International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

# Impact of Sarcopenia on Health - Related Quality of Life in Cirrhotics

**Dr. Ben Xavier[1], Dr. T Ravishankar[2], Dr. A Senthilvadivu[3], Dr. V Arulselvan[4]**

[1]Senior Resident, Department of Medical Gastroenterology,Coimbatore medical college, Coimbatore
Email: *benxavier999[at]gmail.com*
9497670872

[2]Professor, Department of Medical Gastroenterology, Coimbatoremedical college, Coimbatore

[3]Assistant Professor, Department of Medical Gastroenterology,Coimbatore medical college, Coimbatore

[4]Assistant Professor, Department of Medical Gastroenterology,Coimbatore medical college, Coimbatore

**Abstract:** ***Background and objectives: Quality of life (QoL) is variably impaired in chronic liver disease, regardless of cause or severity. Sarcopenia adversely affects clinical outcomes including survival, sepsis-related mortality, and post-liver transplantation survival in cirrhotic patients. The aim of the studywas to investigate the prevalence of sarcopenia and impact on QoL using CLDQ-T questionnaire in patients with cirrhosis. Materials and Methods: After getting ethical clearance and informed consent, a prospective observational study was conducted. Consecutive adult cirrhotic patients with Tamil as mother tongue admitted over aperiod of one year were evaluated for sarcopenia according to the 2021 Indian National Association for Study of the Liver (INASL) consensus statement [hand grip cut-offs and CTskeletal muscle index (SMI)]. The translated version of CLDQ into Tamil (CLDQ-T) was used to assess QoL. Results: The study included 84 patients with a mean age of 46 years. Sarcopenia was present in 39 (46.4%) of patients. Sarcopenia was present in 11.5% in CHILD A, 47.5 % in CHILD B and 94.4 % in CHILD C cirrhotic patients. Sarcopenia had a moderate negative correlation withQuality of life as assessed by CLDQ- T particularly in relation with systemic symptoms andactivity. Conclusion: Cirrhotic patients with sarcopenia were found to have lower overall QoL as per CLDQ-T,especially related to systemic symptoms and activity.***

**Keywords:** quality of life, sarcopenia, cirrhosis, CLDQ-T

## 1. Introduction

Health-related quality of life (HRQOL) is a key component in the evaluation of cirrhosis. Patients with cirrhosis have lower HRQOL compared with the general population. Despite the importance of QoL in patients with cirrhosis, studies in this regard are largely lacking. Malnutrition is a common comorbidity in patients with liver cirrhosis, which impairs the functional status (1). Sarcopenia, one among the main indicators of malnutrition, is characterized by progressive decreases in skeletal muscle mass, strength and function (2). The prevalence of sarcopenia in cirrhosis ranges from 22 - 70% (3). Higher rates of complications (especially hepatic encephalopathy and infections), hospitalisation, and premature mortality are noted in sarcopenic patients (4) There is a strong interplay between sarcopenia, malnutrition, physical deconditioning, and frailty in cirrhosis. These contribute to markedly altered QoL in patients with cirrhosis and sarcopenia (5)

Chronic liver disease questionnaire (CLDQ) is a self-administered, disease specific instrument for measuring the QOL in patients with CLD (6). CLDQ had been translated and validated in several languages, including Chinese, Spanish, Bengali (7). A study conducted in Puducherry had translated CLDQ into Tamil. CLDQ-T had showed good performance characteristics in assessing QOL in Tamil-speaking patients with CLD (8).

As declining liver function impairs HRQOL, the impact of sarcopenia on HRQOL in cirrhotic patients requires evaluation independent of liver function (9). There are only few reports clarifying the effect of sarcopenia on HRQOL in cirrhotic patients.

**Aim of study**

The aim was to study the impact on QoL using CLDQ-T questionnaire in patients with cirrhosis

## 2. Methods and Data Collection

We conducted a prospective observational study in cirrhotic patients attending the department of Medical Gastroenterology, Coimbatore Medical College from April 2022 to March 2023. All consecutive adult (> 18yrs) patients with cirrhosis, irrespective of etiology, with ability to read Tamil, who gave an informed consent, were included in our study. Liver cirrhosis was defined based on clinical, biochemical, abdominal ultrasound, and CT scan features of irregular and nodular liver, small and shrunken liver, splenomegaly, and portosystemic collaterals. Patients with extrahepatic portal vein obstruction or non- cirrhotic portal fibrosis, hepatocellular carcinoma, other overt malignancies, AIDS, advanced CKD, severe COPD, cardiac failure with ejection fraction less than 40 %, neuromuscular disorders, active untreated sepsis, marked hemodynamic instability, overt untreated encephalopathy, obvious psychiatric or cognitive disturbances, recent (<4 weeks) hospitalization or worsening of liver disease in the form of variceal bleed, jaundice, ascites or hepatic encephalopathy inability to either read or speak Tamil were excluded from the study. Severity of CLD was assessed using Child- Turcotte-Pugh (CTP) score and MELD- Na scores.

Every patient was asked to fill CLDQ- T by 10-15 mins. CLDQ- T is the translated and validated Tamil version of CLDQ. It consists of 29 items grouped into 6 domains. The six domains included abdominal symptoms (items 1, 5, 17), fatigue (items 2, 4, 8, 11, 13), activity (items 3, 6, 21, 23, 27), systemic symptoms (items 3, 6, 21, 23, 27), emotional function (items 0, 12, 15, 16, 19, 20, 24, 26) and worry (items 18, 22, 25, 28, 29). A Likert scale response format was used for all items ranging from 1 (most impairment) to 7 (least impairment). Scoring of the questionnaire was done by dividing each domain score by the number of items per domain. Overall CLDQ-T score was obtained by adding scores for each item in the domain and dividing it by the total number of items (n=29). Categories of CLDQ score for determination of frequency of QoL were made which were good if mean CLDQ- T score ≥5 and bad if score is <5. Categories were made for CLDQ-T score by assigning values, based on the international available literature that had shown mean CLDQ score of >5in normal participants.

Sarcopenia was diagnosed based on low handgrip strength and low skeletal muscle mass as per Indian National Association for Study of the Liver (INASL) consensus statement, 2021 on nutrition in liver disease that provided cut-off levels for the Indian population (10)

1) Handgrip strength (<27 kg for men and <16 kg for women)
2) Skeletal muscle mass by CT skeletal muscle index (SMI): total muscle mass at the level of L3 divided by height squared. (<38 $cm^2/m^2$ in females and <42 $cm^2/m^2$ in males)

**Statistical Analysis**

Data collected was entered into MS Excel spreadsheet and was analysed with SPSS 20.0 software. The correlation between sarcopenia and qualitative variables were analysed by Chi-square correlation.

## 3. Results

106 patients were taken up for the study out of which 22 patients were excluded due to incomplete data and 84 patients were taken up for the analysis. There were 15 females and 69males. 36 (42.8%) patients had alcoholic liver disease, 17 (20.2%) HBV, 14 (16.6%) patients

HCV, 11 (13.09%) NASH, 2 (2.3%) patients autoimmune hepatitis and 4 (4.7%) patients had cryptogenic cirrhosis. 26(30.9%) had Child A cirrhosis, 40 (47.6%) Child B cirrhosis and 18 (21.4%) Child C cirrhosis.

Sarcopenia was present in 39 (46.4%). 33 (47.8%) of 69 male patients and 6 (40%) of 15 female patients had sarcopenia. Prevalence of sarcopenia in 54.54% (6 out of 11) in NASH related cirrhosis, 52.7% (19 out of 36) in ethanol related cirrhosis, 50% (7 out of 14) in HCV related cirrhosis, 23.5% (4 out of 17) in HBV related cirrhosis, 50% (1 out of 2) of AIH disease related cirrhosis and 50% (2 out of 4) in cryptogenic cirrhosis.

94.4% (17 out of the 18 patients) CHILD C cirrhotic patients had sarcopenia whereas 47.5% (19 out of 40 patients) of CHILD B patients and 11.5% (3 out of 26 patients) of CHILD A patients only were sarcopenic. 32.5% (13 out of 40) CHILD B cirrhosis had alcohol related cirrhosis. 27 out of 39 (69.2%) sarcopenic patients had MELD score >15 compared to 17 out of 45 (37.7%) patients without sarcopenia, suggesting that patients with cirrhosis and sarcopenia were statistically and significantly sicker compared to patients without sarcopenia.

**Table 1:** Demographics of study population

| | | Number | Percentage (%) |
|---|---|---|---|
| Age group | 18-20 | 1 | 1.1 |
| | 21-40 | 12 | 14.28 |
| | 41-60 | 52 | 61.9 |
| | 61-80 | 19 | 22.6 |
| Sex | Male | 69 | 82.14 |
| | female | 15 | 17.85 |
| Cause | Alcohol | 36 | 42.8 |
| | NASH | 11 | 13.09 |
| | HBV | 17 | 20.2 |
| | HCV | 14 | 16.6 |
| | AIH | 2 | 2.3 |
| | cryptogenic | 4 | 4.7 |
| Sarcopenia | Present | 39 | 46.4 |
| | Absent | 45 | 53.5 |
| Ascites | | 54 | 64.2 |
| CTP | A | 26 | 30.9 |
| | B | 40 | 47.6 |
| | C | 18 | 21.4 |
| MELD- Na | <15 | 40 | 47.6 |
| | >15 | 44 | 52.3 |

**Table 2:** Distribution of Sarcopenia in study population

| Determinant | Number | % In Group |
|---|---|---|
| Male | 33 | 47.8 |
| Female | 6 | 40 |
| Alcohol | 18 | 52.7 |
| NASH | 6 | 54.54 |
| HBV | 4 | 23.5 |
| HCV | 7 | 50 |
| AIH | 1 | 50 |
| Cryptogenic | 2 | 50 |
| Normal | 17 | 43.5 |
| Overweight | 8 | 20.5 |
| Obese | 14 | 35.8 |
| Child<br>A<br>B<br>C | <br>3<br>19<br>17 | <br>11.5<br>47.5<br>94.4 |
| MELD<15<br>MELD>15 | 12<br>27 | 30.7<br>69.2 |

**Table 3:** Prevalence of sarcopenia in various etiology according to CHILD status

| | CTP A | | CTP B | | CTP C | |
|---|---|---|---|---|---|---|
| Sarcopenia | YES | NO | YES | NO | YES | NO |
| Alcohol | 2 | 4 | 13 | 13 | 4 | 0 |
| NASH | 1 | 3 | 1 | 2 | 4 | 0 |
| HBV | 0 | 9 | 2 | 3 | 2 | 1 |
| HCV | 0 | 6 | 2 | 1 | 5 | 0 |
| AIH | 0 | 0 | 0 | 1 | 1 | 0 |
| Cryptogenic | 0 | 1 | 1 | 1 | 1 | 0 |

**Table 4:** Summary of patients' characteristics according to presence or absence of sarcopenia.

| Variable | SARCOPENIA | | p- value |
|---|---|---|---|
| | YES (n=39) | NO (n= 45) | |
| Age | 48 (35 - 75) | 44(20 - 68) | **0.0001** |
| BMI | 26.2 ± 4.4 | 26.5 ± 3.9 | 0.75 |
| Hb (g/dl) | 9.1 ± 2.6 | 9.5±1.2 | 0.76 |
| Albumin (g/dl) | 2.9 ± 0.6 | 3.9 ± 0.6 | **0.0002** |
| Total bilirubin | 3.2 ± 2.4 | 1.7 ± 1.2 | **0.004** |
| sodium | 133.9 ± 7.1 | 139 ± 3.2 | **0.006** |
| Refractory ascites | 50% | 12.1% | **0.0006** |
| Encephalopathy episodes | 55.26% | 6.06% | **0.007** |
| Other infections except SBP | 31.43% | 3.13% | **0.002** |
| SBP | 8.82% | 3.13% | 0.33 |
| AKI | 6.06% | 3.24% | 0.45 |
| Portal vein thrombosis | 16.67% | 17.78% | 0.67 |
| MELD- Na | 17.4 ± 6.5 | 11.9 ± 3.7 | **0.0006** |
| CTP score | 9.2 ± 2.5 | 8.2 ± 2.3 | **0.004** |

**Table 5:** Comparison of CLDQ-T in patients with and without sarcopenia according toCHILD status

| CLDQ-T | SARCOPENIA (A) | | | SARCOPENIA (B) | | | SARCOPENIA (C) | | |
|---|---|---|---|---|---|---|---|---|---|
| | YES | NO | P value | YES | NO | P value | YES | NO | P value |
| Abdominal symptoms | 4.8 ± 1.6 | 4.7 ± 1.6 | 0.77 | 4.6 ± 1.8 | 4.4 ± 1.8 | 0.61 | 3.9 ± 1.9 | 3.9 ± 1.8 | 0.67 |
| Fatigue symptoms | 4.5 ± 1.5 | 4.6 ± 1.5 | 0.76 | 3.9 ± 1.3 | 3.8 ± 1.4 | 0.73 | 3.7 ± 0.9 | 4.2 ± 0.9 | **0.01** |
| Systemic symptoms | 4.6 ± 1.3 | 5.3 ± 1.4 | **0.02** | 4.4 ± 1.3 | 4.9 ± 1.5 | **0.04** | 4.3 ± 1.0 | 4.9 ± 1.0 | **0.007** |
| Activity | 4.6 ± 1.7 | 4.6 ± 1.6 | 0.08 | 4.3 ± 1.6 | 4.8 ± 1.6 | **0.03** | 3.4 ± 1.5 | 3.9 ± 1.5 | **0.02** |
| Emotional function | 4.8 ± 1.5 | 4.8 ± 1.6 | 0.38 | 4.0 ± 1.4 | 4.0 ± 1.6 | 0.78 | 3.9 ± 1.3 | 3.7 ± 1.6 | 0.53 |
| Worry | 4.6 ± 1.8 | 4.6 ± 1.7 | 0.09 | 3.9 ± 1.8 | 3.8 ± 1.9 | 0.80 | 3.4 ± 1.6 | 3.4 ± 1.7 | 0.56 |
| Overall mean | 4.8 ± 1.3 | 4.9 ± 1.3 | 0.72 | 4.2 ± 1.3 | 4.6 ± 1.4 | 0.28 | 3.8 ± 1.0 | 3.8 ± 1.1 | 0.45 |

**Table 6:** Correlation Between sarcopenia and various determinants by Pearson's coefficient

| Determinant | Pearsons Coefficent | p - value |
|---|---|---|
| AGE | 0.044 | 0.47 |
| CLDQ- abdominal symptoms | 0.194 | 0.34 |
| CLDQ- systemic symptoms | -0.271 | **0.02** |
| CLDQ- Fatigue | -0.065 | 0.96 |
| CLDQ- Activity | -0.253 | **0.03** |
| CLDQ- Worry | 0.132 | 0.21 |
| CLDQ- Emotion | -0.063 | 0.25 |
| CLDQ- Overall | -0.124 | **0.02** |
| MELD- Na | 0.573 | **0.034** |

The overall quality of life by overall CLDQ score had a negative weak correlation (r= -0.124)which was statistically significant, suggesting that patients with sarcopenia had low overall QoL. Among the various domains of the CLDQ-T, scores related to Systemic symptoms (r= - 0.271) and activity (r= -0.253) had significant moderate negative correlation with sarcopenia. Whereas scores related to Fatigue, Abdominal symptoms, Emotion and Worry did not have significant correlation.

## 4. Discussion

In patients with cirrhosis evaluated for liver transplantation, sarcopenia and frailty are increasingly recognised as independent predictors of clinical outcomes including wait-list mortality and reduced survival after surgery. Sarcopenia should be a priority for future interventions designed to improve QoL 30

Gauem Kim et al screened around 312 studies and 20 studies were included for the analysis and noted that 48.1% patients had sarcopenia and among males it was 61.6% and among females it was 36% (11). In our study sarcopenia was present in 39 patients (46.4%). 47.8% of male patients and 40% of female patients had sarcopenia. Prevalence of sarcopenia was 54.54% in NASH related cirrhosis, 52.7% in ethanol related cirrhosis, 50% in HCV related cirrhosis, 23.5% in HBV related cirrhosis, 50% of AIH disease related cirrhosis and 50% in cryptogenic cirrhosis. There were only few patients of AIH- related and cryptogenic cirrhosis which maybe reason for such high prevalence of sarcopenia. NASH was found to be an independent predictor for sarcopenia. Koo BK et al found that there was significant prevalence of sarcopenia in subjects with NAFLD (12). Study by N Shanavas et al from Thiruvananthapuram showed 14 out of 16 CTP A patients with sarcopenia had NASH related cirrhosis. The early development of sarcopenia among NAFLD patients may be linked to sarcopenic obesity (13)

94.4% of CTP C and 47.5% of CTP B cirrhotic patients had sarcopenia. CTP A patients had the least sarcopenia of 11.5%. Increase in CTP status was associated with greater loss in muscle mass. CTP score was also a determinant of QoL as it encompassed encephalopathy and ascites. MELD Na (r=0.573) scores also correlated strongly with sarcopenia which highlighted the role of sarcopenia as a prognostic indicator for mortality.

CLDQ -T overall score had weak negative correlation (r=-0.124) with sarcopenia. Domains related to Systemic symptoms (r=-0.271) and activity (r=-0.253) were having moderate negative correlation with sarcopenia which was statistically significant. Scores related to Fatigue, Abdominal symptoms, Emotion and Worry did not correlate negatively or had very weak positive correlation. Study by N Shanavas et al also showed similar impact of sarcopenia on specific aspects of QoL related to activity and systemic symptoms than QoL asa whole.

## 5. Conclusion

Sarcopenia is very common among cirrhotic patients and it significantly impairs their overallQoL. QoL particularly related to systemic symptoms and activity were more affected by the presence of sarcopenia. Patients with NASH related cirrhosis had higher prevalence of sarcopenia than alcoholic cirrhosis. NASH related cirrhosis patients had sarcopenia even at earlier stages. CLDQ-T was found to be a reliable instrument for assessment of QOL in Tamil-speaking patients with CLD, irrespective of the cause or severity of liver disease. It should be useful for clinical and research studies in patients with CLD in the Tamil-speaking population. limitations of the study were (i) less sample size, (ii) less number of HCV and NASH -related CLD, (iii) less number of CTP C patients in whom QOL is likely to be mostcompromised and (iv) less number of CTP A patients

## References

[1] Lautz HU, Selberg O, Körber J, Bürger M, Müller MJ. Protein-calorie malnutrition in liver cirrhosis. Clin Investig 1992;70:478–486.
[2] Tandon P, Ney M, Irwin I, Ma MM, Gramlich L, Bain VG, *et al.* Severe muscle depletion in patients on the liver transplant wait list: its prevalence and independent prognostic value. Liver Transpl 2012;18:1209–1216.
[3] Kim G, Kang SH, Kim MY, Baik SK. Prognostic value of sarcopenia in patients with liver cirrhosis: a systematic review and meta-analysis. PLoS ONE. 2017;12(10):e0186990.
[4] Traub J, Bergheim I, Eibisberger M, Stadlbauer V. Sarcopenia and liver cirrhosis - comparison of the European working group on sarcopenia criteria2010 and 2019. Nutrients. (2020) 12:547. doi: 10.3390/nu12020547
[5] Bunchorntavakul C, Rajender R. Review article: malnutrition/sarcopenia and frailty in patients with cirrhosis. Aliment Pharmacol Ther. (2019) 51:64–77. doi: 10.1111/apt.15571
[6] Younossi ZM, Guyatt G, Kiwi M, Boparai N, King D. Development of a disease specific questionnaire to measure health related quality of life in patients with chronicliver disease. Gut.1999;45:295–30
[7] Ray I, Dutta D, Basu P, De BK. Quality of life assessment of patients with chronic liver disease in eastern India using a Bengali translation chronic liver disease questionnaire. Indian J Gastroenterol. 2010;29:187–95
[8] Goel A, Arivazhagan K, Sasi A, Shanmugam V, Koshi S, Pottakkat B, Lakshmi CP, Awasthi A. Translation and validation of chronic liver disease questionnaire (CLDQ) in Tamil language. Indian J Gastroenterol. 2017 May;36(3):217-226. doi: 10.1007/s12664-017-0756-2. Epub 2017 Jun 13. PMID: 28608324
[9] Younossi Z. Chronic liver disease and health-related quality of life. Gastroenterology 2001;120:305–7
[10] Puri P, Dhiman RK, Taneja S, Tandon P, Merli M, Anand AC, Arora A, Acharya SK,Benjamin J, Chawla YK, Dadhich S, Duseja A, Eapan CE, Goel A, Kalra N, Kapoor D, Kumar A, Madan K, Nagral A, Pandey G, Rao PN, Saigal S, Saraf N, Saraswat VA, Saraya A, Sarin SK, Sharma P, Shalimar, Shukla A, Sidhu SS, Singh N, Singh SP, Srivastava A, Wadhawan M. Nutrition in Chronic Liver Disease: Consensus Statement of the Indian National Association for Study of the Liver. J Clin Exp Hepatol. 2021 Jan-Feb;11(1):97-143. doi: 10.1016/j.jceh.2020.09.003. Epub 2020 Oct 1. PMID: 33679050; PMCID: PMC7897902
[11] Kim G, Kang SH, Kim MY, Baik SK. Prognostic value of sarcopenia in patients with liver cirrhosis: A systematic review and meta-analysis. *PLoS One* 2017; 12:e0186990
[12] Koo BK, Kim D, Joo SK, Kim JH, Chang MS, Kim BG, Lee KL, Kim W. Sarcopenia is an independent risk factor for non-alcoholic steatohepatitis and significant fibrosis. *J Hepatol* 2017; 66:123-131.
[13] Shanavas N, Devadas K, Nahaz N, Varghese J, Cyriac R, Mathew D. Association of Sarcopenia with Health Related Quality of Life in Cirrhotics. J Assoc Physicians India. 2021 Nov;69(11):11-12. PMID: 34781614.
[14] Beaudart C, Reginster JY, Geerinck A, Locquet M, Bruyère O. Current review of the
[15] SarQoLR : a health-related quality of life questionnaire specific to sarcopenia. Expert Rev Pharmacoecon Outcomes Res. (2017) 17:335–41. doi:10.1080/14737167.2017.1360768