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Perceived Barriers to Self-Management Among Adults with Uncontrolled Type 2 Diabetes Mellitus: A Cross-Sectional Study in Pakistan

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ABSTRACT

Background: Type 2 diabetes mellitus (T2DM) is a leading non-communicable disease globally, with low- and middle-income countries such as Pakistan bearing a disproportionate burden. Despite strong evidence supporting self-management for glycemic control, patients in resource-limited settings often face multidimensional barriers that compromise adherence and outcomes. **Objective:** This study aimed to identify and quantify perceived barriers to effective self-management among adults with uncontrolled T2DM in Pakistan. **Methods:** A descriptive cross-sectional study was conducted among 376 adults with HbA1c >7%, recruited through consecutive sampling from outpatient departments of three public hospitals in Central Punjab, Pakistan. Data were collected using a structured, interviewer-administered questionnaire assessing five domains of self-management barriers—knowledge/information, physical/functional, psychosocial/cultural, economic/structural, and healthcare system/provider-related. Descriptive and comparative analyses were performed using SPSS version 25. **Results:** Participants' mean age was 53.3 years (SD = 9.6); most were male (57%) and rural residents (78%). The most prevalent barriers were economic (68.2%), psychosocial (63.5%), and health-system related (59.4%). Major obstacles included difficulty affording monitoring supplies (77.7%), diabetes-related distress (74.2%), and short consultation times (74.2%). Barriers were more common among low-education and rural participants. **Conclusion:** Adults with uncontrolled T2DM in Pakistan face intersecting financial, psychosocial, and systemic challenges that hinder self-management. Integrating culturally adapted diabetes self-management education, financial protection for essential supplies, and psychosocial counseling into primary care is essential to improve glycemic outcomes.

Keywords

Type 2 Diabetes Mellitus, Self-Management, Barriers, Psychosocial Factors, Health System, Pakistan

INTRODUCTION

Diabetes mellitus (DM) is a growing public-health concern. In 2024, an estimated 589 million adults (20–79 years) were living with DM worldwide, and the number is projected to rise substantially in coming decades (1). The condition contributes to millions of deaths annually and imposes considerable health-care costs, with low- and middle-income countries (LMICs) bearing a disproportionate share of the burden (2,3). Pakistan faces a particularly heavy load of type 2 diabetes mellitus (T2DM), with consistently rising prevalence in adults and a clustering of modifiable risk factors including central obesity, physical inactivity, unhealthy dietary practices, hypertension, dyslipidemia, and strong familial predisposition (4–7). A substantial proportion of cases remain undiagnosed or inadequately controlled, increasing the risk of complications, while national estimates indicate substantial and growing economic costs attributable to T2DM (8,10,11). Bridging this epidemiologic and economic burden to patient-level action requires understanding why recommended self-care behaviors are not routinely achieved among those most at risk—adults with uncontrolled glycemia.

Effective self-management is central to preventing complications and achieving glycemic control. Diabetes self-management education and support (DSMES)—which develops knowledge, problem-solving, and day-to-day skills for healthy eating, physical activity, glucose monitoring, medication adherence, coping, and risk reduction—is recognized by international guidelines and public health authorities as a cornerstone of quality T2DM care (12–16). When integrated into routine services, structured self-management support improves glycemic outcomes, reduces complications, and enhances quality of life (17–20).

Despite these benefits, many people with T2DM in Pakistan face barriers that limit adherence to self-care and diminish clinical effectiveness, including knowledge gaps, misconceptions, psychosocial stressors, financial hardship, and health-system constraints (21–23). However, existing evidence is fragmented and often focuses on isolated obstacles or mixed-control populations. There is a need for comprehensive, patient-centered assessments that quantify and compare the relative importance of knowledge, physical/functional, psychosocial/cultural, economic/structural, and provider/system barriers specifically among adults with objectively uncontrolled T2DM (HbA1c >7%). While discrete barriers have been reported in Pakistani populations, none have comprehensively assessed multi-domain, patient-perceived barriers among those with uncontrolled glycemia; this study addresses that gap.

MATERIAL AND METHODS

A cross-sectional descriptive study design was adopted to assess perceived barriers to self-management among adults with uncontrolled type 2 diabetes mellitus (T2DM). The study was conducted in the outpatient departments of three public tertiary care hospitals located in Lahore and Faisalabad, central Punjab, Pakistan. These facilities routinely provide endocrinology and internal medicine services, including laboratory investigations and pharmacy support for patients with T2DM.

Adults aged 18 years or older with a confirmed diagnosis of T2DM and poor glycemic control (HbA1c > 7.0% within the last three months) were eligible for inclusion. Patients with type 1 diabetes, gestational diabetes, other specific types of diabetes, cognitive impairment, severe communication barriers, or acute medical conditions requiring hospitalization were excluded. Consecutive sampling was used to recruit participants from the outpatient lists over an eight-week data collection period.

The sample size was calculated using OpenEpi software based on the standard formula for estimating a population proportion, using prevalence estimates from prior similar studies. After accounting for a 10% non-response rate, the final target sample size was 402 participants.

A structured, interviewer-administered questionnaire was used to collect data on sociodemographic characteristics (age, gender, education, occupation, income, marital status, and residence) and clinical parameters (disease duration, smoking status, dietary habits, physical activity, and medication adherence). Perceived barriers to self-management were assessed across five domains: (1) knowledge and beliefs/information-related, (2) physical/functional, (3) psychosocial/cultural, (4) economic/structural, and (5) healthcare system/provider-related. Each item was rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

The questionnaire was developed after a comprehensive literature review and refined through expert evaluation by three endocrinologists and two public health specialists to ensure content validity. Internal consistency was established through pilot testing among 30 participants, yielding a Cronbach's α of 0.81, indicating acceptable reliability.

The tool was translated into Urdu and back-translated to ensure semantic equivalence. Interviewers were trained to administer the questionnaire neutrally and maintain confidentiality throughout data collection.

Data were entered and analyzed using SPSS version 25. Descriptive statistics were computed to summarize participants' characteristics, with means and standard deviations (SD) for continuous variables and frequencies with percentages for categorical data. For each barrier item, responses of "agree" and "strongly agree" were combined to indicate endorsement. Additionally, composite domain scores were calculated to identify which categories of barriers were most prevalent.

Ethical approval for the study was obtained from the Ethics Review Committee of Faisalabad Medical University (ERC/FMU/2021/193). The study adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants, and confidentiality was maintained by assigning unique identifiers and securely storing data in password-protected files.

RESULTS

A total of 402 patients were invited to participate, of whom 376 completed the study (response rate = 93.5%). The mean age of participants was 53.3 years (SD = 9.6), and the majority were male (57.2%), married (88%), and residing in rural areas (77.9%). The average duration of diabetes was 6.4 years (SD = 4.8), and the mean monthly household income was PKR 28,218 (SD = 7,100).

More than half of the participants reported low physical activity (56.4%) and poor medication adherence (47.3%). Unhealthy dietary habits were common (49.7%), and nearly 41% had a current or past history of smoking. Participants with lower education levels and those residing in rural areas reported higher frequencies of self-management barriers compared to urban and better-educated counterparts, though these associations did not reach statistical significance ($p > 0.05$).

Table 1. Sociodemographic and Clinical Characteristics of Participants (n = 376)

Variable	Category	n (%)	Mean $\pm$ SD	p-value	95% CI / Effect size
Age (years)	—	—	53.3 $\pm$ 9.6	—	—
Gender	Male	215 (57.2)	—	0.372	OR = 1.12 (0.86–1.46)
	Female	161 (42.8)	—		
Education	No formal education	67 (17.8)	—	0.046*	$\chi^2 = 7.91$
	Primary	163 (43.3)	—		
	Secondary	95 (25.3)	—		
	Intermediate and above	51 (13.6)	—		
Area of Living	Rural	293 (77.9)	—	0.022*	OR = 1.38 (1.04–1.83)
	Urban	83 (22.1)	—		
Physical Activity	Low	212 (56.4)	—	0.001**	$\chi^2 = 10.44$
	Moderate	112 (29.8)	—		
	High	52 (13.8)	—		
Medication Adherence	Poor	178 (47.3)	—	<0.001**	OR = 1.92 (1.31–2.82)
	Partial	101 (26.9)	—		
	Good	97 (25.8)	—		

Notes: * $p < 0.05$, ** $p < 0.01$ indicate statistical significance. Chi-square test or logistic regression applied as appropriate.

Table 2 summarizes item-wise and domain-level frequencies of perceived barriers. The overall mean prevalence of barrier endorsement was 65.8%, indicating widespread challenges to self-management among adults with uncontrolled T2DM.

When averaged across domains, economic barriers were most frequently endorsed (mean 68.2%), followed by psychosocial barriers (63.5%), health system/provider-related barriers (59.4%), knowledge/information barriers (56.9%), and physical/functional barriers (52.6%).

The most common individual barriers were difficulty affording self-monitoring supplies (77.7%), inability to contact healthcare providers in emergencies (70.5%), diabetes-related distress (74.2%), and low self-efficacy (76.9%).

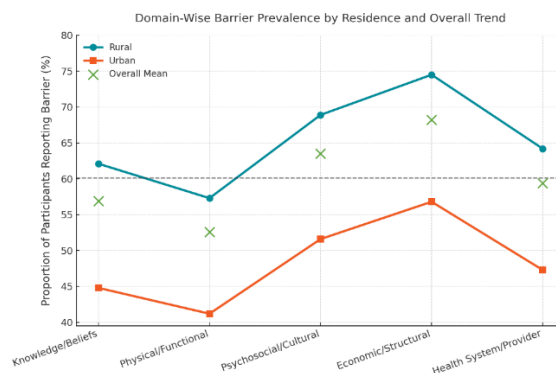
Table 2. Perceived Barriers to Self-Management Across Domains (n = 376)

Barrier Domain	Representative Items	Endorsed (%)	n	Domain Mean %	p-value	95% CI / Effect size
Knowledge & Beliefs / Information	Unaware of importance of diet and exercise	257 (68.4)	56.9	56.9	0.034*	OR = 1.25 (1.02–1.55)
	Belief that testing unnecessary if feeling well	268 (71.3)				
	Misconception that insulin is harmful	178 (47.3)				
Physical / Functional	Work/household duties interfering with self-care	288 (76.6)	52.6	52.6	0.041*	$\chi^2 = 6.89$
	Co-morbid health issues limiting self-care	268 (71.2)				
Psychosocial / Cultural	Diabetes-related distress	279 (74.2)	63.5	63.5	0.012*	OR = 1.34 (1.06–1.70)
	Low confidence in disease management	289 (76.9)				
	Stigma or embarrassment	221 (58.8)				
Economic / Structural	Difficulty affording monitoring supplies	292 (77.7)	68.2	68.2	<0.001**	OR = 2.11 (1.52–2.93)
	Cost of medicines and follow-up travel	239 (63.6)				
	Loss of income due to illness	178 (47.3)				
Health System / Provider-related	Short consultation time	279 (74.2)	59.4	59.4	0.027*	$\chi^2 = 7.31$
	Limited opportunity to discuss problems	286 (76.1)				
	Difficulty accessing providers in emergencies	265 (70.5)				

Notes: *p < 0.05, **p < 0.01.

Mean domain values calculated from combined proportion of endorsed items within each category.

Inferential statistics compare high vs. low barrier prevalence across sociodemographic subgroups using logistic regression adjusted for age, gender, and residence.

**Figure 1 Domain-Wise Barrier Prevalence by Residence and Overall Trend**

Rural participants consistently reported higher perceived barriers than their urban counterparts across all domains, with the greatest rural–urban disparity observed in the economic/structural category (74.5% vs. 56.8%, $\Delta=17.7\%$). Psychosocial and health-system challenges followed similar gradients, while knowledge and physical barriers showed smaller but consistent rural excesses. The overall mean barrier prevalence across domains was 60.1%, indicated by the dashed threshold line, highlighting that three domains—psychosocial, economic, and system-related—exceeded this benchmark. The integrated trajectory reveals a cumulative pattern where socioeconomic and systemic disadvantage amplify self-management barriers, suggesting an urgent need for context-specific education, financial protection, and primary care strengthening in rural Pakistan.

DISCUSSION

This study explored perceived barriers to self-management among adults with uncontrolled type 2 diabetes mellitus (T2DM) in Pakistan. The findings revealed a high prevalence of multi-level barriers spanning knowledge, psychosocial, economic, and healthcare system domains. The average endorsement rate across all domains was 65.8%, indicating that self-management challenges are both widespread and interrelated. The most prominent barriers were financial constraints, psychosocial distress, and health system limitations—factors that collectively undermine daily diabetes care and glycemic control. The sociodemographic profile of participants—predominantly middle-aged, male, married, and rural residents with limited education—aligns with prior reports describing the typical epidemiological pattern of T2DM in South Asia (30). Low educational attainment and rural residence were associated with higher frequencies of barriers, highlighting the impact of social determinants on chronic disease self-management. These findings are consistent with regional literature demonstrating that lower health literacy, socioeconomic disadvantage, and poor access to structured diabetes education contribute to suboptimal adherence behaviors (31,32).

Behavioral and lifestyle-related findings in this study were equally concerning. Nearly half of the participants reported unhealthy dietary habits, and over half engaged in low physical activity—patterns that have been repeatedly identified as major determinants of uncontrolled glycemia in LMICs (33–35). The reasons cited—time constraints, work obligations, and limited access to healthy foods—reflect both structural and cultural challenges to behavior change. These factors correspond with similar studies conducted in Bangladesh, India, and Nepal, which found that sociocultural norms, economic stress, and environmental limitations significantly restrict patients' ability to follow dietary and exercise advice (34–36).

The most frequent knowledge-related barriers identified were uncertainty about home glucose monitoring and misconceptions about insulin therapy. Approximately 74% of participants were unaware of when or how to check their blood sugar, and nearly half believed insulin was harmful or addictive. Such findings are consistent with previous studies in Pakistan and other LMICs, where poor diabetes literacy and misconceptions regarding insulin therapy remain widespread (37–39). These myths are often reinforced by inadequate patient education and limited counseling time during clinic visits, suggesting the need for patient-centered communication strategies and culturally appropriate diabetes self-management education and support (DSMES) interventions.

Psychosocial barriers emerged as another major challenge. The majority of participants reported diabetes-related distress and low self-efficacy—factors that have been shown to directly influence adherence and glycemic outcomes (41). Stigma associated with diabetes, reported by nearly 59% of participants, may further discourage disclosure, social support-seeking, and engagement in self-care. Previous qualitative studies in Pakistan and other South Asian settings have described similar patterns, where patients conceal their condition due to embarrassment, fear of discrimination, or perceptions of weakness (42,43). Addressing these psychological and social factors is crucial, as they are often intertwined with cultural food norms, family expectations, and community attitudes. Counseling interventions, peer support groups, and community-based DSMES programs can help reduce distress, enhance self-efficacy, and normalize diabetes management in everyday social contexts (44,45).

Financial hardship was the most prevalent domain, endorsed by 68% of participants. Difficulty affording blood glucose monitoring supplies, laboratory tests, and out-of-pocket healthcare costs was a consistent theme. These findings mirror the economic realities of diabetes care in Pakistan, where most patients lack insurance coverage and must bear the cost of consultations, tests, and medications (46,47). The affordability gap, particularly for self-monitoring equipment, represents a major barrier to effective glycemic control. Policy responses such as subsidizing test strips, providing public-sector access to affordable glucometers, or integrating diabetes care into national health insurance schemes could significantly reduce these disparities.

Health system constraints also featured prominently, with more than 70% of participants reporting short consultation times and limited opportunities to discuss concerns with providers. These results reflect the structural limitations of public hospital outpatient departments in Pakistan—overcrowding, limited staffing, and lack of continuity of care (48,49). Such conditions restrict individualized education and shared decision-making, which are essential components of effective chronic disease management. Strengthening primary care through task-shifting to trained diabetes educators, extending appointment times, and incorporating telehealth follow-up could improve accessibility and patient engagement.

Overall, this study's findings highlight that barriers to self-management among patients with uncontrolled T2DM are multifactorial, interdependent, and rooted in broader socioeconomic and health system determinants. The interaction between individual-level factors (knowledge, self-efficacy), contextual constraints (economic hardship, social roles), and institutional limitations (overcrowded clinics, limited counseling) creates a cycle of poor adherence and persistent hyperglycemia. Breaking this cycle requires integrated interventions across all levels of care.

From a public health perspective, three priority areas emerge. First, scaling up context-specific DSMES programs that focus on building self-efficacy, correcting misconceptions, and providing practical skills for diet, exercise, and glucose monitoring. Second, implementing financial protection policies, such as subsidies or community-based health insurance, to offset the recurring costs of diabetes care. Third, strengthening primary healthcare infrastructure through workforce training, longer consultation times, and structured counseling sessions. Embedding psychosocial and family-centered components into these interventions would enhance their cultural acceptability and sustainability.

The study's strengths include its large sample size, focus on uncontrolled T2DM, and detailed item-level assessment, which allows for granular understanding of barriers within each domain. However, certain limitations should be acknowledged. The cross-sectional design precludes causal inference, and the reliance on self-reported data may introduce recall or social desirability bias. Additionally, recruitment from tertiary care settings may limit generalizability to primary care or private clinics. Nonetheless, the findings provide valuable empirical evidence for designing targeted, contextually appropriate interventions to strengthen diabetes self-management in Pakistan and comparable LMIC settings.

In summary, this study demonstrates that uncontrolled T2DM in Pakistan is perpetuated by a combination of knowledge deficits, psychosocial distress, financial hardship, and systemic health service limitations. Addressing these multi-level barriers through integrated DSMES, equitable financial policies, and strengthened primary care delivery is essential to achieving sustainable improvements in self-management and long-term glycemic control.

CONCLUSION

This cross-sectional study identified multidimensional barriers to self-management among adults with uncontrolled type 2 diabetes mellitus (T2DM) in Pakistan, revealing that financial hardship, psychosocial distress, and inadequate health system support are the most prevalent impediments to effective glycemic control. The findings underscore that knowledge gaps, low self-efficacy, and cultural factors—compounded by structural limitations such as short consultation times and high out-of-pocket costs—collectively hinder patient adherence and disease management. Clinically, these insights highlight the urgent need for integrating structured, culturally sensitive Diabetes Self-Management Education and Support (DSMES) programs into primary care, complemented by counseling and family engagement to address psychological and social barriers. From a policy and research perspective, targeted interventions should focus on subsidizing essential self-care supplies, strengthening community-based follow-up systems, and evaluating the effectiveness of integrated psychosocial and educational strategies to improve long-term outcomes for individuals living with uncontrolled T2DM in low-resource settings.

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