Frequency of Depression among Patients with Chronic Liver Disease

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Abstract: *Depression is a frequent but under-recognised comorbidity in patients with chronic liver disease and is associated with poorer treatment adherence, impaired quality of life, and adverse clinical outcomes. Data from Pakistan remains limited, particularly from tertiary care settings in South Punjab.* **Objective:** *To determine the frequency of depression among patients with chronic liver disease and to examine its association with selected sociodemographic and clinical factors.* **Methods:** *This descriptive cross-sectional study was conducted at the Department of Psychiatry, Nishtar Hospital, Multan, over the six months from May 2024 to October 2024. A total of 170 patients aged 20–45 years with a documented diagnosis of chronic liver disease for at least two years were enrolled using non-probability convenience sampling. Depression was assessed using the depression subscale of the Hospital Anxiety and Depression Scale, with a score > 8 indicating depression. Sociodemographic and clinical variables were recorded using a structured proforma. Data were analysed using SPSS version 23. Frequencies and percentages were calculated for categorical variables, and means ± standard deviations were calculated for continuous variables. Post-stratification chi-square tests were applied, with $p \leq 0.05$ considered statistically significant.* **Results:** *The mean age of participants was 34.1 ± 6.2 years, and 56.5% were male. Depression was identified in 63 patients, yielding a frequency of 37.1%. Higher frequencies of depression were observed among females, rural residents, unemployed participants, obese individuals, those with lower educational status, and patients with a longer duration of chronic liver disease. Statistically significant associations were noted for gender, area of residence, employment status, obesity, education level, and duration of chronic liver disease ($p < 0.05$ for all).* **Conclusion:** *More than one-third of patients with chronic liver disease in this tertiary care setting had comorbid depression, with a higher burden among socially and clinically vulnerable subgroups. Routine screening for depression should be integrated into chronic liver disease care pathways to support comprehensive management and improve patient-centred outcomes.*

Keywords: Chronic liver disease, Depression, Hospital Anxiety and Depression Scale, Mental health, Pakistan

Introduction

Chronic liver disease (CLD) represents a significant global health challenge, affecting millions of individuals. Liver cirrhosis, the advanced scarring of the liver due to various etiologies such as viral hepatitis, alcohol abuse, and non-alcoholic fatty liver disease, is particularly associated with an array of physical and psychosocial complications. Patients suffering from liver cirrhosis frequently report impaired quality of life and significant comorbidities, including mental health disorders such as depression and anxiety (1, 2, 3).

Research indicates that the prevalence of depressive disorders in patients with liver cirrhosis is markedly higher compared to the general population. Studies have demonstrated that up to 54% of patients with liver cirrhosis may experience depression (1, 3). This finding is corroborated by data suggesting that the overall incidence of depressive symptoms in this cohort has risen significantly, with reports indicating an increase of approximately 80% from 2009 to 2019 (3). Furthermore, the relationship between chronic liver disease and mental health complications is bi-directional; patients with depression face greater risks of liver disease progression, while advanced liver disease exacerbates psychiatric symptoms (4, 5).

A study by Malik et al. highlighted the alarming ramifications of liver cirrhosis on mental well-being, suggesting that amongst the surveyed cohort, 60% exhibited symptoms consistent with clinical depression, significantly correlating with deteriorating health-related quality of life (HRQoL) (6). Beyond the direct implications on mental health, patients frequently endure stigma related to their condition, exacerbating feelings of hopelessness and distress, which can further impair their coping mechanisms (1, 3).

The neuropsychological implications of liver disease, particularly hepatic encephalopathy, also warrant consideration. Symptoms typically associated with impaired cognition, such as confusion and mood disturbances, are prevalent in patients with hepatic dysfunction, further complicating the management of depressive symptoms (2, 7). Importantly, these psychosocial factors may complicate treatment adherence and the overall prognosis for individuals with chronic liver disease (3, 5). Cognitive decline and depressive symptoms are interlinked, where the pathophysiological effects of liver dysfunction manifest as neuropsychiatric disturbances (7, 8).

In Pakistan, the burden of liver disease is compounded by various socio-economic factors, including limited access to healthcare, cultural stigmas associated with mental health, and prevalent dietary habits that may exacerbate liver conditions (3, 6). The Pakistani population exhibits a notable prevalence of liver diseases, notably hepatitis B and C, furthering the need to address mental health in this demographic (6). A multifaceted approach that integrates psychological assessments and psychiatric support into liver disease management protocols is paramount. Addressing the nexus between liver disease and mental health through culturally sensitive interventions could significantly improve health outcomes for patients living with chronic liver disease in Pakistan.

Methodology

The study was conducted as a descriptive cross-sectional investigation at the Department of Psychiatry, Nishtar Hospital, Multan, over a period of six months following formal approval of the research synopsis by the institutional Ethics Review Committee from May 2024 to October 2024. The study setting is a major tertiary care public-sector hospital serving a

large catchment population from urban and rural areas of South Punjab, Pakistan. The target population comprised adult patients diagnosed with chronic liver disease who were attending outpatient and inpatient services in the Department of Medicine and were referred for psychiatric evaluation as part of routine clinical care.

The sample size was calculated using the WHO sample size calculator for estimating a single population proportion. Assuming a prevalence of depression among patients with chronic liver disease of 31.5%, a confidence level of 95%, and a margin of error of 7%, the minimum required sample size was estimated to be 170 participants. A non-probability convenience sampling technique was employed due to the outpatient-based nature of recruitment and the limited availability of eligible patients within the study period. All consecutive patients who met the eligibility criteria during the study period were approached for participation.

Patients aged 20–45 years of either sex with a documented diagnosis of chronic liver disease for at least two years, based on medical records and treating physician assessment, were considered eligible for inclusion. Patients with a prior diagnosis of psychiatric or mental illness who were already receiving treatment, as well as those with major chronic medical comorbidities such as diabetes mellitus, hypertension, or chronic kidney disease, were excluded to reduce confounding related to pre-existing mental health disorders and chronic systemic illnesses known to influence depressive symptomatology. Written informed consent was obtained from all participants prior to enrollment, and confidentiality of personal and clinical information was maintained throughout the study.

Sociodemographic and clinical variables were recorded using a structured proforma. Collected variables included age, gender, area of residence (urban or rural), family structure (nuclear or joint), marital status (unmarried, married, divorced, widowed), educational status categorized by years of formal education (illiterate, primary, middle, secondary, higher secondary, graduate and above), employment status (employed or unemployed), and duration of chronic liver disease in years. Anthropometric measurements were obtained using standardised procedures, with weight measured on a calibrated scale and height measured with a stadiometer. Body mass index was calculated as weight in kilograms divided by height in meters squared, and obesity was defined as ≥ 27.5 kg/m², consistent with Asian population-specific criteria.

Depression was assessed by a consultant psychiatrist using the Hospital Anxiety and Depression Scale, a validated screening tool for psychological distress in patients with chronic medical conditions. The depression subscale consists of seven items, each scored on a four-point Likert scale, yielding a maximum score of 21. In accordance with the operational definition specified in the synopsis, a score greater than 8 on the depression subscale was used to classify participants as having depression. All assessments were conducted in a standardised clinical setting, and participants who screened positive for depression were counselled and referred for further psychiatric management according to institutional protocols, independent of their study participation.

Data were entered and analysed using SPSS version 23. Continuous variables, including age and duration of chronic liver disease, were assessed for normality using the Shapiro–Wilk test and presented as mean and standard deviation. Categorical variables, including gender, area of residence, obesity status, family structure, marital status, educational level, employment status, and depression status, were summarised as frequencies and percentages. Stratified analyses were performed to explore the association between depression and selected sociodemographic and clinical variables, including age categories, duration of chronic liver disease, obesity, family structure, area of residence, education, marital status, and employment status. Post-stratification comparisons were conducted using the chi-square test, and p-values ≤ 0.05 were considered statistically significant.

Results

A total of 170 patients with chronic liver disease were included. The mean age of participants was 34.1 ± 6.2 years (range: 20–45). Males constituted 96 (56.5%) of the sample, while 74 (43.5%) were females, indicating a slight male predominance in the study population (Table 1).

Overall, depression (HADS-D > 8) was identified in 63 patients, yielding a frequency of **37.1%** among individuals with chronic liver disease (Table 2).

Stratified analysis showed a higher proportion of depression among females compared with males (45.9% vs. 30.2%). Patients residing in rural areas demonstrated a higher frequency of depression than urban residents (41.2% vs. 30.9%). Depression was more common among unemployed participants compared with employed individuals (44.4% vs. 26.8%). Obese patients had a higher prevalence of depression compared with non-obese patients (48.4% vs. 30.2%). Lower educational attainment was associated with a greater frequency of depression, with the highest burden observed among illiterate and primary-educated groups (Table 3). Depression frequency increased with longer duration of chronic liver disease, with patients having disease duration greater than three years demonstrating a significantly higher burden compared with those with shorter duration (44.6% vs. 28.2%). These findings indicate that female gender, rural residence, unemployment, obesity, lower educational status, and longer disease duration were significantly associated with a higher frequency of depression in this cohort (Table 3).

Table 1. Baseline demographic and clinical characteristics of study participants (n = 170)

Variable	Category	n (%) / Mean ± SD
Age (years)	Mean ± SD	34.1 ± 6.2
Gender	Male	96 (56.5%)
	Female	74 (43.5%)
Area of residence	Rural	102 (60.0%)
	Urban	68 (40.0%)
Family structure	Nuclear	98 (57.6%)
	Joint	72 (42.4%)
Obesity (BMI ≥ 27.5 kg/m²)	Yes	64 (37.6%)
	No	106 (62.4%)
Marital status	Married	128 (75.3%)
	Unmarried	30 (17.6%)
	Widowed/Divorced	12 (7.1%)
Education status	Illiterate	38 (22.4%)
	Primary (≤5 years)	46 (27.1%)
	Middle (≤8 years)	34 (20.0%)
	Secondary (≤10 years)	28 (16.5%)
	Higher secondary	14 (8.2%)

	Graduate & above	10 (5.9%)
Employment status	Employed	71 (41.8%)
	Unemployed	99 (58.2%)
Duration of CLD (years)	Mean ± SD	3.8 ± 1.4

Table 2. Frequency of depression among patients with chronic liver disease (n = 170)

Depression status	n (%)
Yes	63 (37.1%)
No	107 (62.9%)

Table 3. Stratification of depression by socio-demographic and clinical variables (n = 170)

Variable	Category	Depression Yes n (%)	Depression No n (%)	p-value
Gender	Male (n=96)	29 (30.2%)	67 (69.8%)	0.03
	Female (n=74)	34 (45.9%)	40 (54.1%)	
Area of residence	Rural (n=102)	42 (41.2%)	60 (58.8%)	0.04
	Urban (n=68)	21 (30.9%)	47 (69.1%)	
Obesity	Yes (n=64)	31 (48.4%)	33 (51.6%)	0.01
	No (n=106)	32 (30.2%)	74 (69.8%)	
Employment	Employed (n=71)	19 (26.8%)	52 (73.2%)	0.02
	Unemployed (n=99)	44 (44.4%)	55 (55.6%)	
Education	Illiterate/Primary (n=84)	38 (45.2%)	46 (54.8%)	0.01
	≥ Middle (n=86)	25 (29.1%)	61 (70.9%)	
Duration of CLD	≤ 3 years (n=78)	22 (28.2%)	56 (71.8%)	0.02
	> 3 years (n=92)	41 (44.6%)	51 (55.4%)	

Discussion

The high prevalence of depression among patients with chronic liver disease (CLD) in our study, which found that 37.1% of participants met criteria for depression as measured by the Hospital Anxiety and Depression Scale (HADS), aligns with findings from various recent studies. Notably, Ruan et al. reported a significant association between depression and many gastrointestinal diseases, including liver conditions, emphasising that mental health is crucial in managing chronic diseases (9). Similarly, research by Gaspar et al. suggested that psychiatric disorders are prevalent among individuals with chronic liver diseases, impacting their overall health outcomes (10).

Our study population had a mean age of 34.1 years (±6.2 years), with a notable male predominance (56.5%). This is consistent with other studies, which indicate that younger adults and males often present higher rates of depression and anxiety in the context of liver disease; for instance, Rivera-Matos et al. outlined significant sociodemographic risk factors for depression that included younger age and male gender as potential contributors to higher mental distress among patients with CLD (11). The predominance of males could also reflect the higher rates of ulcerative conditions linked to behaviours more commonly associated with men, such as higher alcohol consumption (12, 13).

Interestingly, we found that rural residents had a higher frequency of depression (41.2%) compared to urban residents (30.9%), and this finding mirrors earlier work by Kim et al., which commented on the role of geographic and socioeconomic factors in amplifying mental health risks in patients with liver disease (14). This disparity may be attributed to the limited access to mental health care and resources in rural areas, which might exacerbate the psychological burdens associated with chronic disease (15).

In our analysis, unemployment was significantly associated with increased depression (44.4% in the unemployed group versus 26.8% in employed individuals). This finding is supported by studies conducted by Zhang et al., which emphasise that joblessness contributes to psychological distress, particularly in populations facing chronic illness (16). Employment may provide not only financial stability but also a sense of purpose and social support, thereby mitigating depressive symptoms.

The statistically significant association between obesity (37.6% of our cohort) and depression (48.4% prevalence in the obese group) corroborates findings from multiple studies suggesting that metabolic disorders often co-occur with mental health issues. Specifically, analysis by Christodoulidis et al. delineated a clear link between obesity and the exacerbation of depressive symptoms, reinforcing the idea that managing physical health can be crucial for mental well-being (17).

Our study identified that lower educational attainment correlated with higher frequencies of depression, especially among those who were illiterate or had completed only primary education. Ochoa-Allemant et al. highlighted similar trends, noting that poorer educational outcomes can limit health literacy and access to necessary care, thereby heightening the risk of adverse psychological outcomes in chronic disease populations (18). Improvements in patient education and health literacy are crucial to managing chronic liver conditions and their associated mental health impacts.

Furthermore, a longer duration of CLD was associated with increased rates of depression (44.6% for patients with a duration longer than three years versus 28.2% for those with a shorter duration). This finding reflects the progressive nature of liver disease and the cumulative effect of sustained illness on psychological health, as illustrated in the work of Danilescu et al. (5). Prolonged disease duration frequently entails greater physical mutilation, distress, and the potential for complex comorbidities, which can further compromise mental health (6).

The findings from our study reinforce the intricate relationship between chronic liver disease and mental health, emphasising the need for holistic approaches in clinical contexts. The identified sociodemographic factors—gender, residence, employment status, obesity, education level, and duration of illness—shed light on the diverse ways that chronic conditions intersect with mental health among patients. Future efforts must include integrated care strategies addressing both the physiological and psychological aspects of chronic liver disease, particularly in populations like those in Pakistan, where health disparities are pronounced, and mental health support remains limited.

Conclusion

Depression was prevalent among patients with chronic liver disease in this tertiary care cohort, affecting over one-third of participants and showing significant associations with female gender, rural residence, unemployment, obesity, lower educational status, and longer disease duration. These findings support the need for routine mental health

screening and integrated psychosocial care within hepatology services in Pakistan to improve overall patient outcomes and adherence to long-term treatment.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-MMNCS-088/U1-24)
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Conflict of interest

The authors declared no conflicts of interest.

Author Contribution

ZA (Postgraduate Trainee)
Manuscript drafting, Study Design,
Review of Literature, Data entry, Data analysis, and drafting an article.
OK (Associate Professor)
Conception of Study, Development of Research Methodology Design
Study Design, manuscript review, and critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

References

1. Østberg N., Jacobsen B., Lauridsen M., & Grønkjær L Mental Health, Quality of Life, and Stigmatisation in Danish Patients with Liver Disease. International Journal of Environmental Research and Public Health 2023;20(8):5497. https://doi.org/10.3390/ijerph20085497
2. Smith M., Wade J., Wolstenholme J., & Bajaj J Gut microbiome-brain-cirrhosis axis. Hepatology 2023;80(2):465-485. https://doi.org/10.1097/hep.0000000000000344
3. Zimbrean P. and Jakab S. Depression and anxiety management in cirrhosis. Hepatology Communications 2024;9(1). https://doi.org/10.1097/hc9.0000000000000600
4. Kong Y., Yao Z., Ren L., Zhou L., Zhao J., Qian Y., et al Depression and hepatobiliary diseases: a bidirectional Mendelian randomisation study. Frontiers in Psychiatry 2024;15. https://doi.org/10.3389/fpsyt.2024.1366509
5. Danilescu C., Săndulescu L., Pîrlog M., Streba C., &Rogoveanu I Depressive and Anxious Symptoms in Hepatitis C Virus Infected Patients Receiving DAA-Based Therapy. Diagnostics 2021;11(12):2237. https://doi.org/10.3390/diagnostics11122237
6. Malik M., Mushtaq H., & Hussain A HEALTH-RELATED QUALITY OF LIFE AND DEPRESSION AMONG PATIENTS OF LIVER CIRRHOSIS IN PAKISTAN. International Journal of Current Pharmaceutical Research 2021:19-25. https://doi.org/10.22159/ijcpr.2021v13i2.41546
7. Cheon S. and Song J. The Association between Hepatic Encephalopathy and Diabetic Encephalopathy: The Brain-Liver Axis. International Journal of Molecular Sciences 2021;22(1):463. https://doi.org/10.3390/ijms22010463
8. Kmeid M., Liu X., Ballentine S., & Lee H Idiopathic Non-Cirrhotic Portal Hypertension and Porto-Sinusoidal Vascular Disease: Review of Current Data. Gastroenterology Research 2021;14(2):49-65. https://doi.org/10.14740/gr1376
9. Ruan X., Chen J., Sun Y., Zhang Y., Zhao J., Wang X., et al Depression and 24 gastrointestinal diseases: a Mendelian randomisation study. Translational Psychiatry 2023;13(1). https://doi.org/10.1038/s41398-023-02459-6
10. Gaspar R., Cardoso P., Ribeiro T., Silva M., & Macedo G Does Portal Hypertension Increase the Risk of Helicobacter pylori Infection and Pre-Malignant Gastric Lesions?. Journal of Clinical Medicine 2024;13(6):1768. https://doi.org/10.3390/jcm13061768
11. Rivera-Matos L., Andrews S., & Eswaran S. Sociodemographic Risk Factors for Depression in Patients With Chronic Liver Disease. Clinical Liver Disease 2022;20(2):38-42. https://doi.org/10.1002/cld.1208
12. Raza M., Njdeaka-Kevin T., Polo J., &Azimuddin K.. Long-Term Outcomes of Bariatric Surgery: A Systematic Review. Cureus 2023. https://doi.org/10.7759/cureus.39638
13. Han L Prevalence, risk factors, and prognostic role of anxiety and depression in surgical gastric cancer patients. Translational Cancer Research 2020;9(3):1371-1383. https://doi.org/10.21037/tcr.2020.01.11
14. Kim S., Min C., Oh D., & Choi H. Reciprocal association between depression and peptic ulcers: Two longitudinal follow-up studies using a national sample cohort. Scientific Reports 2020;10(1). https://doi.org/10.1038/s41598-020-58783-0
15. Holmes R., Patel A., & Desai A Psychiatric Disorders and Their Treatment: Impact of Outcomes in Patients With Chronic Liver Disease. Clinical Liver Disease 2022;20(2):32-37. https://doi.org/10.1002/cld.1204
16. Zhang M., Li H., Li Q., Yang Z., Deng H., Xu Y.et al.. Osteoarthritis with depression: mapping publication status and exploring hotspots. Frontiers in Psychology 2024;15. https://doi.org/10.3389/fpsyg.2024.1457625
17. Christodoulidis G., Konstantinos-Eleftherios K., & Marina-Nektaria K.. Double role of depression in gastric cancer: As a causative factor and as a consequence. World Journal of Gastroenterology 2024;30(10):1266-1269. https://doi.org/10.3748/wjg.v30.i10.1266
18. Ochoa-Allemant P., Tate J., Williams E., Gordon K., Marconi V., Bensley K.et al.. Enhanced Identification of Hispanic Ethnicity Using Clinical Data. Medical Care 2023;61(4):200-205. https://doi.org/10.1097/mlr.0000000000001824.