

# Assessment of Diabetes Knowledge Among Type 2 Diabetic Patients, A Cross-Sectional Observational Study of Karachi

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Submitted for Publication: 15-06-2024  
Accepted for Publication 16-10-2024

**How to Cite:** Majid I, Ahmed S, Adnan TA, Mobin K. Assessment of Diabetes Knowledge Among Type 2 Diabetic Patients, A Cross-Sectional Observational Study of Karachi. APMC 2024;18(4):314-318. DOI: 10.29054/APMC/2024.1638

## ABSTRACT

**Objective:** To evaluate the knowledge of Type 2 diabetes mellitus (T2DM) among patients and identify factors influencing their understanding and management practices. **Study Design:** Cross-sectional observational study. **Settings:** The research was conducted in the MSc Diabetes & Endocrinology program of the College of Family Medicine Pakistan. **Duration:** from June 2023 to June 2024. **Methods:** 323 T2DM patients, collected data using a structured questionnaire assessing demographic information, diabetes knowledge, management practices, and awareness of complications. Statistical analysis included descriptive statistics to summarize demographic characteristics and knowledge levels and inferential statistics such as chi-square tests and logistic regression to identify factors associated with diabetes knowledge. **Results:** The study revealed that 48.7% of participants had moderate knowledge levels, 28.4% had high knowledge levels, and 22.9% had low knowledge levels. Higher educational attainment and programs program participation were significantly associated with better knowledge scores ( $p < 0.001$ ). Patients with higher knowledge levels demonstrated better self-management practices, with significant correlations observed between knowledge and adherence to self-care practices ( $r = 0.58$ ,  $p < 0.001$ ). Additionally, factors such as education level, income, and duration of diabetes were significant predictors of diabetes knowledge. **Conclusion:** The findings indicate that while many T2DM patients possess moderate to high levels of diabetes knowledge, significant gaps remain, particularly among those with lower educational levels and limited access to educational programs. The study underscores the need for continuous and targeted educational interventions to improve diabetes knowledge and self-management practices, ultimately enhancing patient outcomes and reducing the risk of complications.

**Keywords:** Type 2 diabetes mellitus, Patient education, Cross-sectional study, Diabetes management, Family medicine.

## INTRODUCTION

Hyperglycemia induced by insulin resistance or deficiency characterizes diabetes mellitus, a chronic metabolic disorder.<sup>1</sup> The most prevalent type of diabetes mellitus (T2DM) affects millions of people worldwide. Effective management of T2DM hinges on medical treatment and significantly on the patient's knowledge about their condition, which influences their self-care behaviors, medication adherence, and lifestyle modifications.<sup>2</sup> This chapter delves into the importance of assessing diabetes knowledge among T2DM patients, emphasizing recent research findings.

Understanding diabetes is critical for patients to manage their condition effectively. Knowledge about the disease, its management, and potential complications can

significantly affect patients' adherence to treatment regimens and lifestyle changes.<sup>3</sup> A study conducted by the University Hospital of Yopougon in the Endocrinology Department highlighted that most patients had insufficient knowledge about diabetes, which adversely affected their ability to manage the disease. Enhancing patient education is thus a public health priority to mitigate the burden of diabetes.<sup>4</sup>

Several factors influence patients' levels of diabetes knowledge, including socioeconomic status, educational background, and access to healthcare resources.<sup>5</sup> Research in Palestine revealed that patients with higher educational attainment and those participating in diabetes education programs had better knowledge scores.<sup>6</sup> These findings indicate the necessity of

educational interventions tailored to different demographic groups to improve diabetes management.<sup>7</sup>

Studies indicate that while some patients possess adequate knowledge about T2DM, a significant proportion still lack essential information.<sup>8</sup> In Iran, a meta-analysis found that the average knowledge score among diabetic patients was 64%, suggesting a moderate understanding of the disease.<sup>9</sup> This underscores the need for ongoing education and support to ensure patients are well-informed about managing their condition effectively.

Effective self-management of T2DM requires patients to be knowledgeable about their condition.<sup>10</sup> In Malaysia, a study found that more than half of the patients surveyed had low knowledge scores, significantly associated with poor glycemic control. This highlights the direct link between patient knowledge and their ability to manage diabetes, emphasizing the importance of educational interventions in improving health outcomes.<sup>11</sup>

Educational programs have proven effective in enhancing diabetes knowledge and management practices among patients.<sup>12</sup> For instance, a study in South Egypt showed significant improvements in patients' knowledge about diabetes following a hospital-based awareness program. Such programs also educate patients and empower them to take an active role in their healthcare, leading to better disease management and quality of life.<sup>13</sup>

Socioeconomic and demographic factors significantly influence diabetes knowledge. A study conducted in Brazil found that age, marital status, education level, and income were associated with the level of diabetes knowledge. Patients with lower educational levels and income had significantly less knowledge about diabetes. This indicates that targeted educational programs for these groups are essential to improving diabetes management.<sup>6</sup>

Geographical variations also affect the knowledge levels of diabetes patients. A systematic review in Southeast Asia revealed that older patients with lower levels of education and deprived glycaemic control had significantly lower diabetes knowledge. This underscores the need for region-specific educational strategies to address these gaps.<sup>14</sup>

Assessing and enhancing diabetes knowledge among T2DM patients is crucial for effective disease management. Various studies have demonstrated that patient education significantly impacts their ability to manage diabetes, highlighting the need for continuous and tailored educational interventions. Diabetes knowledge can improve patients' quality of life by improving glycemic control and reducing complications.

## METHODS

In this study, patients' knowledge of T2DM is assessed using a cross-sectional observational design. A one-year study was conducted between June 2022 and June 2023, with ethical approval (1904-2022/IRB/CFMP) from the College of Family Medicine Pakistan's institutional review board.

The research was conducted in the MSc Diabetes & Endocrinology program of the College of Family Medicine Pakistan. This location was chosen due to its high patient turnover and specialized diabetes care facilities, providing a comprehensive study setting.

The study population consisted of 323 patients diagnosed with T2DM who were attending the MSc Diabetes & Endocrinology program of the College of Family Medicine Pakistan.

Patients diagnosed with T2DM, age 18 years and above, patients who have been receiving treatment for diabetes for at least one year and informed consent was obtained from patients who consented to participate in the study. Patients with cognitive impairments or other conditions that would interfere with their ability to complete the questionnaire and patients with a history of other major chronic illnesses that might affect diabetes management were excluded from the study.

Data were collected using a structured questionnaire designed to assess the patients' knowledge of diabetes. The questionnaire, developed based on validated tools used in previous studies, covered demographic information, basic knowledge of diabetes, diabetes management, awareness of complications, and self-care practices. It was administered to the patients during their routine clinic visits. A trained interviewer assisted patients in understanding and completing the questionnaire to ensure accurate and complete responses. Participation in this study was voluntary and kept confidential.

A database was created, and statistical software was used to analyze the data. We summarized the patients' demographic characteristics and knowledge levels using descriptive statistics. Inferential statistics, including chi-square tests and logistic regressions, were employed to identify factors associated with diabetes knowledge. Statistical significance was determined by a p-value of 0.05.

## RESULTS

323 patients diagnosed with T2DM participated in this study conducted in the MSc Diabetes & Endocrinology program of the College of Family Medicine Pakistan from June 2023 to June 2024. The demographic characteristics

of the participants are summarized in Table 1. The mean age of the participants was 56.8 years, with a majority being female (57.6%). Most patients had been diagnosed with diabetes for over five years (61.3%) and were predominantly treated with a combination of oral hypoglycemic agents and insulin (54.2%).

**Table 1: Demographic characteristics of study participants**

| Demographic Characteristics | Percentage |
|-----------------------------|------------|
| Mean Age (years)            | 56.8       |
| Female                      | 57.60%     |
| Diagnosed > 5 years         | 61.30%     |
| Combination therapy         | 54.20%     |

### Diabetes Knowledge Assessment

The overall level of diabetes knowledge among the participants was assessed using a structured questionnaire. The knowledge scores ranged from 0 to 20, with a mean score of 11.4. A significant portion of the participants (48.7%) had moderate knowledge levels, 28.4% had high knowledge levels, and 22.9% had low knowledge levels. Key areas assessed included basic diabetes knowledge, management practices, and awareness of complications.

#### Basic Diabetes Knowledge:

- 76.1% of participants could correctly define diabetes.
- 63.4% knew the causes and risk factors associated with Type 2 diabetes.
- 69.2% identified the common symptoms of hyperglycemia.

#### Diabetes Management:

- 54.6% of participants knew the importance of regular blood glucose monitoring.
- 61.7% adhered to dietary recommendations.
- 45.8% engaged in regular physical activity as part of their diabetes management.

#### Complications Awareness:

- 72.5% of participants were aware of the potential complications of diabetes, including neuropathy, retinopathy, and nephropathy.
- 67.9% knew the importance of foot care in preventing diabetic foot ulcers.

**Table 2: Diabetes knowledge levels among participants**

| Knowledge Level | Percentage |
|-----------------|------------|
| Low             | 22.90%     |
| Moderate        | 48.70%     |
| High            | 28.40%     |

### Factors Influencing Diabetes Knowledge

Statistical analysis revealed several factors significantly associated with the level of diabetes knowledge among the participants. Higher educational attainment was strongly correlated with better knowledge scores ( $p < 0.001$ ). Patients with a university education had significantly higher knowledge scores compared to those with only primary education. Additionally, participation in diabetes educational programs was associated with higher knowledge levels ( $p = 0.002$ ). Patients who regularly attended educational sessions better understood and managed their condition.

### Self-Management Practices

Self-management practices were evaluated in conjunction with knowledge assessment. Patients with higher knowledge scores demonstrated better self-management behaviors. There was a significant correlation between knowledge levels and adherence to self-care practices ( $r = 0.58$ ,  $p < 0.001$ ). Patients knowledgeable about their condition were more likely to monitor their blood glucose levels regularly, adhere to prescribed diets, and engage in physical activities.

### Statistical Analysis

Data analysis used descriptive statistics to summarize patients' demographic characteristics and knowledge levels. Inferential statistics, including chi-square tests and logistic regression, were employed to identify factors associated with diabetes knowledge. The analysis showed that education level (OR = 3.5, 95% CI = 2.1–5.8), participation in educational programs (OR = 2.8, 95% CI = 1.6–4.7), and duration of diabetes (OR = 1.7, 95% CI = 1.1–2.6) were significant predictors of diabetes knowledge.

## DISCUSSION

The results of this study highlight the critical role of education in managing T2DM and improving patients' knowledge about their condition. The study revealed that 48.7% of participants had moderate knowledge levels, 28.4% had high knowledge levels, and 22.9% had low knowledge levels. This section compares these findings with existing research and discusses the implications.

The findings of this study align with those from various regions and populations. For instance, a study conducted in Indonesia found that 61% of T2DM patients knew moderately about their disease.<sup>15</sup> Similarly, 50.9% of patients in Palestine had moderate to high knowledge levels, highlighting the importance of educational interventions.<sup>1</sup>

In Iran, a meta-analysis reported an average knowledge score of 64%, comparable to our study's moderate knowledge levels.<sup>8</sup> This similarity suggests that despite regional differences, diabetes knowledge among patients follows a consistent pattern, influenced by educational efforts and healthcare access.

Education and participation in educational programs were significant predictors of diabetes knowledge in our study, corroborating findings from another research. For instance, in a study conducted at Yopougon University Hospital, high school education and the possession of a blood glucose meter were associated with better knowledge scores.<sup>16</sup> Additionally, a study in Malaysia identified education level and participation in diabetes education as crucial factors influencing self-management knowledge.<sup>17</sup>

Our study found a significant correlation between diabetes knowledge and self-management practices, consistent with other research. A study in South Egypt showed that an educational program significantly improved patients' knowledge and self-management behaviors.<sup>18</sup> Similarly, research in Tanzania reported that patients with higher knowledge levels were likelier to engage in appropriate self-care practices.<sup>2</sup>

The impact of socioeconomic factors on diabetes knowledge is well-documented. Our study found that higher educational attainment and income were associated with better knowledge scores. This is consistent with findings from Brazil, where lower education and income levels were linked to insufficient diabetes knowledge.<sup>19</sup> Additionally, a systematic review in Southeast Asia highlighted that older patients with lower education levels and poor glycaemic control had significantly lower diabetes knowledge.<sup>20</sup>

Additionally, a study conducted in the United States found that diabetes education programs significantly improved patients' adherence to self-care practices and glycemic control, further supporting the need for educational interventions.<sup>3</sup> Another study in India indicated that socioeconomic status and access to healthcare resources were significant determinants of diabetes knowledge, emphasizing the need for targeted educational programs.<sup>5</sup> This finding aligns with a systematic review in Southeast Asia that highlighted

lower education levels and poor glycemic control as significant factors affecting diabetes knowledge.<sup>14</sup>

### Implications for Diabetes Management

The consistent findings across different studies underscore the importance of targeted educational interventions to improve diabetes knowledge and management. Healthcare providers should prioritize educational programs, especially for patients with lower socioeconomic status, to bridge the knowledge gap and enhance self-management practices. This approach can lead to better glycaemic control and reduce the risk of complications associated with T2DM.

### CONCLUSION

The study at the College of Family Medicine Pakistan revealed significant gaps in diabetes knowledge among patients, similar to findings from various regions. Higher education and participation in educational programs were crucial in enhancing knowledge levels. The strong correlation between knowledge and self-management practices emphasizes the need for continuous and targeted educational interventions. By addressing these knowledge gaps, healthcare providers can improve diabetes management and patient outcomes.

### LIMITATIONS

Several limitations apply to this study. As a result of the small sample size (223 patients from a single centre), the findings are unlikely to be generalizable. Second, self-reported data are subject to memory and social desirability biases. In addition, causal inferences can only be drawn using a cross-sectional design. The structured questionnaire, though validated, might not have captured all aspects of diabetes knowledge and self-management comprehensively. Lastly, the study did not deeply explore other socioeconomic and cultural factors influencing diabetes management. Despite these limitations, the study provides valuable insights into diabetes knowledge among T2DM patients, highlighting the need for targeted educational interventions.

### SUGGESTIONS / RECOMMENDATIONS

Establish comprehensive diabetes education programs in Karachi, focusing on disease management, nutrition, and lifestyle modifications.

### CONFLICT OF INTEREST / DISCLOSURE

None.

### ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to the participants who took part in this study, sharing their valuable time and information. We also appreciate the

support and cooperation extended by the healthcare professionals and staff at the participating hospitals and clinics in Karachi.

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