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A Prospective Observational Study on the Quality of Life in Patients with Chronic Liver Disease

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KEYWORDS

Chronic liver diseases, Child Pugh score, MELD Score, Quality of life

Abstract

Background: Chronic liver disease can have a profound negative impact on patients' health related quality of life and well-being. The QOL of CLD patients was assessed using the World Health Organization quality of life-BREF questionnaire (WHOQOL-BREF) and short form (SF-36) questionnaire. The severity of the disease was assessed using Child-Pugh score and Model for End-Stage Liver Disease (MELD) score. Chronic liver disease significantly impacts patients' quality of life, affecting physical, psychological, and social well-being. Understanding these impacts is crucial for developing effective management strategies to improve patient outcomes.

Aim: The aim of this study is to assess the quality of life of the patients with chronic liver disease.

Method: A prospective observational study was carried out in a 450 bedded tertiary care hospital by collecting data from patient case sheet and patient medication interview. The study subject involves 120 patients in general medicine, surgery departments with chronic liver disease.

Result: The quality of life in the patients with CLD were studied in 120 participants and found that 79% were males and 21% were females. Among the participants, 28% fell into the age group of 41-50. Notably, 60% of the population had a history of alcoholism. In SF-36 questionnaire, physical role (37.7%) was the lowest domain and physical health (39.6%) was found to lowest in WHOQOL-BREF questionnaire. The severity and prognosis of CLD and cirrhosis were evaluated using the Child Pugh score, with 8.3% classified as class C (high mortality) and 49.1% as class A (low mortality). Based on MELD scores, 3.3% of patients had scores between 30-39, indicating a higher need for liver transplantation, while 32.5% had scores of 9 or less, suggesting a lower need for transplantation. In addition to this a comparison study of different domains of SF-36 with Child Pugh score and MELD score revealed significant associations in domains such as physical functioning, pain, vitality, emotional role, and general health. Demographic variables showed a positive association with Child Pugh score and MELD score.

Conclusion: Chronic Liver Disease (CLD) is a progressive decline in liver function that significantly impacts an individual's quality of life. CLD has a profound effect on the overall well-being of patients, resulting in a lower quality of life compared to those without the disease. Chronic liver disease profoundly affects patients' quality of life, with disease severity, psychological well-being, and social support being pivotal factors. Multidisciplinary approaches that address both the medical and psychosocial aspects of CLD are essential for improving QoL in these patients. Further research should focus on developing and implementing targeted interventions to enhance the overall well-being of individuals with chronic liver disease.

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1. Introduction

Chronic liver diseases are a progressive deterioration of liver function for more than 6 months which leads to inflammation, destruction, and regeneration of liver parenchyma. It encompasses a wide spectrum of disorders, including infectious, metabolic, genetic, drug induced, idiopathic, structural and autoimmune diseases. Cirrhosis is a final stage of chronic liver diseases that results in disruption of liver architecture, the formation of widespread nodules, vascular reorganization, neo-angiogenesis and deposition of an extracellular matrix. Chronic liver diseases are an extremely common clinical condition, and the focus is done on the common aetiologies, clinical manifestations and management. CLD includes synthesis of clotting factors, other proteins, detoxification of harmful products of metabolism, and excretion of bile. [(1)]

CLD with or without liver failure is associated with considerable morbidity and mortality and affects the quality of life as usually they are progressive and often no reversible. The etiological causes for cirrhosis are diverse an vary with the geographical populations worldwide. Countries with high alcohol consumption have higher rates of alcoholic cirrhosis, whereas others have shown viral hepatitis as the most common cause for cirrhosis. Liver cirrhosis is largely preventable. The aetiologies of CLD vary from chronic heavy alcoholic consumption, hepatitis B& C infections, autoimmune diseases, non-alcoholic steatohepatitis (NASH), biliary cirrhosis, cardiac cirrhosis, genetic disorders. [(2)]

Preventing and screening for Chronic Liver Disease (CLD) is extremely important. To prevent CLD, we need to focus on reducing risk factors like excessive alcohol consumption, viral hepatitis infections (HBV and HCV), obesity, and metabolic syndrome. This can be done through public health campaigns, education, and lifestyle changes. Screening is also crucial as it helps identify CLD early on, allowing for timely intervention and management to prevent it from progressing to advanced stages. By screening for viral hepatitis, conducting liver function tests, and using imaging studies, healthcare providers can detect liver disease at its onset and provide appropriate treatments and lifestyle modifications to slow down disease progression and reduce the burden of CLD-related complications. It's also important to ensure access to healthcare services and raise awareness about liver health to effectively prevent and screen for CLD, ultimately improving outcomes and quality of life for those at risk.

2. Methods

Study design and setting:

A prospective observational study was conducted in a 450 bedded tertiary care hospital for over a period of 6 months. The study was conducted in the general medicine, surgery and psychiatry department.

Inclusion and exclusion criteria:

A total of 120 patients were taken into the study. The inclusion criteria were all the patients who are diagnosed with chronic liver disease from all the wards, those patients who are willing to participate in this study and patients who could communicate with the researcher during the period of data collection. The exclusion criteria were all the cases below 18 years of age and patients with psychiatric illness.

Ethical approval:

The study was approved from the hospital authority and institutional human ethical committee (IHEC/SJCP/A-005/2022-2023).

Study procedure

Data was gathered through questionnaires distributed among the study population. These questionnaires were given to patients who could complete them independently. For those unable to fill them out, questions were read aloud in Malayalam to enhance comprehension. The responses were documented in a structured format. Patient information was collected using a data entry form that included details such as name, age, sex, admission date, discharge date, reason for admission, medical history, medication history, social history, known allergies, and lab results including liver and renal function tests and blood counts. The format also allowed for the entry of laboratory investigations, Child Pugh score, MELD score, diagnosis, number of prescribed medications, and discharge medications. Two types of questionnaires were utilized to evaluate the patients' quality of life: SF-36 and WHOQOL-BREF. The SF-36 (Short Form Survey-36) comprises eight domains: Physical Functioning, Physical Role, Pain, General Health, Vitality, Social Functioning, Emotional

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Role, and Mental Health, focusing on health-related quality of life and how physical and mental health influence daily activities. In contrast, the WHOQOL-BREF (World Health Organisation Quality of Life) questionnaire offers a broader assessment of overall quality of life, considering physical, psychological, social, and environmental factors for a more comprehensive understanding of well-being. Each questionnaire item is rated on a 5-point Likert scale, with scores ranging from 1 (very dissatisfied/very poor) to 5 (very satisfied/very good). Domain scores are calculated by summing the item scores within each domain and converting them to a 0-100 scale, where higher scores reflect better quality of life. Severity scores, including the Child Pugh Score and MELD score, are derived from the data collected in the data entry form. The patients were provided patient counselling leaflets, and informative brochures were distributed across all hospital departments to raise awareness among patients with CLD.

Statistical analysis:

The analysis of the data was conducted utilizing the Statistical Package for the Social Sciences (SPSS). Various statistical methods, including the Chi-square test, were employed to compare different domains of the SF-36 questionnaire based on the classifications of the Child Pugh and MELD scores. Additionally, the relationship between the Child Pugh and MELD scores and demographic variables was examined using the Kruskal-Wallis test. A p-value of ≤ 0.05 was considered statistically significant.

3. Results

A prospective observational study on "quality of life in patients with chronic liver disease" was carried out for a period of 6 months to determine the quality of life in the patients with chronic liver disease. In the study, a total of 120 patients were included and their demographic characteristics, social history, laboratory values and medications were analysed.

Table 1: Demographics characteristics

The research, which included 120 participants, indicated that a significant portion of the subjects were middle-aged, with 28.3% falling within the 41-50 age range and 25.9% within the 51-60 age range. A predominant majority of the patients were male, comprising 79% of the total, and 60% of the participants reported a history of alcoholism.

Characteristics		No. of patients (n=120)	Percentage (%)
Age	18-30	5	4.1
	31-40	3	2.5
	41-50	34	28.3
	51-60	31	25.9
	61-70	20	16.7
	71-80	18	15
	81-90	9	7.5
Gender	Male	95	79
	Female	25	21
Social history	Alcoholics	75	60
	Non-alcoholics	48	40

Table 2: Different domains of SF-36 questionnaire

The results from the SF-36 questionnaire showed that Social Function (54.70) and Emotional Role (56.16) had the highest average scores, indicating better performance in these areas. On the other hand, the Physical Role domain had the lowest average score (37.77), pointing to major challenges in physical performance. Other areas like Pain (51.67), Vitality (50.67), and Mental Health (49.20) showed moderate functioning, while General Health (46.94) and Physical Functioning (48.50) indicated lower views of health and physical capabilities among the participants.

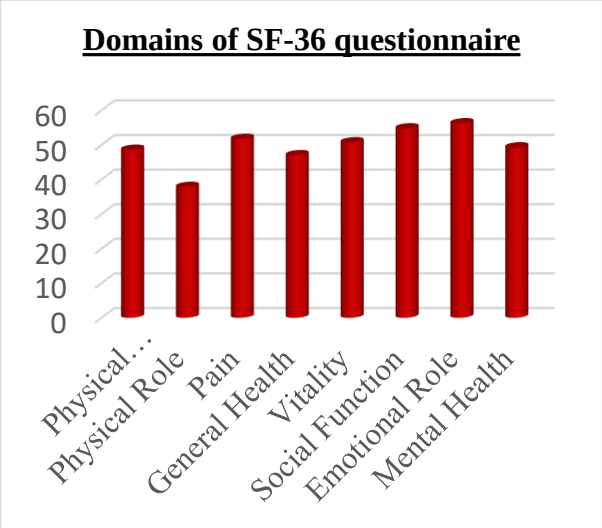

Figure 1: Distribution based on different domains of SF-36 questionnaire

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Table 3: Different domains of WHOQOL-BREF questionnaire

The mean scores for the WHOQOL-BREF domains indicate varying levels of satisfaction with different aspects of quality of life among the study population. The Physical Health domain scored the lowest (39.61), suggesting challenges in areas like pain management, energy, and mobility. Psychological Health scored moderately at 50.15, reflecting a balanced state of emotional well-being and cognitive function. Social Relationships scored higher (53.63), indicating relatively strong social support and satisfaction with personal relationships. Lastly, the Environmental Health domain (51.89) suggests moderate satisfaction with environmental factors such as safety, resources, and access to services.

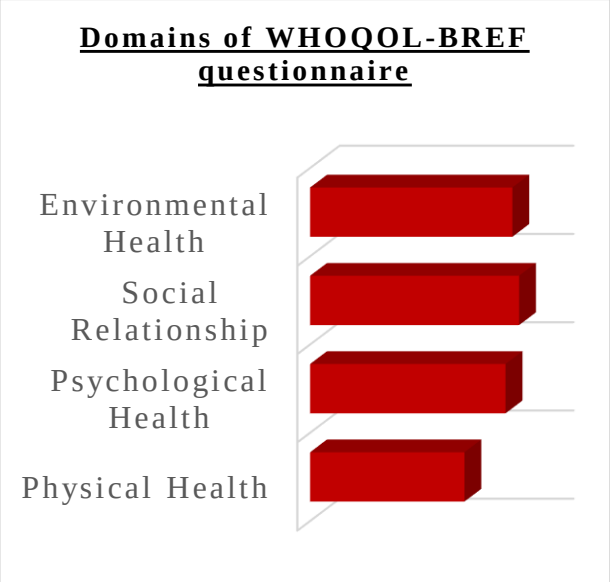

Figure 2: Distribution based on different domains of WHOQOL-BREF questionnaire

Table 4: Distribution based on Child Pugh and MELD score

The study of 120 patients classified by the Child-Pugh and MELD scores shows that 49.1% of patients were in Child-Pugh class A, 42.5% in class B, and 8.3% in class C, indicating that most patients had mild to moderate liver disease. Similarly, MELD scores reveal that 32.5% of patients had a score of 9 or less, 46.6% fell between 10-19, 17.5% between 20-29, and 3.3% between 30-39. The higher concentration of patients in the lower Child-Pugh and MELD score ranges suggests that the majority of patients in this study had relatively stable liver function, which may reflect the early intervention or effective management of their liver disease.

Characteristics		No. of patients (n=120)	Percentage (%)
Child Pugh Score	Class A	59	49.1
	Class B	51	42.5
	Class C	10	8.3
MELD Score	9 or less	39	32.5
	10-19	56	46.6
	20-29	21	17.5
	30-39	4	3.3

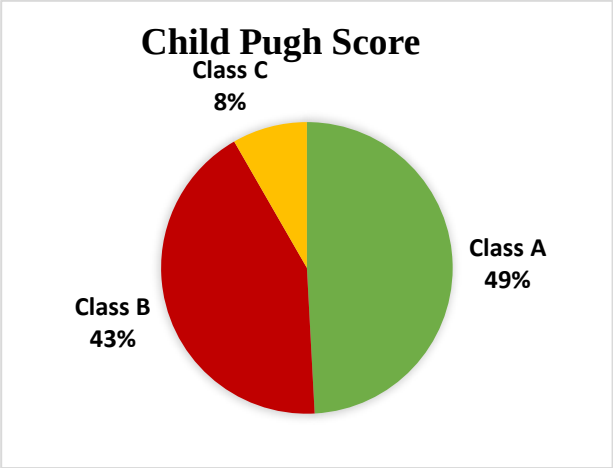

Figure 3: Distribution based on Child Pugh score

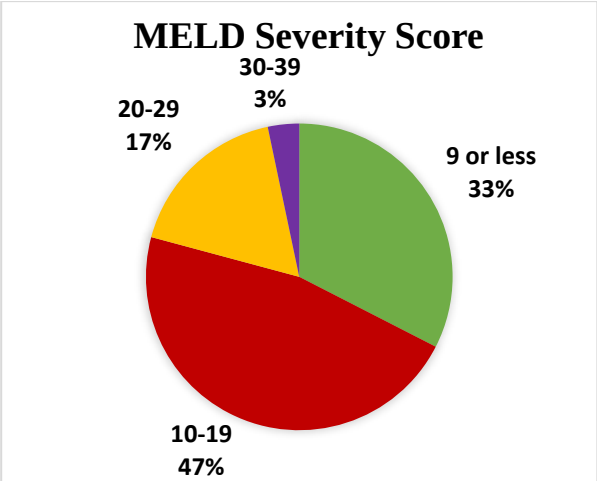

Figure 4: distribution based on MELD severity score

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Table 5: Comparison of different domains SF-36 according to classification of Child Pugh score

The results show significant differences in several quality-of-life dimensions across Child-Pugh score categories in patients with chronic liver disease**.** Specifically, Physical Functioning, Pain, Vitality and Emotional Role exhibit significant variation, indicating that these aspects of health are notably affected by the severity of liver disease. However, no significant differences were observed in Physical Role, General Health, Social Function or Mental Health.

x^2 at 0.05 level of significance
** = Significant*

SF-36	Child Pugh score			Chi square value	p value
	A	B	C		
Physical Functioning	63.31	60.19	45.5	6.263	0.039*
Physical Role	61.06	61.15	53.9	0.414	0.813
Pain	67.75	54.97	45.95	5.946	0.049*
General Health	55.76	67.76	51.4	4.118	0.128
Vitality	62.81	62.21	38.15	7.594	0.031*
Social Function	58.9	60.22	71.4	1.198	0.549
Emotional Role	64.81	55.18	62.2	7.197	0.033*
Mental Health	63.24	61.84	37.6	5.007	0.082

Table 6: Comparison of different domains of SF-36 according to classification of MELD score

The comparison of quality-of-life aspects from the SF-36 with MELD score categories in patients dealing with chronic liver disease shows some notable differences in specific areas. Physical Functioning, Pain, and General Health exhibit significant changes across the MELD score groups, suggesting that these health aspects worsen as liver disease gets more severe. On the flip side, there weren't any significant differences found in Physical Role, Vitality, Social Function, Emotional Role, or Mental Health.

SF-36	MELD score				Chi square value	p value
	06-Sep	Oct-19	20-29	30-40		
Physical Functioning	62.1	59.01	54.95	94.88	6.654	0.041*
Physical Role	57.71	63.53	57.29	62.25	0.912	0.823
Pain	64.35	59.71	55.69	59.25	5.968	0.048*
General Health	50.19	62.98	66.99	92.75	8.079	0.044*
Vitality	60.97	60.68	58.86	62	0.064	0.996
Social Function	54.39	62.09	68.07	58.38	2.527	0.47
Emotional Role	68.22	56.51	60.95	38.75	4.366	0.225
Mental Health	68.37	55.76	58	63.25	3.326	0.344

x^2 at 0.05 level of significance
* = Significant

Table 7: Association of Child Pugh score with demographic variables

The demographic breakdown using the Child-Pugh score shows some interesting links with age, gender, and lifestyle choices. When comparing age groups, there's a notable difference, revealing that more patients over 30 falls into the higher Child-Pugh categories, which suggests that older individuals are more likely to

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experience severe liver issues. Gender also plays a role, with men showing up more in the severe Child-Pugh categories, while women are less common in category C. Additionally, social habits, especially drinking, are closely tied to liver disease severity, as there's a larger number of alcohol users in the advanced Child-Pugh categories, pointing to alcohol being a major player in the worsening of liver conditions.

Sl. No	Demographic variables	Child Pugh score			Total	χ^2 test
		A	B	C		
1.	**Age in years**					χ^2=7.029, df=2, p=0.030*
	≤30	27	14	1	42	
	>30	32	37	9	78	
2.	**Sex**					χ^2=9.799, df=2, p=0.007**
	Male	40	45	10	95	
	Female	19	6	0	25	
3.	**Social habits**					χ^2=11.115, df=2, p=0.004**
	Alcoholic	27	36	9	72	
	Nil	32	15	1	48	

* = Significant at 0.05 level

**=Significant at 0.001 level

Table 8: Association of MELD score with demographics variables

The demographic breakdown related to the MELD score reveals some interesting connections with age, gender, and lifestyle choices. There's a notable link between age and MELD score, showing that patients over 30 tend to have higher MELD scores, which suggests that older individuals often level more severe experience liver issues. When it comes to gender, the distribution is also quite telling, as more men are found in the higher MELD score ranges, and interestingly, no women were in the most critical MELD category (30-40). Additionally, social habits, especially alcohol use, are significantly tied to MELD scores, with a higher number of alcoholics appearing in the elevated MELD categories, highlighting the strong correlation between alcohol consumption and the severity of liver disease.

Sl. No	Demographic variables	MELD score				Total	χ^2 test
		6-9	10-19	20-29	30-40		
1.	**Age in years**						χ^2=11.132, df=3, p=0.011*
	≤30	20	18	2	2	42	
	>30	19	38	19	2	78	
2.	**Sex**						χ^2=15.438, df=3, p=0.001**
	Male	23	48	20	4	95	
	Female	16	8	1	0	25	
3.	**Social habits**						χ^2=16.448, df=3, p<0.001**
	Alcoholic	22	34	15	1	72	
	Nil	17	22	6	3	48	

* = Significant at 0.05 level

**=Significant at 0.001 level

4. Discussion

Chronic liver disease (CLD) is a major cause of death, especially in developing countries. Recently, there has been a rise in CLD cases. In developed nations, common types of CLD include alcoholic liver disease, chronic viral hepatitis (like hepatitis B and C), non-alcoholic fatty liver disease (NAFLD), and hemochromatosis. In India, a challenge is that CLD is often diagnosed late, usually after serious complications have occurred, which puts a strain on healthcare resources. CLD is a long-term

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condition where the liver gets damaged over time, leading to scarring and cirrhosis. Key causes are chronic viral hepatitis, alcohol use, and NAFLD. As fibrosis progresses, it disrupts liver function. In severe cases, cirrhosis can occur, resulting in permanent scarring, high blood pressure in the liver, liver failure, and a higher chance of liver cancer. Early stages may not show symptoms, but later signs include yellowing of the skin, fluid buildup in the abdomen, and brain issues. Treatment aims to address the root cause and stop the disease from worsening. [1,3]

The study included 120 patients who were grouped by their demographic traits. The majority of the populations is between 41-50 (28.3%) similar to the study of Marianna Yumi Kawashima Vasconcelos et.al [53]. This group shows that middle-aged adults are the most affected, as they make up the largest share of patients. Chronic liver disease usually develops over many years, and this age group matches the typical progression of liver issues, particularly for those exposed to risk factors like alcohol, hepatitis, or metabolic diseases for a long time. In terms of gender, most patients were male, accounting for about 79%, while females made up 21%. This is similar to findings by Ravi R. Pradhan et al. [50], where 60% of the population studied were males. Men are notably more common in this group, likely due to higher alcohol consumption, a key risk factor for alcoholic liver disease. Additionally, men may seek medical help later, often presenting with more severe liver conditions. Among the patients, 60% were alcoholics, while 40% were not. Alcohol is a major global cause of liver disease, particularly cirrhosis, as long-term heavy drinking harms liver cells, causing inflammation (alcoholic hepatitis) and eventually leading to cirrhosis.

The SF-36 scores show that patients with chronic liver disease (CLD) face major challenges in their physical abilities and daily roles due to their health issues, as seen in their low scores (Physical Role: 37.77; Physical Functioning: 48.50). This highlights how CLD significantly affects their everyday activities, work, and physical tasks, likely caused by fatigue, pain, and overall decline in health. The moderate scores in general health (46.94) and mental health (49.20) suggest that patients view their health as poor and feel some psychological stress, but their mental well-being is not severely impacted. These results align with Ravi P. Pradhan's [50] study, where emotional role scored the highest and physical role scored the lowest.

The WHOQOL-BREF scores reveal that chronic liver disease (CLD) greatly impacts patients' physical health, with the lowest average score of 39.61 in this area. This indicates significant physical limitations and discomfort, common in CLD, such as fatigue, pain, and reduced ability to function, which adversely affect how patients view their physical health. Suchita Adhikari's [51] study found that the social relationships domain had the highest score, while physical health had the lowest, echoing the earlier findings.

Many patients are classified as Child-Pugh Class A (49.1%) or Class B (42.5%), which means that most have moderate liver issues but are not in the worst stages of liver disease. Only 8.3% are in Class C, showing a smaller number with severe liver problems. This pattern matches a previous study by Giulio Marchesini et al. [68], where 38% of participants were in Class A.

Most patients have MELD scores between 10 and 19 (46.6%), indicating moderate liver impairment that requires careful monitoring. A significant portion has MELD scores of 9 or lower (32.5%), suggesting their liver function is relatively good. However, 17.5% have scores between 20 and 29, which means they are at a higher risk for liver-related issues, and 3.3% have severe dysfunction with scores of 30 to 39. These results are similar to findings from Sagara et al. [45], where the highest percentage also fell within the 10-19 score range, accounting for 41%.

Additionally, a study comparing different areas of the SF-36 with Child Pugh and MELD scores found important links in areas like physical functioning, pain, vitality, emotional role, and general health. Demographic factors also showed a positive relationship with both Child Pugh and MELD scores.

We collaborated with the hospital's clinical pharmacist to incorporate our findings into patient care strategies. Additionally, we created patient counselling leaflets and disseminated informative brochures throughout all hospital departments. These initiatives were designed to increase awareness among patients with chronic liver disease (CLD) regarding their condition and the management options available to them. This strategy aims to improve patient education, foster a deeper

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understanding of CLD, and facilitate effective management and treatment alternatives.

The proposed future steps highlight a holistic approach to enhancing the management of chronic liver disease (CLD) and patient care. Key initiatives include the implementation of targeted interventions addressing both physical and psychological symptoms, bolstering patient education and support, and integrating research findings into clinical practice. Expanding research efforts, reinforcing multidisciplinary care, utilizing technology, and promoting awareness and advocacy are crucial for advancing patient care. Furthermore, assessing and refining quality improvement initiatives while addressing the specific needs of diverse demographics will further improve patient outcomes. By following these steps, healthcare providers can leverage current findings to offer more effective, personalized, and comprehensive care for CLD patients, ultimately enhancing their quality of life and health outcomes.

5. *Conclusion:*

Chronic Liver Disease (CLD) is a progressive decline in liver function that significantly impacts an individual's quality of life. CLD has a profound effect on the overall well-being of patients, resulting in a lower quality of life compared to those without the disease. The study findings highlighted the significance of health-related factors in CLD patients, as assessed through the SF-36 and WHOQOL-BREF questionnaires. Prognostic scoring models such as the Child Pugh score and MELD were identified as valuable tools for predicting life expectancy and prognosis. These scores can aid physicians in the early detection of the disease. Multidisciplinary approaches that address both the medical and psychosocial aspects of CLD are essential for improving QoL in these patients. Further research should focus on developing and implementing targeted interventions to enhance the overall well-being of individuals with chronic liver disease. Collaborative efforts between clinical pharmacy services and medical care can greatly benefit CLD patients by enhancing their clinical outcomes and overall quality of life.

6. Reference:

1. Sharma A, Nagalli S. Chronic Liver Disease. [Updated 2023 Jul 3]. In: Stat Pearls. Treasure Island (FL): Stat Pearls Publishing; 2024 Jan. 3(7)234-245
2. Shantan Cheemerla and Maya Balakrishnan. Global Epidemiology of Chronic Liver Disease. Clinical Liver Disease, vol 17, no 5, May 2021.
3. Moon AM, Singal AG, Tapper EB. Contemporary epidemiology of chronic liver disease and cirrhosis. Clin Gastroenterol Hepatol 2020; 18:2650-2666.
4. Wiegand J, Berg T. The aetiology, diagnosis and prevention of liver cirrhosis: part 1 of a series on liver cirrhosis. Dtsch Arztebl Int. 2013 Feb;110(6):85-91
5. El-Ashry N, E.-D. M., Salem M, Mogawer S. (2007). Large volume
6. Bataller R, North KE, Brenner DA. Genetic polymorphisms and the progression of liver fibrosis: a critical appraisal. Hepatology. 2003 Mar;37(3):493-503.
7. Tsuchida T, Friedman SL. Mechanisms of hepatic stellate cell activation. Nat Rev Gastroenterol Hepatol. 2017 Jul;14(7):397-411
8. Trikha, A., Ray, B.R. (2023). Pathophysiology of Chronic Liver Disease. In: Vohra, V., Gupta, N., Jolly, A.S., Bhalotra, S. (eds) Peri-operative Anesthetic Management in Liver Transplantation. Springer, Singapore. Aug;16(3):271-80
9. Karthik Kumar et.al (2022). Stages of cirrhosis of liver disease. Digestion health centre 2022 July 4.
10. Vilstrup H, Amodio P, Bajaj J, Cordoba J, Ferenci P, Mullen KD, Weissenborn K, Wong P. Hepatic encephalopathy in chronic liver disease: 2014 Practice Guideline by the American Association for the Study of Liver Diseases and the European Association for the Study of the Liver. Hepatology. 2014 Aug;60(2):715-35.
11. Dissegna D, Sponza M, Falleti E, Fabris C, Vit A, Angeli P, Piano S, Cussigh A, Cmet S, Toniutto P. Morbidity and mortality after transjugular intrahepatic portosystemic shunt placement in patients with cirrhosis. Eur J Gastroenterol Hepatol. 2019 May;31(5):626-632.
12. Cordoba J, Blei AT. Brain oedema and hepatic encephalopathy. Semin Liver Dis. 1996 Aug;16(3):271-80.

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JCHR (2025) 15(2), 1522-1531 | ISSN:2251-6727

13. Zieve L, Doizaki WM, Zieve J. Synergism between mercaptans and ammonia or fatty acids in the production of coma: a possible role for mercaptans in the pathogenesis of hepatic coma. J Lab Clin Med. 1974 Jan;83(1):16-28.
14. Grippon P, Le Poncin Lafitte M, Boschat M, Wang S, Faure G, Dutertre D, Opolon P. Evidence for the role of ammonia in the intracerebral transfer and metabolism of tryptophan. Hepatology. 1986 Jul-Aug;6(4):682-698.
15. Reinehr R, Görg B, Becker S, Qvartskhava N, Bidmon HJ, Selbach O, Haas HL, Schliess F, Häussinger D. Hypoosmotic swelling and ammonia increase oxidative stress by NADPH oxidase in cultured astrocytes and vital brain slices. Glia. 2007 May;55(7):758-71.
16. Hoefs JC. Serum protein concentration and portal pressure determine the ascitic fluid protein concentration in patients with chronic liver disease. J Lab Clin Med. 1983 Aug;102(2):260-273.
17. Lo RC, Kim H. Histopathological evaluation of liver fibrosis and cirrhosis regression. Clin Mol Hepatol. 2017 Dec;23(4):302-307.
18. Garbutt JC, West SL, Carey TS, et al. Pharmacological treatment of alcohol dependence. JAMA. 1999; 281:1318-25.
19. O'Shea RS, Dasarathy S, McCullough AJ; Practice Guideline Committee of the American Association for the Study of Liver Diseases; Practice Parameters Committee of the American College of Gastroenterology. Alcoholic liver disease. Hepatology. 2010; 51:307-328.
20. Pierre. M. Gholam. Prognosis and Prognostic Scoring Models for Alcoholic Liver Disease and Acute Alcoholic Hepatitis. Clin Liver Dis 20 (2016) 491- 497.
21. Sandahl TD, Jepsen P, Ott P. Validation of prognostic scores for clinical use in patients with alcoholic hepatitis. Scandinavian Journal of Gastroenterology. May 2011; 6(9):1127-1132.
22. Hoefs JC. Serum protein concentration and portal pressure determine the ascitic fluid protein concentration in patients with chronic liver disease. J Lab Clin Med. 1983 Aug;102(2):260-273.
23. D'Amico G, Pagliaro L, Bosch J. The treatment of portal hypertension: a meta-analytic review. Hepatology. 1995 Jul;22(1):332-54.
24. Garcia-Tsao, G. Current management of the complications of cirrhosis and portal hypertension: Variceal haemorrhage, ascites, and spontaneous bacterial peritonitis. Gastroenterology. 120(3):726-748, 2001.
25. Garcia N JR and Sanyal A.J. Portal hypertension. Clinics in Liver Disease 5(2):509-540, 2001.
26. Gines A, Escorsell A, Gines P. et al. Incidence, predictive factors, and prognosis of the hepatorenal syndrome in cirrhosis with ascites. Gastroenterology 105(1):229–236, 1993.
27. Moore KP, Aithal GP. Guidelines on the management of ascites in cirrhosis. Gut. 2006; 55(suppl VI) vil-vil2.
28. Jiang Q, Jiang XH, Zheng MH, Jiang LM, Chen YP, Wang L. Rifaximin versus nonabsorbable disaccharides in the management of hepatic encephalopathy: a meta-analysis. Eur J Gastroenterol Hepatol. 2008 Nov;20(11):1064-1070.
29. Kamath PS, Wiesner RH, Malinchoc M, Kremers W, Therneau TM, Kosberg CL, D'Amico G, Dickson ER, Kim WR. A model to predict survival in patients with end-stage liver disease. Hepatology. 2001 Feb;33(2):464-470.
30. Koffron A, Stein JA. Liver transplantation: indications, pretransplant evaluation, surgery, and posttransplant complications. Med Clin North Am. 2008 Jul;92(4):861-88.
31. Freeman RB, Steffick DE, Guidinger MK, Farmer DG, Berg CL, Merion RM. Liver and intestine transplantation in the United States, 1997-2006. Am J Transplant. 2008 Apr;8(4 Pt 2):958-976.
32. Charlton MR, Burns JM, Pedersen RA, Watt KD, Heimbach JK, Dierkhising RA. Frequency and outcomes of liver transplantation for non-alcoholic steatohepatitis in the United States. Gastroenterology. 2011 Oct;141(4):1249-1253.
33. Dimartini AF, Dew MA. Monitoring alcohol use on the liver transplant wait list: therapeutic and

practical issues. Liver Transpl. 2012 Nov;18(11):1267-1294.

34. Moore KP, Aithal GP. Guidelines on the management of ascites in cirrhosis. Gut. 2006; 55(suppl VI) vil-vil2.
35. Bloom S, Webster Oxford Handbook of Gastroenterology and Hepatology. Oxford University Press; 2011, p210-1&p364-387
36. Christensen E, Schlichting P, Fauerholdt L, Gluud C, Anderson PK, Juhl E, Poulsen H, et al. Prognostic value of Child-Turcotte criteria in medically treated cirrhosis. HEPATOLOGY 1984; 4:430-435.
37. Bircher J. Assessment of prognosis in advanced liver disease: to score or to measure, that's the question. HEPATOLOGY 1986; 6:1036-1037.
38. Dominguez M, Rincon D, Abraldes JG, Miquel R, Colmenero J, Bellot P, Garcia-Pagan JC, Fernandez R, Moreno M, Banares R, Arroyo V, Caballeria J, Gines P, Bataller R: A new scoring system for prognostic stratification of patients with alcoholic hepatitis. Am J Gastroenterol 2008; 103: 2747-2756.
39. McMillan DC. The systemic inflammation-based Glasgow prognostic score: a decade of experience in patients with cancer. Cancer Treat Rev. 2013; 39: 534-540.
40. Häuser, W., Holtmann, G., & Grandt, D. 2004 Determinants of health-related quality of life in patients with chronic liver diseases. Clinical Gastroenterology and Hepatology. 2004; 2(1), 157–163