

# Knowledge, Attitude, and Preventive Practices Regarding Diabetes Mellitus among Third Year MBBS Students at Rawalpindi Medical University: A Cross-sectional Study

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## Author's Contribution

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<sup>1,2,3,4,5,6</sup> Experimentation/Study Conduction

<sup>1</sup> Analysis/Interpretation/Discussion

<sup>1,2,3,4,5,6</sup> Manuscript Writing

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## Abstract

**Background:** Diabetes Mellitus (DM) is a prevalent non-communicable metabolic disorder characterized by hyperglycemia due to insufficient insulin production or tissue insensitivity. DM is a global health concern. Understanding the Knowledge, Attitude, and Perception (KAP) among medical students is essential for developing effective educational strategies and improving future diabetes prevention and management.

**Objectives:** To assess the level of knowledge, attitude, and preventive practices regarding DM among third-year MBBS students and to identify gaps that may guide future public health interventions.

**Materials and Methods:** An analytical cross-sectional study assessed KAP regarding DM among third-year MBBS students. Using non-random convenience sampling, data were collected through a standardized questionnaire via Google Forms. Statistical analysis using SPSS version 26. Sample size was calculated using the OpenEpi with 95% confidence level, 50% prevalence, 5% margin of error, 375 population rates, and a design effect of 1.

**Results:** A total of 215 students participated, comprising 73% females. Most were aged 20-21 (69.8%), followed by 18-19 (27.9%) and 22-23 (2.3%). A positive attitude towards DM was reported by 98.6% of participants. Good preventive practices were observed in 78.1% of students. Additionally, 42% reported engaging in daily physical activity for 30–60 minutes, whereas only 0.9% regularly monitored their blood glucose levels.

**Conclusion:** Most medical students demonstrated good knowledge and a positive attitude. However, preventive practices were slightly lower (78.1%). Emphasizing such practices could improve their readiness to manage DM in future clinical practices.

**Keywords:** Knowledge, Attitude, Primary Prevention, Diabetes Mellitus, Medical Students

## Introduction

Noncommunicable diseases (NCDs) are persistent, non-infectious medical conditions caused by a combination of environmental, physiological, genetic, and behavioural variables.<sup>1</sup> According to the World Health Organization (WHO), 74% of yearly deaths are due to NCDs.<sup>2</sup> Diabetes Mellitus (DM) is one of the most prevalent NCDs with highly expanding mortality and morbidity worldwide.<sup>3</sup> DM is a combination of multiple disorders that present with the symptoms of increased blood glucose levels due to decreased insulin production or defective action of insulin.<sup>4</sup> Along with defective glucose metabolism, DM also alters the normal carbohydrate and fat metabolism, leading to increased risks of mortality.<sup>5</sup> It is a disease which has become a global public health concern due to its increasing prevalence worldwide, including young people aged<sup>6-7</sup> leading to the pathologies of heart, blood vessels, nerves, eyes, and kidneys gradually.<sup>8</sup> Type 1, 2, and gestational diabetes are three basic types of DM, the most common being type 2 diabetes, whereas type 1 DM is viewed as a young-onset disorder; however, there are growing cases of it being diagnosed in older adults.<sup>9</sup> According to the WHO, Diabetes Mellitus is a widespread worldwide epidemic affecting older people, but also gradually prevailing among the young generation.<sup>3,10</sup> According to the International Diabetes Federation (IDF) 2021 report, around 537 million adults aged between 20 and 79 years are

diabetic worldwide, and by 2045, it will reach 783 million approximately.<sup>3</sup>

Pakistan is a less economically developed country (LEDC) according to the World Bank Report.<sup>11</sup> DM is more widespread in economically developing countries than in economically developed countries,<sup>12-13</sup> and it is estimated that more than two-thirds (70%) of diabetic patients belong to these countries.<sup>14</sup> Pakistan stands first with a comparatively high prevalence rate of diabetes (30.8%) in 2021.<sup>14</sup> IDF mentions that by 2045, the number of Pakistani people suffering from diabetes will reach 62.2 million.<sup>14</sup>

Due to the increasing incidence of DM worldwide, it is becoming a global health challenge<sup>15</sup> and assessment of its knowledge, attitude, and practices (KAP) has become essential for directing behavioural adjustments of people with diabetes and those at risk.<sup>16-17</sup> KAP-related studies play significant roles in designing health programs that minimize threats caused by the disease.<sup>7,18-21</sup> Promoting lifestyle modifications is essential to lessen this burden and improve health outcomes.

This present study is crucial for comprehending how healthcare professionals apprehend and tackle this prevailing illness. By evaluating KAP, this study provides significant details that are a roadmap to interventional strategies, guiding curriculum development, and informing policymakers on DM management. It bridges the gap between theory and practical application, leading to better public health

outcomes. This study aims to investigate the level of understanding and knowledge regarding DM among the Third Year Medical Students of Rawalpindi Medical University. It sought to evaluate their positive and negative attitudes to ensure preventive practices were prevalent among them and to spread awareness regarding the disease.

## Materials and Methods

An analytical cross-sectional study was conducted at Rawalpindi Medical University from March to May 2024 among third-year MBBS students, both boarders and non-boarders, who were designated to be the study population for this research. Students who did not provide informed consent or submitted incomplete or inconsistent responses were excluded from the study. The sample size was calculated using the Open Epi online calculator for a cross-sectional study, assuming a 95% confidence level, 50% prevalence, 5% margin of error, a population size of 375, and a design effect of 1<sup>22</sup>. The required sample size was 191; however, 215 complete responses were ultimately collected and analysed. Non-random convenience sampling was employed based on participant accessibility. Data were collected using a structured questionnaire adapted from previously published studies. The questionnaire was reviewed by subject experts and pre-tested on 10 students not included in the final analysis to ensure clarity and relevance. The finalized English-language questionnaire was administered through Google Forms and consisted of four sections: sociodemographic

information, knowledge, attitude, and preventive practices related to diabetes mellitus. Electronic informed consent was obtained from all participants before data collection. Participation was voluntary, and no personal identifiers were collected to ensure anonymity. Responses submitted through Google Forms were accessible only to the principal investigator via a password-protected account. Data were downloaded, coded, and cleaned before analysis. Incomplete or inconsistent responses were excluded before statistical analysis. Cleaned data were securely stored and analysed using SPSS (Statistical Package for Social Sciences) version 26. Descriptive statistics were used to summarize the study variables.

## Results

Table 1 presents the sociodemographic characteristics of the study participants. A total of 215 third-year MBBS students were included in the study, of whom 157 (73%) were females and 58 (27%) were males. The majority of participants were aged 20–21 years (69.8%), followed by those aged 18–19 years (27.9%), while only a small proportion belonged to the 22–23 years age group (2.3%). Female students constituted a higher proportion of the sample (73.0%) compared to males (27.0%). All participants were third-year MBBS students enrolled at Rawalpindi Medical University. This indicates a predominantly young adult sample, centred around early adulthood, relevant for early intervention education strategies.

**Table 1. Sociodemographic characteristics of the study participants (n = 215)**

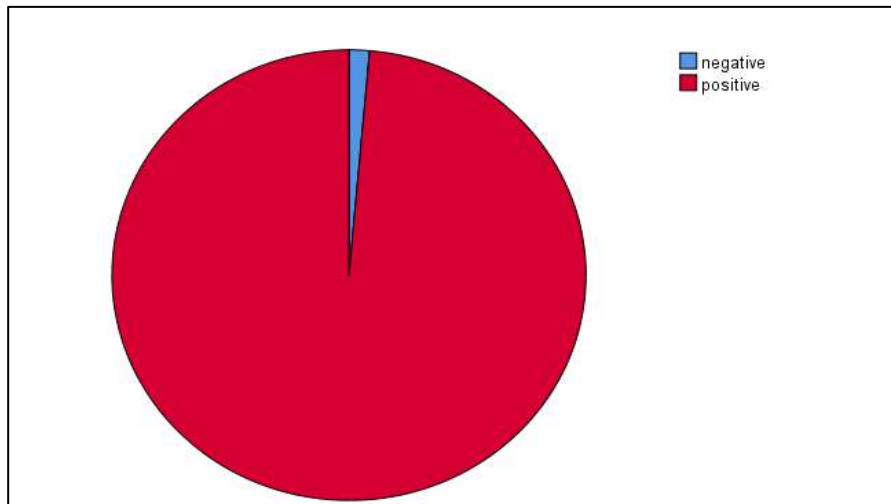
Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–19	60	27.9
	20–21	150	69.8
	22–23	5	2.3
Gender	Male	58	27.0
	Female	157	73.0
Academic Year	Third-year MBBS	215	100.0
Institution	Rawalpindi Medical University	215	100.0

**Note:** Data are presented as frequency and percentage.

The knowledge domain comprised seven questions with response options Yes, No, and Don't know. Each correct response was awarded one point, while incorrect and "Don't know" responses were scored as zero. The total possible knowledge score ranged from 0 to 7. Based on the total score, participants were categorized as having poor knowledge (scores 0–2), average

knowledge (scores 3–4), or good knowledge (scores 5–7). The frequency distribution graph in FIGURE 1 depicts that more than two thirds i-e 170 out of 215 (79.1%), had good knowledge, 43 out of 215 (20%) had average knowledge, and only 2 (0.9%) had poor knowledge regarding DM. The data reflect a strong overall awareness of diabetes among the sample population.

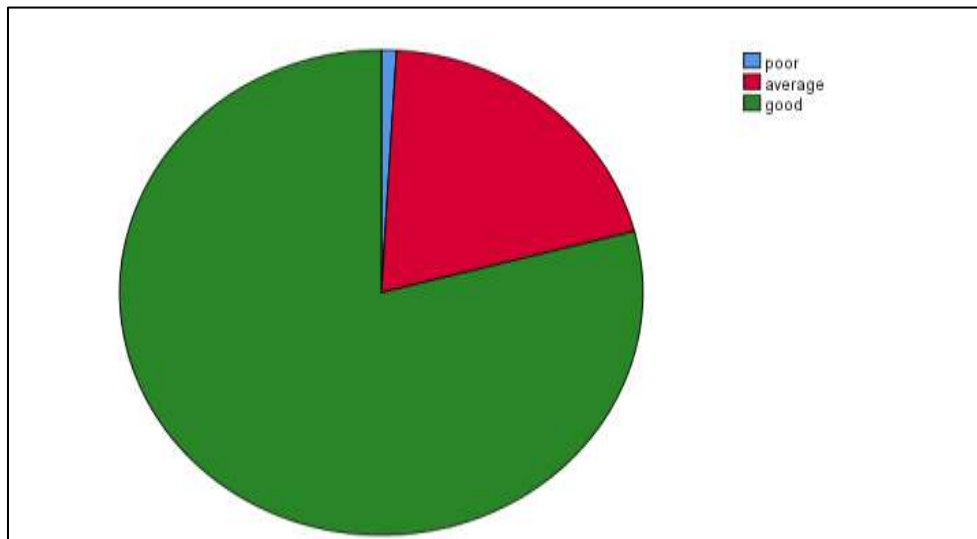
**Figure 1** Frequency Distribution Graph of Knowledge Regarding Diabetes Mellitus



The attitude domain consisted of seven statements with response options *Agree*, *Neutral*, and *Disagree*. Responses were scored as 2 points for Agree, 1 point for Neutral, and 0 points for Disagree. Negatively worded statements were reverse-scored to ensure consistency in interpretation. The total attitude score ranged from 0 to 14, with higher scores indicating a more positive attitude towards diabetes mellitus. Participants scoring 0–6 were

categorized as having a negative attitude (poor attitude), while those scoring 7–14 were considered to have a positive attitude (good attitude). As shown in FIGURE 2, out of 215 third-year medical students, 212 (98.6%) had a positive attitude regarding DM, and only 3 students (1.4%) showed a negative attitude. This suggests that the majority of students not only have knowledge but also a favourable attitude towards diabetes prevention and management.

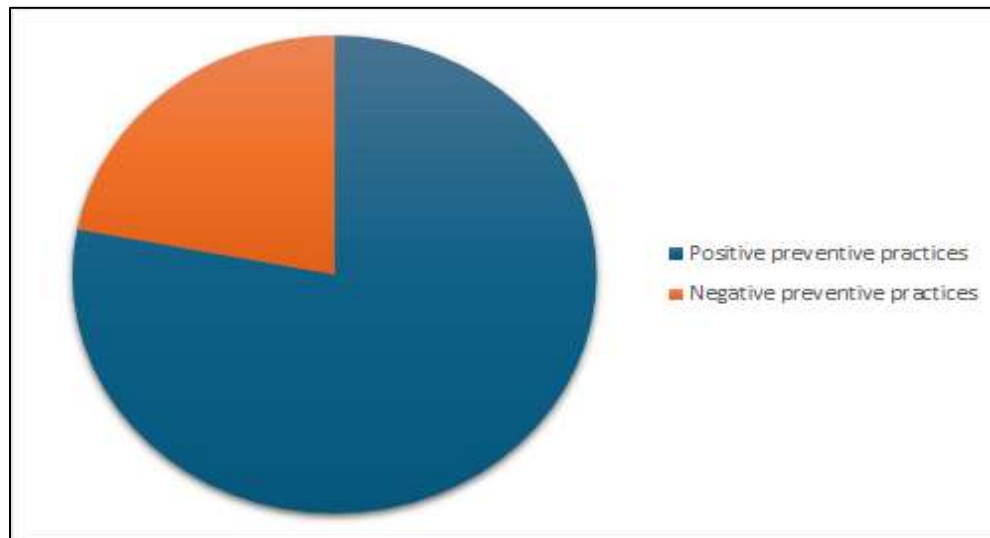
**Figure 2** Frequency Distribution Graph of Attitude regarding Diabetes Mellitus



The preventive practices domain included five questions with response options *Never*, *Occasionally*, and *Frequently*. Responses were scored as 0 points for Never, 1 point for Occasionally, and 2 points for Frequently, yielding a total practice score ranging from 0 to 10. Practice levels were categorized as poor preventive practices for scores less than 50% of the total score (0–4) and good preventive practices for scores of 50% or higher (5–10). FIGURE 3 depicts participants' preventive

practices regarding diabetes mellitus. The data showed that out of the total 215 participants, 168 (78.1%) followed good preventive practices, and 47 (21.9%) had poor preventive practices regarding DM. Although knowledge and attitude were high, around one-fifth showed poor adherence to preventive behaviour, indicating a potential gap between awareness and action.

**Figure 3** Frequency Distribution Graph of Preventive Practices Regarding Diabetes Mellitus



*Note.* Data presented as frequencies

According to Table 2, out of 157 females, 154 (98.1%) had positive and only 3 (1.9%) had negative attitudes regarding diabetes mellitus, whereas out of 58 males, all (100%) had positive attitudes regarding diabetes mellitus. Knowledge responses depicted that 45 out of 58 males (77.6%) and 125 out of 157 females (79.6%) had good knowledge regarding diabetes mellitus. It indicates that both males and females had good knowledge about DM, with

only a slightly higher proportion of good knowledge in females. On the other hand, only 1 male individual and only 1 female individual had poor knowledge regarding Diabetes mellitus. Male and female participants with average knowledge were 12 (20.7%) and 31 (19.7%), respectively. These results show that both genders demonstrated similarly high knowledge and positive attitudes, with minimal gender-based differences.

**Table 2** Gender-Based Distribution of Attitudes and Knowledge Regarding Diabetes Mellitus

Variables	Gender			
	Male		Female	
<b>Attitude</b>				
Negative	0	0.0%	3	1.9%
Positive	58	100%	154	98.1%

### Knowledge

Poor	1	1.7%	1	0.6
Average	12	20.7%	31	19.7%
Good	45	77.6%	125	79.6%

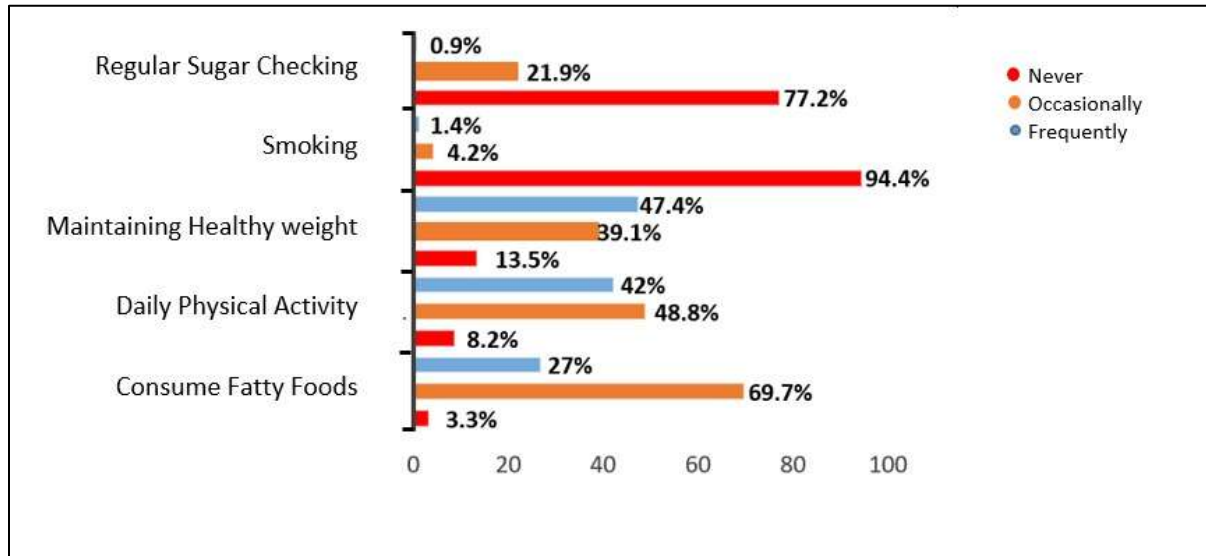
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*Note.* Data presented as frequencies and percentages

As illustrated in the Bar Chart for preventive practices in Figure 4, out of the total 215 participants, only 2 individuals (0.9%) frequently checked their blood sugar levels. In contrast, 47 participants (21.9%) occasionally, and a significant proportion of 166 participants (77.2%) never checked their blood sugar levels. Among 215 participants, only 3 (1.4%) frequently and 9 (4.2%) occasionally smoked, whereas 203 (94.4%) never smoked. Among the participants, 102 (47.4%) frequently attempted to maintain a healthy weight, 84 (39.1%) did so occasionally, and 29 (13.5%) never made efforts to maintain a healthy weight. Among the participants, 91 (42%) frequently engaged in 30-60 minutes of daily physical activity, 105 (48.8%) did so occasionally, and 19 (8.2%) never engaged in it. About two-thirds of the study population (69.7%) occasionally consumed fatty foods, and only a small proportion, 3.3%,

never consumed fatty foods. The preventive practice patterns suggest a discrepancy between awareness/attitude and actual health behaviour, especially in regular blood sugar monitoring and diet. A chi-square test was performed to examine the association between attitude towards diabetes mellitus and gender. There was no statistically significant difference ( $p > 0.05$ ). Similarly, the distribution of knowledge levels did not differ significantly between males and females ( $p > 0.05$ ). Preventive practice patterns revealed that despite high levels of positive attitude and good knowledge, most participants did not regularly monitor blood sugar (77.2% never checked). Lifestyle behaviours such as smoking, weight control, physical activity, and fatty food consumption showed no significant gender differences (all  $p > 0.05$ ).

**Figure 4** Percentage Distribution Bar Chart of Preventive Practices Regarding Diabetes Mellitus



Note. Data presented as percentages

## Discussion

This study investigated the knowledge, attitude, and preventive practices regarding diabetes mellitus among third-year MBBS students at Rawalpindi Medical University. This study found that nearly four-fifths of the study population demonstrated good knowledge of Diabetes Mellitus, and approximately one-fifth had less than adequate knowledge. Our results of knowledge regarding diabetes mellitus are similar to other studies where the study population showed a positive response,<sup>23</sup> while different from several other studies where it was observed that the study population was not adequately aware of the disease.<sup>24-25</sup>

The individuals' preventive practices regarding DM were also analysed, and it revealed that 168 out of 215 (78.1%) participants followed good preventive practices, whereas 47 (21.9%) had

poor prevention of the disease. This result is contrary to a study conducted in Kiribati, in which the majority had poor practice regarding DM.<sup>27</sup> The differences observed in our KAP study compared to other studies can be attributed to several factors. Differences in knowledge scores may relate to educational background, scoring methods, or the number of questions used. Attitude differences could stem from cultural beliefs or variations in how attitudes were measured. Practice-related disparities may be influenced by lifestyle, health awareness, or access to resources. Additionally, the type of questionnaire and analysis methods used may also contribute to these contrasts.

Gender distribution analysis indicated that both males (100%) and females (98.1%) had a positive attitude about the disease, with males having slightly higher positive attitudes than

females. Our result is similar to a Saudi study, which reflected a positive, adequate knowledge and good practicing behaviour for preventing DM, especially in having family history or master's degrees among Saudi residents.<sup>23</sup> Good knowledge was observed in 77.6% of males and 79.6% of females. This result is similar to a Saudi study, which predicted more females with good knowledge than males.<sup>28</sup> This is due to the caregiving responsibilities often assumed by females, such as managing family health and diet, contributing to their increased knowledge about chronic conditions like diabetes mellitus.

Preventive practice questions showed that more than two-thirds, 77.2%, never checked their blood sugar levels. This result is in line with a study that showed more than 50% of individuals had never been screened until their diagnosis.<sup>29</sup> A noteworthy finding from a study conducted in Ghana showed that none of the individuals under 25 assessed their blood glucose levels regularly.<sup>30</sup> In our study, 47.4% of individuals frequently attempted to maintain a healthy weight, 42% of individuals were involved in daily physical activity for 30-60 minutes, and 69.7% occasionally consumed fatty foods. This discrepancy in results can be attributed to differences in education level, variations in analysis scores, and different types of questions asked in questionnaires.

Our study has certain limitations; the first drawback was the sample size, which was smaller because only third-year MBBS students were considered. The second drawback was the higher number of females than males in the

study population. Another drawback was the non-random sampling techniques that introduced recall bias among participants. Lastly, this study only focused on the knowledge, attitude, and preventive practices among third-year medical students at Rawalpindi Medical University, so it cannot be generalized to all medical students' KAP regarding DM. The authors express heartfelt gratitude to all participants who voluntarily contributed to this study, infusing it with authenticity and shaping a collaborative journey that goes beyond mere data collection to a shared exploration of knowledge and understanding. There should be incorporation of structured modules regarding diabetes mellitus into undergraduate medical education. It must be encouraged to perform routine screening tests and blood glucose monitoring as prophylaxis. There should be peer-led awareness campaigns, workshops, and research opportunities to reinforce preventive practices.

## Conclusion

Diabetes Mellitus is a prevalent non-communicable metabolic disorder characterized by hyperglycaemia due to a lack of production or tissue insensitivity to insulin. Adequate levels of knowledge, attitude, and preventive practices among the population are essential for combating the prevalent Diabetes Mellitus. This KAP study showed that the majority of third-year MBBS students had good knowledge and a positive attitude regarding diabetes mellitus. Preventive practices about DM were also followed, but their proportion is

less compared to students' knowledge and attitudes. Policymakers should prioritize education and training on prevalent diseases like diabetes mellitus to ensure future healthcare professionals are both effective in practice and proactive in preventive care.

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