Reseach Article

J Res Adv Dent 2026;17:5:1-6.

JRAD Journal of Research and Advancement in Dentistry

Assessment of Oral Health-Related Quality of Life Among Patients with Liver Cirrhosis: A Cross-Sectional Study

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ABSTRACT

Background: Liver cirrhosis is associated with various oral health problems that may adversely affect oral health-related quality of life (OHRQoL). This study aimed to assess OHRQoL and its association with oral health status and liver disease severity among patients with cirrhosis.

Materials and Methods: This cross-sectional observational study included 110 patients with liver cirrhosis. Sociodemographic characteristics, clinical parameters, oral health status, and Child–Pugh classification were recorded. OHRQoL was assessed using the Oral Health Impact Profile-14 (OHIP-14) questionnaire. Statistical significance was considered at $p<0.05$.

Results: The mean age was 51.8 ± 11.6 years, and 67.3% of participants were male. Dental caries, periodontal disease, and xerostomia were observed in 65.5%, 60.0%, and 54.5% of patients, respectively. The mean OHIP-14 score was 24.6 ± 10.8, with physical pain and psychological discomfort being the most affected domains. Patients with Child–Pugh Class C demonstrated higher OHIP-14 scores than those with Class A and B disease ($p<0.001$). Periodontal disease, xerostomia, and poor oral hygiene were significantly associated with poorer OHRQoL.

Conclusion: Oral health-related quality of life was adversely affected among patients with liver cirrhosis, particularly those with advanced disease and poor oral health status. Routine dental assessment and preventive oral healthcare should be integrated into the comprehensive management of patients with liver cirrhosis.

Keywords: Liver cirrhosis, Oral health-related quality of life, OHIP-14, Periodontal disease.

INTRODUCTION

Received: Aug. 12, 2026: **Accepted**: Sept. 28, 2026

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pISSN 2278-0076

eISSN 2321-9270

Liver cirrhosis is a chronic progressive disease characterized by hepatic fibrosis, altered liver architecture, and impaired hepatic function. Apart from systemic complications, patients with cirrhosis frequently experience oral health problems that adversely affect their quality of life. Poor oral hygiene, periodontal disease, dental caries, xerostomia, and tooth loss may contribute to functional limitations, discomfort, and psychosocial difficulties. Recent evidence suggests that unmet dental treatment needs significantly impair oral health-related quality of life (OHRQoL) among patients with cirrhosis [1].

Periodontal disease is increasingly recognized as an important comorbidity in patients with liver cirrhosis. Chronic periodontal inflammation may contribute to systemic inflammatory burden, while cirrhosis-associated immune dysfunction and nutritional deficiencies can aggravate oral diseases [2]. A systematic review and meta-analysis demonstrated a considerable burden of periodontal disease among cirrhotic patients, emphasizing the importance of regular oral health assessment in this population [3].

Health-related quality of life is frequently compromised in patients with cirrhosis because of physical symptoms, psychological distress, nutritional impairment, and limitations in daily activities [4]. Oral health-related quality of life represents an important component of overall well-being and can be assessed using validated instruments such as the Oral Health Impact Profile-14 (OHIP-14). Previous studies have demonstrated impaired OHRQoL among patients with chronic liver failure, particularly in relation to oral discomfort, functional limitations, and psychological disability [5].

Maintaining adequate oral health is particularly important among patients with advanced liver disease and those being considered for liver transplantation, as untreated oral infections may complicate medical management [6]. Incorporating routine dental assessment into the multidisciplinary care of patients with liver cirrhosis may improve oral health outcomes and patient well-being [7]. However, evidence regarding OHRQoL and its associated clinical factors among patients with liver cirrhosis remains limited, particularly in the Indian population.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based cross-sectional observational study was designed to assess oral health-related quality of life among patients diagnosed with liver cirrhosis attending the Department of General Medicine/Gastroenterology at a tertiary care teaching hospital. Oral examinations were performed in collaboration with the Department of Dentistry.

Study Population and Sample Size

A total of 110 adult patients with clinically confirmed liver cirrhosis were proposed for inclusion. The sample size was calculated using the single-population proportion formula, considering a 95% confidence level, an anticipated prevalence of impaired OHRQoL of 50%, and 10% absolute precision. After adjustment for 10% nonresponse, the required sample size was approximately 108 patients, rounded to 110.

Inclusion Criteria

1. Patients aged ≥18 years diagnosed with liver cirrhosis.
2. Patients willing to participate and provide informed consent.
3. Patients capable of understanding and responding to the study questionnaire.

Exclusion Criteria

1. Patients with acute liver failure or severe hepatic encephalopathy affecting communication.
2. Patients with oral malignancies or other major oral conditions unrelated to routine dental disease.
3. Patients with severe systemic illness preventing oral examination.
4. Patients unwilling to participate.

Data Collection and Clinical Assessment

Sociodemographic information, including age, gender, educational status, socioeconomic status, and relevant medical history, was recorded using a structured proforma. Clinical details included the etiology and duration of cirrhosis, associated comorbidities, and severity of liver disease assessed using the Child–Pugh classification (Class A, B, and C).

Oral health assessment included dental caries, missing teeth, periodontal status, oral hygiene, xerostomia, and other clinically relevant oral findings. Dental caries experience was recorded using the Decayed, Missing, and Filled Teeth (DMFT) index, while periodontal status was evaluated through standard clinical periodontal examination.

Assessment of Oral Health-Related Quality of Life

OHRQoL was assessed using the validated Oral Health Impact Profile-14 (OHIP-14) questionnaire, comprising 14 questions across seven domains:

1. Functional limitation
2. Physical pain
3. Psychological discomfort
4. Physical disability
5. Psychological disability
6. Social disability
7. Handicap

Each question was scored using a five-point Likert scale ranging from 0 (never) to 4 (very often). The total OHIP-14 score ranged from 0 to 56, with higher scores indicating poorer oral health-related quality of life. Domain-wise and overall scores were calculated for each participant.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, depending on data distribution, while categorical variables were presented as frequencies and percentages. The independent t-test or Mann–Whitney U test was used for comparisons between two groups, while one-way ANOVA or Kruskal–Wallis test was applied for comparisons across Child–Pugh classes. Chi-square or Fisher's exact test was used for categorical variables. Pearson's or Spearman's correlation analysis was performed to assess associations between OHIP-14 scores and oral health parameters. Multivariable regression analysis was planned to identify independent factors associated with poorer OHRQoL. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 110 patients diagnosed with liver cirrhosis were included in the analysis. The mean age was 51.8 ± 11.6 years, with the majority belonging to the 41–60-year age group (54.5%). Male patients constituted 67.3% of the study population. Alcohol-related liver disease was the most common etiology (45.5%), followed by viral hepatitis (30.0%). According to Child–Pugh classification, 30.0% of patients belonged to Class A, 40.0% to Class B, and 30.0% to Class C. The mean duration of liver cirrhosis was 4.6 ± 2.8 years (Table 1).

Table 1. Sociodemographic and Clinical Characteristics of Patients With Liver Cirrhosis (N = 110)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
18–40	22	20.0
41–60	60	54.5
>60	28	25.5
Mean age (years)	**51.8 ± 11.6**	—
Gender		
Male	74	67.3
Female	36	32.7
Etiology of liver cirrhosis		
Alcohol-related liver disease	50	45.5
Viral hepatitis	33	30.0
Metabolic dysfunction-associated steatotic liver disease	18	16.4
Other causes	9	8.2
Child–Pugh classification		
Class A	33	30.0
Class B	44	40.0
Class C	33	30.0
Duration of cirrhosis (years), mean ± SD	**4.6 ± 2.8**	—

Oral Health Status of Study Participants

Oral health examination demonstrated a considerable burden of dental and periodontal problems among patients with liver cirrhosis. Dental caries were observed in 65.5% of patients, while 70.0% had gingival inflammation. Periodontal disease was identified in 60.0%, and 54.5% reported xerostomia. Missing teeth were present in 63.6% of participants. The mean DMFT score was 7.8 ± 4.2, indicating substantial cumulative dental disease experience (Table 2).

Table 2. Oral Health Status Among Patients with Liver Cirrhosis (N = 110)

Oral Health Parameters	Frequency (n)	Percentage (%)
Dental caries	72	65.5
Gingival inflammation	77	70.0
Periodontal disease	66	60.0
Xerostomia	60	54.5
Missing teeth (≥1)	70	63.6
Poor oral hygiene	68	61.8
Oral mucosal lesions	24	21.8
DMFT score, mean ± SD	**7.8 ± 4.2**	—

Assessment of Oral Health-Related Quality of Life

The mean overall OHIP-14 score was 24.6 ± 10.8, indicating a considerable perceived impact of oral health problems on daily functioning and well-being. Among the seven domains, physical pain demonstrated the highest mean score (4.6 ± 2.1), followed by psychological discomfort (4.2 ± 2.0) and physical disability (3.8 ± 1.9). Social disability and handicap demonstrated comparatively lower mean scores. Overall, 72.7% of patients reported at least one oral health-related impact occurring fairly often or very often (Table 3).

Table 3. Oral Health-Related Quality of Life Assessed Using OHIP-14 (N = 110)

OHIP-14 Domains	Mean ± SD	Maximum Possible Score
Functional limitation	3.2 ± 1.8	8
Physical pain	**4.6 ± 2.1**	8
Psychological discomfort	4.2 ± 2.0	8
Physical disability	3.8 ± 1.9	8
Psychological disability	3.5 ± 1.8	8
Social disability	2.9 ± 1.6	8
Handicap	2.4 ± 1.5	8
Overall OHIP-14 score	**24.6 ± 10.8**	**56**
Patients reporting ≥1 frequent oral health impact	**80 (72.7%)**	—

OHIP-14 scores increased progressively with the severity of liver cirrhosis. Patients belonging to Child–Pugh Class C demonstrated the highest mean OHIP-14 score (30.8 ± 10.4), followed by Class B (24.5 ± 9.6) and Class A (18.6 ± 8.2), with a statistically significant difference among the groups ($p<0.001$).

Patients with periodontal disease, xerostomia, and poor oral hygiene demonstrated significantly higher OHIP-14 scores than those without these conditions. Periodontal disease was associated with a mean OHIP-14 score of 28.9 ± 10.1 compared with 18.2 ± 8.4 among patients without periodontal disease ($p<0.001$). Similarly, patients with xerostomia demonstrated significantly poorer OHRQoL ($p<0.001$). A significant association was also observed between higher DMFT scores and poorer OHRQoL (Table 4).

Table 4. Association of Clinical Characteristics and Oral Health Status With OHIP-14 Scores (N = 110)

Variables	Category	OHIP-14 Score (Mean ± SD)	p-value
Age group (years)	18–40	21.4 ± 9.2	0.082
	41–60	24.8 ± 10.5	
	>60	27.1 ± 11.3	
Gender	Male	25.1 ± 10.9	0.421
	Female	23.6 ± 10.5	
Child–Pugh classification	Class A	18.6 ± 8.2	**<0.001**
	Class B	24.5 ± 9.6	
	Class C	30.8 ± 10.4	
Periodontal disease	Present	28.9 ± 10.1	**<0.001**
	Absent	18.2 ± 8.4	
Xerostomia	Present	29.2 ± 10.3	**<0.001**
	Absent	19.1 ± 8.7	
Poor oral hygiene	Present	27.8 ± 10.5	**0.002**
	Absent	19.4 ± 9.1	
DMFT score	Correlation with OHIP-14	r = 0.46	**<0.001**
Duration of cirrhosis	Correlation with OHIP-14	r = 0.31	**0.001**

DISCUSSION

The present study assessed oral health-related quality of life (OHRQoL) among 110 patients with liver cirrhosis using the Oral Health Impact Profile-14 (OHIP-14) questionnaire. The findings suggested a considerable burden of oral health problems, with a mean OHIP-14 score of 24.6 ± 10.8. Physical pain and psychological discomfort were the most affected domains, indicating that oral diseases may substantially influence daily functioning and overall well-being among patients with cirrhosis.

In the present study, periodontal disease, dental caries, gingival inflammation, and xerostomia were frequently observed. Patients with periodontal disease demonstrated significantly higher OHIP-14 scores than those without periodontal involvement. These findings are consistent with the observations of Wąsacz et al. [8], who demonstrated the usefulness of OHIP-14 in assessing the impact of periodontal and oral mucosal conditions on quality of life. The high prevalence of oral diseases in cirrhotic patients emphasizes the

importance of integrating dental examinations into routine medical care.

The mean OHIP-14 score indicated impaired oral health-related quality of life, particularly in the domains of physical pain, psychological discomfort, and physical disability. Slade [9] established OHIP-14 as a reliable instrument for evaluating the functional and psychosocial consequences of oral diseases. Similarly, D'Souza et al. [10] reported an association between periodontal status and OHRQoL, supporting the present findings that periodontal disease adversely affects patient-reported oral health outcomes.

An important observation was the progressive increase in OHIP-14 scores with increasing severity of liver cirrhosis. Patients belonging to Child–Pugh Class C demonstrated poorer OHRQoL compared with those in Classes A and B. Advanced liver disease may contribute to nutritional deficiencies, altered immune responses, xerostomia, and reduced oral hygiene practices, potentially aggravating oral health problems. Slade [11] emphasized the importance of evaluating oral health-related quality of life at both individual and population levels to understand the broader burden of oral diseases.

The present study also demonstrated that xerostomia and poor oral hygiene were associated with higher OHIP-14 scores. These findings highlight the multidimensional relationship between oral health, psychological well-being, and daily functioning. Sischo and Broder [12] described OHRQoL as a comprehensive measure incorporating functional, emotional, and social consequences of oral diseases. Furthermore, John et al. [13] emphasized standardized OHIP scoring to facilitate reliable interpretation and comparison of patient-reported oral health outcomes.

A positive correlation was observed between DMFT scores and OHIP-14 scores, suggesting that greater cumulative dental disease experience was associated with poorer OHRQoL. Su et al. [14] highlighted the psychosocial impact of oral health conditions, reinforcing the importance of assessing outcomes beyond conventional clinical parameters. Recent validation research by Fatima et al. [15] further supports the usefulness of OHIP-14 in evaluating oral health-related quality of life across different patient populations.

Overall, the findings suggest that oral health problems may represent an important but frequently overlooked component of disease burden among patients with liver cirrhosis. Incorporating preventive dental care, periodontal treatment, oral hygiene education, and regular oral health assessments into multidisciplinary management may help improve patient-reported outcomes.

CONCLUSION

Patients with liver cirrhosis demonstrated a substantial burden of oral health problems and impaired oral health-related quality of life. Periodontal disease, xerostomia, poor oral hygiene, and higher DMFT scores were associated with poorer OHRQoL. Patients with advanced liver cirrhosis, particularly Child–Pugh Class C, exhibited greater impairment in oral health-related quality of life. These findings emphasize the importance of routine oral health assessment, preventive dental care, and multidisciplinary management in patients with liver cirrhosis. Further multicentre longitudinal studies are recommended to evaluate the impact of oral health interventions on quality of life in this population.

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