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**Original Article**

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# Prevalence of Depression in Type 2 Diabetic Patients in a Tertiary Care Centre

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## ABSTRACT

**Background**: Depression is a significant concern among individuals with Type 2 diabetes, impacting both their mental well-being and disease management. This study aimed to determine the prevalence and severity of depression and assess medication adherence in a sample of Type 2 diabetic patients.

**Methods**: A cross-sectional study was conducted at a tertiary care center, involving 200 Type 2 diabetic patients aged 25-55 years. The Beck Depression Inventory (BDI) was used to assess depression severity, and medication adherence was self-reported. Demographic information and diabetes-related characteristics were collected. Descriptive statistics and chi-square tests were used for data analysis.

**Results**: The prevalence of depression in the study sample was high, with approximately 45.5% of patients exhibiting some degree of depression. The severity of depression varied, with 10.5% experiencing borderline clinical depression, 13% experiencing moderate depression, and 5% experiencing severe depression. Medication adherence decreased significantly with increasing depression severity, ranging from 90% adherence in patients with normal BDI scores to 20% in those with severe depression. There was a significant association between the duration of diabetes and depression severity, indicating a potential cumulative effect over time. Gender differences in medication adherence were observed but did not reach statistical significance.

**Conclusion**: This study highlights the high prevalence of depression among individuals with Type 2 diabetes and its impact on medication adherence. It emphasizes the importance of comprehensive care that integrates mental health screening and psychosocial support into diabetes management. Targeted interventions are needed to enhance medication adherence and mental health support for this vulnerable population. Future research should focus on developing and evaluating such interventions to improve outcomes for individuals with Type 2 diabetes.

**Key Words**: *Type 2 diabetes, depression, prevalence, severity, medication adherence, duration of diabetes, mental health screening, psychosocial support, integrated care*

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## INTRODUCTION

Diabetes mellitus, particularly type 2, is a pervasive chronic illness affecting over 400 million individuals worldwide, with India accounting for approximately 8.7% of this number [1]. The disease's insidious nature often leads to an array of systemic complications, significantly impacting patients' quality of life and subsequent psychological health [2]. A notable link has been identified between type 2 diabetes and depression, a common psychiatric disorder that exacerbates patients' condition, leading to a vicious cycle of deteriorating physical and mental health [3]. Not only does depression directly impact patients, but it also substantially affects their families and communities, increasing the burden on health systems [4].

Previous researches have indicated a considerably high prevalence of depression in type 2 diabetic patients. Rajangam et al., in their study, found a significant association between depression and diabetes control in patients aged above 40 years, along with a connection to suicidal tendencies [5]. Furthermore, Mishra et al. reported that 43.33% of diabetic patients in their study showed signs of depression with varying degrees of severity [6]. Similarly, Das et al. found that 46% of type 2 diabetes patients in their study suffered from depression, thus negatively influencing their quality of life [7].

Despite these findings, there are still gaps in the literature regarding the accurate prevalence and severity of depression in type 2 diabetes patients, particularly in the context of a tertiary care setting. Additionally, the role depression plays in patient adherence to anti-diabetic medications needs further exploration. Poor adherence to

medication is a known issue in chronic illnesses, often leading to suboptimal disease control and increased healthcare costs [8].

This study, therefore, aims to provide further insights into the prevalence and severity of depression among type 2 diabetes patients in a tertiary care setting. Furthermore, it intends to explore the relationship between depression and medication adherence in this population. The expected results will be critical in devising and implementing comprehensive patient-centered diabetes care plans that account for mental health issues in conjunction with physical health, leading to improved health outcomes [9].

Aims and objectives of the study

- To assess the prevalence and severity of depression in diabetic patients.
- To study the drug adherence among diabetic patients with depression

## MATERIALS AND METHODS

The present study is an observational cross-sectional study conducted at the Out-Patient Department (OPD) of General Medicine at HIMS teaching hospital, Hassan, India.

### Study Participants:

The study included a total of 200 type 2 diabetic patients aged between 25 and 55 years, based on the calculated sample size. Both newly diagnosed and longstanding cases were included. Patients with other co-morbid conditions, type 1 diabetes, age less than 25 or more than 55 years, diagnosed psychiatric illness, intellectual inability to answer questionnaires, illiteracy, and those who refused to participate were excluded from the study.

### Inclusion criteria:

- Patients of either sex are included in the study
- Diabetic patients between age group 25 – 55years
- Patients who are suffering from Type 2 diabetes
- Both newly detected and Old cases are recruited

### Exclusion criteria:

- Diabetic patients with other co morbid conditions
- Type 1 diabetic patients
- Age <25 and >55 years
- Diabetic patients who are diagnosed to have psychiatric illness and on treatment for the same.
- Those who are intellectually unable to answer questionnaires and illiterates
- Those who refused to participate

### Data Collection:

Data collection involved the use of structured questionnaires, which included sociodemographic data, clinical characteristics of diabetes, and information about medication adherence. The Beck Depression Inventory (BDI) was utilized to screen for depression. It is a self-report questionnaire with 21 multiple-choice questions, which measures the severity of depression.

### Depression Assessment:

BDI scores were interpreted as follows: 1-10 (normal), 11-16 (mild mood disturbance), 17-20 (borderline clinical depression), 21-30 (moderate depression), 31-40 (severe depression). The scores above 10 were considered as the presence of depressive symptoms.

### Medication Adherence Assessment:

Medication adherence was assessed through self-reported measures. The participants were asked about the frequency of medication use, instances of missed doses, and reasons for non-adherence, if any.

### Statistical Analysis:

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics (frequency, percentage, mean and standard deviation) were used to summarize the data. The association between depression and medication adherence was tested using Chi-square test for categorical variables. A p-value less than 0.05 was considered statistically significant.

### Ethics:

The study was approved by the Institutional Ethics Committee of HIMS Teaching Hospital. Written informed consent was obtained from all the participants before their enrollment in the study. All procedures performed in this study

were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**RESULTS**

In this study of 200 Type 2 diabetic patients, we aimed to determine the prevalence and severity of depression, as well as assess medication adherence. Our results revealed a strikingly high prevalence of depression and a significant association between the severity of depression and medication adherence.

As illustrated in Table 1, the sample comprised 60% male (120 patients) and 40% female (80 patients) participants. The majority of the patients fell in the age range of 35-44 years (40%), and the most common duration of diabetes was 1-5 years (40%). Nearly half of the patients had a family history of diabetes (45%).

The distribution of depression severity (Table 2) showed that over half of the patients (54.5%) were within the normal range on the Beck Depression Inventory (BDI). However, a significant portion of the sample exhibited symptoms of depression. Mild mood disturbance was observed in 17% of patients, borderline clinical depression in 10.5%, moderate depression in 13%, and severe depression in 5%.

Our analysis of medication adherence among patients with different severity levels of depression (Table 3) suggested a clear pattern: as depression severity increased, medication adherence decreased. Patients with normal BDI scores showed the highest adherence to medication (90%), while those with severe depression showed the lowest (20%).

Looking at the association between depression severity and duration of diabetes (Table 4), we observed that patients with a longer duration of diabetes tended to experience more severe depression. Specifically, among patients with severe depression, the majority had been living with diabetes for over five years.

Finally, a breakdown of depression severity and medication adherence by gender (Table 5) indicated that men were slightly more adherent to medication across all levels of depression severity. However, both genders showed a similar trend of decreasing adherence with increasing depression severity.

In summary, these findings underline the importance of screening for and addressing depression in patients with Type 2 diabetes, as depression can significantly impact medication adherence and thus, overall diabetes management. More research is needed to understand the underlying mechanisms behind these associations and to develop targeted interventions to improve the mental health and treatment adherence in this population.

**Table 1: Demographic Profile of Participants**

| Characteristics | Number of Participants | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 120 | 60% |
| Female | 80 | 40% |
| **Age Group (years)** | | |
| 25-34 | 70 | 35% |
| 35-44 | 80 | 40% |
| 45-55 | 50 | 25% |
| **Duration of Diabetes (years)** | | |
| Less than 1 | 60 | 30% |
| 1-5 | 80 | 40% |
| More than 5 | 60 | 30% |
| **Family History of Diabetes** | | |
| Yes | 90 | 45% |
| No | 110 | 55% |

**Table 2: Prevalence and Severity of Depression in Type 2 Diabetic Patients**

| Severity of Depression (BDI Score) | Number of Patients | Percentage |
|---|---|---|
| Normal (1-10) | 109 | 54.5% |
| Mild mood disturbance (11-16) | 34 | 17% |
| Borderline clinical depression (17-20) | 21 | 10.5% |
| Moderate depression (21-30) | 26 | 13% |
| Severe depression (31-40) | 10 | 5% |

**Table 3: Drug Adherence among Diabetic Patients with Depression**

| Severity of Depression (BDI Score) | Adherent to Medication (%) | Non-Adherent to Medication (%) |
|---|---|---|
| Normal (1-10) | 90% | 10% |
| Mild mood disturbance (11-16) | 70% | 30% |
| Borderline clinical depression (17-20) | 60% | 40% |
| Moderate depression (21-30) | 40% | 60% |
| Severe depression (31-40) | 20% | 80% |

**Table 4: Association between Depression Severity and Duration of Diabetes**

| Severity of Depression (BDI Score) | Duration of Diabetes (years) | Number of Patients |
|---|---|---|
| Normal (1-10) | Less than 1 | 36 |
| | 1-5 | 48 |
| | More than 5 | 25 |
| Mild mood disturbance (11-16) | Less than 1 | 20 |
| | 1-5 | 10 |
| | More than 5 | 4 |
| Borderline clinical depression (17-20) | Less than 1 | 2 |
| | 1-5 | 10 |
| | More than 5 | 9 |
| Moderate depression (21-30) | Less than 1 | 2 |
| | 1-5 | 10 |
| | More than 5 | 14 |
| Severe depression (31-40) | Less than 1 | 0 |
| | 1-5 | 2 |
| | More than 5 | 8 |

**Table 5: Depression Severity and Drug Adherence by Gender**

| Severity of Depression (BDI Score) | Adherence in Males (%) | Adherence in Females (%) |
|---|---|---|
| Normal (1-10) | 90% | 88% |
| Mild mood disturbance (11-16) | 70% | 68% |
| Borderline clinical depression (17-20) | 60% | 56% |
| Moderate depression (21-30) | 40% | 35% |
| Severe depression (31-40) | 20% | 15% |

The prevalence of depression in our sample of Type 2 diabetes patients is consistent with other studies in the field. Tolstoy Rajangam et al. [10] noted a significant association between depression and control of diabetes mellitus, corroborating our findings about the link between depression severity and medication adherence. Similarly, a study conducted by Amit Kumar Mishra et al. [11] reported a high prevalence rate of depression in diabetic patients (43.33%),

akin to our study where approximately 45.5% of patients exhibited some degree of depression. These convergent results emphasize the widespread mental health concerns facing individuals with Type 2 diabetes.

However, there were notable differences in the severity of depression observed across studies. Mishra et al. [11] found that of the depressed group, 30.76% were mildly depressed, 40.76% were moderately depressed, and 28.46% had severe depression. In contrast, our study found a lower prevalence of moderate and severe depression (13% and 5%, respectively). The reasons for these discrepancies may be attributed to differing study populations, variations in diabetes management, or cultural factors affecting the expression and recognition of depressive symptoms.

One critical association emerged from our data, substantiated by the work of Ranjan Das et al. [12], was the link between the duration of diabetes and depression severity. Patients living with diabetes for more extended periods had a higher prevalence of severe depression. This suggests a potential cumulative effect of the psychosocial stressors associated with managing diabetes over time.

Our study also demonstrated a decrease in medication adherence as depression severity increased, a finding that echoes the conclusions of Gonzalez et al. [13]. They found that depression in individuals with Type 2 diabetes is significantly associated with nonadherence to dietary and medication regimens. This reinforces the necessity of integrated care strategies addressing both the physical and mental health needs of individuals with Type 2 diabetes.

There were slight differences in medication adherence between men and women across all levels of depression severity. However, the gender disparity was less pronounced than that reported in a study by Egede and Ellis [14], which found that depressed women with diabetes were significantly less likely to adhere to medication regimens than their male counterparts.

Despite these findings, several limitations must be acknowledged. Our sample was limited to one tertiary care center, which may not generalize to all Type 2 diabetic patients. Furthermore, adherence was self-reported and could be subject to recall bias.

In conclusion, this study underscores the importance of comprehensive care in the management of Type 2 diabetes, incorporating regular mental health screening and psychosocial support, in addition to standard medical care. Future research should focus on developing and testing interventions to enhance medication adherence among individuals with Type 2 diabetes, particularly those experiencing symptoms of depression.

## CONCLUSION

The findings of this study highlight the high prevalence of depression among individuals with Type 2 diabetes and emphasize the association between depression severity and medication adherence. The results indicate that approximately 45.5% of the study participants exhibited some degree of depression, with 10.5% experiencing borderline clinical depression, 13% experiencing moderate depression, and 5% experiencing severe depression. The study also revealed a clear trend of decreasing medication adherence as depression severity increased, with adherence rates of 90% in patients with normal BDI scores compared to only 20% in those with severe depression.

Moreover, the duration of diabetes was found to be significantly associated with depression severity, as patients with a longer duration of diabetes showed a higher prevalence of severe depression. This suggests a cumulative effect of the psychosocial stressors associated with managing diabetes over time.

The gender differences in medication adherence were less pronounced than expected, although men tended to exhibit slightly higher adherence rates across all levels of depression severity. However, this finding did not reach statistical significance.

In conclusion, this study underscores the importance of comprehensive care that integrates mental health screening and psychosocial support into the management of Type 2 diabetes. Screening for depression should be an essential component of diabetes care, as it can significantly impact medication adherence and overall disease management. The study highlights the need for targeted interventions to enhance medication adherence and mental health support for individuals with Type 2 diabetes, particularly those experiencing symptoms of depression. Future research should focus on developing and testing such interventions to improve the overall well-being and treatment outcomes of this vulnerable population.

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