INSIGHTS-JOURNAL OF
HEALTH AND REHABILITATION

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

ASSESSING KNOWLEDGE AND AWARENESS ABOUT DIABETES MELLITUS AMONG DIABETIC PATIENTS VISITING CAPITAL HOSPITAL (CDA), ISLAMABAD: A CROSS-SECTIONAL STUDY

Original Research

Arifa Iran Janjua[1]*, Mudassar Mushtaq Jawad Abbasi[2], Wajood Ali Lashari[3], Tanseer Ahmed [4], Habib Ahmed [5]
[1]Public Health Specialist, Health Services Academy, Islamabad, Pakistan.
[2]Associate Professor, Health Services Academy (HSA), Islamabad, Pakistan.
[3]Head Nurse, Capital Development Hospital, Islamabad, Pakistan.
[4]Associate Professor, Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan.
[5]Head Nurse, Pakistan Institute of Medical Sciences, Islamabad, Pakistan.
Corresponding Author: Arifa Iran Janjua, Public Health Specialist, Health Services Academy, Islamabad, Pakistan, arifairanjanjua82@gmail.com
Acknowledgement: The authors thank the staff and participants of Capital Hospital, Islamabad, for their support and cooperation.

Conflict of Interest: None | Grant Support & Financial Support: None

ABSTRACT

Background: Diabetes mellitus remains a growing global health concern, particularly in low- and middle-income countries. Poor disease awareness among patients is a major barrier to effective self-care, often resulting in preventable complications. Patient education is critical for enhancing glycaemic control, adherence to treatment, and lifestyle modification. Evaluating knowledge gaps and their demographic determinants can inform targeted interventions to improve diabetes outcomes.

Objective: To assess the level of knowledge and awareness regarding diabetes mellitus among diabetic patients attending Capital Development Authority Hospital, Islamabad, and to identify demographic factors associated with their understanding.

Methods: A descriptive cross-sectional study was carried out from September to December 2019 at Capital Hospital, Islamabad. A total of 365 diabetic patients aged ≥18 years were selected using convenience sampling. Data were collected using a structured demographic questionnaire and the validated 24-item Diabetes Knowledge Questionnaire (DKQ), which assessed understanding of disease etiology, risk factors, complications, prevention, and management. Each response was scored, with higher scores indicating better knowledge. Statistical analysis was conducted using SPSS Version 27. Descriptive statistics were reported as frequencies and percentages, while associations between demographic variables and knowledge scores were evaluated using ANOVA and Mann-Whitney U tests, with $p < 0.05$ considered significant.

Results: Among 365 participants, 230 (63.0%) were female, and 312 (85.5%) were married. Most participants (n = 248, 68.0%) demonstrated moderate knowledge. A significant association was found between knowledge scores and education level ($p = 0.011$), as well as disease duration ($p < 0.001$). Participants with diabetes for >10 years had the highest mean knowledge score (71.3 ± 12.6). Major gaps were observed in knowledge about complications, diet, and physical activity.

Conclusion: The study highlights moderate awareness of diabetes among patients, with considerable knowledge gaps influenced by education and disease duration. Tailored education programs addressing these gaps are essential to promote self-care and reduce complications.

Keywords: Awareness, Diabetes Mellitus, Health Knowledge, Pakistan, Patient Education, Self-Management, Surveys and Questionnaires.

INTRODUCTION

Diabetes mellitus remains one of the most pressing public health challenges of the 21st century, characterized by a growing global burden that continues to rise in tandem with rapid urbanization, unhealthy dietary patterns, and sedentary lifestyles (1). According to the International Diabetes Federation, the number of individuals affected by diabetes is projected to escalate dramatically from 537 million in 2021 to 783 million by 2045, posing a considerable strain on healthcare systems worldwide (2). Low- and middle-income countries, including Pakistan, bear a disproportionate share of this burden, with an estimated 33 million people currently living with the disease (3). Despite the rising prevalence and well-documented risks associated with diabetes, patient awareness and understanding of the condition remain critically inadequate in many populations. This lack of knowledge directly undermines effective disease management and contributes to poor health outcomes, including increased morbidity and mortality. Patient education is a cornerstone of diabetes management, playing a pivotal role in shaping self-care behaviours, medication adherence, and long-term glycaemic control (4). Individuals with sufficient understanding of their condition are more likely to engage in proactive health behaviours such as regular blood glucose monitoring, adherence to prescribed treatments, and the adoption of healthier lifestyles, ultimately reducing the risk of complications like cardiovascular disease, retinopathy, nephropathy, and neuropathy (5). Conversely, insufficient awareness can lead to poor disease control, frequent hospitalizations, and delayed diagnosis, exacerbating complications and placing an even greater burden on the healthcare system (6). It is imperative for healthcare providers to assess and address patients' knowledge gaps, allowing for tailored counselling and educational interventions that support comprehensive diabetes care. Furthermore, policymakers must be informed about the population's awareness levels to design responsive educational strategies that reflect the needs of diabetic individuals (7).

Numerous international and regional studies have explored diabetes-related knowledge, revealing stark disparities in awareness and management practices. A study conducted in Nigeria found that patients exhibited poor understanding of their disease, while research in India demonstrated relatively better knowledge, particularly among patients with concurrent hypertension or hyperlipidemia (8,9). Within Pakistan, research from Lahore identified significant associations between patients' diabetes knowledge and sociodemographic factors such as gender, education, and family history of the disease (10). Another local study underscored widespread unawareness of key aspects of diabetes—including its risk factors, symptoms, and necessary lifestyle adjustments—leading to delayed diagnosis and suboptimal disease control (11). These findings reinforce the urgent need for structured, targeted educational programs that address these deficits and promote informed self-management. In the context of Pakistan's public healthcare system, tertiary care facilities such as Capital Hospital in Islamabad serve a large and socioeconomically diverse diabetic population. However, limited research has been conducted in such settings to systematically evaluate patients' knowledge and awareness regarding diabetes. Understanding the extent of this knowledge—and identifying the demographic variables that influence it—is vital for designing effective educational strategies. Therefore, this study aimed to assess the level of diabetes-related knowledge and awareness among patients attending Capital Hospital, Islamabad, and to determine the demographic factors associated with their understanding.

METHODS

This cross-sectional analytical study was conducted over a four-month period from 1st September 2019 to 31st December 2019 at Capital Hospital (CDA), Islamabad. A convenience sampling technique was employed to recruit participants from the diabetic outpatient population attending the hospital during the study duration. The study population comprised both male and female individuals aged 18 years and above, with a confirmed diagnosis of diabetes mellitus. Patients who were cognitively impaired, critically ill, or unwilling to participate were excluded to ensure data reliability and ethical compliance. A total of 365 diabetic patients who met the inclusion criteria were enrolled. Ethical approval for the study was granted by the Institutional Research Board & Ethics Committee of Capital Development Authority, Capital Hospital, Islamabad, under reference number IRB-50-2-8-24. Additionally, formal permission was obtained from the Medical Superintendent of the hospital. Prior to data collection, both verbal and written informed consent were obtained from all participants after explaining the study's purpose, voluntary nature of participation, and confidentiality assurances. Data collection was carried out using a structured, two-part questionnaire. The first section captured demographic details including gender, age, marital status, educational level, occupation, monthly household income, and family history of diabetes. The second section assessed

INSIGHTS-JHR
INSIGHTS-JOURNAL OF HEALTH AND REHABILITATION

diabetes-related knowledge using the Diabetes Knowledge Questionnaire (DKQ), a validated instrument consisting of 24 items covering areas such as disease etiology, complications, risk factors, preventive measures, and management strategies. Response options included "Yes," "No," and "Don't Know," with total scores ranging from 0 to 24. Higher scores indicated greater knowledge about diabetes. The internal consistency of the DKQ, as reported in prior validation studies, demonstrated acceptable reliability with a Cronbach's alpha of 0.78 (12). Data were analyzed using IBM SPSS Statistics version 27. Descriptive statistics were applied to summarize demographic characteristics, presented as frequencies, percentages, and means with standard deviations. For inferential analysis, the Mann-Whitney U test was employed to compare knowledge scores across two independent groups, while the Friedman test was used for repeated measures or comparisons within related groups, where applicable. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 365 diabetic patients participated in the study, with the majority being female (63.1%) and 36.9% male. In terms of age distribution, 48.4% were between 51 and 60 years, 25.4% between 36 and 50 years, 15.8% above 60 years, and only 10.1% were in the 18–25 age group. Most participants were married (85.4%), while 7.3% were single and 7.1% were widowed. Educational status varied, with 39.1% having no formal education, 23.2% having primary education, 21.3% secondary education, and only 16.1% having attained a bachelor's degree or higher. Monthly household income showed that 46.3% earned between PKR 30,000–60,000, while 31.2% earned less than or equal to PKR 30,000, and 22.4% earned more than PKR 60,000. Additionally, 43.9% reported a positive family history of diabetes, while 56.1% had no such history. Analysis of diabetes knowledge scores across education levels revealed that 77.2% of participants had moderate knowledge, while only 13.9% had good knowledge and 14.0% had poor knowledge. A statistically significant association was found between education and knowledge level ($p = 0.011$). Among those with no formal education, 18 participants (4.9%) had poor knowledge, while only 7 had good knowledge. Interestingly, even among individuals with a bachelor's degree or higher, only 3 participants demonstrated good knowledge, reflecting a widespread lack of comprehensive understanding across all education levels. When comparing knowledge scores with diabetes duration, a significant positive relationship was observed ($p < 0.001$). Participants with a duration of diabetes less than 5 years had a mean knowledge score of 58.4 ± 14.2, those with 5–10 years had a score of 65.7 ± 13.8, while individuals with more than 10 years had the highest scores, with a mean of 71.3 ± 12.6. This trend suggests that prolonged exposure to the condition may enhance disease-related awareness.

Gender-based analysis of knowledge scores indicated that males had slightly higher mean knowledge scores than females across all domains. The difference was statistically significant in the domain of disease nature (68.5 ± 13.2 in males vs. 65.3 ± 14.1 in females, $p = 0.023$), while no significant differences were noted in the domains of complications ($p = 0.312$), treatment ($p = 0.245$), or prevention ($p = 0.278$). A comparison of knowledge scores based on literacy status demonstrated that literate participants significantly outperformed illiterate ones in all knowledge domains ($p < 0.001$). The largest differences were noted in disease nature (72.5 ± 11.8 vs. 54.3 ± 15.2) and management (70.2 ± 12.1 vs. 52.4 ± 14.8), with similarly notable gaps in understanding risk factors and complications. Regarding self-care practices, medication adherence and blood glucose monitoring were the most consistently practiced behaviors, reported regularly by more than 70% of participants. In contrast, physical activity and dietary modifications were followed less consistently, and foot care practices showed particularly low adherence, with a high proportion of participants reporting irregular or no foot care practices, highlighting a significant gap in preventive foot health awareness. Further analysis was conducted to explore the association between specific sociodemographic variables—namely monthly income and marital status—and self-care behaviors among diabetic patients. The findings revealed a positive trend between income level and self-care adherence. Participants with higher monthly incomes (>PKR 60,000) consistently demonstrated better self-care practices across all domains, including medication adherence (78.9), blood glucose monitoring (77.2), physical activity (65.7), dietary control (68.4), and foot care (53.2). In contrast, those earning ≤PKR 30,000 exhibited lower adherence, particularly in physical activity (55.2) and foot care (45.1), suggesting financial constraints may impede effective diabetes self-management. Similarly, marital status also showed variation in self-care behaviors. Married individuals reported the highest levels of adherence across most domains—particularly medication adherence (75.2) and blood glucose monitoring (73.9)—compared to single and widowed participants. Widowed individuals consistently reported the lowest scores, especially in medication adherence (70.3) and foot care (46.0), possibly reflecting limited social or familial support in managing their condition.

Table 1: Socio-demographic characteristics of study participants (n=365)

Variables	Categories	Frequency	Percentage
Gender	Male	135	36.9
	Female	230	63.1
Age	18-25 Years	37	10.1
	36-50 Years	93	25.4
	51-60 Years	177	48.4
	>60 Years	58	15.8
Marital Status	Single	27	7.3
	Married	312	85.4
	Widow	26	7.1
Education	No formal education	143	39.1
	Primary	85	23.2
	Secondary	78	21.3
	Bachelor’s degree	59	16.1
Monthly Income (PKR)	≤30000	114	31.2
	30000-60000	169	46.3
	>60000	82	22.4
Family History of Diabetes	Yes	160	43.9%
	No	205	56.1%

Table 2: Mean Knowledge Scores by Education Level of study participants (n=365)

	Level of Knowledge				
		Poor	Average	Good	P. Value
Education	No formal education	18	94	7	0.011*
	Primary	6	48	5	
	Secondary	10	61	14	
	Higher Secondary	9	66	3	
	Bachelor Degree or Higher	8	13	3	
		51	282	32	

* p=<0.05 was considered as significant

Table 3: Study Participants’ Knowledge Scores Based on Duration of Diabetes

Duration of Diabetes	Mean Knowledge Score	SD	p-value
<5 years	58.4	±14.2	<0.001*
5-10 years	65.7	±13.8	
>10 years	71.3	±12.6	

* p=<0.05 was considered as significant

Table 4: Gender-based Knowledge Score Comparison

Knowledge Domain	Male (Mean ± SD)	Female (Mean ± SD)	p-value
Disease Nature	68.5 ± 13.2	65.3 ± 14.1	0.023
Complications	63.2 ± 14.5	61.8 ± 13.9	0.312
Treatment	65.8 ± 12.8	64.2 ± 13.4	0.245
Prevention	62.4 ± 13.7	60.9 ± 14.2	0.278

Table 5: Impact of Literacy on Different Knowledge Domains

Knowledge Domain	Literate (Mean ± SD)	Illiterate (Mean ± SD)	p-value
Disease Nature	72.5 ± 11.8	54.3 ± 15.2	<0.001*
Risk Factors	68.7 ± 12.4	51.8 ± 14.7	
Complications	65.3 ± 13.6	48.9 ± 15.3	
Management	70.2 ± 12.1	52.4 ± 14.8	

* p=<0.05 was considered as significant

Table 6: Self-Care Behaviours by Income and Marital Status

Income	Medication Adherence	Blood Glucose Monitoring	Physical Activity	Diet Control	Foot Care
≤30000	72.4	70.1	55.2	58.9	45.1
30000-60000	75.1	73.6	60.5	63	48.7
>60000	78.9	77.2	65.7	68.4	53.2

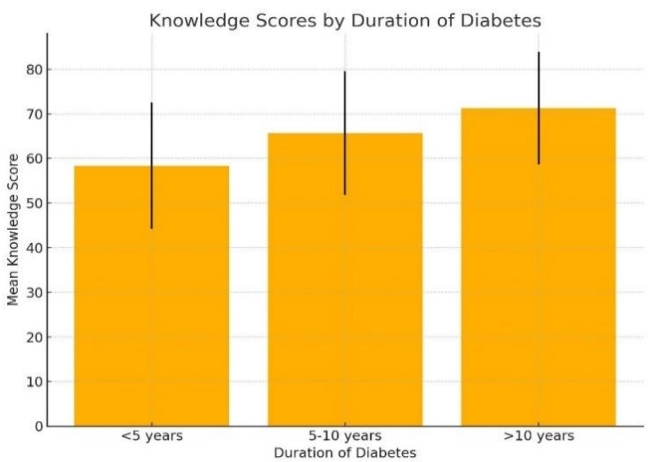


Figure 1Knowledge Scores by Duration of Diabetes

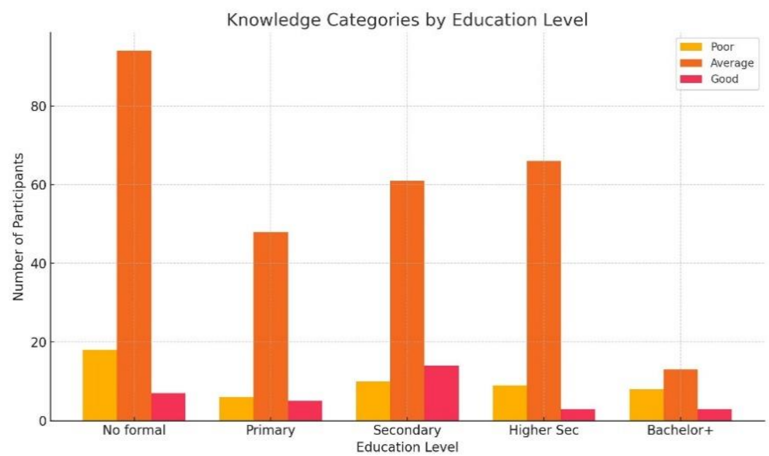
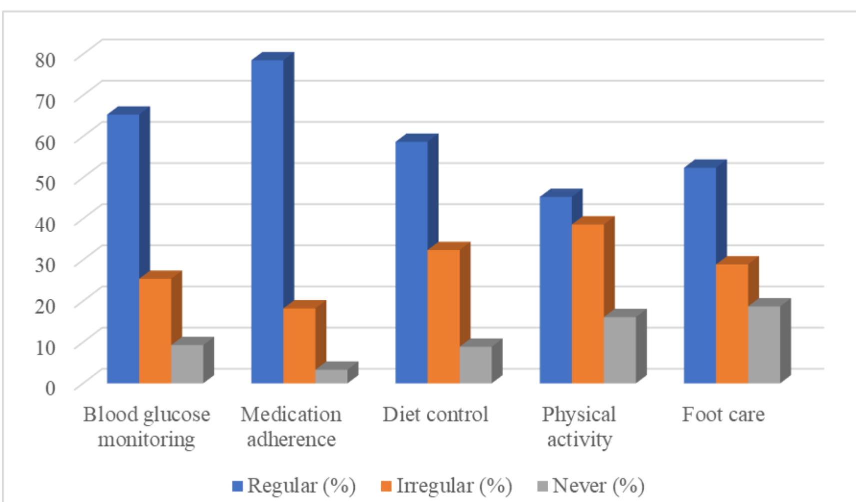


Figure 2 Knowledge Categories by Education Level



DISCUSSION

The present study was conducted to assess the knowledge and awareness of diabetes mellitus among patients visiting Capital Hospital, Islamabad, and to identify demographic determinants influencing their understanding. The demographic distribution observed, particularly the higher proportion of females and a significant representation of individuals aged 36–50 years, mirrors the national epidemiological profile of diabetes in Pakistan. This age bracket, being the most economically productive segment of the population, highlights the growing threat diabetes poses to national productivity and socioeconomic stability. The observed pattern aligns with global trends reported by the International Diabetes Federation, emphasizing the increasing incidence of diabetes in working-age populations within developing countries (13,14). One of the most prominent findings of the study was the statistically significant relationship between educational level and diabetes knowledge. Participants with higher education demonstrated greater awareness across multiple knowledge domains, reinforcing the understanding that education plays a pivotal role in disease perception and management. This observation is consistent with previous research conducted in tertiary care hospitals, including those in the Middle East and South Asia, where higher literacy rates have been associated with improved health knowledge and engagement in self-care practices (15,16). These findings underscore the necessity of integrating educational interventions tailored for low-literate or illiterate individuals, to reduce disparities in health outcomes and promote equitable disease control.

Socioeconomic status, particularly monthly income, also emerged as a significant determinant of diabetes-related knowledge. Participants with higher income reported better knowledge scores and greater adherence to self-care practices, indicating the role of financial stability in accessing healthcare resources, medications, and educational material. Similar findings have been documented in other low- and middle-income countries, where limited financial resources restrict healthcare access and hinder chronic disease management (17). These outcomes suggest the need for diabetes education strategies that not only address knowledge gaps but also consider socioeconomic barriers to care. The study findings further revealed encouraging levels of general awareness about diabetes as a chronic condition. However, inconsistencies in participants' understanding of disease complications and lifestyle-related risk factors were noted. While awareness of the general nature of diabetes was high, detailed knowledge about its long-term complications, such as neuropathy and nephropathy, remained suboptimal. This observation is supported by studies in African and South Asian settings, where a similar mismatch between general disease knowledge and understanding of complications has been reported (18,19). The persistence of such gaps highlights the necessity for comprehensive education programs that go beyond basic awareness to emphasize complication prevention and early detection.

A gender-based disparity in diabetes knowledge was observed, with males exhibiting slightly higher awareness scores, particularly in understanding disease nature. This disparity was statistically significant and aligns with regional data suggesting that women often face structural and cultural barriers to accessing health information and services (20). Such disparities point toward the urgent need for gender-sensitive education strategies that ensure equitable dissemination of information and promote inclusivity in healthcare delivery. Self-care practices among participants were mixed. Medication adherence and blood glucose monitoring were practiced regularly by the majority, suggesting an encouraging level of treatment compliance. However, irregular adherence to dietary control, physical activity, and especially foot care, revealed concerning gaps in holistic disease management. These findings resonate with studies conducted in both high- and low-income settings, where foot care remains a neglected aspect of diabetes self-care despite its importance in preventing diabetic foot complications (21). These gaps in behavior suggest that diabetes education must include practical, culturally appropriate training on day-to-day disease management.

This study presents several strengths. It offers valuable insights into the demographic and socioeconomic factors affecting diabetes awareness in a public-sector tertiary care setting and uses a validated knowledge assessment tool, enhancing the reliability of findings. The large sample size contributes to the robustness of the results and provides a clearer picture of diabetes awareness within a representative population. However, the study also has important limitations. The use of a cross-sectional design restricts causal inference, limiting the ability to establish directionality in observed associations. Additionally, as the study was conducted in a single public hospital, the generalizability of findings to other regions and healthcare settings is limited. Self-reported data, particularly concerning self-care behaviors, may have introduced recall bias or social desirability bias, potentially skewing results. Furthermore, the study did not assess the impact of other influential variables such as access to healthcare services, social support systems, or comorbidities, which could have provided a more comprehensive understanding of patient knowledge and behavior. The findings of this study indicate several avenues for future research and practical interventions. Longitudinal studies across multiple healthcare settings are warranted to explore causality and changes in knowledge over time. Furthermore, interventional studies evaluating the effectiveness of structured diabetes education programs, particularly for low-income and low-literacy populations—could inform national strategies for diabetes management and education. Tailoring these interventions to address gender-based disparities and incorporating behavioral components to improve self-care adherence would be critical to ensuring comprehensive and sustainable improvements in diabetic health outcomes.

CONCLUSION

This study concluded that significant gaps exist in diabetes-related knowledge among patients attending Capital Hospital, Islamabad, with educational attainment, socioeconomic status, and gender emerging as influential factors. Individuals with higher education and income demonstrated better understanding of the disease, while gender disparities pointed to unequal access to health information. Although general awareness of diabetes as a chronic illness was present, knowledge about its risk factors, complications, and self-management remained insufficient. These findings underscore the urgent need for contextually relevant and demographically sensitive educational interventions to enhance disease literacy, empower patients, and ultimately improve diabetes outcomes in similar healthcare settings.

AUTHOR CONTRIBUTION

Author	Contribution
Arifa Iran Janjua*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Mudassar Mushtaq Jawad Abbasi	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Wajood Ali Lashari	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Tanseer Ahmed	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Habib Ahmed	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

REFERENCES

1. World Health Organization. Diabetes: World Health Organization,; 2024
2. International Diabetes Federation. IDF Diabetes Atlas, 10th edn. Brussels, Belgium 2021
3. Kvarnström K, Westerholm A, Airaksinen M, Liira H. Factors contributing to medication adherence in patients with a chronic condition: a scoping review of qualitative research. Pharmaceutics. 2021;13(7):1100.
4. Muhammad FY, Iliyasu G, Uloko AE, Gezawa ID, Christiana EA. Diabetes-related knowledge, attitude, and practice among outpatients of a tertiary hospital in North-western Nigeria. Annals of African medicine. 2021;20(3):222-7.
5. Mathur P, Leburu S, Kulothungan V. Prevalence, awareness, treatment and control of diabetes in India from the countrywide national NCD monitoring survey. Frontiers in public health. 2022;10:748157
6. Bukhsh A, Goh B-H, Zimbudzi E, Lo C, Zoungas S, Chan K-G, Khan TM. Type 2 diabetes patients' perspectives, experiences, and barriers toward diabetes-related self-care: a qualitative study from Pakistan. Frontiers in endocrinology. 2020;11:534873
7. Ferreira PL, Morais C, Pimenta R, Ribeiro I, Amorim I, Alves SM, Santiago L. Knowledge about type 2 diabetes: its impact for future management. Frontiers in Public Health. 2024;12:1328001.
8. Magliano DJ, Boyko EJ, Atlas ID. What is diabetes? IDF DIABETES ATLAS [Internet] 10th edition: International Diabetes Federation; 2021.

9. Visscher BB, Steunenberg B, Heerdink ER, Rademakers J. Medication self-management support for people with diabetes and low health literacy: a needs assessment. PLoS One. 2020;15(4):e0232022

10. O'Donnell M, Hankey GJ, Rangarajan S, Chin SL, Rao-Melacini P, Ferguson J, et al. Variations in knowledge, awareness and treatment of hypertension and stroke risk by country income level. Heart. 2021;107(4):282-9.

11. Okai ED. The Prevalence of Cardiovascular Diseases Risk Factor and Their Associations with Lifestyle Patterns among the Adult Population in Accra, Ghana: Lithuanian University of Health Sciences (Lithuania); 2024.

12. Haroon M, Khan HA, Yousaf M, Wazir Z, Abbas G, Ali MA, et al. Awareness regarding diabetes mellitus and its management amongst patients admitted to a tertiary care teaching hospital of Pakistan. Journal of Medical Sciences. 2020;28(3):233-8.

13. Maheshwari S, Gupta PK, Sinha R, Rawat P. Knowledge, attitude, and practice towards coronavirus disease 2019 (COVID-19) among medical students: A cross-sectional study. Journal of Acute Disease. 2020;9(3):100-4

14. Huang Y-M, Pecanac KE, Shiyanbola OO. “Why am I not taking medications?” Barriers and facilitators of diabetes medication adherence across different health literacy levels. Qualitative Health Research. 2020;30(14):2331-42.

15. Wu K, Wen A, Jin P, Wang X, Li A, Dong H, et al. Characteristics and Correlates of Health Information Literacy Among Patients With Type 2 Diabetes and Metabolic Syndrome: A Cross-Sectional Study. Sci Diabetes Self Manag Care. 2024;50(6):546-62.

16. Borzuoi TB, Kordestani F, Ashktorab T, Delgoshaei Y, Kebria BS. Designing a health literacy model for patients with diabetes. BMC Health Serv Res. 2024;24(1):894.

17. Abdallah SMA, Ayoub AI, Makhlouf MME, Ashour A. Diabetes knowledge, health literacy and diabetes self-care among older adults living with diabetes in Alexandria, Egypt. BMC Public Health. 2024;24(1):2848.

18. BA AL, Alhalal EA. Effects of health literacy on type 2 diabetic patients' glycemic control, self-management, and quality of life. Saudi Med J. 2022;43(5):465-72.

19. Ji X, Chi J. Exploring the Relationship Between eHealth Literacy and Diabetes Knowledge, Self-Efficacy, and Self-Care Behaviors in Chinese Diabetic Patients: A Cross-Sectional Study. J Nurs Res. 2024;32(6):e359.

20. Kim SH. Health literacy and diabetes self-care activities: The mediating effect of knowledge and patient activation. Int J Nurs Pract. 2021;27(4):e12925.

21. Oraibi O, Alameer A, Dalak M, Alsharif S, Hakami SA, Sumayli M, et al. Impaired Awareness of Hypoglycemia and its Risk Factors among Diabetic Patients in Jazan, Saudi Arabia: A Cross-Sectional Study. Curr Diabetes Rev. 2024;20(8):124-37.

