

Original Article

Prevalence of Diabetes Mellitus in People Aged 40 Years and Above

Muhammad Usama Maooz Awan^{1*}, Ramsha Shahid², Nimra Khan², Zahra Yousof², Verda Asif², Maria Munir², Mahnoor², Sana Javaid², Zainab Shabbir²

¹The University of Lahore, Lahore, Pakistan

²The University of Sargodha, Sargodha, Pakistan

*Corresponding Author: Muhammad Usama Maooz Awan; Email: usamamaoaz@gmail.com

Conflict of Interest: None.

A. Maooz U. M., et al. (2024). 4(2): DOI: <https://doi.org/10.61919/jhrr.v4i2.1166>

ABSTRACT

Background: Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by hyperglycaemia, which leads to severe complications affecting multiple organs. The prevalence of DM, particularly Type 2 diabetes, has been increasing globally, exacerbated by factors such as poor diet and lack of physical activity. Previous research, including a study conducted in 2014 at DHQ Hospital Sargodha, indicated that the prevalence of diabetes can be reduced through proper diet and healthy activities.

Objective: To determine the prevalence of diabetes and its associated factors in individuals aged 40 years and above in Sargodha.

Methods: This observational cross-sectional study was conducted on a sample of 150 participants aged 40 and above, selected from the general population and patients at DHQ Hospital Sargodha. Purposive sampling was employed due to time and budget constraints. Data were collected using a self-developed questionnaire covering demographics, medical history, lifestyle factors, and diabetes status. Ethical approval was obtained, and informed consent was secured from all participants. Data were analyzed using SPSS version 25. Descriptive statistics summarized the demographic characteristics, while chi-square tests assessed associations between diabetes status and various factors. Multivariate logistic regression identified independent predictors of diabetes.

Results: Among the 150 participants, 58 were diagnosed with diabetes, resulting in a prevalence rate of 38%. Of the diabetic individuals, 62% were male and 38% were female. The age group with the highest prevalence was 50-60 years (38%), followed by those above 60 years (33%) and 40-50 years (29%). A significant number of diabetic participants were obese (43%) or extremely obese (5%). Additionally, 74% of diabetic individuals had hypertension, and 40% had ischemic heart disease. Lifestyle analysis revealed that 59% had irregular dietary habits and 81% led a sedentary lifestyle. Among diabetic participants, 60% had controlled diabetes while 40% had uncontrolled diabetes.

Conclusion: The study found a 38% prevalence of diabetes among individuals aged 40 and above, with a higher prevalence in males and those aged 50-60 years. Obesity, hypertension, and ischemic heart disease were significantly associated with diabetes. These findings underscore the need for targeted interventions, including lifestyle modifications and regular screening, to manage and prevent diabetes in this population.

Keywords: Diabetes Mellitus, Type 2 Diabetes, Prevalence, Obesity, Hypertension, Ischemic Heart Disease, Lifestyle Factors, Cross-Sectional Study, Sargodha, Public Health

INTRODUCTION

Diabetes Mellitus is a chronic metabolic disorder characterized by hyperglycemia, resulting in serious damage to multiple organs, including the heart, blood vessels, eyes, kidneys, and nerves. The most prevalent form, Type 2 diabetes, primarily affects adults and is marked by insulin resistance or insufficient insulin production (1). Diabetes Mellitus is classified into two main types: Type 1 and Type 2. Type 1 diabetes, also known as juvenile onset or insulin-dependent diabetes, typically manifests in childhood or adolescence due to autoimmune destruction of pancreatic beta cells, leading to minimal or no insulin production (2). In contrast, Type 2 diabetes, also referred to as maturity-onset diabetes, usually develops in adulthood and is associated with a progressive loss of insulin sensitivity and beta-cell function (2). Approximately 90% of individuals with diabetes have Type 2 diabetes, which has seen a

significant rise in prevalence worldwide over recent decades due to increased life expectancy, urbanization, and lifestyle changes (1).

The pathophysiology of Type 2 diabetes involves the body's inability to use insulin effectively, a condition known as insulin resistance, alongside a gradual decline in insulin production. Initially, the pancreas compensates by producing more insulin, but over time this compensation fails, leading to sustained hyperglycemia (2). Risk factors for developing Type 2 diabetes include genetic predisposition, age, obesity, physical inactivity, poor diet, smoking, and certain medications that impact glucose metabolism (2). Sedentary lifestyles, high-calorie diets, and increasing obesity rates are major contributors to the global diabetes epidemic, particularly in low- and middle-income countries (3, 4). Moreover, diabetes is often asymptomatic in its early stages, making it difficult to detect without regular screening, which exacerbates its impact on public health (2).

The complications of diabetes are extensive and categorized into microvascular and macrovascular complications. Microvascular complications include diabetic retinopathy, nephropathy, and neuropathy, while macrovascular complications encompass cardiovascular diseases such as ischemic heart disease and stroke (5). The prevalence of these complications is high, with significant morbidity and mortality associated with diabetes-related conditions (5, 6). Effective management of diabetes involves lifestyle modifications such as healthy eating, regular physical activity, weight control, and smoking cessation, alongside pharmacological interventions including oral antidiabetic drugs and insulin therapy (7). Early diagnosis and management are crucial in preventing or delaying the onset of complications and improving quality of life for individuals with diabetes (8).

The main objective of this research is to determine the prevalence of Diabetes Mellitus in individuals aged 40 years and above, as this population is particularly vulnerable to developing diabetes and its associated complications. Understanding the prevalence and associated risk factors, such as gender, age, marital status, body mass index (BMI), and family history, is essential for developing targeted interventions to manage and prevent diabetes in this age group. Previous studies have shown a significant correlation between diabetes and factors like hypertension, obesity, and ischemic heart disease, highlighting the need for comprehensive management strategies (9, 10). This study aims to contribute to the existing body of knowledge by providing updated prevalence data and identifying key factors associated with diabetes in the target population.

In summary, Diabetes Mellitus, particularly Type 2 diabetes, poses a significant public health challenge due to its high prevalence and association with severe complications. This study seeks to explore the prevalence of diabetes among individuals aged 40 and above and to identify related risk factors, thereby providing valuable insights for healthcare providers and policymakers in addressing the diabetes epidemic through effective prevention and management strategies.

MATERIAL AND METHODS

The study employed an observational cross-sectional design to investigate the prevalence of Diabetes Mellitus in individuals aged 40 years and above. A sample of 150 participants was selected from the general population and patients at DHQ Hospital Sargodha. The sampling technique used was purposive sampling due to time constraints and budget limitations, ensuring a representative sample of the target population.

Data collection was carried out using a self-developed questionnaire designed to gather comprehensive information on participants' demographics, medical history, lifestyle factors, and diabetes status. The questionnaire included sections on age, gender, marital status, body mass index (BMI), family history of diabetes, dietary habits, physical activity, and comorbid conditions such as hypertension and ischemic heart disease. Participants were interviewed in person to ensure accurate and complete data collection. Informed consent was obtained from all participants before the interviews, ensuring they were fully aware of the study's purpose and their right to withdraw at any time (11-13).

The study adhered to ethical principles outlined in the Declaration of Helsinki, maintaining the confidentiality and anonymity of all participants. Ethical approval was obtained from the relevant institutional review board before the commencement of the study. The inclusion criteria were individuals aged 40 years and above, while the exclusion criteria included individuals with incomplete questionnaires, those with complex medical histories, and those below 40 years of age.

Data analysis was performed using SPSS version 25.0. Descriptive statistics were used to summarize the demographic characteristics of the study population. The prevalence of diabetes was calculated, and chi-square tests were employed to assess the association between diabetes status and various demographic and lifestyle factors. Multivariate logistic regression analysis was conducted to identify independent predictors of diabetes among the study participants. The level of significance was set at $p < 0.05$ for all statistical tests, ensuring rigorous analysis of the data.

The results were presented in tables and figures to provide a clear and concise depiction of the findings. The study found that out of the 150 participants, 58 were diabetic, resulting in an overall prevalence of 38%. Among the diabetic individuals, 62% were male and 38% were female. The prevalence of diabetes was higher among individuals aged 50-60 years and was associated with irregular

dietary patterns, higher BMI, and sedentary lifestyle. A significant proportion of diabetic participants also had hypertension and ischemic heart disease, underscoring the need for integrated management of these comorbid conditions (9, 10).

In conclusion, the study provided valuable insights into the prevalence and associated factors of diabetes among individuals aged 40 and above in Sargodha. The findings highlight the importance of targeted interventions, including lifestyle modifications and regular screening, to manage and prevent diabetes in this population. Future research should focus on longitudinal studies to track changes in prevalence and risk factors over time, thereby informing public health strategies to combat the diabetes epidemic.

RESULTS

A total of 150 participants aged 40 years and above were included in the study. The demographic and clinical characteristics of the participants are summarized in Table 1. Out of the total, 58 individuals were diagnosed with diabetes, resulting in a prevalence rate of 38%.

Table 1: Demographic and Clinical Characteristics of Study Participants

| Characteristic | Diabetic (n=58) | Non-Diabetic (n=92) | Total (n=150) |
|----------------------------|-----------------|---------------------|---------------|
| Gender | | | |
| Male | 36 (62%) | 55 (59%) | 91 (61%) |
| Female | 22 (38%) | 37 (41%) | 59 (39%) |
| Age Group | | | |
| 40-50 years | 17 (29%) | 34 (37%) | 51 (34%) |
| 50-60 years | 22 (38%) | 42 (46%) | 64 (43%) |
| Above 60 years | 19 (33%) | 16 (17%) | 35 (23%) |
| BMI | | | |
| Normal | 8 (14%) | 18 (20%) | 26 (17%) |
| Underweight | 13 (22%) | 16 (17%) | 29 (19%) |
| Overweight | 9 (16%) | 22 (24%) | 31 (21%) |
| Obese | 25 (43%) | 30 (33%) | 55 (37%) |
| Extremely Obese | 3 (5%) | 6 (6%) | 9 (6%) |
| Comorbid Conditions | | | |
| Hypertension | 43 (74%) | 19 (21%) | 62 (41%) |
| Ischemic Heart Disease | 23 (40%) | 5 (5%) | 28 (19%) |

The prevalence of diabetes was higher in males (62%) compared to females (38%). The age group with the highest prevalence was 50-60 years, accounting for 38% of the diabetic cases, followed by those above 60 years (33%) and 40-50 years (29%).

Table 2: Age at Diagnosis of Diabetes

| Age at Diagnosis | Number of Participants |
|------------------|------------------------|
| Before 40 years | 8 |
| 40-50 years | 11 |
| 50-60 years | 25 |
| After 60 years | 14 |

A significant number of diabetic individuals were found to be obese (43%) or extremely obese (5%). Normal and underweight categories accounted for 14% and 22%, respectively, among diabetic participants.

Table 3: BMI Distribution Among Diabetic Participants

| BMI Category | Number of Diabetic Participants |
|-----------------|---------------------------------|
| Normal | 8 |
| Underweight | 13 |
| Overweight | 9 |
| Obese | 25 |
| Extremely Obese | 3 |

Among the diabetic participants, 74% had hypertension, and 40% had ischemic heart disease. These findings highlight the significant association between diabetes and other chronic conditions.

Table 4: Association with Hypertension and Ischemic Heart Disease

| Condition | Number of Diabetic Participants |
|------------------------|---------------------------------|
| Hypertension | 43 |
| Ischemic Heart Disease | 23 |

Out of the 58 diabetic individuals, 41 were taking oral medications, and 34 were using insulin to manage their condition. A considerable portion of diabetic patients had irregular dietary habits (59%) and a sedentary lifestyle (81%).

Table 5: Medication and Lifestyle Patterns Among Diabetic Participants

| Category | Number of Diabetic Participants |
|---------------------|---------------------------------|
| Oral Medication | 41 |
| Insulin | 34 |
| Regular Diet | 24 |
| Irregular Diet | 34 |
| Active Lifestyle | 11 |
| Sedentary Lifestyle | 47 |

Among the diabetic participants, 60% had good diabetic control, while 40% had uncontrolled diabetes.

Table 6: Diabetes Control Status

| Control Status | Number of Diabetic Participants |
|----------------|---------------------------------|
| Controlled | 35 |
| Uncontrolled | 23 |

In conclusion, the study found a 38% prevalence of diabetes among individuals aged 40 and above, with a higher prevalence in males and those aged 50-60 years. Obesity, hypertension, and ischemic heart disease were significantly associated with diabetes, underscoring the need for comprehensive management and lifestyle interventions to address these comorbid conditions.

DISCUSSION

The study aimed to determine the prevalence of Diabetes Mellitus among individuals aged 40 years and above in Sargodha, highlighting significant associations with demographic and lifestyle factors. The overall prevalence of diabetes in the study population was 38%, consistent with previous studies that reported high diabetes prevalence in similar age groups. Jamal Zafar et al. found a comparable prevalence rate in an urban population, emphasizing the increasing trend of diabetes with advancing age (7).

The higher prevalence of diabetes among males (62%) compared to females (38%) aligns with existing literature indicating a greater incidence of diabetes in men (1, 2). This gender disparity may be attributed to differences in lifestyle factors, hormonal variations, and genetic predisposition. Moreover, the age group with the highest prevalence of diabetes was 50-60 years, followed by those above 60 years, reflecting the progressive nature of the disease and its association with aging (2, 11-16).

Obesity emerged as a significant factor in the prevalence of diabetes, with 43% of diabetic participants classified as obese and an additional 5% as extremely obese. This finding is supported by other studies that have identified obesity as a major risk factor for Type 2 diabetes due to its impact on insulin resistance (3). The study also found a strong association between diabetes and hypertension, with 74% of diabetic individuals having hypertension. Similarly, 40% of diabetic participants had ischemic heart disease, underscoring the close link between diabetes and cardiovascular conditions (4, 5).

The lifestyle patterns of the diabetic participants revealed that a majority had irregular dietary habits (59%) and a sedentary lifestyle (81%), further corroborating the role of poor diet and physical inactivity in the development and progression of diabetes. These findings are consistent with the literature that highlights the importance of lifestyle modifications in diabetes management (6).

The study had several strengths, including a well-defined age group and a comprehensive assessment of demographic, clinical, and lifestyle factors. However, it also had limitations. The use of purposive sampling and a relatively small sample size may limit the generalizability of the findings. Additionally, the reliance on self-reported data for dietary habits and physical activity could introduce reporting bias. The cross-sectional design also precludes the establishment of causality between the identified risk factors and diabetes prevalence (17-19).

Despite these limitations, the study provides valuable insights into the prevalence and associated factors of diabetes among individuals aged 40 and above in Sargodha. The high prevalence of diabetes underscores the urgent need for targeted public health interventions to promote healthy lifestyle practices and regular screening, particularly among middle-aged and older adults. Recommendations for future research include longitudinal studies to track changes in diabetes prevalence over time and the implementation of community-based interventions to address the identified risk factors (3, 4, 20).

CONCLUSION

In conclusion, the study highlighted a significant burden of diabetes in the studied population, with a higher prevalence among males and individuals aged 50-60 years. Obesity, hypertension, and ischemic heart disease were strongly associated with diabetes, emphasizing the need for integrated management approaches. Public health strategies focusing on lifestyle modifications and early detection are crucial to curb the diabetes epidemic and improve the quality of life for affected individuals.

REFERENCES

1. World Health Organization. Diabetes. 2018. Available from: <https://www.who.int/news-room/fact-sheets/detail/diabetes>.
2. American Diabetes Association. Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. 2014;37(Suppl 1).
3. Hakeem R, Fawwad A. Diabetes in Pakistan: Epidemiology, Determinants and Prevention. *J Diabetol*. 2010;1(3):3-10.
4. Basit A, Shera AS. Prevalence of Metabolic Syndrome in Pakistan. *Metab Syndr Relat Disord*. 2008;6(3):171-5.
5. Basit A, Riaz M. Diabetes Prevention in a Challenging Environment. *Prev Diab*. 2013;10:84-93.
6. Basit A, Shera AS, Fawwad A, Qureshi H, Naz R. NDSP Members. Second National Diabetes Survey of Pakistan (NDSP) 2016-2017. *Diabetes Res Clin Pract*. 2018;140:190-8.
7. Zafar J, Bhatti F, Akhtar N, Rasheed U, Bashir R, Humayun S, et al. Prevalence of Diabetes in Pakistan: A Systematic Review and Meta-Analysis. *J Pak Med Assoc*. 2011;61(7):554-9.
8. International Expert Committee. International Expert Committee Report on the Role of the A1C Assay in the Diagnosis of Diabetes. *Diabetes Care*. 2009;32(7):1327-34.
9. Shera AS, Rafique G, Khawaja IA, Baqai S, King H. Pakistan National Diabetes Survey: Prevalence of Glucose Intolerance and Associated Factors in North West Frontier Province (NWFP) of Pakistan. *J Pak Med Assoc*. 1999;49(9):206-11.
10. Shera AS, Jawad F, Maqsood A. Prevalence of Diabetes in Pakistan. *Diabetes Res Clin Pract*. 2007;76(2):219-22.
11. Anjana RM, Pradeepa R, Deepa M, Datta M, Sudha V, Unnikrishnan R, et al. Prevalence of Diabetes and Pre-Diabetes in Urban and Rural India: Phase I Results of the Indian Council of Medical Research-INDIA DIABetes (ICMR-INDIAB) Study. *Diabetologia*. 2011;54(12):3022-7.
12. Xu Y, Wang L, He J, Bi Y, Li M, Wang T, et al. Prevalence and Control of Diabetes in Chinese Adults. *JAMA*. 2013;310(9):948-59.
13. Bano G, Aziz Ali S, Mawani M, Aziz Ali S. Prevalence of Diabetes Mellitus in Pakistan: A Meta-Analysis of Studies between 1994-2013. *J Coll Physicians Surg Pak*. 2016;26(11):825-9.
14. Chen L, Magliano DJ, Zimmet PZ. The Worldwide Epidemiology of Type 2 Diabetes Mellitus: Present and Future Perspectives. *Nat Rev Endocrinol*. 2012;8(4):228-36.
15. Carter P, Gray LJ, Troughton J, Khunti K, Davies MJ. Fruit and Vegetable Intake and Incidence of Type 2 Diabetes Mellitus: Systematic Review and Meta-Analysis. *BMJ*. 2010;341.
16. National Institute for Health and Care Excellence (NICE). Type 2 Diabetes in Adults: Management. Available from: <https://www.nice.org.uk/guidance/ng28>.
17. Kerssens JJ, McAllister DA, Colhoun HM, Fischbacher CM, Lindsay RS, Wild SH. Trends in Type 2 Diabetes Incidence and Mortality in Scotland between 2004 and 2013. *Diabetologia*. 2016;59(10):2106-13.
18. Abro M, Zafar AB, Fawwad A. Prevalence of Diabetic Microvascular Complications at a Tertiary Care Unit of Karachi, Pakistan. *Int J Diabetes Dev Ctries*. 2018;38(2):232-7.
19. Daily ADA. Scientific Sessions Attendees to Get First Look at Revised Consensus Report on Hyperglycemia Management in Type 2 Diabetes. ADA Daily News. Available from: <https://www.ada.org/meeting>.
20. Whiting DR, Guariguata L, Weil C, Shaw J. IDF Diabetes Atlas: Global Estimates of the Prevalence of Diabetes for 2011 and 2030. *Diabetes Res Clin Pract*. 2011;94(3):311-21.