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Assessment of Patients' Knowledge Regarding Non-Pharmacological Management of Diabetes Mellitus Attending in a Tertiary Care Hospital of Bangladesh

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ABSTRACT

Background: Diabetes mellitus (DM) is a chronic metabolic disorder characterized by elevated blood glucose due to impaired insulin secretion or action. Effective management of DM relies not only on medication but also on adherence to non-pharmacological approaches, including dietary modification, physical activity, smoking cessation, and stress control. Patient knowledge plays a critical role in achieving good glycaemic control and preventing complications. ***Objective:*** To assess patients' knowledge regarding non-pharmacological management of diabetes mellitus attending a tertiary care hospital in Bangladesh. ***Methods:*** A descriptive cross-sectional study was conducted at the Departments of Medicine and Endocrinology, Sylhet MAG Osmani Medical College Hospital, from March to August 2020. A total of 200 diabetic patients were selected through convenience sampling. Data were collected using a structured, pre-tested questionnaire and analyzed using SPSS version 25, with results presented as frequency and percentage. ***Results:*** Most respondents (63%) were over 50 years of age, and 58% were male. Knowledge was moderate across most domains. While 66% understood the role of exercise in diabetes control and 53% correctly identified rice as a high-carbohydrate food, only 11.5% were aware of the combined benefits of a healthy diet. Awareness regarding smoking hazards (68.5%) was satisfactory, whereas knowledge about stress management was poor (45.5% unaware of its effect). ***Conclusion:*** Participants demonstrated partial knowledge of non-pharmacological management, with limited understanding of stress control and holistic self-care. Strengthening diabetes education through structured, culturally tailored programs could enhance self-management and long-term outcomes.

KEYWORDS: Diabetes mellitus; non-pharmacological management; patient knowledge; lifestyle modification.

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INTRODUCTION

Diabetes mellitus (DM), particularly type 2 diabetes mellitus (T2DM), has become a major health concern across South Asia, where rapid urbanization, lifestyle transitions, and population ageing have contributed to an alarming rise in prevalence. According to the International Diabetes Federation (IDF), the South-East Asia region had approximately 107 million adults living with diabetes in 2024, corresponding to a prevalence of about 10.8% (1). Bangladesh is one of the most affected countries in this region, ranking among the top ten globally for diabetes burden. National surveys reveal that the prevalence of diabetes among adults aged 35 years and older increased from 10.9% in 2011 to 13.8% in 2017–2018, with a notable concentration in urban areas and among individuals with higher body mass index (2,3).

The common symptoms of diabetes include frequent urination, excessive thirst, hunger, fatigue, weight loss, and blurred vision (4). However, many cases remain undiagnosed until complications arise. Major risk factors contributing to the development of diabetes in Bangladesh include obesity, high carbohydrate intake, physical inactivity, hypertension, and genetic predisposition (3). Socio-cultural barriers such as restricted outdoor movement for women and limited access to recreational spaces further aggravate the risk of sedentary lifestyles, especially in rural and semi-urban communities (5).

Misconceptions and cultural myths continue to influence diabetes management in Bangladesh. Many people believe that diabetes can be cured with herbal remedies, that insulin causes dependence or kidney failure, or that substituting white sugar with brown sugar or jaggery is beneficial (6). Others assume that medication alone is sufficient without adopting lifestyle changes. These misconceptions delay treatment adherence and undermine self-management, leading to poor glycaemic control and a higher risk of complications (7).

Non-pharmacological management forms the cornerstone of diabetes prevention and long-term control. Evidence-based approaches such as medical nutrition therapy (MNT), regular physical activity, weight reduction, smoking cessation, stress management, and adequate sleep are proven to improve glycaemic outcomes and cardiovascular health (8,9). Recent meta-analyses confirm that structured lifestyle interventions can reduce HbA1c levels and delay disease progression in patients with prediabetes or established T2DM (8,10).

In Bangladesh, the National Guideline on Diabetes Mellitus (2024) emphasizes lifestyle modification as an essential part of diabetes care alongside pharmacotherapy. The Diabetic Association of Bangladesh (BADAS) and its Nationwide Healthcare Network (NHN) play a pivotal role in providing counseling on diet, exercise, and behavioral modification. However, access to trained diabetes educators, nutritionists, and physiotherapists remains limited, especially in rural areas, resulting in uneven implementation of lifestyle interventions (11).

Several innovative, culturally adapted programs have demonstrated success in Bangladesh. A 2025 cluster-randomized trial in rural districts implemented a mosque-based, faith-integrated lifestyle intervention for adults with prediabetes and achieved a 43% relative reduction in diabetes incidence compared to standard care (12). Another trial utilizing Participatory Learning and Action (PLA) community groups improved diet and physical activity behaviors among rural populations (13). These findings highlight the effectiveness of community-driven, culturally aligned programs in promoting sustainable behavior change.

At present, tertiary hospitals in Bangladesh provide diet counseling, exercise recommendations (such as at least 150 minutes of moderate-intensity physical activity per week), and education on smoking cessation and foot care as part of non-pharmacological management. Nevertheless, patient adherence and understanding remain suboptimal. Strengthening patient education programs, addressing misconceptions, and expanding access to structured diabetes self-management education (DSME) could improve long-term outcomes.

Future strategies in Bangladesh should include faith-based and community-centered interventions, standardized DSME programs tailored to literacy levels, expansion of dietitian-led MNT services, integration of mobile health (mHealth) tools for behavioral support, and gender-sensitive exercise initiatives (14,15). Incorporating stress management and sleep hygiene counseling could further enhance holistic diabetes care. Proper knowledge about diabetes and its non-pharmacological treatment is very much essential for achieving a good glycaemic control and prevention of diabetes related complications. This study aimed to assess patients' knowledge about non-pharmacological management of diabetes mellitus.

METHODS

This cross-sectional descriptive clinical research was carried out at department of Medicine and Department of Endocrinology, Sylhet MAG Osmani Medical College Hospital, Sylhet which was done within the period of March 2020 to August 2020. Adult patients of 200 with diabetes mellitus with informed written consent from both sexes were included whereas who were not mentally or physically stable or having genetic defects for an example, Cushing's syndrome were excluded from this research.

After selection of appropriate cases patients and their attendance were convinced to cooperate with the researcher, sit in a nearby room apart from crowdy environment of outpatient department or indoor ward. Informed written consent was taken after explaining the interview process in brief.

Demographic and personal details of the patients were recorded. Clinical data were collected through interviews with patients or their attendants. Appropriate questionnaire derived from validated instruments was used. Questionnaire is modified according to local guideline by Bangladesh Diabetic Association. (16)

Operational Definition

Diabetes Mellitus (DM)

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both (1). It is clinically classified into type 1 diabetes, type 2 diabetes, gestational diabetes, and other specific types. In this study, diabetes refers to patients diagnosed with type 2 diabetes mellitus, confirmed by fasting plasma glucose ≥7.0 mmol/L, 2-hour plasma glucose ≥11.1 mmol/L during an oral glucose tolerance test, or HbA1c ≥6.5%, following the American Diabetes Association (ADA) criteria (17).

Non-Pharmacological Management

Non-pharmacological management refers to strategies aimed at controlling diabetes without medication use. It includes medical nutrition therapy (MNT), regular physical activity, weight management, smoking cessation, stress control, adequate sleep, and diabetes self-management education (18,19). These interventions play a vital role in improving glycaemic control, preventing complications, and enhancing quality of life among individuals with diabetes.

Knowledge Regarding Non-Pharmacological Management

Knowledge refers to patients' understanding of diet, exercise, weight control, and other lifestyle modifications essential for diabetes management. It includes awareness of proper meal planning, frequency and duration of exercise, the importance of avoiding tobacco and alcohol, and stress management techniques (20). In this study, knowledge will be assessed using a structured questionnaire consisting of multiple-choice questions developed based on established diabetes education guidelines.

Tertiary Care Hospital

A tertiary care hospital is a specialized healthcare institution equipped with advanced diagnostic and therapeutic facilities that provide comprehensive management for complex diseases, including diabetes mellitus, usually through multidisciplinary teams (21).

Data analysis

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 25.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The qualitative observations were indicated

by frequencies and percentages. Chi-Square test with Yates correction was used to analyze the categorical variables, shown with cross tabulation. Student t-test was used for continuous variables. P values <0.05 was considered as statistically significant.

RESULT

Figure 1 pie chart indicates sex distribution of the respondents. Out of a total of 200 participants included in the study, the majority were male. Among them, 116 (58.0%) were male, whereas 84 (42.0%) were female. This indicates that men comprised a slightly higher proportion of the study population compared to women.

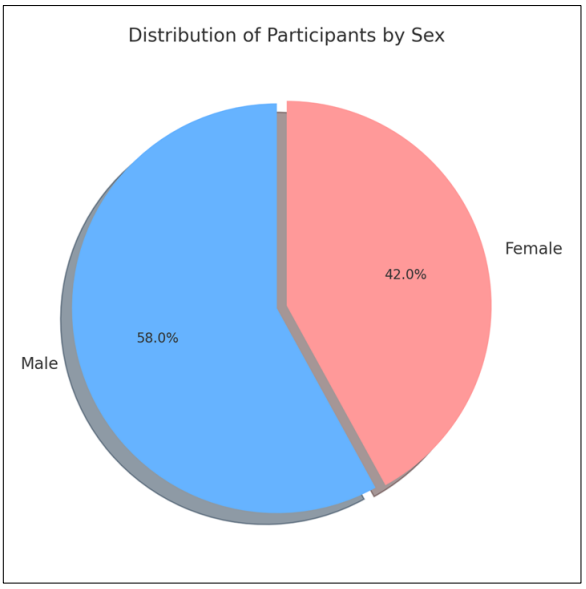

Figure 1: Sex distribution of the respondents (n=200)

Table 1: Socio-demographic characteristics of respondents (n=200)

Age distribution of the study subjects (n=200)		
Age (years)	**Frequency (n)**	**Percentage (%)**
≤20	7	3.5
21-30	11	5.5
31-40	19	9.5
41-50	37	18.5
>50	126	63
Economic status of the study subjects (n=200)		
Economic status	**Frequency (n)**	**Percentage (%)**
<15000 taka	65	32.5
15000-30000 taka	121	60.5
>30000 taka	14	7.0
Residence status of the study subjects (n=200)		
Area	**Frequency (n)**	**Percentage (%)**
Rural	18	9%
Urban	149	74.5%
Slum	33	16.5%
Occupation status of the study subjects (n=200)		
Occupation status	**Frequency (n)**	**Percentage (%)**
Sedentary worker	48	24
Moderately heavy worker	83	41.5
Heavy worker	69	34.5
Marital status of the study subjects (n=200)		
Marital Status	**Frequency (n)**	**Percentage (%)**
Married	138	69%
Unmarried	62	31%

Table 1 resembles socio-demographic characteristics of respondents. Out of 200 study participants, it is found that, the largest proportion (63%) were aged over 50 years. Most individuals (60.5%) belonged to the middle-income group with monthly earnings between 15,000 and 30,000 BDT, while 32.5% were from lower-income backgrounds. A substantial share (74.5%) resided in urban areas. In terms of occupation, 41.5% were moderately active workers, 34.5% performed heavy labor, and 24% had sedentary jobs. Regarding marital status, 69% of participants were married.

Figure 2 bar chart shows BMI status of the study subjects. It is evident that, 49% were normal weight, 30.5% were overweight and 10.5% obese.

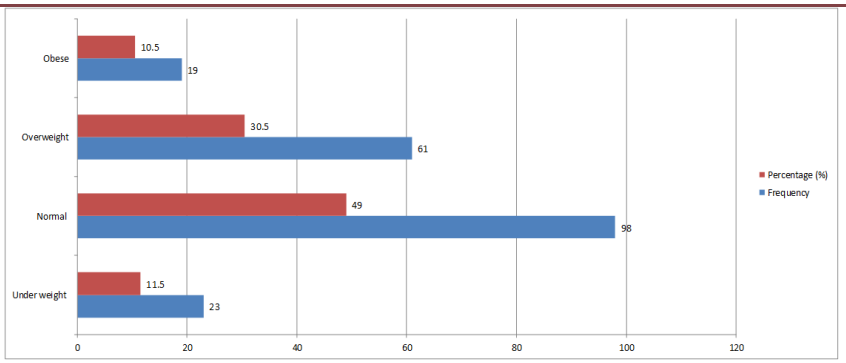

Figure 2: BMI status of the study subjects (n=200)

Table 2: Knowledge about diabetes of study subjects (n=200)

Knowledge	Frequency (n)	Percentage (%)
What is diabetes		
Frequent passing of urine	23	11.5
Persistently high blood glucose	105	52.5
Occasional rise of blood glucose	41	20.5
All of above	31	15.5
What are the factors think that contribute to diabetes?		
Obesity	34	17
Decreased physical activity	21	10.5
Family history of diabetes	32	16
Mental stress	12	6.0
Consuming more sugar or sweetened food	101	50.5
What are the Clinical features of diabetes?		
Frequent passing of urine	18	9
Increase thirst	31	15.5
Loosing weight	33	16.5
Delayed wound healing	9	4.5
I don't know	109	54.5
Do you know about the complications of diabetes?		
Kidney disease	35	17.5
Eye problem	29	14.5
Diabetic foot problems	46	23
Nerve disease	5	2.5
All of above	22	11.5
Dont know	63	31.5
What is the best method for home blood glucose testing?		
Urine testing	26	13
Blood testing	106	53
both are equally good	32	16
None of these	36	18
Which one are the symptoms of low blood glucose?		
Profuse Sweating	15	7.5
Palpitation	25	12.5
Both	21	10.5
I don't know	139	69.5
A low blood glucose reaction may be a result of		
Too much insulin or diabetic pill	26	13
Too little insulin	41	20.5
Too much food	25	12.5
Too little exercise	108	54
Delayed or missed meal can cause low blood glucose reaction?		
Yes	39	19.5
No	51	25.5
I don't know	110	55
What food will prefer in case of low blood glucose reaction?		
Sugary drinks or juice	102	51.0
Milk	67	33.5
Plain water	31	15.5

Table 2 shows knowledge about diabetes of study subjects. It is evident that, more than half of the participants (52.5%) correctly identified diabetes as persistently high blood glucose, while knowledge about causes and symptoms was limited. Excess sugar

intake (50.5%) was most commonly perceived as a risk factor, and over half (54.5%) were unaware of the main clinical features. Awareness of complications and hypoglycemia symptoms was also poor, with many unable to identify correct responses. However, 53% knew that blood testing is the best method for home glucose monitoring, and 51% correctly chose sugary drinks or juice for managing low blood glucose.

Table 3: Knowledge about non-pharmacological management of diabetes (n=200)

Knowledge regarding Diet	**Frequency (n)**	**Percentage (%)**
The diabetic diet is		
The way most Bangladeshi people eat	102	51
A healthy diet for most people	37	18.5
Too high in carbohydrate for most people	31	15.5
Too high in protein for most people	30	15
Which of the following is highest in carbohydrate?		
Rice	106	53.0
Fish	43	22.5
Meat	36	18.0
Vegetables	21	10.5
Which of the following is highest in fat?		
Milk	47	23.5
Fruit juice	27	13.5
Egg yolk	126	63.0
Which of the following is highest in protein?		
White portion of egg	144	72.0
Fruits	27	13.5
Vegetables	29	14.5
Do you know the effect of healthy dietary habit on diabetic patients?		
Controls blood glucose	71	35.5
Prevent obesity	35	17.5
Reduces incedence of heart disease and stroke?	71	35.5
All of above	23	11.5
Knowledge about exercise	**Frequency (n)**	**Percentage (%)**
Do you know about effect of regular exercise on diabetes?		
Yes	134	66.0
No	66	33.0
What are effects of Regular exercise on diabetes?		
Helps to maintain a healthy weight	31	15.5
Controls blood glucose	85	42.5
Reduces the amount of medication	56	28.0
I don't know how it helps	28	14
Which of the following is highest in fat?		
Milk	42	26
Fruit juice	27	13.5
Egg yolk	131	65.5
Which of the following is highest in protein?		
White portion of egg	164	82.0
Fruits	23	11.5
Vegetables	13	7.5
Do you know the effect of healthy dietory habit on diabetic patients?		
Controls blood glucose	81	42.5
Prevent obesity	35	17.5
Reduces incedence of heart disease and stroke?	61	30.5
All of above	23	11.5
Knowledge about smoking cessation	**Frequency (n)**	**Percentage (%)**
What are the harmful effects of smoking on diabetic patients?		
Make them weak	45	22.5
Rises blood glucose	18	9.0
Increase risk of heart attack and stroke	137	68.5
Do you think e-cigarettes are safe for diabetic patients?		
Yes	22	11.0
No	116	58.0
I don't know	62	31.0
Knowledge about psychological stress management	**Frequency (n)**	**Percentage (%)**
Do you think better management of psychological stress is helpful in diabetes control?		
Helpful	65	32.5

May be helpful	44	22.0
I've no idea	91	45.5
Do you know how to manage mental stress?		
Exercise	64	32
Meditation	32	16
Spending quality time with family	62	31
All of above	42	21

Table 3 illustrates knowledge about non-pharmacological management of diabetes. Most participants displayed moderate awareness regarding non-pharmacological management of diabetes. In dietary knowledge, 53% correctly recognized rice as high in carbohydrates, 63% identified egg yolk as high in fat, and 72% acknowledged the white portion of an egg as rich in protein; however, only 11.5% understood all benefits of a healthy diet. For exercise, 66% knew it positively affects diabetes, and 42.5% associated it with blood glucose control. Concerning smoking, 68.5% were aware that it increases the risk of heart attack and stroke, while 58% rejected e-cigarettes as safe. Awareness of stress management was limited; 45.5% had no idea about its role in diabetes control, and 32.5% considered it helpful.

DISCUSSION

Diabetes is one of the most prevalent non-communicable diseases throughout the world and currently, the disease is a major public health concern because of its chronic nature, rapidly increasing prevalence, related complications, and the requirement of long-term care. The higher prevalence of diabetes is related to an increased prevalence of obesity, population ageing, population growth, urbanization and physical inactivity. Diabetes has become a major global economic burden in recent decades, but proper management of the factors related to it can be useful for reducing this burden. It is also an increasingly economic threat in Bangladesh.

This study found were more males (58%) than females (42%) participated in this study. More recent reports from developing countries have found that DM and its risk factors are more common in women. This finding is in keeping with the results from a study conducted in South Africa at Mamelodi Hospital in which 81.1 % were female and 18.9 % were male (22).

This study shows majority respondents (63%) were >50 years followed by 18.5% were between 41-50 years, 9.5% were between 31-40 years, 5.5% were between 21-30 years and 3.5% were ≤20 years. This is reflective of the fact that the ethnology of type 2 diabetes mellitus includes usually older adults to elderly. (23,24)

Regarding economic status majority of respondents in this study had income between 15000-30000 taka (60.5%) followed by respondents in the less than 15000-taka income (33.5%). This low income amongst majority of respondents could limit their accessibility and affordability of a well-balanced diet and healthy food and it was considered as the main factors (barrier) to their practice of life style modification especially diet modification.

In present study half of respondents (49%) had normal weight, followed by 30.5% with overweight and only 10.5% obesity. This study had just demonstrated that lack of physical activities and poor dieting habit among respondents, seem to contribute to the development of DM rather than obesity. This finding is in contrast with many studies done on this area in which obesity was common in the representative sample of diabetes patients attending a diabetes clinic (25).

In this study most of respondent had moderate knowledge. This finding is in line with two other studies conducted in Bangladesh (26,27). It has been shown that diabetes related knowledge levels are acceptable for the general public and suboptimal for semi-urban participants (28). This relatively revealed similar result with study done in Nigeria at Kaduna in the year 2012 on 347 patients; 230 non-diabetic and 117 diabetic patients. The study recorded 56.4% score of knowledge for diabetic participants (29).

In contrast to this finding, IKOMBELE found in his study that no respondent had good knowledge and 92.6% of respondents had poor knowledge about the benefits of exercise, weight loss and healthy diet (30).

It was observed that majority have moderate knowledge about non pharmacological management of diabetes. The findings show similarities with those from studies of various countries, including Bangladesh (30-32).

It was observed that majority have moderate knowledge about exercise. Similar study resorted the proportion of respondents with good practice (49.1%) and those with average practice (17.24%) and poor practice (33.62%). About one third, patients had poor practice of LSM and the result was not satisfactory as that of knowledge and attitude. That could be due to majority of the patients had limited resources and low income which limit their affordability for a well-balanced dieting and necessary equipment to exercise. This result was similar with study conducted in Qatar and Omani which reported 49.5% of the respondents were not exercise regularly and 48% of the participants were not practices recommended diet (33) and less than 40% exercise regularly and only 56% of the patients were adhere to recommended diet respectively (34).

The study findings indicate the necessity of integrating structured DSME into hospital-based and community-based care. Interventions should prioritize patient-specific counseling on diet, exercise, smoking cessation, and stress management using locally relevant examples and visual aids. Collaboration with the Diabetic Association of Bangladesh (BADAS) and the Directorate General of Health Services (DGHS) could help scale education through faith-based, digital, and group-based initiatives. Enhancing awareness and self-efficacy through such programs would likely yield measurable improvements in glycaemic control and quality of life.

Limitation

This study was limited to a single tertiary care hospital, so the findings may not fully represent diabetic patients from other regions or healthcare settings in Bangladesh. The cross-sectional design restricts interpretation of cause-and-effect relationships between knowledge and behavior. Information was collected through self-reported questionnaires, which may involve recall errors or socially desirable responses. In addition, the study did not assess actual lifestyle practices such as diet or exercise patterns, which could have strengthened the findings. Therefore, the results should be interpreted with caution and cannot be generalized to all diabetic populations across the country.

CONCLUSION

Awareness is comparatively higher regarding dietary choices and physical activity, yet understanding of stress management and smoking cessation remains limited. Most individuals recognize the role of healthy eating and exercise in blood glucose control but lack comprehensive insight into their long-term benefits. Enhancing patient education through structured, culturally adapted Diabetes Self-Management Education (DSME) programs and continuous counseling can significantly strengthen understanding, promote healthy behaviors, and improve glycaemic outcomes. Strengthening awareness at both hospital and community levels is essential to achieve better diabetes control and prevent complications.

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