Original Article

Prevalence of Diabetes Mellitus and Its Association with Socio-demographic Factors among Family Members of Second Year MBBS Students at Rawalpindi Medical University

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Abstract

Background: Diabetes Mellitus is a disorder in which blood glucose levels are unusually high due to defects in insulin release or its action. The prevalence of diabetes is growing worldwide and has significant implications for public health. Pakistan is ranked 3rd in the world in terms of the number of diabetic cases reported. As per the International Diabetes Federation, in the year 2021, this disease was reported to be affecting approximately 26.7% of adults in the country. This study evaluates the prevalence of diabetes and compares it to sociodemographics.
Objectives: This study aims to evaluate the prevalence of diabetes mellitus and its relationship with different sociodemographic factors among family members of 2nd-year MBBS students at Rawalpindi Medical University.
Materials and Methods: A cross-sectional study was performed during the months of April-May 2024, the population of which was the immediate family members of Second Year MBBS students at Rawalpindi Medical University. A self-structured and approved questionnaire was circulated, and data from 196 people were obtained via convenience sampling.
Data Analysis was completed using SPSS version 25, and descriptive analysis was performed.
Results: The study investigated the prevalence of diabetes mellitus type 2 among the participants, finding that 20 out of 91 males (22%) and 29 out of 105 females (27.6%) were diagnosed with the condition. It showed that the highest percentage of cases was reported in the age group of 66-75 years (47.6%).
Conclusion: The increasing prevalence of diabetes worldwide is an alarming situation. Our study helped evaluate its prevalence in Pakistan, which can help as a stepping stone for further medical advancement in diabetes management. Proper counseling about lifestyle management can be very beneficial in curbing its incidence and side effects.
Keywords: Diabetes Mellitus, Prevalence, Sociodemographic Factors.

Introduction

Diabetes mellitus is a disorder in which blood glucose levels are unusually high due to defects in insulin release or its action.[1] It might result from inadequate insulin action on the targeted bodily cells or autoimmune destruction of the pancreatic beta cells, leading to severely raised blood glucose levels, which increases the risk of several other illnesses, such as cardiac defects, blindness due to retinopathy, renal failure due to nephropathy, depression, and even suicide.

The prevalence of diabetes is growing worldwide and has important implications for public health. It is increasing more rapidly in developed countries and affecting more women than men worldwide, especially in urban areas.[2] The latest International Diabetes Federation (IDF) Diabetes Atlas (2025) reports that 11.1% – or 1 in 9 – of the adult population (20-79 years) is living with diabetes, with over 4 in 10 unaware that they have the condition.[3]

As per the International Diabetes Federation, in the year 2024, around 130,000,000 cases of diabetes were recorded in Pakistan, affecting approximately 31.4% of the adults in the country.[3,4,5] Diabetes is causing a healthcare burden both in rural and urban areas of (name of country is concealed to maintain anonymity). Its prevalence depends upon lifestyle, obesity, age, economic status, and levels of education.[6] This study is meant to understand the prevalence of diabetes mellitus and its relation with different sociodemographic factors among family members (research setting is concealed to maintain anonymity). These factors include gender, age, occupation, marital status, residential location, physical activity, and educational levels.

Materials and Methods

This research was registered with the Research Directory of Rawalpindi Medical University (RMU), a public sector medical university located in Rawalpindi, Pakistan. The study was conducted under the guidance and supervision of the RMU Research Department during the year 2024. The university's research supervision ensured adherence to ethical research standards, and informed consent was obtained from all participants before collecting their data. Participant confidentiality and anonymity were strictly ensured.

The study was a cross-sectional descriptive study to evaluate the prevalence and lifestyle patterns associated with type 2 diabetes among immediate family members of second-year MBBS students at Rawalpindi Medical University. The sampling technique was non-random convenience sampling. This method was deemed suitable due to the accessibility of the target population and the limited timeframe of the study.

The inclusion criteria required participants to be immediate family members (parents, siblings, etc.) of second-year MBBS students enrolled in RMU and diagnosed with type 2 diabetes mellitus. Exclusion criteria included individuals diagnosed with gestational diabetes or any type of diabetes other than type 2. These criteria were

set to maintain focus on adult-onset diabetes, which is often influenced by lifestyle and hereditary factors, and to ensure homogeneity of the study population.

To determine an appropriate sample size, the Raosoft online sample size calculator was used. With a total population size of approximately 1200 individuals (estimated based on the number of enrolled second-year MBBS students and their families), a 95% confidence interval, 5% margin of error, and an assumed response distribution of 50%, the calculated sample size was 187 participants.

A self-structured questionnaire was developed after conducting a detailed literature review to ensure the relevance and validity of the questions. The questionnaire consisted of multiple sections. The first section included an introductory paragraph outlining the purpose of the study and obtaining informed consent. This was followed by questions related to demographic details such as gender, age, height, and weight. The next sections addressed the presence or absence of diabetes, lifestyle habits such as diet and physical activity, and any known risk factors or family history of diabetes. [6]

Data was imported into IBM SPSS Statistics Version 25 for analysis. Descriptive statistics such as mean, median, frequency, and percentage were computed to describe the characteristics of the participants and summarize the prevalence of diabetes and related lifestyle factors.

Results

Data was collected from a total of 196 participants, with about 25% of them being male (n=91) and 75% being female (n=105).

Table 1 *Sociodemographic characteristics of study participants (N=196)*

Variable	Frequency (%)	Diabetic (%)	Non-diabetic (%)
Gender			
Male	91 (46.4)	20 (22)	71 (78)
Female	105 (53.6)	29 (27.6)	76 (72.4)
Age			
35-45 years	36 (18.4)	7 (19.4)	29 (80.6)
46-55 years	105 (53.6)	21 (20)	84 (80)
56-65 years	26 (13.2)	8 (30.8)	18 (69.2)
66-75 years	21 (10.7)	10 (47.6)	11 (52.4)

>75 years	8 (4.0)	3 (37.5)	5 (62.5%)
Relationship to Medical Student			
Father	81 (41.3)	14 (17.3)	67 (82.7)
Mother	82 (41.8)	20 (24.4)	62 (75.6)
Grandfather	10 (5.1)	6 (60)	4 (40)
Grandmother	19 (9.6)	7 (36.8)	12 (63.2)
Education level			
Grade 1-5	16 (8.1)	8 (50)	8 (50)
Grade 6-10	19 (9.6)	6 (31.6)	13 (68.4)
FSc	29 (14.8)	8 (27.6)	21 (72.4)
College/University	132 (67.3)	27 (20.4)	105 (79.5)
Residential location			
Rural	15 (7.6)	5 (33.3)	10 (66.7)
Suburban	10 (5.1)	1 (10)	9 (90)
Urban	171 (87.2)	43 (25)	128 (74.9)

The study investigated the prevalence of diabetes mellitus type 2 among the participants, finding that 20 out of 91 males (22%) and 29 out of 105 females (27.6%) were diagnosed with the condition. Whereas 71 out of 91 males (78%) and 76 out of 105 females (72.4%) were non-diabetic. The study revealed that males and females had a similar prevalence of diabetes mellitus type 2, with a slightly higher proportion of females diagnosed with this condition.

The prevalence of diabetes mellitus type 2 varied notably by age group. Specifically, 7 out of 36 (19.4%) study participants belonging to the age group of 35-45 years, 21 out of 105 (20%) study participants of age group 46-55 years, 8 out of 26 (30.8%) of subjects belonging to age group 56-65 years, 10 out of 21

(47.6%) subjects belonging to age group 66-75 years, and 3 out of 8 (4%) subjects belonging to the age of 75 years and above were diagnosed with diabetes mellitus type 2. The study showed that the highest percentage of cases was found in the age group of 66-75 years (47.6%).

The study also explored the prevalence of diabetes mellitus type 2 among family members of the participants. Out of 81 fathers, 14 (17.3%) were diabetic. Similarly, out of 82 mothers, 20 (24.4%) were found to have diabetes mellitus type 2. Moreover, the study found that out of 10 grandfathers, 6 (60%) were diagnosed with diabetes mellitus type 2, and out of 19 grandmothers, 7 (36.8%) were also found to have the condition. The study revealed that grandfathers had the highest rate of diabetes (60%) compared to other family members.

The educational level of the participants was also analyzed, with the majority of the participants having completed university education (67.3%), followed by post-secondary (14.8%), secondary (9.6%), and primary (8.1%) education. It's interesting to note that among the 49 diabetic cases studied, more than half, specifically 27 cases or 55.1%, had post-secondary education qualifications. This suggests that post-secondary education is associated with an increased risk of developing diabetes, which could be attributed to physical inactivity related to the work environment in educated participants.

Lastly, the study investigated the distribution of diabetes cases across different residential areas, revealing that the highest percentage of cases was found in urban areas (87.7%), followed by rural areas (10.2%) and suburban areas (2%)

Figure 1: *Prevalence of diabetes in different BMI categories.*

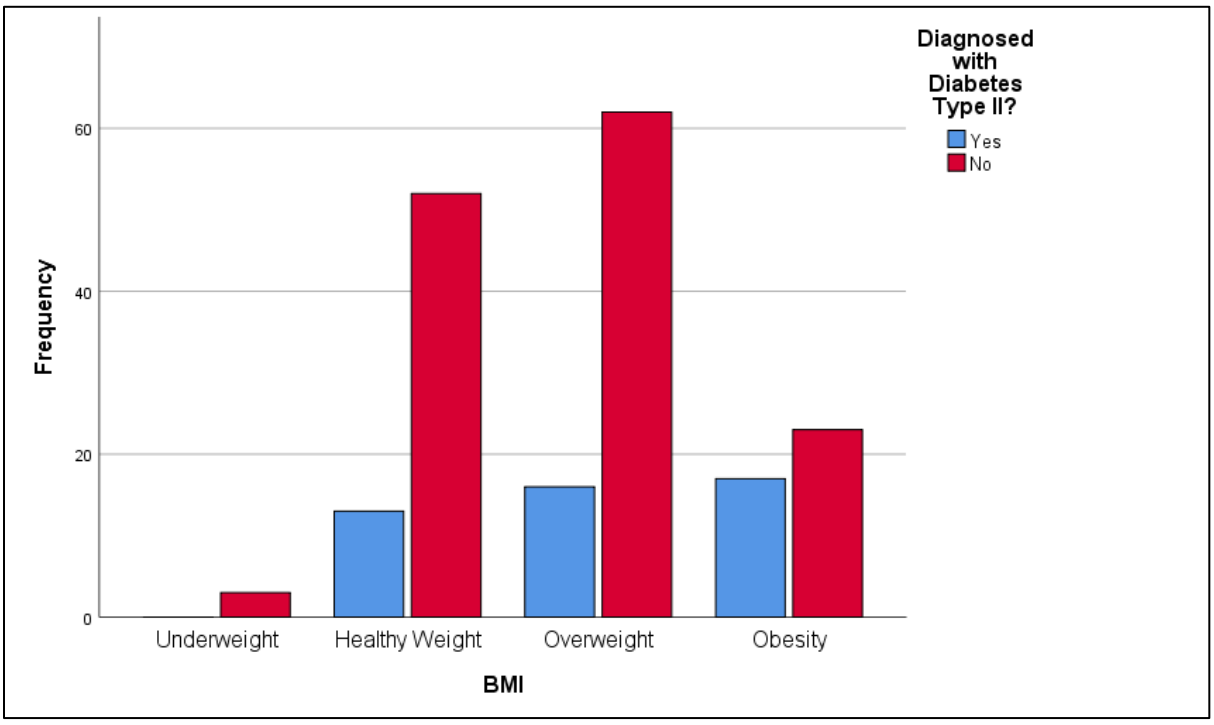


Figure 1 depicts the prevalence of diabetes across various BMI groups. The data revealed that individuals classified as obese had the highest incidence of diabetes, followed by those classified as overweight. Interestingly, individuals with a normal or healthy weight also showed a high prevalence of diabetes, although comparatively less than the obese and overweight groups. The least affected group was individuals classified as underweight.

Figure 2: *Relationship between diabetes and physical activity.*

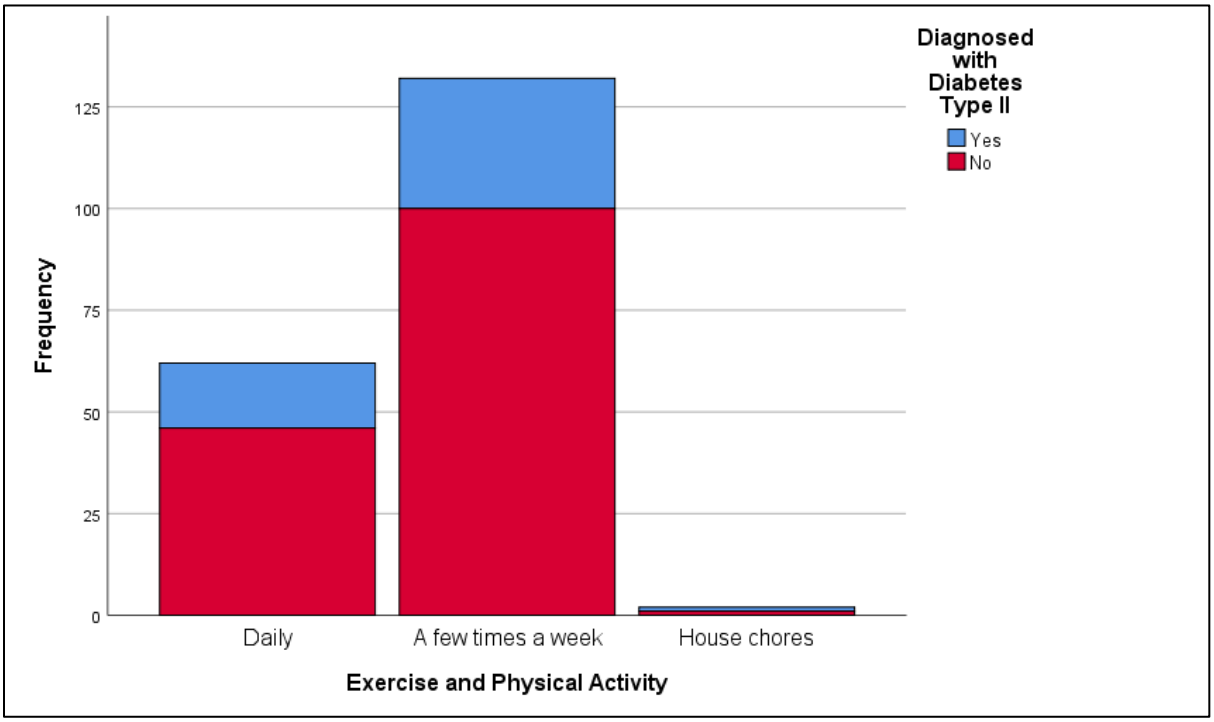
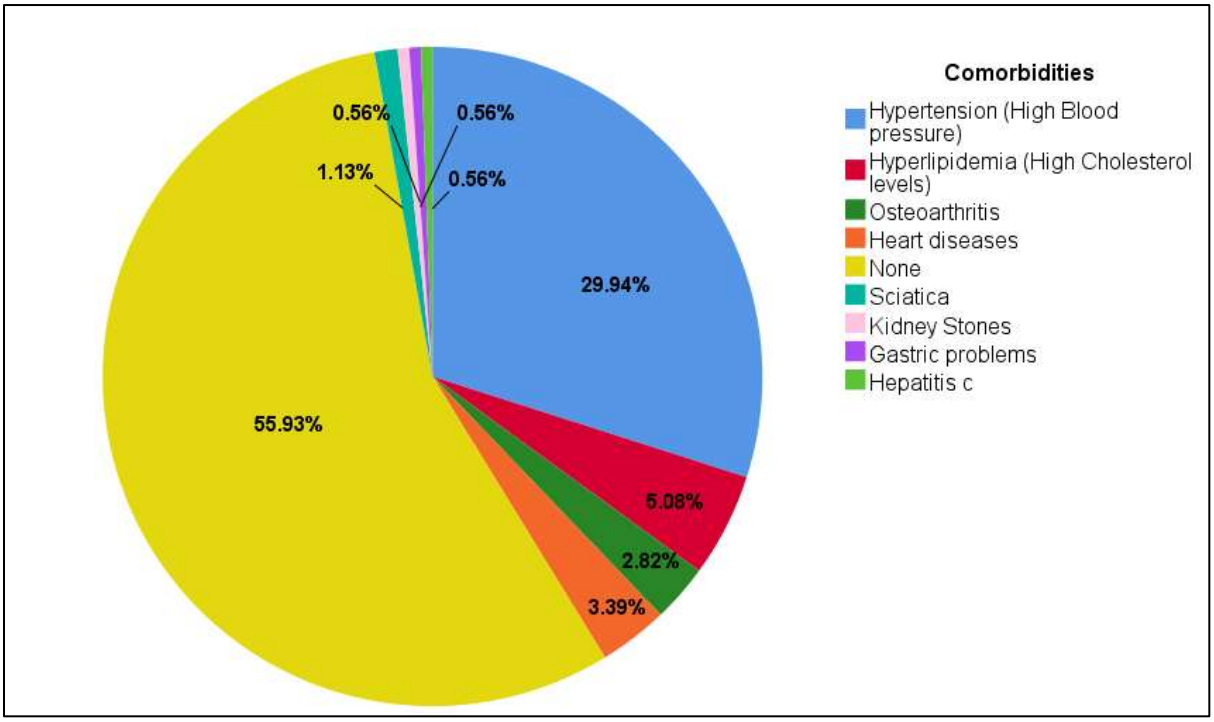


Figure 2 demonstrates the relationship between physical activity levels and the prevalence of diabetes. The data suggested that individuals who engaged in regular physical activity had a significantly lower incidence of diabetes compared to those who led a sedentary lifestyle. Furthermore, the graph indicates that as physical activity levels increased, the prevalence of diabetes decreased. This graph highlights the importance of regular physical activity in reducing the risk of diabetes and maintaining overall health.

Our research showed that family history played a crucial role in the prevalence of diabetes. According to the information collected, diabetes has a higher onset in individuals with a family history of the condition.

Figure 3: *Comorbidities related to diabetes.*



The pie indicates the relationship between comorbidities and diabetes. This research showed that there is a high prevalence of hypertension among diabetic people, followed by hyperlipidemia, heart diseases, sciatica, osteoarthritis, hepatitis C, kidney stones, and gastric problems. By examining the relationship between these comorbidities and diabetes, we can gain a better understanding of the impact of diabetes and associated comorbidities on overall health and well-being.

This research also showed that the most popular method of managing diabetes was through oral medication, followed by dietary modification, physical activity, insulin injections, and a combination of oral medication and insulin injections.

Discussion

Results of this study discussed the prevalence of diabetes mellitus type 2 among family members of the participants and its association with socio-demographic factors. The study revealed that males and females had almost the same prevalence of diabetes mellitus type 2, with a slightly higher proportion of females diagnosed with this condition, supporting previous literature on the topic.[1]

Furthermore, the study also revealed that among family members of the participants, grandfathers had the highest rate of diabetes as compared to other family members. Some studies also depicted a higher rate of diabetes in older individuals, which has been attributed to a lack of proper awareness.

regarding lifestyle management for that age group.[7,8,9]

The education level of the participants was also discussed, with most of the participants having completed university education (67.3%), followed by post-secondary (14.8%), secondary (9.6%), and primary (8.1%) education. It is interesting to note that among the 49 diabetic cases studied, more than half, specifically 27 cases or 55.1%, had post-secondary education qualifications. This suggests that post-secondary education significantly increases the chance of developing diabetes, which could be attributed to physical inactivity related to the work environment in educated participants. As studies show, physical inactivity is an important risk factor for type 2 diabetes. Physical inactivity leading to obesity can prove to be an extremely important factor in developing insulin resistance in the muscle tissue, which can lead to diabetes type II.[10]

Lastly, the study also discussed the prevalence of diabetes mellitus type 2 across different residential locations. It was found that the highest percentage of cases (87.7%) was in urban areas, followed by rural areas (10.2%) and then suburban areas (2%). As other studies report, urban areas had a higher prevalence of diabetes mellitus type 2 as compared to rural areas.[1]

The prevalence of diabetes was higher in the population who were overweight, had low physical activity, had a family history of diabetes, and in individuals who did not manage their condition as per the physician's guidelines. Patrick also reflected that diabetes is more prevalent in low-physically active individuals as compared to highly active individuals.[11] Furthermore, Simmons, Thompson, and Brancati depicted that obesity also increases the risk of diabetes.[12-14]

Results reflected that, even though not according to international standards, oral medication was still the most commonly directed and used mode of diabetes management. [15, 16]

Our research throws light on the topic of the prevalence of Diabetes Mellitus and its related sociodemographic factors, though it is crucial to note some of the limitations of our study, like the lack of comprehensive data on medical oversight and certain factors like diet quality, duration of the condition, medications used by the victims, and how often they visit their doctors. Despite these constraints, our findings highlight key factors that may be contributing to diabetes, such as socio-economic status, obesity, family history, and low physical activity. Where work needs to be done in improving diabetes management care by the development of special clinics for its proper monitoring, electronic media can play an equally important role in making the general population aware of the dangers of this silent killer.[4]

Conclusion

Diabetes mellitus is a very prevalent issue, especially in Pakistan, with more than 25% of our collected sample size reporting positive for it. Its prevalence may be associated with other

co-morbidities, especially hypertension; however, it is easily managed via oral medication, insulin injections, and dietary modifications.

Where diabetes may be very difficult to manage as a lifelong condition, proper awareness of its extent may help in easier management of it, which is what was sought by our study. Our study may serve as a stepping stone to further advancements in diabetes management by helping provide necessary data about its prevalence.

The study has several limitations, including the absence of a comparative group, such as students from another field, and a small sample size. Other limitations involve the non-random sampling method and recall bias among participants. There is a concern that participants might provide socially acceptable answers rather than their genuine preferences, causing fluctuations in results. The field of study could also benefit from an expansion in terms of compliance rate.

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