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Health-related Quality of Life in Patients with Liver Cirrhosis: Its Determination and Correlation with Relevant Factors

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ABSTRACT

OBJECTIVE: To determine the health-related quality of life (HRQOL) among patients with Cirrhosis of the liver using a short form of liver disease quality of life (SF-LDQOL) instrument, also to correlate HRQOL scores with relevant factors.
METHODOLOGY: This is a prospective, cross-sectional study carried out in the medical department of Civil Hospital Karachi from May 2021 to April 2022. One hundred ninety-seven confirmed cases of Cirrhosis from either gender over 18 years of age without malignancy, HIV infection, or Psychiatric/Neurological diseases were enrolled using convenient sampling. The SF-LDQOL instrument assessed HRQOL, summarizing overall disease-targeted HRQOL (0 to 100), where a higher score shows good HRQOL or otherwise. HRQOL was correlated with various sociodemographic factors and the severity of liver cirrhosis.
RESULTS: Using SPSS version 23, the SF-LDQOL score was 44±7.3. The severity of liver cirrhosis by (Child Turcotte Pugh) CTP-A correlated weakly (-0.1294), while CTP B and CTP C strongly correlated with SF-LDQOL scores (-0.9894 and -0.9912), respectively. The p-value for CTP A (0.705) is insignificant; however, for CTP B and C ($p < 0.00001$ & $p < 0.00001$) is significant. Demographically, the age and income status correlated strongly to SF-LDQOL scores, displaying considerable p-values ($p < 0.00001$ and $p < 0.00001$).
CONCLUSION: Most patients had compromised HRQOL as assessed by well-validated and more disease-specific tool SF-LDQOL score. HRQOL correlated positively with the severity of Cirrhosis by applying CTP and Model of end-stage liver disease (MELD) scoring. Sociodemographic parameters of age and income status also correlated well with HRQOL.

KEYWORDS: Cirrhosis of the liver, Child Turcotte Pugh, Model of end-stage liver disease, Health-related quality of life,

INTRODUCTION

Liver disease from viral hepatitis and hepatocellular carcinoma are responsible for more than 2 million deaths globally annually. 3.5% of fatalities worldwide contributed to liver cirrhosis and hepatocellular carcinoma. Cirrhosis of the liver ranks among the top twenty causes and is responsible for 1.6 % of disability-adjusted years of life and 2.1% of lost life years for the global burden[1]. Liver cirrhosis has a considerable part in subsequent morbidity and mortality, accounting for the 11th most common cause of mortality worldwide. Diverse aetiologies like Alcohol (prevalence increased by 78.2%), non-alcoholic fatty liver disease (NAFLD), where prevalence has risen 125.61% from 1990 to 2017, and viral hepatitis B and C, where prevalence has increased by 29.6% and 28.7% respectively caused the global detriment to worsen[2].

Various medical interventions for Cirrhosis emphasize reducing risk factors (HCC screening and surveillance over varices). These current medical strategies mainly focus on clinical aspects, which are extremely important, but often ignore patient-related factors responsible for health-related quality of life (HRQOL). Quantitative data from patients battling compensated Cirrhosis has revealed reasonable survival (12 years of median survival)[3], indicating that patients can live for ample periods even with severe disease. The entire management strategy for Cirrhosis usually implies clinical outcomes like mortality rates, biochemical results or the development of complications without considering factors pertinent to patients. HRQoL is a recognized fundamental health gauge, beneficial in supervising health policies and effectively evaluating the paraphernalia of various medical conditions and managements[4]. HRQOL is a subjective, multi-dimensional conception which deals with diverse angles of an entity's life, like gender, age, socioeconomic class (social functioning), type of illness and treatment[5], which must all be judged as essential parts of patient assessment[6].

The impact of disease-related complications and socioeconomic factors have compromised HRQOL among patients with CLD. Patients usually present with anorexia, asthenia, insomnia, indisposition, marked sarcopenia and other complications specific to liver cirrhosis like ascites, variceal haemorrhage and hepatic encephalopathy. Furthermore, HRQOL in CLD is also affected by socioeconomic factors like loss of job, functional disability, depression, labile moods, anxiety and low self-esteem[7-9].

Different subjective and objective constructs deliberate HRQOL. Objective constructs measure the capability of an individual to perform activities or specific tasks, whereas subjective constructs measure patients' perception of health status and wellbeing[10]. HRQOL assessment tools are generally sorted as one's overall assessment, whilst others render assessments tailored for specific diseases. Several proformas have been advocated to expand the HRQOL in cirrhotic patients. Generic subjective inquiry forms like Sickness Impact Profile, Nottingham Health Profile (NHP) and short form (SF-36) have been used for any chronic ailment to determine global evaluation related to life's worth. A significant advantage of the above subjective scales is to consent to the relative impact of various ailments to be studied and their use for comparison among populations. Subjective generic scales did not exhibit sensitivity and specificity of clinically momentous though little variations resulting from management interventions or disease evolution in specific situations[11]. The above justification concludes that disease-specific tools like chronic liver disease questionnaire (CLDQ)[12], liver disease quality of life (LDQOL)[13] and liver disease symptom index 2.0 (LDSI)[14], if combined with generic tools, will further enhance sensitivity in assessing HRQOL in a clinical environment and provide a comprehensive view HRQOL[15].

Pakistan has a considerable burden of Cirrhos due to elevated morbidity and mortality encumbered due to the advanced disease[16]. Comprehensive HRQOL assessment of patients with Cirrhosis helps provide a balanced service between clinical and patient factors. This study will assist in devising a robust treatment strategy for prolonging life rather than just enhancing it by inculcating related factors (HRQOL). This study intends to determine health-related quality of life in Pakistani patients with liver cirrhosis using (SF-LDQOL) as a specific tool and correlate various relevant factors through (SF-LDQOL) instrument among these patients.

METHODOLOGY

A prospective, cross-sectional study was carried out in the medical department of DUHS and Civil Hospital Karachi. All cases confirmed having liver cirrhosis aged 18 years or more from either gender were enrolled for the study. Approval from the institutional review board was sought pre-hand to the study.

All cases confirmed to have liver cirrhosis aged 18 years or more from either gender who gave informed consent were enrolled for the study. However, patients with malignancy, human immunodeficiency virus infection, and related psychiatry issues were excluded. Moreover, patients with hepatic encephalopathy and neurological problems (language or cognitive difficulties) were excluded, which could hamper the proficient implementation of this (SF - LDQOL) questionnaire.

Cirrhosis of the liver

Cirrhosis was confirmed on clinical, biochemical and radiological (ultrasound or computerized tomography) parameters. Radiographic characteristics of Cirrhosis exhibited shrunken and small liver along with intra-abdominal varices in the presence or absence of splenic enlargement. Besides these parameters, confirmation of Cirrhosis over a histopathological basis was also carried out wherever necessary.

Assessment of health-related quality of life (HRQOL)

Quality of life-related to health was assessed in all cirrhotic patients using the short form of liver disease quality of life instrument SF-LDQOL[17]. SF-LDQOL is a well-validated and dependable implement to evaluate the quality of life related to health among cirrhotics. SF-LDQOL is a precise, disease-centered, comprehensive instrument encompassing multiple dimensions. It merges earlier validated LDQOL 1.0 and a short form (SF-36) generic tool. LDQOL 1.0 part of SF-LDQOL LDQOL 1.0, which is a disease-focused scale, include specific symptomatology of liver disease, clear consequences of liver cirrhosis on daily activities, recall, attentiveness, social interface value, torment of health, sleep, lonesomeness, anguish or despair, self-professed stigmata related to liver disease, sexual performance and sexual issues with an overall score of 36[18]. SF-LDQOL score summaries comprehensive ailment targeted HRQOL with a sole number range from 0 to 100 where a higher score shows good HRQOL and vice versa.

The SF-36 part of SF-LDQOL defines a broadly employed basic HRQOL tool. It is meant to determine eight aspects of HRQOL: these are bodily performance, role constraint overall health, physical, body aches, and position constraint – emotional, vitality or vigor, social performance and emotional well-being. All domains of SF-36 are categorized into summary scores: the physical component summary (PCS) score & and the mental component summary (MCS) score[19]. Prior permission to use the SF-LDQOL instrument in our patient and its translation had

been sought from the authors who originally designed it. Furthermore, the copyright permission was taken from the respected journal.

Sociodemographic and clinical details:

All sociodemographic and clinical characteristics like gender, age, occupation and, level of education, income status[20], alongwith clinical details for all patients enrolled for the study, were recorded through specially designed proforma.

Determination of MELD and CTP-Score variables:

MELD is a prognostic scoring system among cirrhotics and was calculated among all enrolled patients with the help of a standard equation[21]. CTP- score, which is another prognostic scoring system, includes precisely five signatures clinically (prothrombin time, ascites, serum albumin, hepatic encephalopathy and total bilirubin) linked with chronic liver disease[22] were also calculated for all cirrhotic patients.

Statistical analysis:

Data analysis was performed through SPSS version 23. SF-LDQOL instruments were pretested among 25 patients to verify the applicability before similar population characteristics. SF-LDQOL validity and steadfastness for intrinsic consistency Cronbach's alpha coefficient were determined. A Cronbach alpha coefficient equivalent to or higher than 0.7 evidenced internal consistency. These patients from the pilot study were not a part of the final study sample. Otherwise, frequencies and percentages were determined for categorical variables (cause of liver disease, race, sex). However, continuous variables (CTP, MELD and SF-LDQOL scores) were depicted through means and standard deviations. A correlation was ascertained using Pearson's correlation coefficient between MELD, CTP and SF-LDQOL scores and other parameters like age, family income and education.

RESULTS

Sociodemographic characteristics:

The sociodemographic features of (197) cirrhotic patients are shown in **Table I**. Most patients in this study were males (57%). The mean age among patients was 67±7 years. All ethnic groups of the Pakistani population were present, among which most of the patients were Sindhis (30 %). The majority of participants were married (87%). Most patients (74%) had employment, whereas most were self-employed. The majority of participants (47%) had a family income class of lower income (<1,045$/year), followed by 83% of lower middle income (1,046-4,095$/year) and 21% of upper middle income (>1,2696 $/year). Over 41.5% had received primary level education (up to 5th standard), followed by 24.8% had middle level (up to 8th standard), followed by 22.8% had matric level (up to 10 years of schooling) and only 9.1 and 2.0% patients had intermediate (12 years of education) and higher level respectively.

Clinical and biochemical characteristics:

Table II shows the clinical and biochemical characteristics of (197) liver cirrhosis patients**.** Viral-related Cirrhosis was the main (83%) cause with chronic hepatitis C (61%) and B (39%). 17% of patients had non-viral related reasons for Cirrhosis with autoimmune (38%), Wilson (23.5%), Alcohol (14%), PBS (5.5%), Haemochromatosis (2.94 %), NASH (11.7%) and cryptogenic (2.9%) confirmed on liver biopsy. Most of the cirrhotic patients in this study had moderately severe disease (CTP-B 53.2%), followed by severe disease (30.7%) and mild severe disease (CTP-A 5.5%). Mean scores of various stages of severity of Cirrhosis were (5.5±0.31), (8.0±0.65) and (12.7±1.3) in CTP-A, CTP-B and CTP-C correspondingly. The mean score of the model of end-stage liver disease (MELD) in the patient's Cirrhosis of the liver was 25±6 [**Table II**]. Most of the patients had MELD level 1 (64%), followed by level III (19%) and level II (17%). Liver chemistries like ALT, AST, bilirubin, INR, sodium and creatinine among participants are shown in Table II. The overall SF-LDQOL score was 44±7.3.

SF-LDQOL score correlation with variables:

The variables like CTP score, income status and age are correlated, and p-values are derived in Table III. The severity score of Cirrhosis i.e., CTP A is weakly correlated (-0.1294), but CTP B and CTP C strongly correlate with the SF-LDQOL scores (-0.9894 and -0.9912), respectively. The p-value for CTP A (0.705) is not significant; however, for CTP B & C (< 0.00001 & < 0.00001), the p-value is quite substantial. Overall, the MELD score and its levels have shown a strong correlation with SF-LDQOL as shown in **Table III**. Among the demographic parameters, age and income status are found to be strongly correlated to SF-LDQOL scores, and their p-values (<0.00001 and < 0.00001) were found to be significant as well [**Table III**].

Table I: Sociodemographic profile of patients with cirrhosis of liver

Sociodemographic Profile	Results
Gender;	
Male:	112(57%)
Female:	85(43%)
Age; mean (SD)	69(±7)
Ethnicity %	
Sindhis	65(33%)
Balochis	57 (29%)
Pashtuns	33 (17%)
Muhajirs	22 (11%)
Saraikis	10 (05%)
Punjabis	6 (03%)
Others	4 (02%)
Marital Status;	
Unmarried:	26(13%)
Married:	171(87%)
Employment Status;	
Employed	146 (74%)
Government Servant:	16 (11%)
Private Servant:	32(22%)
Self employed	98(67.12%)
Unemployed:	51(26%)
Family income class	
Low income (< 1,045$/year or 167,200 PKR/ year)	93 (47%)
<13,933 PKR/Month	
Lower middle income (1,046-4,095$/year or 167,360 – 655,200 PKR/year	83 (42%)
14,000 – 54,600 PKR/Month	
Upper middle income (4,096-12,695$/year or 655,360 – 2,031,200 PKR/year	21 (11%)
54,613 – 167,267 PKR/Month	
High income > 1,2696 $/year or 2,031,360 PKR/year	NIL
>169,260 PKR	
Education level:	
Primary	81 (41.11%)
Middle	49 (24.8%)
Matric	45 (22.8%)
Intermediate	18 (9.13%)
Higher	04 (2.03%)

Table II: Clinical and biochemical profiles of patients with cirrhosis of liver

Clinical and biochemical profile	No and frequency %
Aetiology:	
Viral	163 (83%)
HCV	99 (61%)
HBV	64 (39%)
Non-Viral	34(17%)
AIH	13 (38%)
Wilson disease	08 (23.5%)
Alcohol	05 (14.7%)
PBC	02 (5.88%)
Hemochromatosis	01 (2.94%)
NASH	04 (11.76%)
Cryptogenic	01 (2.9%)
Severity stages of Cirrhosis	
CTP-A	11 (5.58%)
CTP-B	109 (55.32%)
CTP-C	77 (39.0%)
Scores of CTP stages	
CTP-A	5.5±0.31
CTP-B	8.0±0.65
CTP-C	12.7±1.3
MELD Score	24±2.6
MELD I	6±2.5
MELD II	14±1.9
MELD III	22.5±1.7
Biochemical profile:	
Bilirubin	2.94±0.78
INR	2.0±0.54
Sodium	129±4.1
Creatinine	1.8±0.3
SF-LDQOL Score:	
CTP-A	60.48±2.9
CTP-B	47.7±3.39
CTP-C	36.68±68
Overall	44±7.3

Table III: Correlation of SF-LDQOL score with severity and socio demographic profiles

Variables	SF-LDQOL SCORE		
	Correlation	**Coefficient of correlation**	**P value**
Severity of Cirrhosis			
CTP Scoring:			
CTP-A	-0.1294	0.0557	0.705
CTP-B	-0.9894	0.9789	< 0.00001
CTP-C	-0.9912.	0.9825	< 0.00001
MELD			
Overall	-0.9286	0.8623	< 0.00001
MELD I	0.9702	0.9702	< 0.00001
MELD II	0.9524	0.9524	< 0.00001
MELD III	0.8694	0.8694	< 0.00001
Sociodemographic:			
Income status	0.8699	0.7567	< 0.00001
Age	-0.9727	0.9461	< 0.00001

DISCUSSION

Labelled among the foremost reasons for morbidity and mortality, Cirrhosis of the liver greatly affects the quality of life; thus, the need to assess and sequentially apply SF-LDQOL scores in these patients is only logical where the role of these tools is increasingly documented to be vital in evaluating various disease outcomes to shape further interventions.

As far as the sociodemographic parameters are concerned, out of 197 patients, 57% were males. At the same time, the older age group over and around 69 years was the most affected age group, comparable to other studies[23,24]. **Ragusa et al.**[25] have shown compromised HRQOL among HCV patients using the Health Utilities Index Mark 3 survey, besides the EuroQol Index survey. Earlier studies[23] have demonstrated similar results with no substantial variances in HRQOL scores according to age and gender among cirrhotic patients except for social support. **Häuser W et al.**[26] by using the Short Form Health Survey (SF-36) as basic tool; additionally, the German version of the Chronic Liver Disease Questionnaire (CLDQ) as an HRQOL instrument, which is disease-specific, elaborated that gender and academic qualification levels did not link with HRQOL in cirrhotic patients. However, in this study, contrastingly, SF-LDQOL scores declined as the age group advanced; thus, HRQOL also decreased and also shows that the significant socioeconomic group with severely compromised HRQOL is the one with the lowest income group. The earlier study shows similar data with decreasing quality of life in the lowest income groups[27].

The upshot of the severity of liver cirrhosis and its correlation with HRQOL was determined by assessing the CTP scores in this study. All CTP stages were analyzed and labelled according to the assigned format of clinical and biochemical profiles. The observations made were that with the soaring severity of the chronic liver disease from CTP-A to CTP-C, the HRQOL deteriorated simultaneously, as evidenced by a decreasing score of SF-LDQOL. As shown in [**Table III**] where a score of severity of Cirrhosis, i.e., CTP A, is in weak correlation (-0.1294), but CTP B and CTP score in strong correlation with the SF-LDQOL scores (-0.9894 and -0.9912) respectively and has shown an overall a positive correlation. Earlier studies[28,29] have also shown similar results that the progressing severity of liver disease affects HRQOL among cirrhotics; however, the scores used to assess HRQOL were different. **Affendy A et al.**[30] in a sizeable cirrhotic pool have shown poor HRQOL among CTP-B and C patients; however, they have used the SF-36 scoring tool for HRQOL. Earlier studies[31,32] have also demonstrated similar to this study where deterioration of Cirrhosis will have poor HRQOL. Again, the above-referred studies have used the SF-36 plus liver disease-specific questionnaire (CLDQ) assessment version of HRQOL.

The relationship between HRQOL and the severity of Cirrhosis assessed by the MELD score is not much studied, partly because the MELD score was not wisely used before 2002[33]. This study has shown a significant correlation between overall and different levels of MELD. **Nikam V et al.**[34] have also demonstrated significant correlations between the MELD score and various spheres of SF-36. **Kanwal et al.**[35] showed a substantial association between PCS and MELD score, whereas a correlation was weak between CPS and MELD. Saab S et al.[36] have shown the frail correlation between SF-36, MELD and CLDQ.

The studies on assessing HRQOL among cirrhotic patients from Pakistan are limited. Previously **Malik M et al.**[37] used SF 36 and HADS to determine HRQOL among cirrhotic patients in Pakistan and showed the lowest scores in physical and emotional domains. However, in contrast to the above study, the present study used a more validated tool, SF-LDQOL, which includes a

disease-specific tool combined with a generic tool for determining HRQOL. **Malik M et al.**[37] have also shown that severity and advancing age negatively impacted HRQOL, which is in agreement with the present study. **Parkash O et al.**[38] have shown meagre HRQOL as resolute through CLDQ score being high in liver cirrhotic. However, HRQOL was determined by a disease-specific tool (CLDQ).

The current study is constrained as it is a single-centre study which did not determine the effect of HRQOL score over mortality; this implies that a large population-based study is required to assess the true impact of HRQOL among cirrhotic.

CONCLUSION

Most of the cirrhotic patients in this study had compromised HRQOL as assessed by SF-LDQOL score, a well-validated and more disease-specific tool. HRQOL is well correlated with the severity of Cirrhosis as evaluated through CTP along with MELD scoring. Among sociodemographic parameters, age and income status were also well correlated with HRQOL.

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AUTHOR CONTRIBUTIONS

Naqvi IH: Conceived the study concept and design. Critical revision and final approval of the manuscript

Salman M: Data collection and drafting of the manuscript

Siddiqui S: Data collection and statistical analysis

REFERENCES

1. Asrani SK, Devarbhavi H, Eaton J, Kamath PS. Burden of liver diseases in the world. J Hepatol. 2019; 70(1): 151-71. doi: 10.1016/j.jhep.2018.09.014.
2. Zhai M, Long J, Liu S. The burden of liver cirrhosis and underlying etiologies: results from the global burden of disease study 2017. Aging (Albany NY). 2021; 13(1): 279-300. doi: 10.18632/aging.104127
3. D'Amico G, Garcia-Tsao G, Pagliaro L. Natural history and prognostic indicators of survival in Cirrhosis: a systematic review of 118 studies. J Hepatol. 2006; 44(1): 217-31. doi: 10.1016/j.jhep.2005.10.013.
4. Tran TXM, Lee S, Oh CM, Chang YJ, Cho H. Understanding health problems in people with extremely low health-related quality of life in Korea. Sci Rep. 2022; 12(1): 4037. doi: 10.1038/s41598-022-07528-2.
5. Wu H, Han S, Zhang G, Wu W, Tang N. Health-related quality of life and determinants in North-China urban community residents. Health and Quality of Life Outcomes. 2020; 18: 1-9. doi: 10.1186/s12955-020-01522-w.
6. Makovski TT, Schmitz S, Zeegers MP, Stranges S, van den Akker M. Multimorbidity and quality of life: Systematic literature review and meta-analysis. Ageing Res Rev. 2019; 53: 100903. doi: 10.1016/j.arr.2019.04.005.
7. Janani K, Jain M, Vargese J. Health-related quality of life in liver cirrhosis patients using SF-36 and CLDQ questionnaires. Clin Exp Hepatol. 2018; 4(4): 232-39. doi: 10.5114/ceh.2018.80124.
8. Kim HJ, Chu H, Lee S. Factors influencing on health-related quality of life in South Korean with chronic liver disease. Health Qual Life Outcomes. 2018; 16(1): 142. doi: 10.1186/s12955-018-0964-1.
9. Hui Y, Li N, Yu Z. Health-Related Quality of Life and Its Contributors According to a Preference-Based Generic Instrument in Cirrhosis. Hepatol Commun. 2022; 6(3): 610-620. doi: 10.1002/hep4.1827.
10. Amy E. Ustjanauskas, Vanessa L. Malcarne. Health-Related Quality of Life. In: Suzy Bird Gulliver, Lee M. Cohen, eds. The Wiley Encyclopedia of Health Psychology. John Wiley & Sons Ltd, 2021; (cited 2023 April 13): 149-154. doi: 10.1002/978111905 7840.
11. Orr JG, Homer T, Ternent L. Health related quality of life in people with advanced chronic liver disease. J Hepatol. 2014; 61(5): 1158-1165. doi:10.1016/j.jhep.2014.06.034.
12. Chang PE, Tan HK, Lee Y, Fook-Chong S, Chia PY, Shaik-Hussain N et al. Clinical validation of the chronic liver disease questionnaire for the Chinese population in Singapore. JGH Open. 2020; 4(2): 191-7. doi: 10.1002/jgh3.12239.
13. Ha Y, Hwang S, Chon YE, Kim MN, Lee JH, Hwang SG. Validation of the liver disease quality of life instrument 1.0 in patients with Chronic Hepatitis B: A prospective study. J Clin Med. 2019; 8(5): 656. doi:10.3390/jcm8050656.
14. van der Plas SM, Hansen BE, de Boer JB. The Liver Disease Symptom Index 2.0; validation of a disease-specific questionnaire. Qual Life Res. 2004; 13(8): 1469-81. doi :10.1023/B:QURE.0000040797.17449.c0.
15. Younossi ZM. Chronic liver disease and health-related quality of life. Gastroenterology. 2001; 120(1): 305-07. doi:10.1053/gast.2001.22073.
16. Ali B, Salim A, Alam A. HEP-Net opinion on the management of ascites and its complications in the setting of decompensated Cirrhosis in the resource constrained

environment of Pakistan. Pak J Med Sci. 2020; 36(5): 1117-1132. doi:10.12669/pjms.36.5.2407.

17. Kanwal F, Spiegel BM, Hays RD. Prospective validation of the short form liver disease quality of life instrument. Aliment Pharmacol Ther. 2008; 28(9): 1088-101. doi:10.1111/j.1365-2036.2008.03817.x
18. Gralnek IM, Hays RD, Kilbourne A. Development and evaluation of the Liver Disease Quality of Life instrument in persons with advanced, chronic liver disease--the LDQOL 1.0. Am J Gastroenterol. 2000; 95(12): 3552-65. doi:10.1111/j.1572-0241.2000.03375.x.
19. Lins-Kusterer L, Valdelamar J, Aguiar CV, Menezes MS, Netto EM, Brites C. Validity and reliability of the 36-Item Short Form Health Survey questionnaire version 2 among people living with HIV in Brazil. Braz J Infect Dis. 2019; 23(5): 313-21. doi: 10.1016/j.bjid.2019.08.001.
20. World Bank Country and Lending Groups: (2022) Retrieved from: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
21. Berry P, Theocharidou E, Kotha S. Clinical utility of prognostic scores and models in decompensated liver disease. J Liver Transpl. 2021; 4: 100048.
22. Tsoris A, Marlar CA. Use of the Child Pugh Score in Liver Disease. [Updated 2023 Mar 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Available from: https://www.ncbi.nlm.nih.gov/books/NBK542308/.
23. Rabiee A, Ximenes RO, Nikayin S. Factors associated with health-related quality of life in patients with Cirrhosis: a systematic review. Liver Int. 2021; 41(1): 6-15. doi: 10.1111/liv.14680.
24. Huang R, Fan JG, Shi JP, Mao YM, Wang BY, Zhao JM et al. Health-related quality of life in Chinese population with non-alcoholic fatty liver disease: a national multicenter survey. Health and Quality of Life Outcomes. 2021; 19(1): 1-8.
25. Ragusa R, Bertino G, Bruno A, Frazzetto E, Cicciu F, Giorgianni G et al. Evaluation of health status in patients with hepatitis c treated with and without interferon. Health and Quality of Life Outcomes. 2018 ; 16: 1-9. doi: 10.1186/s12955-018-0842-x.
26. Häuser W, Holtmann G, Grandt D. Determinants of health-related quality of life in patients with chronic liver diseases. Clin Gastroenterol Hepatol. 2004; 2(2): 157-63. doi: 10.1016/s1542-3565(03)00315-x.
27. Pradhan RR, Kafle Bhandari B, Pathak R. The Assessment of Health-Related Quality of Life in Patients With Chronic Liver Disease: A Single-Center Study. Cureus. 2020; 12(9): e10727. doi: 10.7759/cureus.10727.
28. Nagel M, Labenz C, Wörns MA. Impact of acute-on-chronic liver failure and decompensated liver cirrhosis on psychosocial burden and quality of life of patients and their close relatives. Health Qual Life Outcomes. 2020; 18(1): 10. doi: 10.1186/s12955-019-1268-9.
29. Zuberi BF, Memon AR, Afsar S, Qadeer R, Kumar R. Correlation of quality of life in patients of Cirrhosis of liver with etiology and disease severity using disease-specific quality of life questionnaire. J Ayub Med Coll Abbottabad. 2007; 19(2): 7-11.
30. Afendy A, Kallman JB, Stepanova M. Predictors of health-related quality of life in patients with chronic liver disease. Aliment Pharmacol Ther. 2009; 30(5): 469-76. doi: 10.1111/j.1365-2036.2009.04061.x.

31. Bao ZJ, Qiu DK, Ma X. Assessment of health-related quality of life in Chinese patients with minimal hepatic encephalopathy. World J Gastroenterol. 2007; 13(21): 3003-8. doi: 10.3748/wjg.v13.i21.3003.
32. Younossi ZM, Boparai N, Price LL, Kiwi ML, McCormick M, Guyatt G. Health-related quality of life in chronic liver disease: the impact of type and severity of disease. Am J Gastroenterol. 2001; 96(7): 2199-205. doi: 10.1111/j.1572-0241.2001.03956.x.
33. Kamath PS, Kim WR. Advanced Liver Disease Study Group. The model for end-stage liver disease (MELD). Hepatology. 2007; 45(3): 797-805. doi: 10.1002/hep.21563.
34. Nikam V, Ramaswamy V, Chaudhary A, Singhvi S. Effect of Orthotopic Liver Transplantation on the Health-Related Quality of Life in Indian Patients with End-Stage Liver Disease: A Prospective Study. J Surg Res. 2022; 5: 435-440.
35. Kanwal F, Hays RD, Kilbourne AM, Dulai GS, Gralnek IM. Are physician-derived disease severity indices associated with health-related quality of life in patients with end-stage liver disease? Am J Gastroenterol. 2004; 99(9): 1726-32. doi: 10.1111/j.1572-0241.2004.30300.x
36. Saab S, Ibrahim AB, Shpaner A. MELD fails to measure quality of life in liver transplant candidates. Liver Transpl. 2005; 11(2): 218-23. doi: 10.1002/lt.20345.
37. Malik M, Mushtaq H, Hussain A. Health-related quality of life and depression among patients of liver cirrhosis in Pakistan. Int J Curr Pharm Sci [Internet]. 2021; 13(2): 19-25. Available from: https://innovareacademics.in/journals/index.php/ijcpr/article/view/41546.
38. Parkash O, Iqbal R, Jafri F, Azam I, Jafri W. Frequency of poor quality of life and predictors of health related quality of life in Cirrhosis at a tertiary care hospital Pakistan. BMC Res Notes. 2012; 5: 446. doi: 10.1186/1756-0500-5-446.