International Journal of Community Medicine and Public Health
Sobhan SS et al. Int J Community Med Public Health. 2024 May;11(5):1949-1956
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20241193

Original Research Article

Common mental disorders among patients with diabetes in a secondary care facility: nature, prevalence, and explanatory models

Soumya S. Sobhan[1]*, Rajesh Gopalakrishnan[1], Vinod J. Abraham[2], Anju Kuruvilla[1]

[1]Department of Psychiatry, Christian Medical College, Vellore, Tamil Nadu, India
[2]Department of Community Health, Christian Medical College, Vellore, Tamil Nadu, India

Received: 10 March 2024
Accepted: 11 April 2024

***Correspondence:**
Dr. Soumya S. Sobhan,
E-mail: sobhansoumya@gmail.com

ABSTRACT

Background: Diabetes is a chronic medical condition which is psychologically and behaviourally demanding in nature. Persons with diabetes may be particularly vulnerable to developing mental health disorders. This study was conducted to estimate the prevalence and factors associated with common mental disorders (CMDs) in patients with diabetes and understand their explanatory models of illness.
Methods: One hundred and seventy patients who attended the diabetic clinic at a secondary care hospital were recruited to participate in this cross-sectional study. Psychiatric morbidity and the individual's conceptualization of the illness were assessed using the clinical interview schedule-revised and the modified short explanatory model interview (SEMI) respectively. Socio-demographic and clinical details were recorded using a structured proforma.
Results: CMDs were observed in 14.7% of the sample and were significantly associated with female gender, longer duration of diabetic illness and treatment, use of insulin and past treatment for psychiatric illness. Illness attributions included unhealthy diet, heredity, and stress, as well as punishment from God. Religious and traditional healing methods were cited as potential sources of help in addition to medical interventions and lifestyle modification.
Conclusions: Diabetes can significantly impact the emotional health of an individual in addition to its myriad physical consequences. Understanding patient perspectives regarding their illness and identifying and providing appropriate interventions for those with emotional disorders are an important component of diabetes care programs.

Keywords: Diabetes, Common mental disorder, Anxiety, Depression

INTRODUCTION

Diabetes mellitus (DM) has been described as a growing epidemic by the World Health Organization with the majority of those affected living in low-and middle-income countries.[1] The prevalence has been steadily increasing, attributable to a variety of factors including genetics and lifestyle. Diabetes and psychiatric disorders often co-exist. The relationship between the two is considered to be bidirectional, as DM can increase the risk of developing certain mental disorders while the presence of a psychiatric disorder is associated with greater incidence and prevalence of DM.[2]

CMDs such as depression and anxiety have been found to be more prevalent among persons with DM as compared to the general population.[3] Patients may experience adjustment difficulties and distress related to the challenges of the daily management of the illness and the threat of complications.[4] Depressive disorders are two and three times more common in people with type 2 and type 1 diabetes respectively in comparison with the general population.[5] The risk of anxiety disorders is also higher than among people without DM.[6] Conversely, metabolic side-effects of some medicines used in the treatment of psychiatric disorders can lead to the development or worsening, of diabetes.[7] The mechanisms

thought to underly the association of DM with psychiatric disorders are multifactorial and include genetic, biological (hypothalamic-pituitary-adrenal axis activation, inflammation, oxidative stress, insulin sensitivity), behavioural (lifestyle and dietary habits), psychosocial (stress, adherence to treatment) and disease-specific factors (antidepressant and antipsychotic medication use).[8] Risk factors for the development of CMDs in individuals with diabetes include female gender, poverty, poor glycaemic control, longer duration of diabetes and presence of long-term complications.[9]

The presence of comorbid mental disorders can interfere with adherence to diabetes care regimens resulting in unhealthy habits, irregular monitoring of blood sugar, missing medication and skipping doctor's appointments, leading to worse health outcomes, a poor quality of life and premature mortality. Beliefs and conceptualization regarding the illness also influence treatment adherence and disease related morbidity. Therefore, eliciting explanatory models (EMs) of illness from patients can help the physician better understand their attitudes towards the illness and its treatment. The nature of explanatory models varies and can include biomedical explanations such as heredity, obesity, poor diet and lack of exercise, as well as folk or traditional models which reflect religious and cultural influences.[10,11] Multiple, and even contradictory EMs, may be held simultaneously.[12] Differences in explanatory models between the patient and physician have been identified as an important reason for non-compliance with prescribed treatment.[13]

Despite their high prevalence in medical settings and the community, co-morbid psychiatric disorders in diabetics are not often recognised or adequately treated.[14] This study aimed to explore the prevalence and nature of CMDs present in people with diabetes and their explanatory models of illness. This can help plan care programs that effectively address some of the challenges associated with living with diabetes.

METHODS

Study design and setting

This cross-sectional study was carried out in a secondary care hospital catering primarily to the rural population around a town in the state of Tamil Nadu, southern India, specifically focused on individuals residing in 82 villages and 175 tribal hamlets.

Sample

Patients who presented to the diabetic clinic at the hospital were contacted for possible recruitment to the study using systematic sampling. Those above the age of 18 years who spoke Tamil were considered eligible to take part, while subjects with severe language, hearing, or cognitive impairment were excluded. Informed consent was obtained from the participants. Patients were recruited over a period of 12 months from February 2019 and were interviewed at a single point in time.

Assessment

The revised clinical interview schedule (CIS-R) was used to assess for CMDs. This standardized semi-structured interview assesses the mental state of individuals with non-psychotic disorders and provides a symptom profile and a total score that enables the patient to be classed as a case (scoring 12 or more) or non-case. It has been shown to have high inter-rater reliability and has been translated into several Indian languages. The Tamil version of the interview was used for this study.[15] Beliefs about illness were recorded using the SEMI.[16] It explores the patient's perspectives regarding the nature of the illness, its perceived causes and impact, and help-seeking behaviour. It is semi-structured in design with open-ended questions along with probes to elicit concepts. A brief instrument with well-established face and content validity, it has been translated into many different languages. The Tamil version was used in this study.[17] Demographic and clinical details of the patient were recorded in a specifically designed proforma. All interviews were conducted by a single researcher (SSS).

Sample size estimation and data analysis

A sample size of 154 was obtained using the formula $4pq/d^2$, where p denotes the estimated prevalence of CMD in patients with diabetes (45%), q=(100-p), and d the precision, taken as 8. The statistical software SPSS for Windows (version 16) was used to analyse the data. Mean and standard deviation were employed to describe continuous variables, while frequency distributions were obtained for categorical data. The chi-square test and the student's t test were used to assess the significance of associations for categorical and continuous variables respectively. Logistic regression was employed as multivariate statistics to adjust for confounders.

Ethical considerations

The study protocol was approved by the Institutional Review Board and Ethics Committee (IRB Min No. 11707 dt 03/12/2018).

RESULTS

A total of 201 subjects who fulfilled eligibility criteria were contacted for possible recruitment to the study, and 170 subjects (84.6%) consented to participate. There was no statistical difference in the age and gender of those who consented and those who did not. The sociodemographic and clinical characteristics are documented in Table 1. The majority of the sample were female, married, could read and write and were from a rural, low socioeconomic background. About half the participants were wage earners. The average distance travelled to reach the hospital was 4.45 kms and the mean

cost incurred for travel was 5.56 INR. The majority of the participants had type 2 DM and the mean age of onset was 50.78 years. Most were on one or more oral hypoglycaemic agents and a smaller group was on insulin. The HbA1c was available for 42 out of the total sample and the mean value was 7.78%. Comorbidity was common (90.6%), mostly hypertension (80.6%) and dyslipidemia (72.9%), 17.1% of the sample had been on psychiatric treatment in the past. Twenty-five (14.7 %) of the 170 patients interviewed scored 12 or more on the CIS- R, satisfying criteria for a common mental disorder. Using items from the CIS-R, algorithms were constructed for different psychiatric diagnoses based on ICD-10-primary care version criteria for these 25 participants; anxiety was the most common disorder (10%), followed by depression and neurasthenia (2.35% each).

Table 2 records the factors associated with CMDs. On bivariate analysis, presence of CMD was associated with female gender (p=0.03), longer duration of diabetes (p=0.016) and treatment (p=0.02), use of insulin (p=0.001) as compared to oral hypoglycaemics alone and past history of treatment for psychiatric illness (p<0.001). These remained significant on adjusting for age in logistic regression. The following factors were not significantly associated with presence of CMD: age, marital status, religion, residence, income and debt, literacy and education, distance and cost of travel to a hospital, type of DM, drug compliance, presence of comorbid illnesses, blood pressure, blood sugar and lipid levels, diet, exercise, alcohol and nicotine use, perceived social support, and family history of DM.

The responses to the SEMI are listed in Table 3. An unhealthy diet (35.9%), heredity (28.2%) and stress (12.9%) were common attributions for the development of the disease. Twenty percent of the participants said they did not know the cause while two participants felt their problems could be a result of punishment from God. Many perceived their illness to be moderately (72.9 %) or very (17.1 %) serious, and the majority (75%) reported a fear of physical complications of the disease. All domains of life were affected by the illness, work (65.9%) being the most commonly mentioned. Almost half (45.9%) responded that they were emotionally affected by the illness and cited financial difficulties (32.1%), physical symptoms (32.1%) and the perception of being a burden to others (33.3%) as the cause. While all expected to receive help from medical professionals, dietary restrictions and exercise, some participants also believed that religion (24%) and traditional healers (1.2%) could help. All the patients had approached other sources for advice regarding diabetes and two were taking traditional medication in addition to those prescribed in the hospital.

Presence of common mental disorder was significantly associated with patient's admission of being emotionally affected by illness (χ^2=25.10; df=l; p<0.001) and belief that illness was a punishment from God (χ^2=11.73; df=l; p=0.021). Association between psychiatric morbidity and a perception that the illness had a chronic course showed a trend towards statistical significance (χ^2=6.57; df=l; p=0.057). There were no significant associations between presence of CMD and perceived seriousness of illness or expectation of care from different sources.

Table 1: Sociodemographic and clinical profile of sample.

Variables	Mean (SD)	Frequency (%)
Socio-demographic characteristic		
Age (in years)	57.82 (11.58)	-
Gender-Female		112 (65.9)
Marital status-Currently married		131 (77.1)
Religion-Hindu		139 (81.8)
Residence-Rural		109 (64.1)
Employment-Employed		90 (52.9)
Literacy-Literate		120 (70.6)
Years of education	3.50 (3.00)	
Monthly income (in rupees)	3799.41 (2133.65)	
Debt-Present		133 (78.2)
Distance travelled from hospital (in km)	4.45 (2.42)	
Cost of travel to hospital each visit (in Rs.)	5.56 (4.22)	
Clinical characteristic		
Type of DM-Type 2	168 (98.8)	
Duration of DM (in years)	7.28 (2.70)	
Duration of treatment of DM (in years)	7.15 (2.60)	
Oral hypoglycaemics-in combination		137 (80.6)
On insulin: Yes		49 (28.8)
Medication compliance: Good		117 (68.8)
Co-morbid illness: Present		154 (90.6)
Hypertension		137 (80.6)
Dyslipidemia		124 (72.9)

Continued.

Variables	Mean (SD)	Frequency (%)
Clinical characteristic		
AC sugars (mg/dl)	151.96 (55.98)	
PC sugars (mg/dl)	225.54 (86.83)	
HbA1c (%), (n=42)	7.78 (1.41)	
Triglycerides (mg/dl), (n=17)	156.71 (81.18)	
Regular physical activity-No		110 (64.7)
Follows diabetic diet-Yes		117 (68.8)
Alcohol use: Yes		15 (8.8)
Nicotine use: Yes		26 (15.3)
Past psychiatric treatment: Yes		29 (17.1)
Revised clinical interview schedule (CIS-R)-case		25 (14.7)
ICD-10 PHC diagnosis of CIS-R cases, (n=25)		Depression-4 (2.35) Neurasthenia-4 (2.35) Anxiety-17 (10.0)

ICD-10 PHC: Primary care version of international classification of diseases (10th revision) Chapter V. for mental and behavioural disorders; CIS-R: Clinical interview schedule-revised, SD: standard deviation

Table 2: Factors associated with CMDs.

Variables	CISR positive	CISR negative	Univariate statistics			Multivariate statistics (logistic regression adjusted for age)		
			Chi-square/t	Df	P value	Adjusted OR	95% CI	P value
Gender, n (%)								
Male	4 (6.9)	54 (93.1)	4.28	1	0.03	0.27	0.68-0.86	0.027
Female	21 (18.75)	91 (81.25)						
Treatment, n (%)								
OHA	11 (9.1)	110 (90.9)	10.55	1	0.001	0.25	0.11-0.61	0.002
Insulin	14 (28.57)	35 (71.43)						
Past psychiatric treatment received, n (%)	14 (48.3)	15 (51.7)	31.41	1	0.00	0.09	0.03-0.24	0.000
Duration of DM, mean (SD)	8.48 (2.63)	7.08 (2.66)	-2.43	168	0.016	1.17	1.01-1.36	0.031
Duration of treatment, mean (SD)	8.24 (2.35)	6.97 (2.60)	-2.29	168	0.02	1.18	1.01- 1.37	0.037

CISR: Clinical Interview Schedule-Revised; SD: standard deviation; CI: confidence interval.

Table 3: Patient's perspective on illness.

Perspective	N (%)
Perceived cause of problem	
Wrong diet	61 (35.9)
Heredity	48 (28.2)
Mental stress, worry	22 (12.9)
Consumption of other medication	3 (1.8)
Punishment from God	2 (1.2)
Don't know	34 (20)
Perceived seriousness of the problem	
Very serious	29 (17.1)
Mild–moderate seriousness	124 (72.9)
Not serious	17 (10.0)
Most feared aspect of illness	
Physical complications	128 (75.3)
Being a burden to others	18 (10.6)

Continued.

Perspective	N (%)
Don't know	24 (14.1)
***Domains of life affected**	
Emotional	78 (45.9)
Mobility	33 (19.4)
Social life	16 (9.4)
Home life	42 (24.7)
Relationships	3 (1.8)
Work	112 (65.9)
Cause of emotional distress	
Financial burden	25 (32.1)
Being a burden to others	26 (33.3)
Physical ill health	25 (32.1)
Inability to work	2 (2.6)
***Expectation of help from**	
Medical centre	170 (100)
Religious centre	24 (14.1)
Native healing	2 (1.2)
Dietary measures	170 (100)
Perceived course of illness-chronic	167 (98.2)

(* Multiple responses)

DISCUSSION

In addition to the effects on the physical health of patients, living with diabetes can have a significant impact on the emotional health of the individual. This study attempted to study the prevalence and factors associated with CMDs among patients with diabetes and their explanatory models of illness in an out-patient secondary care hospital setting.

The prevalence of CMD in this population of diabetic individuals was 14.7%, lower than that reported in studies by Das-Munshi (21.6%) and Claro (43%).[3,18] Variations in reported prevalence rates may be attributable to differences in study settings and populations, assessment methods, methods of classifying CMDs as symptoms or syndromes, type of diabetes and sample size.[19] Anxiety was the most common disorder identified (10%) in the present study. In a meta-analysis of patients with diabetes, prevalence of generalized anxiety disorder was 14% and symptoms of anxiety was 40%. [20] In a German sample of diabetic patients, the prevalence of anxiety disorders was 5.9%, with an additional 19.3% reporting some anxiety symptoms.[21] Clinicians should therefore be alert to the possibility of syndromal, as well as subsyndromal anxiety in persons with diabetes. Depression has been the most studied of the mental disorders associated with diabetes and a meta-analysis reported the prevalence in type 2 diabetes to range from 1.8% to 88%.[22] This study found the prevalence of depression to be 2.35%. While many researchers have reported a greater prevalence of depression in diabetic patients, even up to twice that of the general population, others failed to find a significant difference in the prevalence of depression between diabetic and non-diabetic individuals.[21,23]

Female gender was found to be associated with common mental disorder; this is a finding reported by several researchers. Deischinger et al observed the gender gap for depression in diabetes to be even more pronounced than among non-diabetic controls, suggesting that women with diabetes, especially those at a high-risk due to obesity or cardiovascular disease, be carefully monitored for psychiatric morbidity.[24] Longer duration of illness was associated with psychiatric morbidity, similar to that reported in research from other countries.[25] In a study of older men, the association between duration of diabetes and risk of depression increased in the first few years, then declined-possibly due to acceptance of the illness and the effects of treatment, and then increased again in later years-secondary to the increase in complications, comorbidities and frailty.[26] A negative appraisal of insulin therapy has been noted among many people with diabetes, associated with poor emotional well-being and lower diabetes related self-efficacy. This has been attributed to fear of injections or concerns regarding potential complications from insulin.[27] In the present study, being on insulin in contrast to OHAs alone, was associated with psychiatric comorbidity. Though not replicated in this study, other factors that have been reported to be associated with depressive symptoms in persons with diabetes include older age, lower socioeconomic status, inadequate social support and diabetes related complications.[9]

Comorbid anxiety or depression in diabetes interferes with compliance with self-care regimens resulting in poorer glycaemic control and a negative impact on the quality of life.[21] Therefore physicians need to routinely screen their patients with diabetes for these syndromes, as well as non-syndrome symptoms of mental distress which may be even more common than full-fledged mental

disorders. Acknowledging patients' distress, providing them adequate time to discuss their concerns, teaching them techniques to correct negative thought patterns and breathing and muscular relaxation exercises to reduce anxiety are useful interventions.[28] Selective serotonin re-uptake inhibitors, such as sertraline, fluoxetine and escitalopram are useful in the treatment of depressive and anxiety disorders and also have a favourable effect on glycaemic control; tricyclic antidepressants, paroxetine and mirtazapine are less suitable as they induce significant weight gain.[29]

An explanatory model of illness or the way a person makes sense of his/her ailment can significantly influence a patient's attitude towards treatment compliance, clinical outcome and quality of life. Eliciting the belief systems and explanatory models of patients in routine clinical practice helps medical professionals gain a better understanding of their subjective experience of illness.[30] Most participants in the study held biomedical models of illness, though some simultaneously held causative explanations such as punishment from God, and treatment expectations from traditional and religious interventions. In studies among Mexican-American and Ghanaian patients with diabetes, the illness was thought to be caused by experiencing strong emotions, supernatural sources such as witchcraft, sorcery or evil forces, as well as heredity, stress, obesity, poor diet and lack of exercise.[10,31] Similarly, combined biomedical and traditional belief systems were reported in studies involving Hispanic and Ethiopian patients with diabetes.[11,12] Cultural differences in attributing responsibility and blame for developing the disease were noted in research from Britain; while south-east Asians highlighted their life circumstances in accounting for diabetes thus externalizing the cause, white respondents tended to emphasize the role of their own lifestyle choices and personal failings. Individuals who see themselves as responsible for maintaining their physical health have been shown to be more likely to take steps to improve their health and have good adherence to a medical regimen.[32] Being uncertain about the cause of DM and a having a perception that one had little or no control over it was associated with seeking religious healing and traditional medicine in addition to, or instead of, the biomedical methods. Non-medical, external explanations and supernatural causes are often used when people are trying to cope with chronic illness and are asking questions that go beyond the workings of mechanical and biological causes.[33,34] The fatalistic view that diabetes was a result of supernatural punishment for previous or current sinful behaviour was associated with the presence of a common mental disorder in this study. While this suggests that some aspects of religion may have negative consequences for mental health, religiosity can also have positive effects by helping patients reframe their medical condition as something that helps them gain pardon for sins.[35] While medical staff view diabetes principally as a biological problem, patients highlight difficulties in the different domains of their daily lives.[13] In the present study as well, participants expressed concerns about the deleterious effects of DM on many non-health domains of life such as social interactions, relationships, finances, mobility and ability to carry out daily activities and duties.[12,13] To improve functioning and quality of life, healthcare professionals need to elicit patients' specific areas of concern and work with them collaboratively to plan interventions tailored to their individual needs.[36] The perception that the illness had a chronic course was associated with case-ness on CISR with a p value approaching significance. Patients' beliefs regarding the nature, course and consequences of their illness have been shown to significantly affect their psychological health, perhaps even more than the actual status of the medical disease.[37]

Several research studies including the present one note that many patients said they were not aware of the cause of DM.[11,12] This highlights the need for health care professionals to actively engage patients in diabetes education to ensure a good clinical outcome.[38] Providing adequate health information will ensure a better understanding of the condition and improve the patient's own ability and confidence to manage it. In patients who are ambivalent about making the necessary lifestyle changes of regular physical exercise, diet modification, sleep hygiene and avoidance of substance use, pointing out the discrepancy between current behaviour and his or her health-related goals, can help to increase motivation for change.[39] Engaging the patient's family and eliciting their support also helps to minimize distress.

CONCLUSION

Depression and anxiety are a risk factor as well as a complication of diabetes. Care teams need to be sensitive to patients' experiences of their illness and be aware of the individual patient's understanding of the illness and its management. A comprehensive diabetes education protocol keeping in mind the local and individual contexts, and screening for the presence of common psychiatric problems should be incorporated into routine clinical practise. Lifestyle modification along with psychological interventions and appropriate weight neutral pharmacological agents can improve both glycaemic control and depressive symptoms.

Funding: Funding sources by Fluid Research Grant No. 22Z651, from Christian Medical College, Vellore.
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee IRB Min No. 11707 dt 03/12/2018).

REFERENCES

1. World Health Organization. Fact sheet: Diabetes. Available at: https://www.who.int/news-room/fact-sheets/detail/diabetes. Accessed on 1 February 2024.

2. Al-Atram AA. A review of the bidirectional relationship between psychiatric disorders and diabetes mellitus. Neurosciences (Riyadh). 2018;23(2):91-6.
3. Das-Munshi J, Stewart R, Ismail K, Bebbington PE, Jenkins R, Prince MJ. Diabetes, common mental disorders, and disability: findings from the UK National Psychiatric Morbidity Survey. Psychosom Med. 2007;69(6):543-50.
4. Parsa S, Aghamohammadi M, Abazari M. Diabetes distress and its clinical determinants in patients with type II diabetes. Diabetes Metab Syndr. 2019;13(2):1275-9.
5. Roy T, Lloyd CE. Epidemiology of depression and diabetes: a systematic review. J Affect Disord. 2012;142(1):S8-21.
6. Chaturvedi SK, Gowda SM, Ahmed HU, Alosaimi FD, Andreone N, Bobrov A, et al. More anxious than depressed: prevalence and correlates in a 15-nation study of anxiety disorders in people with type 2 diabetes mellitus. Gen Psychiatr. 2019;32(4):e100076.
7. Rubin RR, Ma Y, Marrero DG, Peyrot M, Barrett-Connor EL, Kahn SE, et al. Elevated depression symptoms, antidepressant medicine use, and risk of developing diabetes during the diabetes prevention program. Diabetes Care. 2008;31(3):420-6.
8. Talbot F, Nouwen A. A review of the relationship between depression and diabetes in adults: is there a link? Diabetes Care. 2000;23(10):1556-62.
9. Balhara YPS. Diabetes and psychiatric disorders. Indian J Endocrinol Metab. 2011;15(4):274-83.
10. Jezewski MA, Poss J. Mexican Americans' explanatory model of type 2 diabetes. West J Nurs Res. 2002;24(8):840-58.
11. Habte BM, Kebede T, Fenta TG, Boon H. Explanatory models of adult patients with type 2 diabetes mellitus from urban centers of central Ethiopia. BMC Res Notes. 2016;9(1):441.
12. Heuer L, Lausch C. Living with diabetes: perceptions of Hispanic migrant farmworkers. J Community Health Nurs. 2006;23(1):4-64.
13. Cohen MZ, Tripp-Reimer T, Smith C, Sorofman B, Lively S. Explanatory models of diabetes: patient practitioner variation. Soc Sci Med. 1994;38(1):59-66.
14. Ducat L, Philipson LH, Anderson BJ. The Mental Health Comorbidities of Diabetes. JAMA. 2014;312(7):691-2.
15. Kuruvilla A, PothenM, Philip K, Braganza D, Joseph A,Jacob KS. The validation of the Tamil version of the 12 item general health questionnaire. Indian J Psychiatry. 1999; 41(3):217-21.
16. Lloyd KR, Jacob KS, Patel V, St. Louis L, Bhugra D, Mann AH. The development and use of the Short Explanatory Model Interview (SEMI) and its use among primary care attenders with common mental disorders: A preliminary report. Psychol Med. 1998;28:1231-7.
17. Joy DS, Manoranjitham SD, Samuel P, Jacob KS. Explanatory models and distress in primary caregivers of patients with acute psychotic presentations: A study from South India. Int J Soc Psychiatr. 2017;63:563-8.
18. Claro AE, Palanza C, Mazza M, Corsello A, Rizzi A, Tartaglione L, et al. Evaluation of the prevalence of the most common psychiatric disorders in patients with type 2 diabetes mellitus using the patient health questionnaire: results of the cross-sectional "DIA2PSI" study. Acta Diabetol. 2023;60:247-55.
19. Andreoulakis E, Hyphantis T, Kandylis D, Iacovides A. Depression in diabetes mellitus: a comprehensive review. Hippokratia. 2012;16(3):205-14.
20. Grigsby AB, Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. Prevalence of anxiety in adults with diabetes: a systematic review. J Psychosom Res. 2002;53(6):1053-60.
21. Hermanns N, Kulzer B, Krichbaum M, Kubiak T, Haak T. Affective and anxiety disorders in a German sample of diabetic patients: prevalence, comorbidity and risk factors. Diabet Med. 2005;22(3):293-300.
22. Harding KA, Pushpanathan ME, Whitworth SR, Nanthakumar S, Bucks RS, Skinner TC. Depression prevalence in Type 2 diabetes is not related to diabetes-depression symptom overlap but is related to symptom dimensions within patient self-report measures: a meta-analysis. Diabet Med. 2019;36(12):1600-11.
23. Kruse J, Schmitz N, Thefeld W. German National Health Interview and Examination Survey. On the association between diabetes and mental disorders in a community sample: results from the German National Health Interview and Examination Survey. Diabetes Care. 2003;26(6):1841-6.
24. Deischinger C, Dervic E, Leutner M, Kosi-Trebotic L, Klimek P, Kautzky A, et al. Diabetes mellitus is associated with a higher risk for major depressive disorder in women than in men. BMJ Open Diabetes Res Care. 2020;8(1):e001430.
25. Tiki T. Prevalence and Associated Factors of Depression among Type 2 Diabetes Mellitus Patients on Follow up at Ambo General Hospital, Oromia Regional State, Ethiopia, Institutional Based Cross Sectional Study. J Depress Anxiety. 2017;6:1-5.
26. Almeida OP, McCaul K, Hankey GJ, Yeap BB, Golledge J, Norman PE, et al. Duration of diabetes and its association with depression in later life: The Health in Men Study (HIMS). Maturitas. 2016;86:3-9.
27. Holmes-Truscott E, Skinner TC, Pouwer F, Speight J. Negative appraisals of insulin therapy are common among adults with Type 2 diabetes using insulin: Results from Diabetes MILES-Australia cross-sectional survey. Diabet Med. 2015;32(10):1297-303.
28. Kreider KE. Diabetes Distress or Major Depressive Disorder? A Practical Approach to Diagnosing and Treating Psychological Comorbidities of Diabetes. Diabetes Ther. 2017;8(1):1-7.

29. Gregory JM, Rosenblat JD, McIntyre RS. Deconstructing diabetes and depression: clinical context, treatment strategies, and new directions. Focus (Am Psychiatr Publ). 2016;14(2):184-93.
30. Buchbinder M. THE CANON-5. Patients and healers in the context of culture: An exploration of the borderland between anthropology, medicine, and psychiatry, by Arthur Kleinman. Anthropol Med. 2013;20(1):109-11.
31. De-Graft Aikin A, Awuah RB, Pera TA, Mendez M, Ogedegbe G. Explanatory models of diabetes in urban poor communities in Accra, Ghana. Ethn Health. 2015;20(4):391-408.
32. Omeje O, Nebo C. The influence of locus control on adherence to treatment regimen among hypertensive patients. Patient Prefer Adherence. 2011;5:141-8.
33. Johnson S, Sathyaseelan M, Charles H, Jeyaseelan V, Jacob KS. Insight, psychopathology, explanatory models and outcome of schizophrenia in India: a prospective 5-year cohort study. BMC Psychiatr. 2012;27:12-59.
34. Jerotijević D. The Coexistence of Different Explanatory Models of Misfortune: A Case from Serbia. Human Affairs. 2015;25(3):261-75.
35. Onyishi CN, Eseadi C, Ilechukwu LC, Okoro KN, Okolie CN, Egbule E, et al. Potential influences of religiosity and religious coping strategies on people with diabetes. World J Clin Cases. 2022;10(25):8816-26.
36. Thomas Z, Mathew A, Jowil G, Sriram MK, Ranjan M, Dhinagar MJ, et al. Quality of life among those with diabetes mellitus type II attending a secondary outpatient facility in South India. J Family Med Prim Care. 2022;11(11):7204-11.
37. Groarke A, Curtis R, Coughlan R, Gsel A. The impact of illness representations and disease activity on adjustment in women with rheumatoid arthritis: A longitudinal study. Psychol Heal. 2005;20(5):597-613.
38. The Lancet Diabetes Endocrinology. Diabetes education: the key to a brighter tomorrow. Lancet Diabetes Endocrinol. 2022;10(12):827.
39. Welch G, Zagarins SE, Feinberg RG, Garb JL. Motivational interviewing delivered by diabetes educators: does it improve blood glucose control among poorly controlled type 2 diabetes patients? Diabetes Res Clin Pract. 2011;91(1):54-60.

Cite this article as: Sobhan SS, Gopalakrishnan R, Abraham VJ, Kuruvilla A. Common mental disorders among patients with diabetes in a secondary care facility: nature, prevalence, and explanatory models. Int J Community Med Public Health 2024;11:1949-56.