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Knowledge Attitude and Practice Regarding Diabetes Mellitus Among General Population in Karachi

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ABSTRACT. Diabetes Mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia, leading to complications such as heart disease, blindness, and kidney disease. This study aims to analyze the knowledge, attitudes, and practices (KAP) concerning DM among the general population in Karachi, Pakistan, and identify factors influencing these aspects. A cross-sectional study was conducted from June 2022 to July 2023 using a Google survey form. The study included 642 participants. The results showed that 75.7% of participants had significant knowledge about the association between diabetes and eye ailments. However, only 51.9% engaged in regular exercise to maintain blood sugar levels, and 38.3% followed a proper diet plan. Additionally, 73.4% showed a lack of interest in visiting an endocrinologist, while 75.7% attended annual eye check-ups. Only 38.3% underwent HbA1C testing for diabetes monitoring, and 87.4% had not experienced hospitalization due to diabetes-related complications. The study concludes that while the majority had adequate knowledge about diabetes and its risk factors, there was a lack of focus on effective diabetes control practices. Intensive health education regarding DM and its associated illnesses should be conducted among the general public, diabetic patients, and their caregivers to enhance understanding and compliance with DM management and eye care, ultimately preventing complications in Karachi.

Keywords: Diabetes Mellitus; hyperglycemia; heart disease; blindness; microvascular.

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Introduction

Diabetes mellitus (DM) is a group of metabolic disorders characterized by hyperglycemia due to either insufficient insulin production or ineffective insulin action (Maritim et al., 2003). Insulin, a hormone synthesized in the pancreatic beta cells, plays a critical role in the transportation and storage of glucose in muscle and adipose tissues. Without adequate insulin, tissues cannot take up glucose, resulting in intracellular hypoglycemia and extracellular hyperglycemia (Kangralkar et al., 2010). This condition can lead to a range of macrovascular and microvascular complications, including heart disease, stroke, blindness, and renal disease (Loghmani, 2005). Hyperlipidemia and oxidative stress are also contributing factors in the pathogenesis of diabetes.

The global prevalence of diabetes is rising alarmingly. In the United States alone, approximately 23 million adults have been diagnosed with diabetes, with the prevalence expected to reach 5.5% by 2025 (Centers for Disease Control and Prevention [CDC], 2022). Other regions, especially the Middle East and Asia, are projected to experience even higher rates due to rapid economic growth, development, and dietary changes. Pakistan, in particular, has the third-highest diabetes prevalence worldwide after China and India. The prevalence rates in Pakistan were 11.77% in 2016 (Meo et al., 2016), 16.98% in 2018 (Aamir et al., 2019), and 17.1% in 2019 (Atlas, 2019). According to the International Diabetes Federation [IDF], (2019), there were approximately 33 million cases of diabetes globally in 2022, with 26.7% of adults in Pakistan affected.

Diabetes mellitus puts patients at constant risk of complications, including macrovascular (coronary artery disease, peripheral vascular disease, and stroke), microvascular (neuropathy, retinopathy, and nephropathy), and combined micro- and macrovascular (diabetic foot) complications. The elderly is particularly prone to morbidity and mortality due to macrovascular degeneration rather than microvascular complications

(Wallace and Matthews, 2004). Diabetic retinopathy, a significant cause of premature blindness, is a primary concern among diabetologists due to its non-invasive diagnostic methods. However, diabetes affects every part of the eye, leading to various ocular problems beyond retinopathy, which are more prevalent in the diabetic population (Blahova et al., 2021).

Given the increasing prevalence of diabetes and its associated complications, it is crucial to assess the general population's knowledge, attitude, and practices (KAP) regarding the disease and related disorders. This cross-sectional study aims to explore the factors associated with knowledge, attitude, and practices of diabetes mellitus and its complications, particularly common eye diseases, among the general population in Karachi, Pakistan. By understanding the level of awareness and behavior towards diabetes, effective strategies can be developed to enhance public knowledge and potentially reduce the disease's prevalence and impact.

Materials and methods

Study design and sampling method

From June 2022 to July 2023, we conducted a cross-sectional study to assess the knowledge, attitude, and practices (KAP) related to diabetes mellitus (DM) among the general population of Karachi. The study aimed to explore the factors associated with KAP towards DM and common eye diseases. A total of 642 participants were invited to participate through various internet resources, including WhatsApp, email, and other online platforms.

Data collection

Data collection was carried out using a Google survey form. Before enrolling in the study, participants were required to provide informed consent. The online questionnaire was designed to gather information on epidemiological characteristics, as well as knowledge, attitudes, and practices regarding diabetes and common eye diseases. To ensure data quality, all researchers involved in the study were trained experts in the medical field.

Questionnaire

The questionnaire included questions derived from verified instruments:

- The Diabetes Knowledge and Awareness Questionnaire developed for the Chennai Urban Rural Epidemiology Study (Deepa et al., 2005).
- The AusDiab Health Knowledge, Attitudes and Practices Questionnaire (Cameron et al., 2012).
- The KAP Creation Guide by the World Health Organization [WHO], (2008).

Questions evaluating knowledge of diabetes are listed in (Table 1). Questions assessing the practice of diabetes management, particularly among those diagnosed with diabetes or their relatives, are detailed in (Table 2) and (Figure 3).

Table 1. Demographic data of the participants.

Demographic Characteristic		Frequency (%)
Gender	Male	324 (50.5)
	Female	318 (49.5)
Age (years)	20 – 29	483 (75.2)
	30 – 39	99 (15.4)
	40 – 49	39 (6.1)
	50 – 59	15 (2.3)
	60 – 69	6 (9)
	⩾ 70	0 (0)
Education	Matric	33 (5.1)
	Intermediate	201 (31.3)
	Bachelor / Graduate	303 (47.2)
	Masters	87 (13.6)
	PhD	18 (2.8)
Profession	Government job	39 (6.1)
	Private job	285 (44.4)
	Self – employed	63 (9.8)
	Unemployed	255 (39.7)

Table 2. Assessment of the level of knowledge of the participants.

Knowledge questions	Yes	No	Don't know
Do you know what diabetes is?	92.1%	7.5%	0.4%
Do you realize diabetes is a genetic disease?	80.3%	9.6%	10.1%
Do you know about glucose tolerance tests?	82.7%	14.5%	2.2
Do you know how to diagnose diabetes?	86.9%	9.35%	3.8%
Do you know about fasting blood sugar levels?	59%	38.1%	2.9%
Do you know about random blood sugar levels?	70%	26.2%	3.6%
Do you think reducing sugar intake can reduce diabetes?	73.1%	14.4%	12.5%
Are you aware of the risk factors associated with diabetes?	84.8%	13.8%	1.4%

Scoring for knowledge, attitude, and practice

A total of 26 items were included in the evaluation. The knowledge segment comprised 9 items, the attitude segment included 7 items, and the practice segment consisted of 10 items. Responses were categorized into three options: yes, no, and don't know. Each positive response was assigned a score of 1, while negative responses were assigned a score of 0.

Statistical analysis

The statistical analysis was performed using IBM Statistical Package for the Social Sciences (SPSS), version 27. Descriptive statistics were used to report the socio-demographic characteristics of the participants, including age, gender, profession, and education level. The participants' attitudes were evaluated based on the percentage of responses to the questions posed. Additionally, the participants' practices regarding diabetes management were graphically represented.

Ethical approval

The protocol of this study was reviewed and approved by the Institutional Review Board of Iqra University North Karachi. The approval number is IRB/IUNC/2022/005, and the date of approval is May 25, 2022

Map of the study region

To enhance understanding of the region studied, a map of Karachi is included below, highlighting the areas where the survey participants were located.(Figure 1)

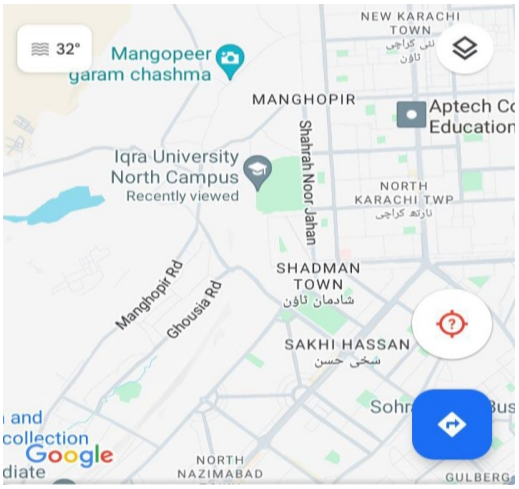

Figure 1. Map of the study region in Karachi, highlighting the location of Iqra University North Campus and surrounding areas (Source: Google Maps).

Results

Demographic characteristics

This cross-sectional study included a sample of 642 participants, and their demographic characteristics are presented in (Table 1). The majority of participants were aged 20-29 years, accounting for 75.2 percent. In terms of education, 47.2 percent held a Bachelor's degree or higher. Regarding profession, 44.4 percent were engaged in private jobs, followed by 39.7 percent who were unemployed.

Knowledge assessment

Table 2 shows that 80.3 percent of respondents knew that diabetes mellitus (DM) is a genetic disorder, 82.7 percent were aware of glucose tolerance tests, and 86.9 percent knew how to identify DM. Additionally, 59 percent were familiar with fasting blood sugar (FBS) and 70 percent with random blood sugar (RBS) levels. Moreover, 73.1 percent knew that reducing sugar intake can mitigate diabetes risk, while 84.8 percent were aware of the severe complications associated with diabetes. Out of 642 contributors, 23 percent were affected by type II diabetes mellitus, 10 percent by type I diabetes mellitus, 18 percent were unaware of their diabetes status, and 49 percent were non-diabetic. In Figure 2, 10% of people have suffered from type 1 diabetes, whereas 20.3% have type 2. Additionally, 19% have not been tested yet, while 49.9% are non-diabetic. Figure 3 shows that 75.7% are aware that diabetes can cause eye disease, whereas 24.3% are still unaware Figure 4 illustrates that 75.7 percent of the population possessed significant knowledge about the association between diabetes and eye ailments, while 24.3 percent remained ignorant of this fact.

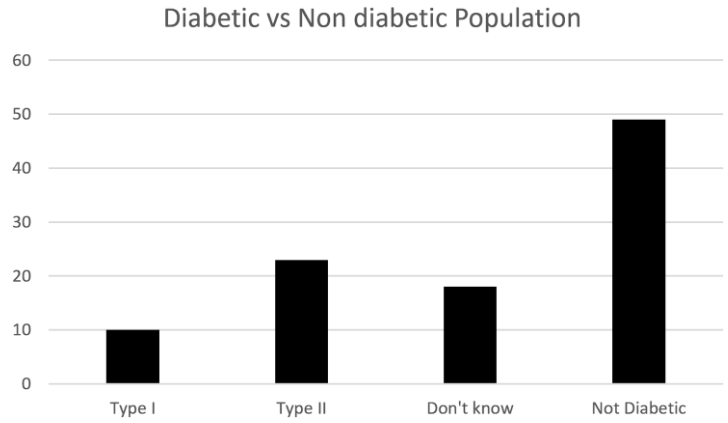

Figure 2. Percentage of diabetic and non-diabetic individuals.

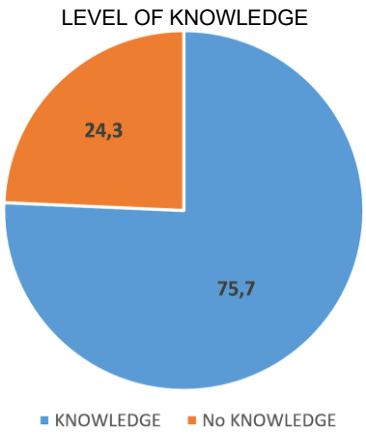

Figure 3. Percentage of population with the knowledge that diabetes cause eye disease.

Attitude assessment

Table 3 presents the participants' perspectives on diabetes. A significant majority, 79 percent, agreed that maintaining proper sugar control can help preserve their vision. Furthermore, 68.7 percent expressed confidence in determining the appropriate timing for insulin administration. Conversely, 69.6 percent reported not experiencing low blood sugar level reactions, while 76.6 percent had not encountered symptoms of high blood sugar levels. A substantial proportion, 76.2 percent, believed that medication needs to be adjusted over time.

Table 3. Public attitude towards diabetes.

Attitude	Yes (%)	No (%)	Maybe (%)
Controlling sugar can preserve your vision	79.0	8.4	12.6
Ever experienced low blood sugar level reactions	30.4	69.6	0.0
Ever experienced high blood sugar level symptoms	23.4	76.6	0.0

Ever faced problems with infections	27.6	66.4	6.1
Go for sessions with a registered dietician	31.8	68.2	0.0
Know when to administer your insulin	68.7	23.4	7.9
Believe that medication needs to be changed with time	76.2	15.0	8.9

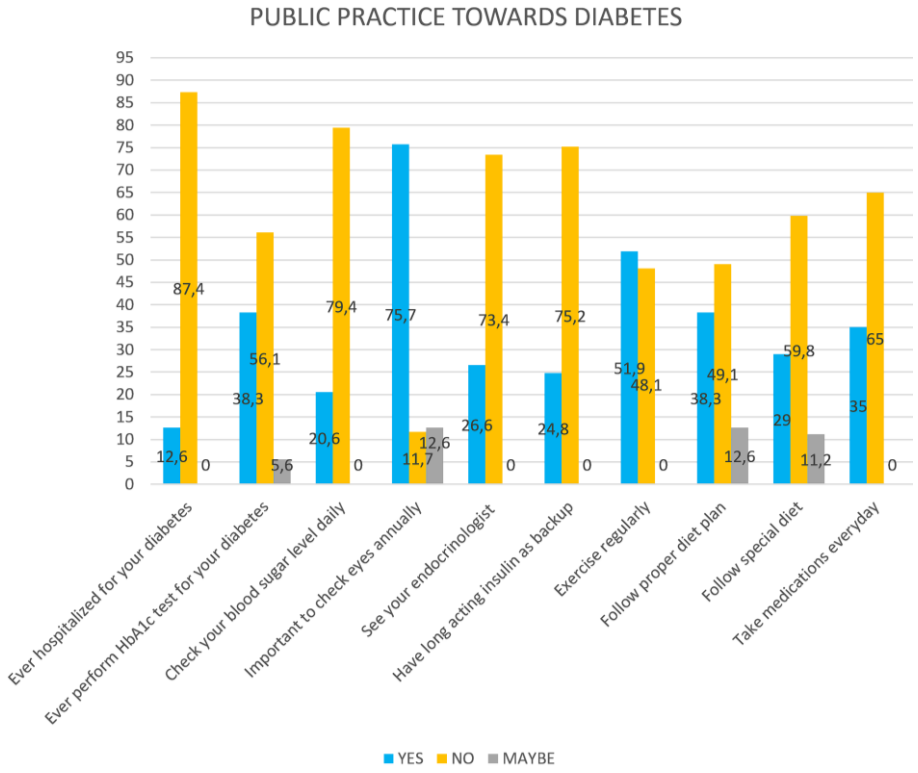

Figure 4. Evaluation of Public Practice Towards Diabetes Mellitus.

Practice assessment

The findings indicate that 65 percent of diabetic patients do not adhere to daily medication intake. However, 51.9 percent reported engaging in regular exercise to maintain their blood sugar levels. While 38.3 percent followed a proper diet plan, only 29 percent adhered to a specialized diet for managing their DM. Interestingly, 73.4 percent of individuals showed a lack of interest in visiting an endocrinologist, despite recognizing the importance of annual eye check-ups with an ophthalmologist. Additionally, only 38.3 percent of patients undergo HbA1C testing for diabetes monitoring. Notably, 87.4 percent of patients had not experienced hospitalization due to diabetes-related complications.

Discussion

Our study is the first of its kind to evaluate the knowledge, attitude, and practices (KAP) towards diabetes mellitus (DM) and its risk factors among the general population of Karachi. The findings indicate that while the majority of participants had excellent knowledge of DM and associated issues such as eye disorders, a smaller percentage remained unaware of these facts. This contrasts with a study from Punjab, Pakistan, which reported poor awareness about common eye conditions among various populations in the region (Gillani et al., 2018).

Knowledge

The high level of knowledge regarding DM among the participants is promising. Approximately 80.3 percent of respondents were aware that DM is a genetic disorder, and 82.7 percent knew about glucose tolerance tests. This suggests that public health campaigns and educational programs in Karachi may be effectively disseminating information about diabetes. However, there is still a need to target the 24.3 percent of the population who are not aware of the association between diabetes and eye ailments. This gap in knowledge can lead to underestimation of the importance of regular eye check-ups, which are crucial for preventing diabetes-related complications such as retinopathy (Fong et al., 2004).

Attitude

The study revealed a concerning attitude towards diabetes management. While 79 percent of participants agreed that maintaining proper sugar control can help preserve their vision, a significant number reported poor attitudes towards diabetes management practices. For instance, only 68.7 percent felt confident in determining the appropriate timing for insulin administration. This indicates a need for more targeted educational interventions to improve self-management skills among diabetic patients (Peyrot et al., 2005).

Practice

The practice of diabetes management among participants also showed significant shortcomings. Despite understanding the importance of sugar control, 65 percent of diabetic patients did not adhere to daily medication intake, and only 51.9 percent engaged in regular exercise. This is in line with global studies that highlight poor adherence to diabetes management protocols as a major barrier to effective disease control (Diabetes Control and Complications Trial Research Group [DCCT], 1993). Additionally, only 38.3 percent of patients undergo HbA1C testing for diabetes monitoring, suggesting a lack of regular follow-up and monitoring, which is critical for effective diabetes management (American Diabetes Association [ADA], 2023).

Interestingly, a large proportion of individuals (73.4 percent) showed a lack of interest in visiting an endocrinologist, despite recognizing the importance of annual eye check-ups with an ophthalmologist. This discrepancy might be due to perceived barriers such as cost, accessibility, or lack of perceived need for specialist care (Weinger et al., 2005). Addressing these barriers through policy changes and improved healthcare infrastructure could enhance adherence to recommended practices.

Conclusion

This study provides a comprehensive assessment of the current state of knowledge, attitude, and practice related to diabetes among the general population of Karachi. The results highlight a high level of knowledge but poor attitudes and practices towards diabetes management. Public health initiatives should focus on bridging the gap between knowledge and practice by promoting regular follow-up, adherence to medication, and lifestyle modifications. Additionally, targeted interventions are needed to improve self-management skills and reduce barriers to accessing specialist care. By addressing these areas, it is possible to enhance the overall management of diabetes and prevent its complications in the population of Karachi.

References

Aamir, A. H., Ul-Haq, Z., Mahar, S. A., Qureshi, F. M., Ahmad, I., Jawa, A., Sheikh, A., Raza, A., Fazid, S., Jadoon, Z., & Khalid, M. (2019). Diabetes prevalence survey of Pakistan (DPS-PAK): Prevalence of type 2 diabetes mellitus and prediabetes using HbA1c: A population-based survey from Pakistan. *BMJ Open, 9*(2), e025300.

American Diabetes Association [ADA]. (2023). Standards of medical care in diabetes—2023. *Diabetes Care, 46*(Suppl. 1), S1–S292. https://doi.org/10.2337/dc23-Sint

Blahova, J., Kobzova, D., & Krcmova, L. K. (2021). Diabetic eye disease: A critical review of the literature. *International Journal of Environmental Research and Public Health, 18*(4), 2046.

Cameron, A. J., Magliano, D. J., Dunstan, D. W., Zimmet, P. Z., Hesketh, K., Peeters, A., & Shaw, J. E. (2012). A bi-directional relationship between obesity and health-related quality of life: Evidence from the longitudinal AusDiab study. *International Journal of Obesity, 36*(2), 295–303.

Centers for Disease Control and Prevention [CDC]. (2022). *National diabetes statistics report*. U.S. Department of Health and Human Services.

Deepa, R., Shanthirani, C. S., & Mohan, V. (2005). Awareness and knowledge of diabetes in Chennai: The Chennai Urban Rural Epidemiology Study (CURES-9). *Journal of the Association of Physicians of India, 53*, 283–287.

Diabetes Control and Complications Trial Research Group [DCCT]. (1993). The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *New England Journal of Medicine, 329*(14), 977–986. https://doi.org/10.1056/NEJM199309303291401

Fong, D. S., Aiello, L. P., Gardner, T. W., King, G. L., Blankenship, G., Cavallerano, J. D., Fredrick, L., & Klein, R. (2004). Retinopathy in diabetes. *Diabetes Care, 27*(Suppl. 1), S84–S87. https://doi.org/10.2337/diacare.27.2007.S84

Gillani, A. H., Syed, S., Ishaq, R., Alfaris, E. A., Shaikh, S. A., & Idrees, J. (2018). Awareness of common eye diseases and their treatment among the rural population of Punjab, Pakistan. *Oman Journal of Ophthalmology, 11*(1), 37–40. https://doi.org/10.4103/ojo.OJO_213_2017

Gillani, A. H., Amirul Islam, F. M., Hayat, K., Atif, N., Yang, C., Chang, J., & Fang, Y. (2018). Knowledge, attitudes and practices regarding diabetes in the general population: A cross-sectional study from Pakistan. *International Journal of Environmental Research and Public Health, 15*(9), 1902.

International Diabetes Federation [IDF]. (2019). *IDF diabetes atlas* (9th ed.). International Diabetes Federation.

Kangralkar, V. A., Patil, S. D., & Bandivadekar, R. M. (2010). Oxidative stress and diabetes: A review. *International Journal of Pharmaceutical Applications, 1*(1), 38–45.

Loghmani, E. (2005). Diabetes mellitus: Type 1 and type 2. In *Goldman-Cecil Medicine* (pp. 1488–1503). Elsevier.

Meo, S. A., Usmani, A. M., & Qalbani, E. (2016). Prevalence of type 2 diabetes in the Arab world: Impact of GDP and energy consumption. *European Review for Medical and Pharmacological Sciences, 20*(3), 421–428.

Maritim, A. C., Sanders, R. A., & Watkins, J. B. (2003). Diabetes, oxidative stress, and antioxidants: A review. *Journal of Biochemical and Molecular Toxicology, 17*(1), 24–38.

Peyrot, M., Rubin, R. R., Lauritzen, T., Skovlund, S. E., Snoek, F. J., Matthews, D. R., & Landgraf, R. (2005). Psychosocial problems and barriers to improved diabetes management: Results of the Cross-National Diabetes Attitudes, Wishes and Needs (DAWN) Study. *Diabetic Medicine, 22*(10), 1379–1385.

Wallace, T. M., & Matthews, D. R. (2004). Recent advances in the monitoring and management of diabetic ketoacidosis. *QJM: An International Journal of Medicine, 97*(12), 773–780.

World Health Organization [WHO]. (2008). *KAP surveys (Knowledge, Attitudes, and Practices)*. https://www.who.int

Weinger, K., Butler, H. A., Welch, G., & La Greca, A. M. (2005). Measuring diabetes self-care: A psychometric analysis of the Self-Care Inventory-Revised with adults. *Diabetes Care, 28*(6), 1346–1352. https://doi.org/10.2337/diacare.28.6.1346