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EXPLORING MENTAL HEALTH PATTERNS IN DIABETES AND HYPERTENSION: A COMPARATIVE STUDY OF PSYCHOLOGICAL DISORDERS

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Abstract:
Diabetes mellitus (DM) is a prevalent chronic metabolic disorder that can lead to numerous complications as it progresses, potentially resulting in significant disability. It is widely recognized that individuals with diabetes experience higher rates of depression, and managing both diabetes and depression can be particularly challenging. This study focuses on the prevalence of depression in individuals with type II diabetes and its impact on their quality of life. A total of 195 participants with type II diabetes were interviewed at a single location. The assessment utilized the patient version of the Structured Clinical Interview for DSM-IV Axis I Disorders to identify major depressive episodes. To evaluate socio-demographic characteristics, quality of life, and depression levels, the Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q SF) and the Hamilton Depression Rating Scale (HAM-D) were administered. Among the participants, 46.15% (N=90; 41 men and 49 women) met the criteria for major depressive episodes as defined by the DSM-IV, with the majority (36.7%) experiencing moderate depression. Patients with depression had significantly lower scores on both the overall and specific items of the QLESQ-SF compared to those without depression. Additionally, there were notable negative correlations between the total QLESQ-SF scores, HAM-D scores, and HbA1c levels. Our findings indicate that the presence of depression significantly deteriorates the quality of life in patients with type II diabetes, suggesting that addressing depression could enhance overall well-being.

Keywords: Diabetes Mellitus, Quality of Life, Hypertension, Depression, Psychological Disorders.

1. INTRODUCTION

The connection between diabetes and mental health has long intrigued both

endocrinologists and mental health professionals. In the early 17th century, Thomas Willis suggested that diabetes was caused by "long sorrow and other depressions." Similarly, in his 1879 book "The Pathology of Mind," Sir Henry Maudsley noted that diabetes often appeared in families with a history of mental illness. Following the discovery of insulin, insulin coma therapy was even employed as a treatment for mental health conditions during the first decade. Over the past several decades, this relationship has been examined with greater scientific rigor. There is a reciprocal relationship between mental health issues and diabetes, with each influencing the other. This article explores various aspects of this connection. Initially, it will address the overarching challenges associated with the topic, followed by a detailed examination of the key characteristics of each individual's specific mental health condition.

1.1. The Intersection of Diabetes and Psychiatric Disorders

Diabetes and mental illness can coexist in various ways. Initially, both conditions may manifest independently, stemming from distinct yet interconnected pathogenic pathways. Additionally, the development of mental health issues can complicate the management of diabetes. In some instances, diabetes itself may serve as a contributing factor to mental disorders.

In this context, various biological and psychological factors play a significant role in the development of mental illnesses. Additionally, certain mental conditions, such as schizophrenia and depression, each pose a considerable risk for the onset of diabetes. There may also be similarities in the clinical presentations of conditions like panic attacks and episodes of hypoglycemia or ketoacidosis. Furthermore, medications used to treat mental health disorders can have adverse effects, including reduced glucose tolerance and the potential development of diabetes. The treatment of psychological issues may also impact diabetes management, as discussed in the following sections.

Diabetes and Mental Illness Risks
• **Impact of Diabetes on Mental Health Outcomes** • **Psychiatric Disorders Affecting Diabetes Management** • **Common Pathways and Mechanisms** • **Role of Medications in Managing Both Conditions** • **Implications for Treatment Strategies** • **Exist as concurrent, independent conditions with no apparent connection**

Other interactions between mental illnesses and diabetes also exist. For instance, substances like alcohol and tobacco can alter the pharmacokinetics of oral hypoglycemic medications. Additionally, co-occurring mental health conditions, such as depression, can hinder diabetes management by affecting treatment adherence. Similarly, issues like fear of needles and injections may complicate procedures like insulin administration and blood

glucose testing. Furthermore, individuals with psychological disorders are often less likely to seek treatment, which can lead to delays in diagnosing co-occurring diabetes.

Co-occurrence Implications in Diabetes-psychiatric Illness

Patients with co-occurring psychiatric disorders experience poorer glycemic control, as indicated by elevated HbA1c levels. They also tend to have more frequent emergency room visits for diabetic ketoacidosis, increased hospital stays, and higher absenteeism rates. Additionally, the cost of medical treatment rises significantly for these individuals. Those with both psychiatric illnesses and endocrine disorders often incur medical expenses that are twice as high, or even more, for non-mental health issues compared to the general population, depending on the treatment context.

Psychiatric Illnesses Diagnosing in Diabetes-related

One of the primary challenges in addressing psychological illnesses in individuals with diabetes is the low rate of identification. Untreated mental health issues and significant emotional distress affect up to 45% of those being treated for diabetes. This problem stems from both patient and physician-related factors. Healthcare providers should be aware of the potential co-occurring psychological conditions associated with diabetes. As outlined in the following sections, diabetes patients often experience mental co-morbidities, making regular screenings for common mental disorders essential. Effective brief screening tools for conditions like depression and anxiety include the Symptom Checklist-90 (SCL-90) and the Patient Health Questionnaire (PHQ), both of which are sensitive, efficient, and well-supported by empirical research. Additionally, the Hospital Anxiety and Depression Scale (HADS) can be employed to assess the mental health of this population. It is vital to routinely screen diabetics for the development of these psychological issues.

The relationship between mental illnesses and diabetes is bidirectional; each can influence the other. It is essential to investigate the behavioral and cognitive aspects of mental health conditions, especially since there may be overlap between the physical symptoms of diabetes and those associated with mental health issues.

Despite some differences, there is significant overlap between the two classification systems. The more widely used ICD-10 employs an alphanumeric coding method to identify various mental disorders, with psychiatric illnesses categorized under Chapter F. This chapter is further divided into ten categories, numbered 00 through 09, each containing specific mental health conditions. Additionally, ICD-10 includes a streamlined primary care version to assist primary care physicians in diagnosing mental illnesses. Among the mental health conditions particularly relevant to diabetes are delirium, substance use disorders, depression, anxiety, psychotic disorders like schizophrenia, and eating disorders.

1.2. Hypertension and HF

Hypertension is a global pandemic that affects approximately 50% of individuals over the age of 60 in various countries. It is defined as persistently elevated blood pressure (BP) exceeding 140/90 mmHg. Despite the increasing use of antihypertensive medications, the

prevalence of hypertension continues to rise. It is well established that hypertension is associated with elevated rates of cardiovascular and overall mortality, independent of other risk factors. Additionally, the role of hypertension in specific heart failure deaths is likely underreported, as stroke or myocardial infarction (MI) are often classified as competing causes of death related to hypertensive cardiovascular disease.

Hypertension Causes HF

One of the most notable findings from the Framingham cohort study was that individuals with hypertension had a significantly higher cumulative incidence of heart failure (HF). Among the 5,143 participants diagnosed with HF, 91% had a history of hypertension, underscoring its role as a contributing factor in the majority of HF cases. Both men and women with hypertension faced a twofold increase in risk for heart failure compared to those with normal blood pressure, with the risk rising to threefold in some instances. It is important to note that hypertension can also elevate the risk of ischemic coronary disease and other cardiovascular events, such as stroke, acting as a confounding factor. However, these studies may not fully reflect the risks in today's population, which is often treated for hypertension and has benefited from current heart failure management guidelines. Nonetheless, they highlight the critical role of untreated hypertension in the development of heart failure. Alarmingly, 90% of Americans aged 50 and older have some degree of lifetime risk for hypertension, emphasizing the need for effective interventions to manage hypertension and prevent heart failure.

Hypertension Treatment Prevents HF

Long-term management of both systolic and diastolic hypertension has been shown to significantly reduce the risk of heart failure (HF). For individuals over the age of 65 with a history of myocardial infarction (MI), the risk of developing HF may be decreased by as much as 80%. In those under 65 with hypertension, the risk can be reduced by about 30%. Numerous large, high-quality studies and a meta-analysis of long-term hypertension treatment trials have demonstrated that maintaining healthy blood pressure levels lowers the risk of new cardiovascular events by approximately 50%.

In placebo-controlled studies, both ACE inhibitors and calcium channel blockers have been effective in reducing the relative risk of major cardiovascular events. However, only ACE inhibitors significantly decreased the risk of developing HF, while calcium channel blockers did not show the same effect. Moreover, treatment strategies that target lower blood pressure goals resulted in greater reductions in risk compared to those that aimed for higher blood pressure thresholds.

2. LITERATURE REVIEW

Clerici, M., Bartoli, F., Carretta, D., Crocamo, C., Bebbington, P., & Carrà, G. (2014) The purpose of this research was to investigate the prevalence of cardiovascular disease (CVD) risk determinants in individuals who experience the ill effects of serious dysfunctional behavior (SMI) and to measure such dangers in Southern Europe, a region with particular dietary practices. Individuals with SMI might have a higher frequency of hazard factors for

CVDs than everybody because of different reasons, including as poor health habits and psychopharmacological medications.

De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D. A. N., Asai, I., & Leucht, S. (2011). In comparison to the general population, those with severe mental illness (SMI) had shorterlife expectancies. The majority of these additional fatalities may be attributed to health issues. We talkabout how disparities in access, utilization, and supply of health care, as well as the incidence rates ofdifferent physical diseases, are all contributors to these poor physical health outcomes.

Thomas, J., Jones, G., Scarinci, I., & Brantley, P. (2003) purpose of this study is to determine whether low-pay individuals with hypertension, asthma, or potential joint inflammation likewise experience the ill effects of type II diabetes. Low-pay essential consideration patients with type 2 diabetes, hypertension, joint inflammation, and asthma, as well as those without an ongoing condition (n = 326),were studied utilizing a cross-sectional philosophy to decide the commonness of sorrow and uneasiness problems during the past 12 months. Anxiety and depression diagnoses were tested for association with type II diabetes using a logistic regression (LR) model adjusted for established risk factors.

Komaroff, A. L., Fagioli, L. R., Doolittle, T. H., Gandek, B., Gleit, M. A., Guerriero, R. T., & Bates, D. W. (1996). To assess the functional state and overall wellbeing of individuals with chronic fatigue syndrome (CFS), and to compare their results to those of six illness comparator groups and the general population. They performed much worse than individuals with depression in every dimension except those evaluating mental health and role impairment brought on by emotional issues, where they performed significantly better. Except for irritation and sadness, the two SF-36 scores measuring mental health did not connect with any of the symptoms of CFS.

Onyeka, I. N., Collier Høegh, M., Nåheim Eien, E. M., Nwaru, B. I., & Melle, I. (2019) Clinical under-diagnosis of physical diseases are widespread in people with severe mental illness (SMI), which may have detrimental treatment effects. The existence of drug use problems may make things worse. In general, while there has been comprehensive research on physical ailments among those with SMI, no prior analysis has stratified data based on whether or not drug use issues were present. This research sought to compile data on the prevalence of co-occurring physical diseases in people with SMI who either had or did not have drug use disorders.

Research Objectives

1) To evaluate the prevalence of psychological issues, specifically depression, in individuals with chronic metabolic conditions such as diabetes mellitus and hypertension.

2) To compare the prevalence and patterns of psychiatric disorders among patients with diabetes and those with hypertension.

3) To evaluate the severity of depression in individuals with long-term metabolic diseases.

4) To examine the relationship between clinical features (such as duration of diabetes and HbA1c levels) and the severity of depression.

5) To evaluate the impact of psychiatric illnesses on the quality of life of patients with chronic metabolic diseases.

3. MATERIALS AND METHODS

The institutional ethics board approved the single-center, cross-sectional design of this study. The Private Diabetic Care Center selected consecutive type II diabetes mellitus patients who had recently been diagnosed or were in follow-up care and were willing to provide informed consent to participate. The study included patients aged 18 to 60 who were cognitively capable of completing the interview and excluded those with schizophrenia, other psychotic disorders, or substance use issues. Participants with any concurrent conditions that could affect neurological function or those taking medications unrelated to diabetes (which are known to induce depression) were also excluded.

The study was conducted between February 2011 and January 2012, involving 195 individuals (81 men and 114 women). Patients were categorized into two groups based on their depression history: those with depressive episodes (90 individuals) and those without (105 individuals). To assess the patients' socio-demographic characteristics, semi-structured socio-demographic forms were used. Clinical status was objectively evaluated through HbA1c readings taken on the day of the interview, reflecting long-term blood glucose control. Quality of life was measured using the Hamilton Depression Rating Scale (HAM-D) and the Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q SF) for both groups. The HAM-D is a widely recognized 17-item scale employed by clinicians to quantify depressive symptoms.

3.1. Statistical analysis

SPSS 20 (SPSS Inc., Chicago, USA) was used for the statistical analysis. The t-test was applied to compare groups of continuous variables, while the chi-square (χ^2) test was utilized for categorical variables. The relationship between the Hamilton Depression Rating Scale (HAM-D), the Quality of Life Enjoyment and Satisfaction Questionnaire Short Form (Q-LES-Q SF), and other clinical features (such as duration of diabetes and HbA1c levels) was examined using Pearson's correlation analysis. A significance level of $P < 0.05$ was set for all tests.

4. RESULTS

The study included a total of 196 participants; 81 (41 men and 40 women) met the DSM-IV criteria for major depressive episodes, while the remaining 115 (50 men and 65 women) had not experienced a major depressive episode in the previous month. Using the Hamilton Depression Rating Scale (HAM-D), it was found that 32.2% (N=29) of the depressed group had mild depression, 36.7% (N=33) had moderate depression, 14.4% (N=13) had severe depression, and 16.7% (N=15) had very severe depression.

The average age of participants with depression was 54.31 ± 7.52 years, while those without depression averaged 34.75 ± 7.5 years. The t-test indicated no statistically significant age difference between the two groups ($P > 0.05$; $t = 0.52$), suggesting that neither the depressed nor the non-depressed groups exhibited significant age differences.In the depressed group, there were 41 men and 40 women, while the other

group comprised 50 men and 65 women. The chi-square test revealed no statistically significant difference in gender distribution between the two groups ($\chi^2 = 2.2$, P = 1.38).
In terms of religious affiliation, the depressed group consisted of 55 Hindus and 33 Muslims, while the non-depressed group included 47 Hindus and 58 Muslims. The two groups did not show a significant difference in their distribution of religious affiliation ($\chi^2 = 2.14$, P = 1.4).Regarding family structure, the depressed group had 70 individuals from nuclear families and 11 from joint families, whereas the non-depressed group included 67 from nuclear families and 19 from joint families. There was no statistically significant difference in family composition between the two groups ($\chi^2 = 2.52$, P = 1.34).Overall, there were no significant differences between the depressed and non-depressed groups in terms of age, gender, religion, or family structure, as summarized in the table.

Table 1 Characteristics Depressed (N=81) Non-depressed (N=115) P value

Characteristics	Depressed (N=81)	Non-depressed (N=115	P value
Age (years)	54.31±7.52	34.75±7.5 t=0.52,	P>0.05
Gender			$\chi2$ =2.2 P=1.38
Male (N=91)	41	50	
Female (N=102)	42	65	
Religion			$\chi2$ =2.14 P=1.4
Hindu (N=102)	55	47	
Muslim (N=91)	33	58	
Family type			$\chi2$ =2.52 P=1.34
Nuclear (N=137)	70	67	
Joint (N=30)	11	19	

Table 1b: Depression severity

Severity of depression	Count	Percentage
Mild	**30**	**23.3**
Moderate	**45**	**32.6**
Severe	**14**	**14.5**
Very severe	**25**	**18.6**

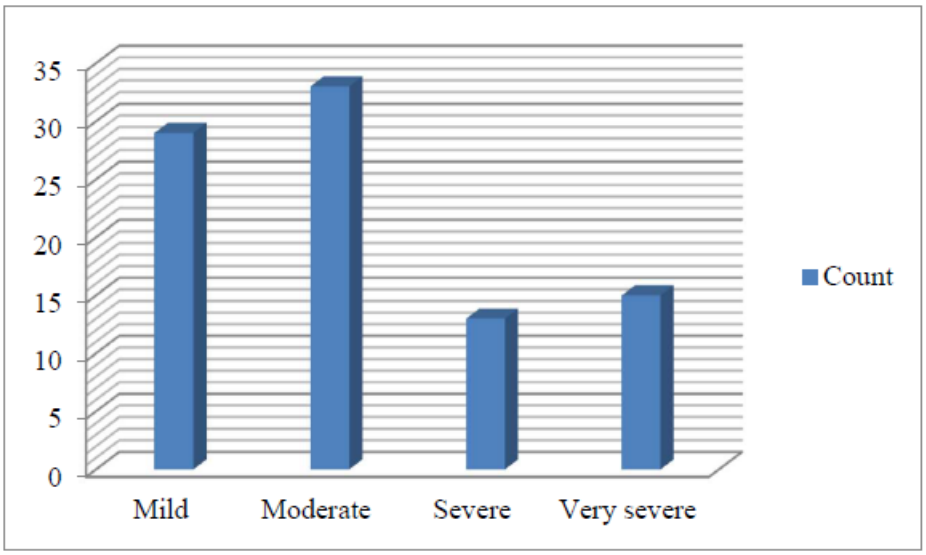

Figure 1: Study population depression severity

The average duration of diabetes in the depressed group was 62.25 ± 53.62 months, while the non-depressed group had an average duration of 25.30 ± 26.45 months. However, the difference in diabetes duration between the groups was not statistically significant (t = 2.75, P = 1.18).

In contrast, there was a significant difference in mean HbA1c levels between the two groups, with the depressed group having an HbA1c of 9.25 ± 2.35 compared to 7.8 ± 2.5 in the non-depressed group (t = 8.75, P < 0.001).

Table 2 shows the mean HbA1c values for the two gatherings and the term of the DM.

Table 2: Depressed and non-depressed diabetes duration, Hba1c, and Ham D scores

	Depressed (N=81)	Non-depressed (N=115)	P value
Length of diabetes (months)	62.25±52.62	25.30±26.45	t=−2.75 P=1.18
HbA1c	9.25±2.35	7.8±2.5	t=−8.75 P=0.001

Crude scores on the QLESQ-SF were changed to % most extreme scores (QLESPER) to assess the QoL.The QLESQ-SF life quality scale concentrates on uncovering that the sad group had considerably lower scores on all of the scale's components as well as its overall score. Table 3 displays the results of both oups' QLESQ-SF life quality item scores.

Table 3: Depressed and non-depressed QLESQ SF item scores

QLESQ-SF questionnaire	Depressed (N=81)	Non-depressed N=115	t	P
Q1 Your Body	3.56±1.23	2.15±1.45	15.74	0.001
Q2 Mood	2.56±1.4	4.63±1.58	19.85	0.001
Q3 Work	3.45±1.65	4.15±1.28	21.85	0.001
Q4 Home Life	3.48±1.48	2.84±1.52	16.48	0.001
Q5 Relationships in the community	4.81±1.7	2.18±1.7	8.74	0.001
Q6 The Family	4.7±1.85	3.32±1.85	9.4	0.001
Q7 What do you do in your free time?	3.56±1.65	2.25±1.74	14.84	0.001
Q8 Capacity to Perform Daily Activities	3.32±1.48	4.5±1.85	15.96	0.001
Q9 Do you have a sexual urge, desire, or interest?	2.98±2.12	4.26±1.24	14.24	0.001
Q10 How's the Economy?	1.23±1.51	4.2±1.9	8.45	0.001
Q11 Describe Your Home	3.65±1.7	6.21±1.85	7.88	0.001
Q12Physical mobility without lightheadedness	3.52±1.57	5.4±1.41	9.14	0.001
Q13 How do you imagine your future occupation and leisure activities to be?	1.23±1.8	4.12±1.58	23.62	0.001
Q14 In general, how do you feel?	1.47±1.57	4.58±1.23	16.25	0.001
QLESQPER	65.23±5.87	72.23±24.21	32.45	0.001

* Significant correlation (two-tailed $p<0.05$), ** Significant correlation (two-tailed $p<0.01$)

5. DISCUSSION

The aim of this study was to evaluate the prevalence of major depressive disorder (MDD) and its impact on quality of life. According to the findings, 46.15% of diabetes mellitus (DM) patients were diagnosed with MDD, with the majority (36.7%) experiencing moderate depression. Notably, a diabetic individual's vulnerability to depression appears to be independent of demographic factors such as age, gender, religious affiliation, or family structure. In contrast, the HbA1c level—a marker of long-term glucose control—was associated with a reduced risk of developing depression. The mean HbA1c level in the depressed group was significantly higher than in the non-depressed group, supporting the hypothesis that poor blood sugar management may contribute to depressive disorders.

This study suggests that depression may be more prevalent among diabetics than previously recognized. However, the estimated rates of depression in the diabetic population can vary significantly based on the type of diabetes and the socio-economic context, with differences observed between developed and developing countries. For example, Li et al. reported an age-adjusted depression rate of 8.3% (95% CI 7.3-9.3) among U.S. adults aged 18 and older, with state-level rates ranging from 1.0% to 34.9%. In rural Bangladesh, Asghar et al. found evidence of depression in 29% of men and 30.5% of women with a recent diabetes diagnosis. Similarly, Sotiropoulos et al. reported that 54.6% of a sample of Greek individuals with diabetes experienced depression. In a rural region of Pakistan, Zahid et al. identified a moderate prevalence of depression at 25.8% among diabetic patients.

Tattersall et al. report that individuals with diabetes often need to make significant lifestyle adjustments, such as reducing exercise, social outings, family time, and participation in favorite hobbies. It is increasingly recognized that the impact of chronic illnesses on quality of life (QoL) should be considered alongside traditional medical outcome measures. QoL is known to be a critical factor in determining how effectively patients respond to diabetes

treatment. In this study, individuals with depression demonstrated significantly lower total and item scores on the QLESQ-SF, indicating a diminished quality of life.

Depression is associated with poorer overall quality of life (QoL) scores, consistent with previous studies suggesting that depressive episodes can significantly affect the lives of individuals with chronic illnesses. Those with both depression and diabetes rate their QoL lower than those with diabetes alone. All aspects of the QLESQ-SF were significantly correlated with the prevalence and severity of depression, indicating that its effects are widespread, with the presence of depression negatively impacting QoL.

Depression affects key human capabilities, including motivation, energy, concentration, and self-esteem. According to Egede et al., depressed patients in general medical settings reported a higher QoL than those with common illnesses such as hypertension, arthritis, diabetes, and heart disease being treated at the same facilities. When combined with our findings, this provides strong evidence that co-morbid depression leads to further functional impairment.

In this study, there was a negative correlation between HbA1c levels, a measure of metabolic control, and quality of life ratings. This suggests that patients experience a lower quality of life when their blood sugar levels are poorly managed. Higher HbA1c levels were associated with poorer clinical outcomes and a significantly increased incidence of complications. It is well-established that diabetes complications can further exacerbate the challenges faced by patients, leading to a cycle of declining health and reduced quality of life

6. CONCLUSION

Diabetes is one of the most complex chronic medical conditions, significantly limiting a patient's ability to participate in everyday activities. Regardless of the severity of the underlying medical issues, the presence of depression in individuals with diabetes has been shown to adversely affect quality of life (QoL). This highlights the importance of investigating how the severity of the illness compares to the impact of co-morbid depression on QoL, particularly given the high rates of depression among diabetes patients.

The primary goals of treatment should focus on normalizing metabolic markers and enhancing QoL. Effective management of depression has been shown to improve QoL. Thus, addressing depression may be crucial for enhancing the well-being of individuals with type II diabetes. Clinicians should recognize that early intervention in treating depression can lead to significant improvements in a patient’s quality of life.

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