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ATTITUDE OF DOCTORS IN SCREENING & MANAGEMENT OF PRE-DIABETES IN ADULTS IN PESHAWAR.

Faiza Akbar[1], Bushra Iftikhar[2], Muhammad Abbas Khan[3], Muhammad Zafar Khan[4], Rabia Akbar[5]

1 Lecturer, Department of Community Medicine, Khyber Medical College, Peshawar, Pakistan

2 Professor, Department of Community Medicine, Khyber Medical College, Peshawar, Pakistan

3 Final Year Medical Student, Khyber Medical College, Peshawar, Pakistan

4 Training Medical Officer, Department of Community Medicine, Khyber Medical College, Peshawar, Pakistan

5 Department of Public Health and Community Nursing, Hayatabad Medical Complex, Peshawar, Pakistan

Correspondence Email: faizaakbar408@gmail.com

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ABSTRACT

BACKGROUND: Prediabetes, a reversible high-risk state for type 2 diabetes, remains significantly underdiagnosed, hindering timely intervention. With Pakistan ranking third globally in diabetes prevalence, understanding physician practices is critical for prevention. This study assesses the attitudes of doctors towards the screening and management of prediabetes in adults at tertiary care hospitals in Peshawar.

OBJECTIVE: This study aims to assess the attitudes of doctors towards the screening and management of prediabetes in adults.

METHODOLOGY: :A cross-sectional questionnaire-based study was conducted from 26th March 2025 to 26th September 2025. A total of 106 doctors were recruited via convenience sampling technique. Exploratory Factor Analysis (EFA), t-tests, ANOVA, and regression analyses were used to determine the strengths of association with demographics, with p-value of < 0.05 was considered statistically significant.

RESULTS: In current study majority of the doctors have positive attitudes: 63.2% supported universal screening, 75.5% favored WHO/ADA guidelines, and 74.5% agreed evidence-based practice is effective. Nonetheless, psychological effects were perceived differently, and 35.8% of respondents believed that diagnosis might have adverse effects on mental health. Additionally, this study demonstrates that male doctors adhered more to guidelines than females ($p = 0.04$), and TMOs had more positive attitudes toward screening than registrars ($p = 0.03$). Higher qualifications were linked with concern about psychological impact of the diagnosis ($p = 0.02$).

CONCLUSION; Doctors in Peshawar tended to have positive attitudes towards prediabetes screening, and management. Nevertheless, health systems, skills-based training, and localized guidelines should be enhanced to channel positive attitudes into effective preventive practice.

KEYWORDS Prediabetes, Prediabetes Management, Screening Disease

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INTRODUCTION

Diabetes is a chronic metabolic syndrome characterized by high blood glucose levels in the body, leading to micro- and macrovascular complications over time. It is caused by either insulin non-production (by the pancreas) or the body not using the already produced insulin. Diabetes has two types: type 1 diabetes mellitus, or juvenile-onset diabetes, and type 2 diabetes mellitus, or adult-onset diabetes mellitus.[1] Common symptoms of diabetes mellitus are polydipsia, polyuria, blurred vision, fatigue & weight loss.

Prediabetes is a warning of type 2 DM, as blood sugar levels are elevated but not falling within the criteria for type 2 DM. As it is an underdiagnosed condition, this stage is reversible with timely diagnosis and lifestyle modifications.[2] There are many factors contributing to diabetes, i.e., environmental, socio-demographic & genetic factors. Lifestyle modification is the best way to prevent or delay the onset of DM by 1) maintaining a healthy body weight, 2) doing 30 minutes (per 24 hours) of moderate physical activity, 3) avoiding carbohydrates, especially simple sugars and saturated fats, and 4) avoiding/quitting tobacco smoking. Contributing factors in the rise of type 2 DM are urbanization, an aging population, increasing obesity and overweight, and a sedentary lifestyle.[3] According to the International Diabetes Federation (IDF), 540 million people worldwide have diabetes, 90% of which is type 2 DM. IDF projections show that approximately 783 million people will be living with diabetes by the year 2045, i.e., 1 in 8 adults. In 2021, approximately 537 million adults (20-79 years) were living with diabetes.[4] By the year 2030, its projections are 643 million, and by 2045, there will be a massive increase to 783 million. 3 in 4 adults with diabetes are living in low-to-middle-countries. Diabetes has life-devastating effects on individuals, societies, countries, or territories, leading to over 4 million deaths per year (2021 10th edition).[5] Pakistan ranks no. 3 after China and

India in diabetes prevalence. In 2019, 17.1% were suffered from diabetes which were upsurge to 26.7% in 2022, making a total of 33,000,000 individuals. In Khyber Pakhtunkhwa, 9.2% of males and 11.60% of females were suffering from diabetes. Despite a worrying pattern in the national statistics of prediabetic and diabetic conditions, access to healthcare services and other concerns is geographically unequal. In a 1% drop in HbA1c, there will be a 21% decrease in complication rate, and a decrease in mortality and morbidity rates of diabetes.[6]

By timely screening and management of prediabetes, we can reduce the risk of diabetes or delay its onset. One of the most critical issues to tackle this outcome of increasing numbers of prediabetic cases is the underdiagnosis and the ineffective treatment of the prediabetes stage. Nevertheless, there is a huge gap in the information about the level of awareness, attitudes, and existing practices of the physicians in Peshawar in screening and managing prediabetes in line with standardized international practices. Factors like perceived importance, knowledge, patient-physician relationship, time constraints, and guideline adherence impact screening rates.

As there is a lack of studies in the local existing literature on the attitudes of doctors in screening and managing prediabetic patients, this study aimed to see their approach to prediabetes screening and management according to the WHO or the American Diabetes Association guidelines. By knowing one's health status and its risk, early actions can be taken for prevention and the delayed onset of DM, having numerous long-term benefits. Moreover, diabetes management involving the cost of medication, complication management, and productivity costs is enormous to both families and the national healthcare system. The prediabetes intervention is one of the most cost-efficient ways of curbing this economic burden of the future. Therefore, this study aims to assess the attitude of doctors in screening and managing prediabetes in adults in Peshawar, Pakistan.

METHODOLOGY:

A descriptive cross-sectional study was carried out from 26th March 2025 to 26th September 2025. Sample size was calculated using OpenEPI software version 4. Using 95% confidence level 5% margin of error, and an anticipated frequency of adequate attitude of doctors from the previous study, which was 93.5%. The calculated sample size was 94, but we enrolled 106 participants to compensate for any loss of data.

The data was collected using a pre-tested questionnaire that broadly consists of demographics and questions regarding the attitudes of doctors towards the screening and management of prediabetics. Regarding the attitude questionnaire, it was developed from a similar study conducted by Saleh et al.[3] with a slight modification in wording and an addition of items related to local practice (e.g., follow-up for complications and use of ADA protocols). The responses were measured on a 5-point Likert scale, where 1 represents strongly disagree, and 5 represents strongly agree. After obtaining ethical approval from the Institutional Ethical Review Board (IREB) of Khyber Medical College, Peshawar, data were collected from the representative sample via hard copy questionnaires. IBM SPSS (software version 20) was then used to analyze the collected data. We calculated means and standard deviations for quantitative variables and percentages and frequencies for qualitative variables. Initially, a nine-attitudinal (Q1–Q9) item Exploratory Factor Analysis (EFA) was performed to determine the underlying constructs that influence the attitudes of doctors toward prediabetes screening and management. The Kaiser-Meyer-Olkin (KMO) measure ensured the sampling adequacy of the analysis, with a value of 0.69, exceeding the acceptable value of 0.6. The extraction method was the principal axis factoring (PAF) method, with an oblique (Promax) rotation performed, as the resulting factors were theorized to be correlated. After checking the normality by Shapiro Wilk test, for the parametric tests, we ran independent t-tests to measure the association of gender and designation with the three subscales. Also, a one-way ANOVA was run to measure the association of the highest degree with each subscale. Multiple linear regression was applied to measure the strength of association between the demographic characteristics and the three subscales. A p-value of < 0.05 was considered statistically significant.

The ethical approval was obtained from the Institutional Review and Ethics Board, Khyber Medical College, with approval number 484/DME/KMC on 12th June 2024.

RESULTS

Our study sample comprised 106 doctors, with predominantly male participation (68.9%). Most of the doctors in our study held the designation of Trainee Medical Officer (87.7%), with the remaining being registrars (12.3%). There were no assistant professors or professors in the study sample. In terms of qualification, 50.9% of the doctors hold an MBBS degree, 47.2% hold an FCPS degree, and a small number hold a post-fellowship qualification (1.9%). The mean age of the participants in our sample was 29.6 ± 3.5 (Table 1).

Table 1: demographic characteristics of the study sample (n = 106)

Variables	Categories	Frequency	(%)
Gender	Male	73	68.9%
	Female	33	31.1%
Designation	TMO	93	87.7%
	Registrar	13	12.3%
	Assistant Professor	0	0%
	Professor	0	0%
Degree	MBBS	54	50.9%
	FCPS	50	47.2%
	Post-fellowship	2	1.9%

TMO: Trainee Medical Officer

Table 2 demonstrated an overall favorable perception of the doctors towards the attitude items. Almost two-thirds of the participants (63.2%) agreed or strongly agreed that universal screening for adults aged between 20 and 79 is important. Similarly, the majority (66%) of the participants reported that labeling a patient with prediabetes helps in awareness regarding treatment approach. There was also a high rate of acceptance of the WHO/ADA guidelines in clinical practice, with 75.5% agreeing or strongly agreeing. Almost half (48.1%) emphasized personal laboratory values as a priority to preventive strategies, yet 24.5% disagreed. Regarding the risk-benefit of prediabetes diagnosis, 59.4% agreed with it, and 27.4% were neutral. On the follow-up and complication screening, 73.6% of physicians concurred that follow-up and complication screening reduce permanent disability. Additionally, a large percentage of respondents (74.5%) found evidence-based practice to be effective in prediabetes management. On the other hand, the psychological effect of getting the prediabetes diagnosis was controversial because 35.8% said it could have a negative mental health effect, while 39.6% said it would not. Regarding applying international guidelines (e.g., ADA) in management, 54.7% said they agreed, but 25.5% remained neutral (Table 2).

Table 2: The distribution of the study sample by their attitudes towards prediabetes (n = 106)

Variables	Responses	Frequency	Percentages
For prediabetes prevention, focus on screening should be given to all adults (20-79) irrespective of their blood glucose levels.	Strongly disagree	12	11.3%
	Disagree	7	6.6%
	Neutral	20	18.9%
	Agree	43	40.6%
	Strongly agree	24	22.6%
Labeling a patient with prediabetes helps in awareness regarding treatment modalities.	Strongly disagree	14	13.2%
	Disagree	10	9.4%
	Neutral	12	11.3%
	Agree	51	48.1%
	Strongly agree	19	17.9%

WHO or ADA guidelines in diabetes diagnosis helps in diagnosis and treatment during my practice	Strongly disagree	9	8.5%
	Disagree	2	1.9%
	Neutral	15	14.2%
	Agree	53	50.0%
	Strongly agree	27	25.5%
For consistently deranged blood levels of glucose, focus should be on individuals' lab values in diabetes prevention.	Strongly disagree	7	6.6%
	Disagree	19	17.9%
	Neutral	19	17.9%
	Agree	51	48.1%
	Strongly agree	10	9.4%
Diagnosing prediabetes based on risk vs. benefit (treatment).	Strongly disagree	4	3.8%
	Disagree	10	9.4%
	Neutral	29	27.4%
	Agree	51	48.1%
	Strongly agree	12	11.3%
Follow-ups and screening for complications help in disease limitation and avoiding permanent disability.	Strongly disagree	7	6.6%
	Disagree	14	13.2%
	Neutral	7	6.6%
	Agree	36	34.0%
	Strongly agree	42	39.6%
Evidence-based practice is effective in the treatment of prediabetes.	Strongly disagree	8	7.5%
	Disagree	9	8.5%
	Neutral	10	9.4%
	Agree	44	41.5%
	Strongly agree	35	33.0%

Diagnosing prediabetes has a negative impact on patients' mental health.	Strongly disagree	16	15.1%
	Disagree	26	24.5%
	Neutral	22	20.8%
	Agree	38	35.8%
	Strongly agree	4	3.8%
Management protocols in treating prediabetic patients are based on international guidelines, e.g., the American Diabetic Association.	Strongly disagree	7	6.6%
	Disagree	14	13.2%
	Neutral	27	25.5%
	Agree	34	32.1%
	Strongly agree	24	22.6%

Our findings of the Exploratory Factor Analysis (EFA) of the attitude items are provided in Table 3. The analysis produced a three-factor solution to investigate the structure of the scale. The question about the effectiveness of evidence-based practice loaded very well on Factor 1 (0.851) with a high communality (0.988), which is very strong in defining this factor. Factor 1 (0.514) and Factor 2 (-0.652) showed significant cross-loadings in the item on labeling patients to enhance awareness. Moreover, Factor 1 (0.571) moderately loaded the item on the usefulness of the WHO/ADA guidelines. On the other hand, our analysis reported that the item that covers the individuals' lab values did not have any significant factor loading (0.366) or communality value (0.246), which shows that it is not well covered by the three-factor structure. The item focusing on diagnosing based on risk vs. benefit showed moderate cross-loadings on all three factors. In short, the EFA was able to perform an extraction of three factors, but the extracted solution supports the pre-defined theoretical domains only partially. One (Factor 1) has a clear-cut key item, yet several other items had cross-loadings or low communalities, indicating that the proposed three-domain model is not entirely supported in the sample (Table 3).

Table 3: Exploratory Factor Analysis (EFA) for Attitude Items

Questions	Factor 1	Factor 2	Factor 3	Communalities
Evidence-based practice is effective in the treatment of prediabetes.	0.851	0.158	-0.489	0.988
Labeling a patient with prediabetes helps in awareness regarding treatment modalities.	0.514	-0.652	0.018	0.690
WHO or ADA guidelines in diabetes diagnosis helps in diagnosis and treatment during my practice	0.571	-0.079	0.338	0.447

For consistently deranged blood levels of glucose, focus should be on individuals' lab values in diabetes prevention.	0.366	0.090	0.321	0.246
Diagnosing prediabetes based on risk vs. benefit (treatment).	0.438	0.359	0.183	0.354

We run a Pearson correlation test to assess the linear relationship between the participants' age and the three attitude subscales. Our results show no significant association between the doctors' age and their attitude towards prediabetes screening and management in all three subscales (all p-values > 0.05). Our table also shows a significant positive association between subscale 1 and subscale 2 ($r = 0.618$, $p < 0.001$) and between subscale 1 and subscale 3 ($r = 0.415$, $p < 0.001$) (Table 4).

Table 4: Pearson correlation between age and attitudes subscales

Variables	Subscale 1 (r, p)	Subscale 2 (r, p)	Subscale 3 (r, p)
Age	-0.190 (0.051)	0.162 (0.098)	-0.141 (0.151)
Subscale 1	-	0.618 (< 0.001)	0.415 (<0.001)
Subscale 2		-	0.334 (<0.001)
Subscale 3			-

r = correlation coefficient

Attitude scores were compared using independent samples t-tests based on gender and designation (TMO vs. Registrar). From our analysis, regarding gender, statistical significance was only observed in Subscale 2 ("guidance adherence"). Adherence to guidelines and risk/benefit attitude was much more positive among male doctors (mean = 0.11) than among female doctors (mean = -0.25) (p = 0.04). The other two subscales did not reveal significant differences. Regarding the designation of the doctors, subscale 1 was statistically significant (benefits of screening and diagnosis). The attitude of Trainee Medical Officers (TMOs) towards the advantages of screening and diagnosis was more positive (mean = 0.103) as opposed to that of Registrars (mean = -0.74) (p = 0.03). The other subscales did not show any significant difference regarding designation (Table 5).

Table 5: t-test showing correlation of gender and designation with attitudes' subscales

Subscales	Male Mean ± SD	Female Mean ± SD	Mean difference	t (df)	p-value
Subscale 1	0.095 ± 0.94	-0.21 ± 1.09	0.30	1.48 (104)	0.14
Subscale 2	0.11 ± 0.78	-0.25 ± 0.86	0.36	2.11 (104)	0.04
Subscale 3	0.36 ± 0.86	-0.79 ± 0.84	0.11	0.65 (104)	0.52
	TMO Mean ± SD	Registrar Mean ± SD	Mean difference	t (df)	p
Subscale 1	0.103 ± 0.92	-0.74 ± 1.20	0.84	2.4 (14.05)	0.03
Subscale 2	-0.25 ± 0.84	0.18 ± 0.70	-0.27	-0.85 (104)	0.34
Subscale 3	0.03 ± 0.84	-0.20 ± 0.91	0.23	0.91 (104)	0.36

t = t-test statistic, df = degrees of freedom

Table 6: One-way ANOVA showing correlation between degree and attitudes' subscales

Variable	F (df)	p-value
Degree		
Subscale 1	0.476 (2, 103)	0.623
Subscale 2	0.007 (2, 103)	0.993
Subscale 3	1.614 (2,103)	0.204

F = ANOVA test statistic, df = degrees of freedom

Mann-Whitney Test for Gender and Designation and Kruskal-Wallis Test for Degree

The non-parametric tests, including the Mann-Whitney test for gender and designation and the Kruskal-Wallis test for degree to analyze specific individual questions from the attitude items (rather than the subscales) by gender, designation, and degree. The results show no statistically significant correlation (all p-values > 0.05) for all four selected questions when compared across gender, designation, and degree. These strengthen the findings from the parametric test that these demographic factors have a limited effect on the attitudes of the doctors towards screening and management in prediabetes (Table 7).

Table 7: Mann-Whitney Test for Gender and Designation and Kruskal-Wallis Test for Degree

Variables	Male Mean Rank	Female Mean Rank	U	r	p
For prediabetes prevention, focus on screening should be given to all adults (20-79) irrespective of their blood glucose levels.	52.9	54.9	1159	0.02	0.75
Follow-ups and screening for complications help in disease limitation and avoiding permanent disability.	55.3	49.6	1075	0.06	0.35
Diagnosing prediabetes has a negative impact on patients' mental health.	53.3	53.9	1192	0.01	0.93
Management protocols in treating prediabetic patients are based on international guidelines, e.g., the American Diabetic Association.	52.9	54.9	1161	0.02	0.76
Variables	**TMO Mean Rank**	**Registrar Mean Rank**	**U**	**r**	**p**
For prediabetes prevention, focus on screening should be given to all adults (20-79) irrespective of their blood glucose levels.	53.5	53.6	603	0.001	0.9

Follow-ups and screening for complications help in disease limitation and avoiding permanent disability.	55.7	33	392	0.15	0.3
Diagnosing prediabetes has a negative impact on patients' mental health.	52.2	62.2	490	0.08	0.3
Management protocols in treating prediabetic patients are based on international guidelines, e.g., the American Diabetic Association.	53	55	575	0.02	0.8
	MBBS Mean Rank	**FCPS Mean Rank**	**Post-fellowship Mean Rank**	**H (df)**	**p**
For prediabetes prevention, focus on screening should be given to all adults (20-79) irrespective of their blood glucose levels.	54.6	53.1	33.8	0.97 (2)	0.6
Follow-ups and screening for complications help in disease limitation and avoiding permanent disability.	57.3	48.1	85.5	5.1 (2)	0.08
Diagnosing prediabetes has a negative impact on patients' mental health.	52.5	55	41.5	0.5 (2)	0.8
Management protocols in treating prediabetic patients are based on international guidelines, e.g., the American Diabetic Association.	51.5	56.3	35	1.4 (2)	0.5

U = Mann-Whitney test statistic, r = effect size, H = Kruskal-Wallis test statistic, df = degrees of freedom, p = probability value

To examine the combined effect of all the demographic variables (age, gender, designation, and degree) on each subscale of attitude, a multiple linear regression was carried out. The regression models predict a relatively small portion of the variance in attitudes (R2 values of 0.108, 0.071, and 0.075 for Subscales 1, 2, and 3, respectively), which implies that most of the factors that explain these attitudes are not covered by these demographics. Gender is a strong independent predictor of Subscale 2 (guidance adherence) (= -0.22, p = 0.03), which supports the t-test finding that the female gender correlates with a weaker attitude in this domain. Degree is also an important independent predictor of Subscale 3 (diagnosis concern and psychological caution) (= 0.25, p = 0.02), which implies that the higher the qualifications, the more a person is concerned about the psychological effect of the diagnosis. It is a novel finding that was not determined in the former ANOVA. Other demographic variables did not appear as significant predictors of the other subscales (Table 8).

Table 8: Linear regression analysis

Predictors	Subscale 1	Subscale 2	Subscale 3
	Beta (p-value)	**Beta (p-value)**	**Beta (p-value)**
Age	-0.072 (0.50)	0.151 (0.17)	-0.12 (0.28)
Gender	-0.138 (0.16)	-0.22 (0.03)	-0.11 (0.29)
Designation	-0.272 (0.12)	0.03 (0.82)	-0.10 (0.37)
Degree	0.127 (0.22)	0.03 (0.79)	0.25 (0.02)
R2	0.108	0.071	0.075
F (p-value)	3.071 (0.02)	1.93 (0.11)	2.06 (0.092)

R^2 = coefficient of determination in regression, F = test statistic for regression

DISCUSSION

This research examined the perception of physicians in Peshawar towards the screening and management of prediabetes in adults. The overall result shows that the majority of the physicians acknowledge the significance of timely diagnosis and evidence-based treatment, but there was certain variation in other perceptions associated with the psychological effects of diagnostic identification and adherence to international guidelines. The rationale behind the high value of universal screening and structured follow-up presented in this study is consistent with past findings that early prediabetes identification is effective in postponing or stopping the onset of type 2 diabetes.[7,8] The physicians of our sample agreed mostly that the WHO and ADA recommendations could be used in clinical decision-making. This is in alignment with the findings from the study conducted by Mohan et al., who found that guideline-based screening was positively perceived even in a country with limited resources like India.[9] This indicates that the doctors of South Asia recognize the importance of international standards, although they might have to be adapted to suit the region. One of the interesting facts about this research was that there was a divided opinion about the psychological effect of prediabetes labeling. Although labeling was supported by most doctors as a method of enhancing patient awareness and medication compliance, a large percentage of them raised their concern over the fear of anxiety and stigmatization. Likewise, another has raised similar concerns, highlighting that the over-medicalization of prediabetes can have a negative psychological impact with no relevant clinical value.[10] However, in a study conducted by Lipska et al., the diagnostic labeling could be used as a motivating factor in the lifestyle change.[11] Collectively, these results point to the necessity of a balanced attitude in the process of patient communication, when diagnostic labels are applied constructively without excessively changing psychosocial load. In our study, the hypothesized three-domain structure of physician attitudes was partially supported by the exploratory factor analysis. One of the factors came out with significant strength concerning the advantage of evidence-based practice, and other items recorded low-strength or cross-loadings. Other studies in the field of healthcare have also reported similar methodological challenges in measuring attitudes.[12] This implies that the attitude of physicians towards prediabetes is complex and does not necessarily fit into predetermined theoretical areas, and their validation in larger and more heterogeneous samples is required. There were also sociodemographic differences in our research. The male physicians were found to be more adherent to guidelines than the female physicians, and the trainee medical officers (TMOs) were found to have higher perceived benefits of screening than the registrars. The degree level was linked with increased concern regarding the psychological impact of diagnosis, indicating that better education qualifications can help generate a sense of the psychosocial dimension of care. These results align with other South Asian studies, whereby variations in the training level and educational exposure affected the attitude towards preventive practice.[13,14] Although the attitude toward the implementation of the guidelines was generally positive, neutral, or negative attitudes towards guideline implementation were observed in some physicians in this study. The possible causes are the unstructured training, the lack of resources, and the uncertainty of the applicability of the international recommendations to the local setting. Similar barriers were also reported in Pakistani and regional research.[15,16] To overcome these gaps, more institutional support, adjustment of the guidelines to local realities, and capacity-building training of healthcare providers are needed.

Our study has several strengths that contribute to the validity and effectiveness of the findings. To the best of our knowledge, it is among the first few studies that specifically examine physician attitudes to prediabetes management in Peshawar, Pakistan, which fills an important gap in the local literature. The novelty of our topic and its relevant findings may help to formulate public health strategies in the context of diabetes in a region with a high incidence of the disease.

Besides its strengths, our research has several limitations. First, our study was conducted in a single setting, and the sample that was used mainly comprised trainee medical officers, thus

restricting the generalization of our study. Its cross-sectional design and convenience sample can be biased and are not capable of determining causation. Additionally, our self-reported data could increase the risk of social desirability bias, and the study did not directly assess clinical practice, which created an attitude-practice gap. Lastly, the sample size (n=106) is relatively small to carry out stable factor analysis, and some of the items have weak psychometric properties, which require refining and testing in larger, more heterogeneous cohorts.

The results of our research outline some significant policy and practice implications in Pakistan. Firstly, doctors should be encouraged to follow international guidelines such as the American Diabetes Association (ADA) and World Health Organization (WHO) for the early detection and management of prediabetes. Secondly, continuing medical education (CME) programs should be made mandatory for doctors to update their knowledge about the recent advances in prediabetes diagnosis and treatment. Medical curricula should include more emphasis on preventive medicine and lifestyle modification to create awareness among future healthcare providers. Hospitals should ensure that routine screening for prediabetes is practiced especially among high-risk groups. Public-private partnerships can play a vital role in establishing structured programs for prediabetes screening and management. Further large-scale studies involving different hospitals and healthcare professionals should be conducted to assess the generalizability of findings and to explore barriers to prediabetes management in Pakistan.

CONCLUSION

This study demonstrates that physicians in Peshawar generally hold positive attitudes toward prediabetes screening, evidence-based guidelines, and preventive follow-up. However, concerns related to the psychological impact of diagnostic labeling, limitations of the attitude measurement scale, and system-level constraints highlight that favorable attitudes alone may not translate into consistent clinical practice. These findings suggest the need for context-specific guidelines, structured training, and supportive health system frameworks to better align physicians' attitudes with effective preventive strategies for prediabetes management in Pakistan

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CONFLICT OF INTEREST

The authors declare no conflict of interest related to this publication

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REFERENCES

1.Tseng E, Greer RC, O'Rourke P, Yeh HC, McGuire MM, Clark JM, Maruthur NM. Survey of primary care providers' knowledge of screening for, diagnosing, and managing prediabetes. J Gen Intern Med. 2017 Nov;32(11):1172-1178. https://doi.org/10.1007/s 11606-017-4103-1.

2.Gillani AH, Amirul Islam FM, Hayat K, Atif N, Yang C, Chang J, Qu Z, et al. Knowledge, attitudes and practices regarding diabetes in the general population: A cross-sectional study from Pakistan. Int J Environ Res Public Health. 2018;15(9):1906. https://doi.org/10.3390/ijerph15091906.

3.Saleh AM, Almobarak AO, Badi S, Siddiq SB, Tahir H, Suliman M, et al. Knowledge, attitudes and practice among primary care physicians in Sudan regarding prediabetes: A cross-sectional survey. Int J Prev Med. 2021;12:80. https://doi.org/10.4103/ijpvm.IJPVM_189_19.

4.Appajigol J, Somannavar M. Assessment of knowledge, attitude and practices of medical officers in primary health centres regarding type 2 diabetes mellitus. J Med. 2019;20:63-67. https://doi.org/10.3329/jom.v20i2.42167.

5.Khan AT, Lateef NA, Khamseen MA, Alithan MA, Khan SA, Ibrahim I. Knowledge, attitude and practice of ministry of health primary health care physicians in the management of type 2 diabetes mellitus: A cross-sectional study in the Al Hasa District of Saudi Arabia, 2010. Niger J Clin Pract. 2011;14(1):52-59. https://doi.org/10.4103/1119-3077.79241.

6.Hafez D, Nelson DB, Martin EG, Cohen AJ, Northway R, Kullgren JT. Understanding type 2 diabetes mellitus screening practices among primary care physicians: a qualitative chart-stimulated recall study. BMC Fam Pract. 2017;18(1):50. https://doi.org/10.1186/s12875-017-0613-4.

7.Tabák AG, Herder C, Rathmann W, Brunner EJ, Kivimäki M. Prediabetes: a high-risk state for developing diabetes. Lancet. 2012;379(9833):2279-2290. https://doi.org/10.1016/S0140-6736(12)60283-9.

8.Barry E, Roberts S, Oke J, Vijayaraghavan S, Normansell R, Greenhalgh T. Efficacy and effectiveness of screen and treat policies in prevention of type 2 diabetes: systematic review and meta-analysis of screening tests and interventions. BMJ. 2017;356:i6538. https://doi.org/10.1136/bmj.i6538.

9.Mohan V, Deepa M, Deepa R, Shanthirani CS, Farooq S, Ganesan A, Datta M. Secular trends in the prevalence of diabetes and impaired glucose tolerance in urban South India—the Chennai Urban Rural Epidemiology Study (CURES-17). Diabetologia. 2006;49(6):1175-1178. https://doi.org/10.1007/s00125-006-0219-2.

10.Carrera PM. Correction to "The epidemic of pre-diabetes: the medicine and the politics". BMJ. 2014;349:g4485. https://doi.org/10.1136/bmj.g4485.

11.Lipska KJ, Ross JS, Wang Y, Inzucchi SE, Minges K, Karter AJ, Huang ES, Desai MM, Gill TM, Krumholz HM. National trends in US hospital admissions for hyperglycemia and hypoglycemia among Medicare beneficiaries, 1999 to 2011. JAMA Intern Med. 2014;174(7):1116-1124. https://doi.org/10.1001/jamainternmed.2014.1824.

12.Ajzen I. The theory of planned behaviour: Reactions and reflections. Psychol Health. 2011;26(9):1113-1127. https://doi.org/10.1080/08870446.2011.613995.

13.Rani PK, Raman R, Subramani S, Perumal G, Kumaramanickavel G, Sharma T. Knowledge of diabetes and diabetic retinopathy among rural populations in India, and the influence of knowledge of diabetic retinopathy on attitude and practice. Rural Remote Health. 2008;8(3):838. https://doi.org/10.22605/RRH838.

14.Umbreen G, Rehman A, Avais M, Jabeen C, Sadiq S, Maqsood R, Rashid HB, Afzal S, Webby RJ, Chaudhry M. Knowledge, attitude, practice and barriers associated with influenza vaccination among health care professionals working at tertiary care hospitals in Lahore, Pakistan: a multicenter analytical cross-sectional study. Vaccines (Basel). 2023;11(1):136. https://doi.org/10.3390/vaccines11010136.

15. Jafar TH, Haaland BA, Rahman A, Razzak JA, Bilger M, Naghavi M, Mokdad AH, Hyder AA. Non-communicable diseases and injuries in Pakistan: strategic priorities. Lancet. 2013;381(9885):2281-2290. https://doi.org/10.1016/S0140-6736(13)60646-7.

16.Basit A, Riaz M, Fawad A. Improving diabetes care in developing countries: The example of Pakistan. Diabetes Res Clin Pract. 2015;107(2):224-232. https://doi.org/10.1016/j.diabres.2014.10.013.

Key Contributions of the Authors	
Author Names	**Author Contributions**
Faiza Akbar	A, B, D
Bushra Iftikhar	B, C, D
Muhammad Abbas Khan	B, C, D
Muhammad Zafar Khan	A, D
Rabia Akbar	C, D

Key for Author Contributions:
A.Conception or Design
B.Acquisition, Analysis, or Interpretation of Data
C.Manuscript writing
D.Critical Review and approval
All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved