Journal of Medicine and Allied Health

JOMAH.ORG
JOURNAL OF MEDICINE AND ALLIED HEALTH

Volume I, Issue I
Open Access, Double Blind Peer Reviewed.
Web: https://jomah.com, **ISSN**: xxx-xxx
https://doi.org/10.5281/zenodo.18234926

Article

Knowledge, Attitude, and Practices Regarding Diabetes Mellitus among Patients in Primary Health Care Settings: A Cross-Sectional Study

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Received 2025-04-21
Revised 2025-05-11
Accepted 2025-06-14
Published 2025-06-30
No conflicts declared; ethics approved; consent obtained; data available on request; no funding received.

Authors' Contributions
Concept and design: AK; data collection: AK, TF; analysis: SAMAK, FAK; manuscript drafting and revision: AK, TF, SAMAK, FAK

ABSTRACT

Background: Hypertension is a major public health problem and a leading contributor to cardiovascular morbidity and mortality worldwide, with a disproportionately high burden in low- and middle-income countries. In Pakistan, rapid urbanization and lifestyle transitions have contributed to increasing hypertension prevalence, while many cases remain undiagnosed in routine outpatient settings. **Objectives:** To determine the prevalence of hypertension and identify associated risk factors among adult patients attending outpatient clinics in Lahore, Pakistan. **Methodology:** A cross-sectional observational study was conducted among 165 adult patients attending selected outpatient clinics in Lahore. Blood pressure was measured using a standardized protocol. Hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg or current use of antihypertensive medication. A structured questionnaire was used to collect information on demographic characteristics, body mass index, smoking status, physical activity, dietary salt intake, and family history of hypertension. Descriptive statistics were calculated, and inferential analyses, including chi-square tests and multivariable logistic regression, were performed to identify factors independently associated with hypertension. **Results:** The overall prevalence of hypertension was 34.5%. Prevalence increased significantly with age, reaching 52.5% among participants older than 50 years. Obesity was strongly associated with hypertension (adjusted odds ratio [AOR] 3.68; 95% confidence interval [CI] 1.62–8.37). High dietary salt intake (AOR 2.41; 95% CI 1.19–4.88) and a positive family history of hypertension (AOR 2.22; 95% CI 1.12–4.40) were also independently associated with hypertension. **Conclusion:** Hypertension was highly prevalent among adult outpatients in Lahore, with several modifiable risk factors identified. Integrating routine blood pressure screening and targeted lifestyle modification interventions into outpatient care is essential to improve early detection and reduce the burden of hypertension-related complications.

Keywords: Hypertension; Prevalence; Risk factors; Outpatient clinics; Cross-sectional study

INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both, and it represents one of the leading causes of cardiovascular disease, renal failure, blindness, and premature mortality worldwide (1). The global burden of diabetes continues to rise rapidly, particularly in low- and middle-income countries, where health systems face increasing pressure from long-term disease management and diabetes-related complications (2). Effective control of diabetes depends not only on pharmacological treatment but also on patients' active participation in self-care behaviors, making patient-centered management a cornerstone of diabetes control strategies (3).

Knowledge, attitude, and practices (KAP) related to diabetes mellitus are widely recognized as critical determinants of disease outcomes. Adequate knowledge enables patients to understand disease mechanisms, recognize symptoms, adhere to medications, and adopt preventive behaviors, while positive attitudes influence motivation, treatment compliance, and engagement with health care services (4). Conversely, inappropriate practices such as poor dietary habits, physical inactivity, and irregular monitoring of blood glucose levels contribute to poor glycemic control and accelerate the development of complications (5). Evidence from previous studies suggests that even when patients possess reasonable knowledge about diabetes, this does not consistently translate into optimal self-care practices, indicating a complex interplay between cognitive, behavioral, and contextual factors (6).

In South Asia, including Pakistan, the prevalence of diabetes mellitus has increased substantially due to rapid urbanization, sedentary lifestyles, unhealthy dietary patterns, and population aging (7). Pakistan is currently among the countries with the highest number of adults living with diabetes, and projections indicate a continued rise in prevalence over the coming decades (8). Despite this growing

burden, diabetes-related complications remain common, largely due to delayed diagnosis, limited access to structured education, and suboptimal self-management practices among patients (9). Primary health care settings serve as the first and most frequent point of contact for patients with diabetes and therefore play a pivotal role in patient education, counseling, and long-term disease monitoring.

Previous KAP studies on diabetes have demonstrated considerable variation in patient knowledge levels, attitudes, and self-care behaviors across different populations and health care settings (10,11). However, much of the available evidence from Pakistan has focused on tertiary care hospitals or community-based surveys, with comparatively limited data derived from primary health care facilities, where the majority of patients receive routine diabetes care (12). Moreover, there is a lack of integrated assessment examining knowledge, attitude, and practices simultaneously among patients attending primary health care settings in large urban centers such as Lahore. This gap limits the ability of health planners and clinicians to design targeted educational interventions tailored to primary care populations.

Understanding the existing levels of diabetes-related knowledge, attitudes, and practices among patients attending primary health care facilities is essential for identifying gaps in patient education and for strengthening self-management support within routine care. Therefore, the objective of this study was to assess the knowledge, attitude, and practices regarding diabetes mellitus among patients attending primary health care settings in Lahore using a cross-sectional study design (13).

MATERIALS AND METHODS

A cross-sectional observational study was conducted in primary health care settings in Lahore, Pakistan, over a defined data collection period. This study design was selected to assess the prevailing levels of knowledge, attitude, and practices (KAP) regarding diabetes mellitus among patients at a single point in time, which is appropriate for identifying gaps in awareness and self-care behaviors within routine primary care populations (14). Adult patients were approached consecutively during regular clinic hours to minimize selection related to appointment timing. All eligible participants were informed about the study objectives and procedures, and written informed consent was obtained prior to participation.

The study population comprised adult patients aged 18 years and above who were attending primary health care facilities for diabetes-related or general medical consultations. Patients with a confirmed diagnosis of diabetes mellitus or those receiving diabetes-related counseling were included. Individuals who were severely ill, cognitively impaired, or unwilling to participate were excluded to ensure reliable responses. A non-probability convenience sampling technique was employed due to feasibility constraints inherent to busy primary care settings; however, recruitment across multiple centers and different days was undertaken to enhance sample heterogeneity and reduce selection bias.

Data were collected using a structured, interviewer-administered questionnaire developed based on previously published and widely used diabetes KAP instruments (15,16). The questionnaire consisted of four sections: socio-demographic characteristics, knowledge related to diabetes mellitus, attitude toward diabetes management, and self-care practices. The knowledge domain assessed understanding of disease causes, symptoms, complications, and preventive measures. The attitude domain evaluated beliefs, perceptions, and motivation regarding diabetes control and treatment adherence. The practices domain assessed routine behaviors including dietary adherence, physical activity, medication compliance, blood glucose monitoring, and follow-up visits. Responses were scored using predefined criteria, and overall KAP levels were categorized as adequate or inadequate knowledge, positive or negative attitude, and good or poor practices based on established cut-off values used in similar studies (17).

Several measures were implemented to reduce information bias and enhance data quality. Interviews were conducted by trained data collectors using standardized instructions to ensure consistency in questionnaire administration. Participants were assured of confidentiality and informed that their responses would not affect their clinical care, thereby minimizing social desirability bias. Potential confounding by age, gender, and duration of diabetes was addressed analytically by including these variables in multivariable models, given their established associations with diabetes-related knowledge and self-care behaviors (18).

The sample size was set at 180 participants to estimate KAP levels with acceptable precision, assuming moderate prevalence of adequate knowledge and good practices, a 95% confidence level, and a feasible recruitment target within the study period. Data were entered into a secure, password-protected database and double-checked for accuracy. Statistical analysis was performed using SPSS (IBM Corp., Armonk, NY). Categorical variables were summarized as frequencies and percentages, while continuous variables were summarized as means and standard deviations. Associations between KAP domains and participant characteristics were examined using chi-square tests, and multivariable logistic regression analysis was conducted to identify independent predictors of good self-care practices. A two-sided p-value of <0.05 was considered statistically significant.

Ethical approval for the study was obtained from the relevant institutional ethics review committee in Lahore, and all procedures were conducted in accordance with the principles outlined in the Declaration of Helsinki for research involving human participants (19). Data integrity and reproducibility were ensured through predefined variable coding, standardized data collection procedures, and restricted access to anonymized study data limited to the research team.

RESULTS

A total of 180 patients attending primary health care facilities in Lahore were included in the analysis. Slightly more than half of the participants were male (54.4%), and the largest proportion belonged to the 31–50 years age group (46.1%). One-quarter of the participants were older than 50 years, while 28.9% were aged between 18 and 30 years. More than half of the participants (58.3%) reported a duration of diabetes exceeding five years. Regarding educational status, 35.6% had primary education or below, 39.4% had secondary education, and 25.0% had attained higher education (Table 1).

Overall, adequate knowledge regarding diabetes mellitus was observed in 54.4% of participants, while 62.8% demonstrated a positive attitude toward diabetes management. In contrast, only 41.7% of participants reported good self-care practices, indicating a substantial gap between knowledge, attitudes, and actual behaviors (Table 2). Analysis of factors associated with adequate knowledge revealed that educational level was a significant determinant. Participants with higher education had a markedly greater likelihood of possessing adequate knowledge compared with those with secondary or lower education (75.6% vs 47.4%; OR 3.12; 95% CI 1.46–6.66; p=0.003). No statistically significant associations were observed between adequate knowledge and gender or age group (Table 3).

A strong relationship was observed between knowledge, attitude, and self-care practices. Participants with adequate knowledge were more than three times as likely to report good practices compared with those with inadequate knowledge (53.1% vs 28.0%; OR 3.47; 95% CI 1.84–6.55; p<0.001). Similarly, a positive attitude toward diabetes management was strongly associated with good practices, with over half of participants with positive attitudes demonstrating good practices compared with 25.4% among those with negative or neutral attitudes (OR 4.18; 95% CI 2.17–8.05; p<0.001) (Table 4).

Evaluation of specific self-care behaviors showed that medication adherence was the most commonly reported practice, with 68.9% of participants reporting regular adherence. In contrast, adherence to recommended diabetic diets (39.4%) and regular physical activity (36.1%) were notably low. Routine blood glucose monitoring was practiced by 44.4% of participants, while regular follow-up visits were reported by 51.1% (Table 5). In multivariable logistic regression analysis, adequate knowledge (adjusted OR 2.96; 95% CI 1.49–5.89; p=0.002), positive attitude (adjusted OR 3.41; 95% CI 1.72–6.77; p<0.001), and higher educational attainment (adjusted OR 2.18; 95% CI 1.07–4.45; p=0.031) remained independent predictors of good self-care practices after adjustment for age and gender. Duration of diabetes and age were not independently associated with good practices in the adjusted model (Table 6).

Table 1. Socio-Demographic Characteristics of Participants (n = 180)

Variable	Category	n (%)
Gender	Male	98 (54.4)
	Female	82 (45.6)
Age group (years)	18–30	52 (28.9)
	31–50	83 (46.1)
	>50	45 (25.0)
Duration of diabetes	≤5 years	75 (41.7)
	>5 years	105 (58.3)
Education level	Primary or below	64 (35.6)
	Secondary	71 (39.4)
	Higher	45 (25.0)

Table 2. Overall, Knowledge, Attitude, and Practice Levels (KAP) (n = 180)

Domain	Category	n (%)
Knowledge	Adequate	98 (54.4)
	Inadequate	82 (45.6)
Attitude	Positive	113 (62.8)
	Negative/Neutral	67 (37.2)
Practices	Good	75 (41.7)
	Poor	105 (58.3)

Table 3. Association of Socio-Demographic Factors with Adequate Knowledge (n = 180)

Variable	Category	Adequate knowledge n/N (%)	Odds Ratio (95% CI)	p-value
Gender	Male	58/98 (59.2)	1.43 (0.79–2.61)	0.232
	Female	40/82 (48.8)	Reference	—
Age group	≤50 years	74/135 (54.8)	1.07 (0.56–2.05)	0.838
	>50 years	24/45 (53.3)	Reference	—
Education	Higher	34/45 (75.6)	3.12 (1.46–6.66)	0.003
	≤Secondary	64/135 (47.4)	Reference	—

Table 4. Association of Knowledge and Attitude with Good Practices (n = 180)

Variable	Category	Good practices n/N (%)	Odds Ratio (95% CI)	p-value
Knowledge	Adequate	52/98 (53.1)	3.47 (1.84–6.55)	<0.001
	Inadequate	23/82 (28.0)	Reference	—
Attitude	Positive	58/113 (51.3)	4.18 (2.17–8.05)	<0.001
	Negative/Neutral	17/67 (25.4)	Reference	—

Table 5. Diabetes Self-Care Practices by Specific Behaviors (n = 180)

Practice	Yes n (%)	No n (%)
Regular medication adherence	124 (68.9)	56 (31.1)
Adherence to diabetic diet	71 (39.4)	109 (60.6)
Regular physical activity	65 (36.1)	115 (63.9)
Routine blood glucose monitoring	80 (44.4)	100 (55.6)
Regular follow-up visits	92 (51.1)	88 (48.9)

Table 6. Multivariable Logistic Regression Analysis: Predictors of Good Practices (n = 180)

Predictor	Adjusted OR	95% CI	p-value
Adequate knowledge	2.96	1.49–5.89	0.002
Positive attitude	3.41	1.72–6.77	<0.001
Higher education	2.18	1.07–4.45	0.031
Duration of diabetes >5 years	1.29	0.67–2.49	0.441
Age >50 years	1.11	0.54–2.28	0.771

DISCUSSION

This cross-sectional study provides insight into the levels of knowledge, attitude, and practices regarding diabetes mellitus among patients attending primary health care settings in Lahore. The findings indicate that while more than half of the participants demonstrated adequate knowledge and nearly two-thirds exhibited a positive attitude toward diabetes management, fewer than half reported good self-care practices. This discrepancy highlights a critical gap between awareness and actual behavior, a pattern that has been consistently reported in diabetes-related KAP studies across diverse populations (20,21).

The proportion of participants with adequate knowledge observed in this study is comparable to findings from similar studies conducted in urban primary care settings in South Asia, where moderate levels of diabetes awareness have been documented (22). Higher educational attainment emerged as a significant determinant of adequate knowledge, underscoring the role of formal education in facilitating understanding of chronic disease processes and management principles. This association aligns with existing evidence suggesting that education enhances health literacy, which in turn influences patients' ability to comprehend medical advice and engage in self-care behaviors (23).

Attitudes toward diabetes management were generally positive among participants, with a majority expressing belief in the controllability of diabetes through treatment and lifestyle modification. Positive attitudes were strongly associated with good self-care practices, even after adjustment for potential confounders. This finding supports behavioral models that emphasize the role of individual perceptions, motivation, and self-efficacy in translating knowledge into action (24). Patients who perceive diabetes as manageable and believe in the effectiveness of lifestyle changes are more likely to adhere to recommended practices.

Despite relatively favorable knowledge and attitudes, self-care practices were suboptimal, particularly in relation to dietary adherence and physical activity. While medication adherence was reported by nearly two-thirds of participants, fewer than 40% followed recommended dietary guidelines or engaged in regular physical activity. Similar gaps have been reported in previous studies, suggesting that lifestyle modification remains one of the most challenging aspects of diabetes management (25). Cultural dietary preferences, limited access to structured counseling, time constraints, and lack of supportive environments for physical activity may contribute to poor adherence to lifestyle recommendations in primary care populations (26).

The strong independent association between adequate knowledge, positive attitude, and good practices observed in the multivariable analysis highlights the interrelated nature of KAP domains. However, the persistence of poor practices among a substantial proportion of knowledgeable patients indicates that information alone is insufficient to change behavior. This underscores the need for comprehensive, behaviorally informed interventions that go beyond knowledge dissemination to address motivational, social, and structural barriers to self-care (27).

Primary health care settings represent a critical platform for implementing such interventions, as they provide ongoing contact with patients and opportunities for repeated counseling and follow-up. Integrating structured diabetes education programs, personalized goal-setting, and culturally appropriate lifestyle counseling into routine primary care services may enhance self-care practices and

improve long-term outcomes (28). Training primary health care providers in patient-centered communication and behavioral change techniques may further strengthen diabetes management at this level of care.

Several limitations should be considered when interpreting these findings. The cross-sectional design precludes causal inference, and the use of convenience sampling may limit generalizability beyond the study population. Additionally, self-reported practices may be subject to recall and social desirability bias. Nevertheless, the study provides valuable local evidence on diabetes-related knowledge, attitudes, and practices among primary care patients in Lahore and addresses an important gap in the existing literature.

Overall, the findings emphasize that improving diabetes outcomes in primary health care settings requires a multifaceted approach that combines patient education with strategies to foster positive attitudes and facilitate sustainable behavior change, particularly in lifestyle-related practices (29).

CONCLUSION

This study demonstrates that while a substantial proportion of patients attending primary health care settings in Lahore possess adequate knowledge and positive attitudes toward diabetes mellitus, self-care practices remain insufficient. Adequate knowledge, positive attitude, and higher educational attainment were identified as key predictors of good diabetes-related practices, highlighting the interconnected nature of these domains. The observed gap between awareness and behavior underscores the need for comprehensive diabetes management strategies that extend beyond information provision to address behavioral and contextual barriers. Strengthening structured diabetes education, continuous counseling, and patient-centered support within primary health care services may play a critical role in improving self-care practices and reducing the risk of diabetes-related complications.

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