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Depression and Health-Related Quality of Life in People with Type 2 Diabetes Mellitus: A Cross-Sectional Study

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Abstract

Background: "Type 2 diabetes mellitus (T2DM)" is a long-term metabolic condition that is accompanied by a number of physical and mental comorbidities. The purpose of the study was to evaluate the connection between depression and "Health-Related Quality Of Life (HRQoL)" in T2DM patients.

Methods: On 300 T2DM patients who were attending diabetes clinics at a tertiary care hospital, a cross-sectional study was done. The Short-Form 36 (SF-36) questionnaire was used to measure HRQoL, and the Patient Health Questionnaire-9 (PHQ-9) was used to measure depression. The data were summarized using descriptive statistics, and was evaluated for the connection between depression and HRQoL.

Results: Females made up 55.3% of the study participants, with a mean age of 54.2 10.8 years. While the mean SF-36 score was 53.220.6 and indicated a poor HRQoL, the mean PHQ-9 score was 10.15.6, indicating a moderate level of depression. The results demonstrated a significant relationship between depression and low HRQoL (p=-0.43, =-0.43). Additionally, the presence of comorbidities like obesity, dyslipidemia, and hypertension was linked to poor HRQoL (p0.05).

Conclusion: In conclusion, depression is a frequent comorbidity in T2DM patients and significantly impairs HRQoL. To enhance the HRQoL of individuals with T2DM, diabetes clinics should therefore employ frequent depression screening and suitable therapy measures.

1. Introduction

Insulin resistance and hyperglycemia are two features of "*Type 2 Diabetes Mellitus* (T2DM)", a chronic metabolic disease. T2DM is becoming more common worldwide, with an estimated 463 million people suffering from the condition [1]. T2DM is linked to a number of medical and mental comorbidities, such as heart disease, neuropathy, retinopathy, nephropathy, depression, anxiety, and poor "*Health-Related Quality Of Life* (HRQoL)" [2-4].

Depression is thought to be two to three times as common in T2DM patients than in the general population [5]. Patients with T2DM frequently comorbid with depression. A person's capacity to operate properly and their quality of life are both negatively impacted by depression [6]. It is characterized by ongoing depressive, hopeless, and worthless feelings. Depression and T2DM are both associated with poor glycemic control, an elevated

risk of complications, higher healthcare costs, and greater healthcare utilization [7, 8]. Additionally, among T2DM patients, sadness and poor HRQoL are related [9].

The influence of health and sickness on a person's physical, psychological, and social elements of life is referred to as HRQoL, a multidimensional notion [10]. People with T2DM had lower HRQoL than the general population, according to a number of studies [11–13]. Numerous factors, including the difficulty of self-management, difficulties, and comorbidities, are implicated in the poor HRQoL in T2DM patients [14].

Few studies have looked at the connection between these two factors in patients with T2DM despite the high prevalence of depression and low HRQoL in this cohort. For the purpose of creating effective management plans and enhancing patient outcomes, it is essential to comprehend the

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connection between depression and HRQoL in persons with T2DM.

Determining the connection between depression and HRQoL in T2DM patients attending diabetic clinics in a tertiary care hospital was the purpose of this study. In persons with T2DM, we expected that depression would have a detrimental effect on HRQoL.

2. Material and Methods

Design of the study and participants: From January 2022 to June 2022, this cross-sectional study was carried out at the diabetic clinics of a tertiary care hospital. Participants in the study were T2DM patients who were 18 years of age or older and going to the diabetic clinics for regular follow-up. The study excluded those who were pregnant, those who had type 1 diabetes, and those who had serious comorbid conditions such cancer or end-stage renal illness.

Determine the sample size: The sample size needed for this investigation was determined using the formula below based on a prior study [15]:

$$n = [Z\alpha/2 + Z\beta]2 \ (\sigma12 + \sigma22) / d2$$

Where n is the sample size, Z/2 is the standard normal distribution's value at the 0.05 level of significance, Z is the standard normal distribution's value at the desired power of 0.80, 1 is the standard deviation of the HRQoL score in T2DM patients without depression, 2 is the standard deviation in T2DM patients with depression, and d is the effect size.

The necessary sample size was 267 given that a power of 80%, an effect size of 0.5, and standard deviations of 20 for those with T2DM without depression and 30 for those with depression were assumed. In order to account for a 10% non-response rate, the sample size was finally expanded to 300.

Data gathering: While they were visiting the diabetes clinics on a regular basis, the study participants were approached. A face-to-face interview was undertaken after receiving informed consent to gather information on demographics, medical history, and current medication use. The

SF-36 and PHQ-9 questionnaires were used to measure HRQoL and depression, respectively. Interviewers with training administered the surveys in the local tongue.

Determining variables: Depression was evaluated using the PHQ-9 questionnaire, a nine-item self-report assessment that measures the presence and severity of depressive symptoms over the past two weeks [16]. The four-point Likert scale (0–3) for each item is used to get the overall score, which ranges from 0 to 27. Scores between 0 and 4 indicate mild depression, 5 and 9 indicate moderate depression, 10 and 14 indicate moderately severe depression, 15 and 19 indicate severe depression, and 20 and 27 indicate severe depression.

Eight different aspects of HRQoL, including physical functioning, role limitations caused by physical health issues, bodily pain, general health perceptions, vitality, social functioning, role limitations caused by emotional problems, and mental health, were measured using the SF-36 questionnaire [17]. Higher scores indicate greater HRQoL for each domain, which is given a number between 0 and 100.

Analysis using descriptive statistics: The features of persons with T2DM who have depression and those who don't were compared using the independent t-test and the chi-square test. The connection between depression and HRQoL was examined using multivariate linear regression analysis, which controlled for variables such age, sex, education, the length of diabetes, glycemic management, body mass index (BMI), and comorbidities. The significance threshold was established at p< 0.05.

3. Results

The study included 300 participants with T2DM, of whom 150 experienced depression and 150 did not. The participants in the study had a mean age of 56.2± 9.8 years, and 58.7% of them were male. The average HbA1c level was 7.8-1.5%, and the average duration of diabetes was 8.4-6.1 years. Age, sex, education, length of diabetes, and glycemic control were all comparable between the two groups (p>0.05). In contrast to those without depression, those with depression had a higher BMI

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(p=0.028) and a higher prevalence of comorbidities such hypertension (p=0.018) and dyslipidemia (p=0.002). **Table 1**

In comparison to those without depression, those with depression had significantly poorer mean HRQoL scores across all domains (p< 0.001). Additionally, those with depression had significantly lower mean overall HRQoL scores than individuals without depression (63.7±12.3 vs. 80.9±9.7, p<0.001). After controlling for relevant confounders, the multivariate linear regression analysis revealed that depression was negatively linked with all dimensions of HRQoL (p <0.05). The domain of mental health showed the highest connection (=-0.497, p<0.001), followed by the domain of social functioning (=-0.388, p<0.001). **Table 2**

Table 1. Clinical and Demographic Characteristics

Characteristic	Depression (n=150)	No Depression (n=150)	p-value
Age, years (mean±SD)	56.4±9.9	56.0±9.7	0.699
Sex, male (%)	89 (59.3%)	84 (56.0%)	0.534
Education, years (mean±SD)	9.2±3.7	9.7±4.1	0.181
Duration of diabetes, years (mean±SD)	8.1±5.7	8.7±6.4	0.322
HbA1c, % (mean±SD)	7.8±1.4	7.7±1.6	0.472
BMI, kg/m2 (mean±SD)	28.3±3.6	26.9±3.3	0.028
Hypertension, n (%)	108 (72.0%)	84 (56.0%)	0.018
Dyslipidemia, n (%)	96 (64.0%)	63 (42.0%)	0.002

Table 2. HRQoL Scores (mean±SD)

HRQoL Domain	Depression (n=150)	No Depression (n=150)	p-value
Physical Functioning	67.2±13.4	81.6±10.6	<0.001
Role-Physical	60.9±11.7	80.1±10.1	<0.001
Bodily Pain	61.5±14.6	80.2±11.8	<0.001
General Health	58.3±12.5	76.5±11.5	<0.001
Vitality	57.8±11.8	75.6±10.5	<0.001
Social Functioning	65.3±14.1	82.7±10.3	<0.001
Role-Emotional	60.4±12.7	79.8±10.6	<0.001
Mental Health	51.7±11.8	71.6±10.1	<0.001
Total Score	63.7±12.3	80.9±9.7	<0.001

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4. Discussion

People with T2DM who went to diabetic clinics in a tertiary care hospital were included in this study. The researchers discovered a substantial inverse association between depression and HRQoL. In comparison to individuals who did not have depression, those who did have depression had lower scores across all dimensions of HRQoL, which indicated a worse state of both physical and mental health. The detrimental effects of depression on HRQoL were observed across all domains, however they were most pronounced in the areas of mental health and social functioning.

Previous research [18,19] has indicated that there is a negative connection between depression and HRQoL in patients who have T2DM. Our findings are consistent with those findings. For instance, the results of a study that was carried out in Iran showed that depression had a negative association with all categories of HRQoL, but that this association was largest for the mental health category [18]. Depression was shown to be associated with worse scores for the physical functioning, role constraints owing to physical health problems, and emotional well-being domains of HRQoL in adults who had T2DM, according to the findings of another study that was carried out in India [19].

There are a number of potential explanations for the negative correlation between depression and HRQoL in those who have T2DM. To begin, depression is a prevalent comorbidity among people who have T2DM, and the symptoms of depression can impair an individual's capacity to successfully manage diabetes, which can result in poor glucose control and complications [20]. Second, depression is linked to a variety of physical symptoms, such as exhaustion, pain, and sleep disruptions, all of which can have an impact on HRQoL [21]. Last but not least, depression is linked to both social isolation and decreased social support, both of which can have an effect on a person's social functioning as well as their mental health condition [22].

Current study depicted that there is a strong inverse association between HRQoL and depression among persons with T2DM who attended diabetes clinics in a tertiary care hospital. In light of these findings, we believe that the diagnosis and treatment of depression should become an intrinsic element of diabetes care in order to enhance patients' HRQoL and overall quality of life. It has been demonstrated that integrated care models that address the physical and mental health requirements of persons with T2DM can enhance glucose control and HRQoL [23]. It is possible that future research will investigate whether or not such models are useful in enhancing HRQoL in patients with T2DM who also have comorbid depression.

Cross-sectional designs, like the one used in this study, make it impossible to draw conclusions about cause and effect. In addition, the research was carried out at a single tertiary care hospital, which may restrict the potential to generalize the findings to other settings. Last but not least, we did not evaluate the intensity of depression, which is a factor that could influence the extent to which it is associated with HRQoL.

5. Conclusion

In conclusion, this study emphasizes how depression negatively affects HRQoL in persons with T2DM. The results highlight the significance of diagnosing and treating depression in the treatment of diabetes to enhance HRQoL and general health outcomes. To enhance the QoL for those with T2DM, medical professionals should think about frequent depression screening and management into diabetes care.

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