



Original Research Article

PSYCHOLOGICAL IMPACT OF DIABETES ON ANXIETY AND DEPRESSION: A CROSS-SECTIONAL STUDY IN A RURAL TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Diabetes mellitus is a chronic metabolic disorder with a growing global and national burden, particularly in India. Beyond physical complications, it is increasingly associated with psychological morbidity, including anxiety and depression, which may adversely affect disease outcomes. This study aimed to assess the psychological impact of diabetes with respect to anxiety and depression in a rural tertiary care setting.

Materials and Methods: A cross-sectional observational study was conducted among 218 adult patients with diabetes mellitus attending a rural tertiary care hospital in Tamil Nadu, India. Sociodemographic and clinical data, including glycemic parameters and diabetic complications, were collected using a structured questionnaire. Anxiety and depression were assessed using validated tools, the Generalised Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9). Data were analysed using SPSS version 23.

Results: The mean age of participants was 50 ± 9.98 years, with a mean HbA1c of $8.5 \pm 1.34\%$, indicating suboptimal glycemic control. The median PHQ-9 score was 12 and the median GAD-7 score was 9, reflecting moderate levels of depression and anxiety. Diabetic complications were present in 52.8% of participants. A significant association was observed between diabetic complications and both depression ($\chi^2 = 43.85$, $p < 0.001$) and anxiety ($\chi^2 = 34.06$, $p < 0.001$). No significant association was found between gender and psychological distress.

Conclusion: Diabetic patients in this rural setting showed a notable burden of anxiety and depression, especially among those with complications. Psychological distress was not related to gender but was strongly linked to disease severity. These findings support routine screening with PHQ-9 and GAD-7 and an integrated approach to diabetes care addressing both physical and mental health.

Keywords: Diabetes mellitus, Anxiety, Depression, Psychological distress, PHQ-9, GAD-7, Diabetic complications, Rural study.

INTRODUCTION

Diabetes mellitus is a long-term metabolic disorder in which the body is unable to properly regulate blood glucose levels because of inadequate insulin production, impaired insulin action, or both. It is one of the most common non-communicable diseases worldwide and has become a major public health concern due to its rapidly increasing prevalence. Diabetes can affect multiple organs and is associated

with complications involving the heart, kidneys, nerves, and eyes.^[1,2] India carries a particularly high burden of diabetes and is often described as the “diabetes capital of the world.” Rapid urbanisation, unhealthy dietary habits, reduced physical activity, obesity, stress, and sedentary lifestyles have contributed to the growing number of diabetes cases in both urban and rural populations.^[3,4,5]

The long-term nature of diabetes and its associated complications significantly increase morbidity,

mortality, and healthcare costs. Persistent hyperglycemia can damage blood vessels and nerves, leading to complications such as diabetic neuropathy, nephropathy, and retinopathy. In addition, individuals with diabetes are at greater risk of cardiovascular diseases, including myocardial infarction, stroke, and heart failure. These complications not only increase hospital visits and treatment expenses but also reduce productivity and overall quality of life.^[6,7,8,9] Apart from physical health problems, diabetes also has a considerable psychological impact. Managing the disease requires lifelong medication, dietary control, regular monitoring of blood glucose levels, and continuous fear of complications. Financial burden, repeated hospital visits, and lifestyle restrictions often contribute to emotional stress, anxiety, and depression. Research has shown that psychological distress in diabetic patients can negatively affect treatment adherence, sleep, social relationships, and overall well-being.^[10,11,12,13,14]

Anxiety is common among patients with diabetes mellitus and is characterised by persistent fear, worry, and emotional distress. Fear of hypoglycemia, long-term complications, dietary restrictions, and lifelong treatment contribute significantly to anxiety in diabetic individuals. Anxiety may impair medication adherence, self-care practices, and glycemic control, thereby worsening disease outcomes and quality of life. Recent studies have reported a high prevalence of anxiety among patients with type 2 diabetes, particularly in those with prolonged disease duration and complications.^[11,13,15] Depression is a frequent psychological comorbidity in diabetes mellitus and shares a bidirectional relationship with the disease. Chronic stress, fear of complications, financial burden, and continuous treatment may contribute to depressive symptoms, while depression negatively affects self-care, treatment adherence, lifestyle practices, and glycemic control. Consequently, depression increases the risk of diabetes-related complications and poor quality of life. Recent evidence highlights the significant psychological burden of depression among patients with type 2 diabetes.^[13,14,16]

The prevalence of diabetes is increasing in rural populations where awareness regarding diabetes management and mental health remains limited. Anxiety and depression are often underdiagnosed due to poor mental health literacy, social stigma, inadequate healthcare resources, and a lack of routine psychological screening. Early identification of psychological disorders in rural tertiary care settings is essential to improve treatment adherence, glycemic control, and overall quality of life.^[11,13,14] Despite the rising prevalence of diabetes mellitus, anxiety and depression among diabetic patients remain underdiagnosed, especially in rural populations. Psychological distress can adversely affect treatment adherence, self-care, glycemic control, and quality of life. Limited studies are available regarding the psychological impact of diabetes in rural tertiary care

settings. Therefore, the present study was undertaken to assess anxiety and depression among diabetic patients attending a rural tertiary care hospital.

Aim

- To assess the association between psychological distress (anxiety and depression) and diabetic complications among patients attending a rural tertiary care hospital.

Objectives

- To assess the relationship between gender and psychological distress (anxiety and depression) among diabetic patients.
- To evaluate the association between diabetic complications and anxiety among diabetic patients.
- To evaluate the association between diabetic complications and depression among diabetic patients.
- To describe the socio-demographic and clinical profile of diabetic patients attending a rural tertiary care hospital.
- To assess the psychological status (anxiety and depression) among diabetic patients using standardised scales (GAD-7 and PHQ-9).

MATERIALS AND METHODS

This cross-sectional observational study was conducted in the Department of General Medicine at a rural tertiary care hospital in Tamil Nadu, India, from September 2025 to April 2026. Adult diabetic patients attending the outpatient and inpatient departments were included in the study. A total of 218 participants were enrolled based on inclusion and exclusion criteria. Patients aged >18 years with diagnosed diabetes mellitus who were willing to participate were included, while patients with known psychiatric illness, critically ill patients, pregnant women, and unwilling participants were excluded. Written informed consent was obtained from all participants. Sociodemographic and clinical details, including age, gender, duration of diabetes, HbA1c levels, diabetic complications, and treatment history, were collected using a structured questionnaire. Anxiety and depression were assessed using validated screening tools, namely the Generalised Anxiety Disorder-7 (GAD-7) scale and Patient Health Questionnaire-9 (PHQ-9). Microsoft Excel was used for entering data, which was then analysed using the Statistical Package for the Social Sciences (SPSS) software for Windows, version 23.

Ethical Approval: Ethical approval was obtained from the Institutional Ethics Committee (IECHS/IRCHS/NO.703) before initiation of the study. The study adhered to the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants, and confidentiality of the collected data was maintained throughout the study.

Sample size: The sample size was calculated using OpenEpi software (Version 3.01) for estimation of a

proportion. Considering a finite population of 500, an assumed prevalence of 50%, 95% confidence level, and 5% absolute precision, the minimum required sample size was calculated to be 218. The sample size was calculated using OpenEpi software version 3 (Open Source Epidemiologic Statistics for Public Health, www.openepi.com).

RESULTS

The study included a total of 218 participants, of whom 136 (62.4%) were female and 82 (37.6%) were male, indicating a higher representation of female participants in the study population. [Figure 1] The mean age of the study population was 50 ± 9.98 years, and the mean duration of diabetes was 8.31 ± 3.30 years. The mean fasting blood sugar (FBS) was 171 ± 38.5 mg/dL, while the mean postprandial blood sugar (PPBS) was 235 ± 51.0 mg/dL. The mean HbA1c level was $8.5 \pm 1.34\%$, indicating suboptimal glycemic control among the participants. [Table 1] The median PHQ-9 score was 12 (IQR: 4–14), and the median GAD-7 score was 9 (IQR: 3–11), indicating the presence of moderate levels of depressive and anxiety symptoms in the study population. Regarding educational status, 79 (36.2%) participants had primary education, 60 (27.5%) had secondary education, 40 (18.3%) were illiterate, and 39 (17.9%) were graduates. [Table 2]

In terms of occupation, housewives constituted the largest group (80, 36.7%), followed by daily wage labourers (51, 23.4%), farmers/agricultural workers (43, 19.7%), and government/private employees (22, 10.1%). Self-employed individuals accounted for 22 (10.1%) participants. [Table 2] With respect to treatment modalities, 103 (47.2%) patients were on oral hypoglycemic agents alone, 70 (32.1%) were on insulin therapy, and 45 (20.6%) were receiving both oral agents and insulin. Diabetic complications were present in 115 (52.8%) participants, whereas 103 (47.2%) had no documented complications. Analysis of psychological variables showed no significant association between gender and depression ($\chi^2 = 0.02$, $df = 1$, $p = 0.888$; Cramér's $V = 0.01$). Similarly, no significant association was observed between gender and anxiety ($\chi^2 = 0.004$, $df = 1$, $p = 0.950$; Cramér's $V = 0.004$), indicating that gender did not influence psychological distress in the study population. [Table 4]

However, a statistically significant association was observed between depression and diabetic complications ($\chi^2 = 43.85$, $p < 0.001$), with a moderate-to-strong effect size (Cramér's $V = 0.45$). Similarly, anxiety was significantly associated with

diabetic complications ($\chi^2 = 34.06$, $p < 0.001$), with a moderate effect size (Cramér's $V = 0.40$), indicating that patients with psychological distress were more likely to have diabetic complications. [Table 4]

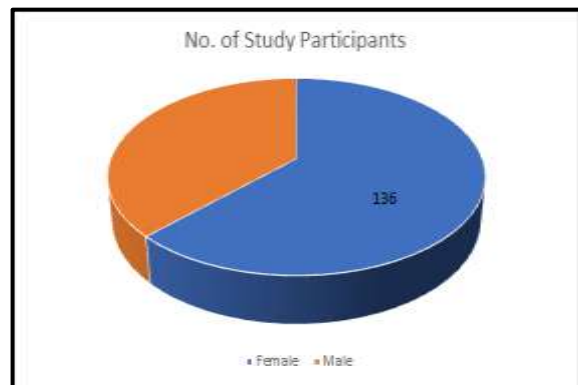


Figure 1: Gender-Wise Distribution of Study Participants.

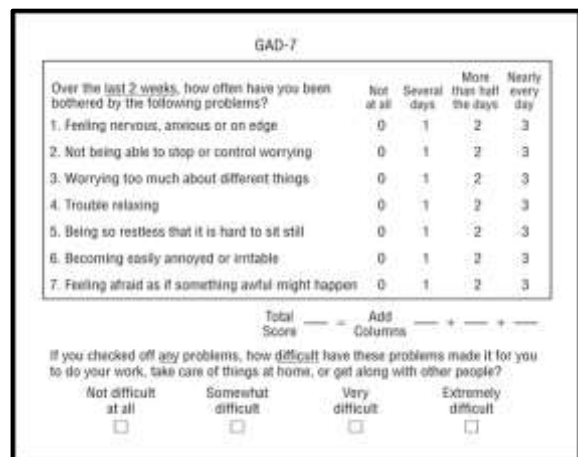


Figure 2: The Generalized Anxiety Disorder 7-Item (GAD-7) Scale.



Figure 3: The PHQ-9 scale.

Table 1: Baseline and Clinical Characteristics

Variable	Mean \pm SD
Age (years)	50 ± 9.98
Duration of diabetes (years)	8.31 ± 3.30
Fasting blood sugar (FBS, mg/dL)	171 ± 38.5
Postprandial blood sugar (PPBS, mg/dL)	235 ± 51.0
HbA1c (%)	8.5 ± 1.34

Table 2: Socio-Demographic Profile

Variable	Category	n (%)
Education	Illiterate	40 (18.3)
	Primary	79 (36.2)
	Secondary	60 (27.5)
	Graduate	39 (17.9)
Occupation	Housewife	80 (36.7)
	Daily wage labourer	51 (23.4)
	Farmer	43 (19.7)
	Govt/Private employee	22 (10.1)
	Self-employed	22 (10.1)

Table 3: Treatment and Complications

Variable	Category	n (%)
Treatment	OHA	103 (47.2)
	Insulin	70 (32.1)
	Both	45 (20.6)
Complications	Present	115 (52.8)
	Absent	103 (47.2)

Table 4: Association with Psychological Variables

Variable	χ^2	p-value
Gender vs Depression	0.02	0.888
Gender vs Anxiety	0.004	0.950
Complications vs Depression	43.85	<0.001
Complications vs Anxiety	34.06	<0.001

DISCUSSION

This cross-sectional study assessed anxiety and depression among patients with diabetes mellitus attending a rural tertiary care hospital. The results showed a notable burden of psychological distress, with moderate levels of both anxiety and depression based on GAD-7^[17] [Figure 2] and PHQ-9 scores.^[18] [Figure 3] These findings reinforce that diabetes is not only a metabolic disorder but also closely linked to psychological morbidity, as reported in previous studies.^[10-13] A significant association was observed between diabetic complications and both anxiety and depression ($p < 0.001$). Patients with complications experienced higher psychological distress, indicating that increasing disease severity negatively affects mental health. This aligns with evidence showing that complications such as neuropathy, nephropathy, retinopathy, and cardiovascular disease contribute to reduced quality of life due to chronic symptoms, disability, and dependency.^[6-9]

In contrast, gender did not show a significant association with psychological distress in this study, suggesting that anxiety and depression affect diabetic patients regardless of sex. While some studies report higher rates in females, differences in population characteristics and coping mechanisms may explain this variation.^[13,15] The study also revealed poor glycemic control (mean HbA1c 8.5%), which may be influenced by psychological distress. Anxiety and depression can reduce medication adherence, self-care, and lifestyle compliance, leading to poor glucose control. Conversely, uncontrolled diabetes can further worsen mental health, suggesting a clear bidirectional relationship.^[14,16]

More than half of the participants had diabetic complications (52.8%), which likely contributed to

increased psychological burden due to frequent hospital visits, financial strain, physical limitations, and long-term dependency. Similar findings have been reported in earlier studies linking complications with higher depression and anxiety scores.^[11,12] Importantly, in rural healthcare settings, psychological distress often remains underdiagnosed due to limited awareness, stigma, and lack of routine screening. Simple tools like PHQ-9 and GAD-7 can be easily integrated into diabetic care for early detection and timely intervention. Overall, the study highlights that diabetic complications are strongly associated with psychological distress, while gender has no significant effect. This emphasises the need for integrated diabetes care addressing both physical and mental health, especially in resource-limited rural settings.

CONCLUSION

This study highlights that anxiety and depression are common psychological concerns among patients with diabetes mellitus in a rural tertiary care setting. A clear and significant association was observed between diabetic complications and psychological distress, while gender showed no meaningful impact. The findings also point toward a close, bidirectional relationship between poor glycemic control, diabetes-related complications, and mental health status, where each can negatively influence the other. This emphasises that diabetes management extends beyond blood sugar control and must include attention to emotional well-being. In resource-limited rural settings, routine use of simple screening tools such as PHQ-9 and GAD-7 can help in early identification of psychological distress. Integrating mental health assessment into standard diabetic care

may improve adherence, glycemic control, and overall quality of life.

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