lifestyle", and some old patients (those aged above 60 years) said that, because of joint pain, body pain, and tiredness they cannot engage in regular exercises. Regarding weight control management participants' answers include "I cannot control the amount of food I take because I have more desire to eat", and "Due to my busy life schedule I cannot engage in exercises". Hence, lack of time and aging have been mentioned as reasons for poor adherence to exercise. It was revealed that though the knowledge of T2DM was adequately noted by the respective participants, they were unable to apply it in their real lives. Even for weight control, lack of mind fullness and a busy lifestyle were mentioned by the participants as barriers to poor weight management.

Accordingly, regarding the barriers to relaxation techniques, most of the patients said "I have no idea about relaxation techniques" and "I have no time to do relaxation techniques due to my busy lifestyle. Lack of knowledge of relaxation techniques and lack of time to perform relaxation techniques were mentioned by the participants as barriers to stress management. A few mentioned that a busy lifestyle had become a reason for inadequate stress management.

A qualitative study done by Ranasinghe et al., (2015) mentioned that the main perceived barrier to regular physical activity was health factors related to complications of diabetes and their fear of such complications getting aggravated during physical activities. Even though some of the participants mentioned that they do not have any barriers to diet control, regular exercise, weight control, and stress management, there was not any significant practice observed in their lifestyle. In summary, the present study explored awareness of non-pharmacological methods and their use in real life among people with T2DM while identifying the main barriers people have in achieving better glycemic control.

## **CONCLUSIONS/RECOMMENDATION**

The participants were aware of non-pharmacological methods for the management of T2DM, however, the practices were not up to the recommended diabetic management.



Since it highlights the knowledge gaps and gaps in practices with barriers, it is recommended to conduct further studies on this area. Finally, the present study recommends that improving knowledge, adopting a healthy lifestyle, and overcoming barriers will greatly influence reducing morbidity and mortality and would be supportive of the country's economy as well. Hence it is needed to improve the motivational levels of the participants to adapt to a healthy lifestyle. Family members should also be involved in education sessions to establish a better food culture in the family.

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