

Original Research Article

Knowledge and Practice Regarding Oral Pharmacotherapy and Lifestyle Modification Among Diabetes Mellitus

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Abstract: **Background:** The care of DM still depends on medication and lifestyle changes, despite the fact that it results in significant resource waste and mortality. A big part of preventing diabetes and its complications is changing one's lifestyle. Thus, the purpose of this study is to evaluate DM patients' knowledge and behavior about medication and lifestyle changes. **Methodology:** Patients of any gender who have type 2 diabetes mellitus and are between the ages of 18 and 65 years. Patients with diabetes who were on insulin, had significant hearing problems, were unable to talk, or had memory or cognitive impairments were excluded. Following this, the researcher conducted interviews with each patient and used a validated questionnaire released by the International Journal of Public Health Science (IJPHS) in December 2019 to evaluate knowledge and practice regarding oral pharmacotherapy and lifestyle modification. The twelve items on the questionnaire are broken down into three categories: cognitive, affective, and psychomotor. The responses are either "yes" or "no." Every Yes receives a score of 1, while every No receives a score of 0. Preparation (both cognitive and affective domains are answered correctly; 7/7), Contemplation (only the cognitive domain is answered correctly; 4/4), Action (correct answers in all three domains; 12/12), and Pre-contemplation (no correct answers in all domains) are the four levels into which DM patients' knowledge and practice are separated. A custom created proforma was used to record all of this information. **Results:** The age distribution showed that 48 instances (31.40%) were between the ages of 41 and 60, and 105 cases (68.60%) were between the ages of 18 and 40. The average age was 35.96 + 8.71 years. The gender breakdown showed that 69 cases (45.10%) were female and 84 cases (54.90%) were male. Descriptive knowledge statistics showed that 45 (29.40%) were in pre-contemplation, 20 (13.10%) were in contemplation, 37 (24.20%) were in preparation, and 51 (33.30%) were in action. **Conclusion:** This study focuses on the general attitudes and behaviors of T2DM patients toward lifestyle changes. Patients require assistance in converting this awareness into concrete behavioral changes, even while they have a clear grasp and acceptance of the need for changes including greater activity, better food, and weight loss.

Keywords: Diabetes mellitus, knowledge, lifestyle modification.

INTRODUCTION

The current definition of diabetes is a collection of metabolic diseases marked by hyperglycemia brought on by abnormalities in insulin secretion, action, or

both.¹ The global burden of diabetes is still increasing, according to the most recent World Health Organization report (WHO, 2023), underscoring the need for better pharmaceutical and lifestyle

therapies.² The GBD 2021 Diabetes Collaborators report that the prevalence of diabetes has been rising gradually worldwide and is expected to significantly increase by 2050.³

Diabetes self-management education, lifestyle modifications, goal-setting, glucose control, and medication management of hypertension and hyperlipidemia are now crucial elements of diabetes treatment.⁴ Changing one's lifestyle, which includes abstaining from tobacco use, eating a balanced diet, and exercising frequently, is the cornerstone of managing diabetes mellitus.⁵ In order to improve patients' lifestyles and help control blood sugar levels, diabetes education is essential. It has been noted that poor medication and lifestyle compliance can result from inadequate guidance and communication.^{6,7} According to a study, lifestyle modification—which includes food, exercise, and self-care routines—is just as important for the optimal control of type 2 diabetes as pharmaceutical intervention. Despite the established advantages, many patients do not follow through on suggested lifestyle modifications, which can negatively impact glycemic control and raise the risk of complications. In a different study, 422 persons participated in total, with a 100% response rate. In this survey, 172 (41%) had good practice, 248 (59%) were competent, and 223 (53%) had a favorable attitude.⁸

The care of DM still depends on medication and lifestyle changes, despite the fact that it results in significant resource waste and mortality. A big part of preventing diabetes and its complications is changing one's lifestyle. Thus, the purpose of this study is to evaluate DM patients' knowledge and behavior about medication and lifestyle changes. Since no study has been published to date that covers Lodhran and its surrounding rural areas, the results of this study can be used as a baseline for classifying people into groups based on their current knowledge and practices regarding the management of their disease and how each group will be handled independently by healthcare providers to support their patient-focused approach toward better understanding and management of their disease.

METHODOLOGY:

With approval from the ethical review committee, this descriptive cross-sectional study was carried out from 12th June 2025 to 11th October 2025 at the Department of Medicine, Shahida Islam Teaching Hospital, Lodhran. With a 5% margin of error and a 95% confidence level, a sample size of 153 cases was determined, with 11.21% of people with diabetes mellitus having inadequate knowledge of oral medication and lifestyle adjustment. Patients of any gender who have type 2 diabetes mellitus and are between the ages of 18 and 65 (previously diagnosed cases of any duration based on any one of the

following criteria: These included using oral antidiabetic medications and having RBS > 200 mg/dl, FBS > 126 mg/dl, or HbA1c > 6.5% with two abnormal test results or one abnormal result with characteristic symptoms (polydipsia, polyuria, polyphagia, etc.). Patients with diabetes who were on insulin, had significant hearing problems, were unable to talk, or had memory or cognitive impairments were excluded.

Every patient gave their informed permission. The demographic characteristics were then recorded, including age, gender, length of diabetes mellitus, height (in meters), weight (in kilograms), BMI, place of residence (rural/urban), lifestyle (active/sedentary), monthly income (based on household income distribution data from the Pakistan Bureau of Statistics (HIES 2021–22) and national poverty thresholds as follows: <20,000 (low)/20000–50,000 (middle)/>50000 (high)), education (illiterate/primary/middle/matric & above), and employment status (unemployed/employed). Following this, the researcher conducted interviews with each patient and used a validated questionnaire released by the International Journal of Public Health Science (IJPHS) in December 2019 to evaluate knowledge and practice regarding oral pharmacotherapy and lifestyle modification.¹⁰ The twelve items on the questionnaire are broken down into three categories: cognitive, affective, and psychomotor. The responses are either "yes" or "no." Every Yes receives a score of 1, while every No receives a score of 0. Preparation (both cognitive and affective domains are answered correctly; 7/7), Contemplation (only the cognitive domain is answered correctly; 4/4), Action (correct answers in all three domains; 12/12), and Pre-contemplation (no correct answers in all domains) are the four levels into which DM patients' knowledge and practice are separated. Individuals who are at the pre-contemplation stage indicate that they lack a cognitive grasp of managing diabetes mellitus and are unwilling to take their medication on a regular basis. People who are in the contemplation stage show that they are conscious of the illness and want to improve or modify their behavior from contemplation to action and maintenance. In the meantime, those in the preparation stage demonstrate that they have begun to improve their adherence to diet programs, exercise, low-carbohydrate intake, and medication.⁹ A custom created proforma was used to record all of this information.

SPSS version 25.0 was used to conduct the statistical analysis. Age, height, weight, BMI, and length of DM were all shown together with the mean and standard deviation or median (IQR). The Shapiro-Wilk test was used to determine whether the data was normal. Gender, lifestyle (simple/sedentary), place of residence (rural/urban), monthly income

(<25000/25000-50000/>50000), education (illiterate/primary/middle/matric & above), employment (unemployed/employed), and level of knowledge/practice (Pre-contemplation/Contemplation/Preparation/Action) were among the qualitative variables for which frequency and percentage were computed.

Stratifications were used to control effect modifiers such as age, gender, length of DM, place of residence (rural/urban), education (illiterate/primary/middle/matric & above), and employment (unemployed/employed). Using the post-stratification chi-square/Fischer exact, a p-value of less than 0.05 was deemed significant.

RESULTS

Table I: Distribution of different variables (n=153)

Confounding variables		Frequency	%age
Age (years)	18-40	105	68.60
	41-60	48	31.40
Gender	Male	84	54.90
	Female	69	45.10
Duration (years)	≤5	64	41.80
	>5	89	48.10
BMI (kg/m ²)	≤25	53	34.60
	>25	100	65.40
Residence	Rural	53	34.60
	Urban	100	65.40
Socioeconomic status	Poor	42	27.50
	Middle	66	43.10
	Upper	45	29.40
Education	Illiterate	24	15.70
	Primary	24	15.70
	Middle	38	24.80
	Matric & above	67	43.80
Employment	Unemployed	82	53.60
	Employed	71	46.40

Table II: Knowledge and practice regarding oral pharmacotherapy and lifestyle modification among diabetes mellitus (n=153)

Knowledge and practice	No. of patients	%
Pre-contemplation	45	29.40
Contemplation	20	13.10
Preparation	37	24.20
Action	51	33.30

Table III: Descriptive statistics of knowledge by effect modifiers (n=135)

Age(years)	Knowledge				P-value
	Pre-contemplation	contemplation	Preparation	Action	

18-40	26	17	26	36	0.165
41-60	19	03	11	15	
Gender					
Male	26	09	18	31	0.524
Female	19	11	19	20	
Duration of DM (years)					
≤5	13	05	15	31	0.005
>5	32	15	22	20	
BMI (kg/m²)					
≤25	14	09	15	15	0.497
>25	31	11	22	36	
Education					
Illiterate	07	02	05	10	0.063
Primary	08	06	07	03	
Middle	15	03	12	08	
Matric & above	15	09	13	30	
Socioeconomic status					
Poor	16	09	06	11	0.049
Middle	14	10	18	24	
Upper	15	01	13	16	
Residence					
Urban	11	10	13	19	0.230
Rural	34	10	24	32	
Employment					
Unemployed	29	07	18	28	0.151
Employed	16	13	19	23	

DISCUSSION

Applications of both pharmaceutical and non-pharmacological management are necessary for diabetic control. The current study evaluated type 2 diabetic patients' use of lifestyle modification techniques and the factors that influence them. In this study, 33.30% of participants engaged in good lifestyle modification practices. The variables that were found to have significant associations with good lifestyle modification practices were being urban dwellers, having diabetes patients without comorbidities, attending secondary school or college, and receiving education on lifestyle modification practices.

According to our data, 48 instances (31.40%) were between the ages of 41 and 60, and 105 cases (68.60%) were between the ages of 18 and 40. The average age was 35.96 + 8.71 years. In Malaysia, however, Shu Hui Ng et al. found that the largest percentage of participants (32.0%) were between the ages of 60 and 69, followed by those between the ages of 50 and 59 (24.0%) and 70 and 79 (21.3%).¹⁰ This is because genetic, sociodemographic, and environmental factors played different roles in the two study populations.

Females with diabetes made up 45.10% of the study. In contrast, a study in Gaza revealed that 55.8% of the patients had diabetes, which is greater than the percentage of our study participants.¹¹ In contrast to our study group, which had 24.80% up to

intermediate education and 43.80% bachelor education, a study carried out in Bangladesh found that 58% of female respondents had elementary level education, 36% had intermediate education, and only 19% had bachelor degrees.¹² A study carried out in Brazil produced similar results.¹³ We also discover that the frequency is higher among those with greater educational attainment, which is corroborated by a study conducted in Kenya.¹⁴

Our participants were aware of the main causes of diabetes, including smoking, eating more, obesity, and genetics. 46.6% were aware of dietary recommendations for diabetes control, compared to 31.3%, 31.6%, 30.2%, and 6.9%, respectively. The percentage of research participants who regularly exercised was approximately 42.2%. More than half of the population in Malaysia, according to Shu Hui Ng et al., were unaware of the main causes of diabetes mellitus, and 3/4 of them were unaware of nutrition in relation to diabetes control. However, 45% of them admitted to regularly exercising, which is comparable to our participants.¹⁰ About 20% of individuals are aware of increased urine and 12% are aware of increased hunger as signs of diabetes. Compared to the current study group, a prior study in the Aseer region of Saudi Arabia revealed that 33% of participants knew about increased hunger and 72% knew about increased urination.¹⁵

Only 33.30% of diabetic individuals followed

suggested lifestyle changes, according to the study. This is consistent with research on the knowledge, attitudes, and lifestyle modification practices of diabetic patients at the University of Gondar Comprehensive Specialized Hospital Northwest Ethiopia and Somalia, which found that the percentage of patients who practiced good lifestyle modification was 38.8%⁷ and 41.0%⁸ respectively. These results, however, surpass those of earlier research carried out in Hodeida City, Yemen, which found 21.0%.¹⁶ The differences in the research settings, socioeconomic level, nutrition education, and the instruments employed could all contribute to this disparity.

Several parameters were linked to effective lifestyle modification activities, according to the results of the multivariate regression analysis. In this study, type 2 diabetic patients' good lifestyle modification practices were positively correlated with their educational status. Patients with type 2 diabetes who completed secondary school or above had probabilities of having good lifestyle modification practices that were 3.7 times and 3.9 times higher, respectively, than those who were illiterate. This result is consistent with earlier research from Southern Benin¹⁷ and the University of Gondar Comprehensive Specialized Hospital in Bahir Dar, Northwest Ethiopia.^{18,19} Additionally, a study on type 2 diabetic patients' physical activity in Thailand²⁰ and Jimma²¹ shows a relationship between their practice and level of education. The association between respondents' higher educational attainment and appropriate dietary and physical activity (lifestyle modification) practices may be explained by the observation that patients with higher education levels have easier access to information from books, pamphlets, newspapers, and social media than patients with lower education levels. Education can help patients become more health literate, which may improve their ability to modify their lifestyle.

One of the primary characteristics that was found to positively correlate with patients' good lifestyle modification practices was receiving diabetes lifestyle modification education. Compared to patients who received diabetic lifestyle modification instruction, those who did not were more likely to have bad practices. This is consistent with reports from Gurage Zone Southwest, Ethiopia²², Northeast Ethiopia²³, and Dessie's Referral Hospital.²⁴ Patients who received nutrition instruction on diabetes diets were also shown to have better dietary habits than their peers, according to studies done in Bahir Dar²⁵ and Debre Tabor.²⁶ This could be due to the fact that individuals with diabetes who receive lifestyle modification education are more likely to follow clinical advice and have a better understanding of the connections between physical activity, nutrition, and disease than those who do not.

Another element that was shown to be related to the lifestyle modification behaviors of diabetic patients was where they lived. According to this study, people with diabetes who live in cities are three times more likely than those who live in rural areas to adopt healthy lifestyle modifications. This is consistent with the Tigray regional state research.²⁷ In contrast to their urban counterparts, diabetic patients in rural areas were more likely to engage in bad eating habits, according to a different study carried out at Debre Tabor General Hospital.²⁶ This could be because the participants' educational levels varied, with rural individuals more likely to be illiterate and less knowledgeable about diabetes nutrition and physical exercise than urban responses. The difference may also be due to rural residents' way of life, or culture. This is explained by the fact that family members in rural areas typically eat similar meals without paying special attention to diabetic patients, which causes them to follow dietary guidelines less closely and pay less attention to physical activity recommendations.

Comorbidities were also found to be a contributing factor to inadequate lifestyle change practices. According to this study, patients without comorbidities were three times more likely than those with comorbidities to undertake healthy lifestyle modification. This outcome is consistent with research conducted in a Somali tertiary hospital.⁷ This is due to the fact that in all diabetic patient settings, coexisting comorbidities are linked to lower adherence to lifestyle management practices. The majority of individuals with type 2 diabetes have at least one additional comorbid disease that may affect how they manage their diabetes and how it develops.²⁸ Comorbidities significantly lower type 2 diabetic patients' health-related quality of life, which may be the cause. In individuals with diabetes, coexisting comorbidities are also linked to poor metabolic control, reduced medication adherence, and fewer lifestyle change practices.²⁹

Study limitations:

Recall bias may exist because this study used a self-reported questionnaire. The effect of social and cultural factors on T2DM patients' knowledge and adoption of lifestyle changes has not been investigated in our study. The impact of co-morbid conditions like hypertension and dyslipidemia on these patients' comprehension and application of LSM has not been evaluated in our study. Furthermore, this study's cross-sectional methodology makes it impossible to establish causal or temporal correlations between different variables. The quality of life and psychosocial variables affecting LSM in people with type 2 diabetes have not been evaluated in our analysis. In a similar vein, this study has not yet attempted to ascertain our setup's level of social support and access to healthcare services. These limitations imply that more research is required to

confirm the results of this study and investigate how co-morbidities and cultural and societal factors affect diabetic patients' awareness of and adherence to lifestyle changes. It is advised that future research on prospective, multicenter clinical trials address these issues for validity and generalization.

CONCLUSION:

This study focuses on the general attitudes and behaviors of T2DM patients toward lifestyle changes. Patients require assistance in converting this awareness into concrete behavioral changes, even while they have a clear grasp and acceptance of the need for changes including greater activity, better food, and weight loss. Although socioeconomic class and geography were taken into consideration, they were not found to be determinants of adherence to lifestyle modifications. This highlights the possible impact of additional elements, generally speaking, inside individual belief systems and cultural preferences. Therefore, it is crucial to modify and create healthcare delivery strategies that tackle these obstacles, stressing a more thorough and personalized comprehension of patients' situations. Particularly with regard to the possible impact of cultural and social factors and co-comprehension of lifestyle modification in patients with Type 2 morbidities, the findings present a number of novel problems and new directions for further investigation.

Recommendations:

The responsible body should educate the general public about the illness condition and lifestyle changes (such as the value of exercise, weight loss, foot care, quitting smoking, and adopting good eating habits). Health care providers should therefore share a shared understanding, monitor patients' compliance with the diabetic lifestyle modification recommendation, and provide patient-centered diabetes lifestyle education at each follow-up appointment. National recommendations for diabetic lifestyle adjustment must be prepared. To raise residents' literacy rates regarding these illnesses, integrated governmental and nongovernmental initiatives should be implemented. In order to create an awareness-raising campaign and a longitudinal study for improved results in all aspects of LSM practices, future researchers should investigate a thorough community-based study.

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