

# Factors Associated With Health Literacy in Patients Diagnosed With Liver Cirrhosis

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## Abstract

**Introduction:** Health literacy (HL) is defined as an individual's ability to obtain, process, and understand medical information required to make appropriate health-related decisions. Low HL has been linked to increased healthcare costs, higher rates of hospitalization, reduced likelihood of liver transplantation, and increased mortality, leading to adverse clinical outcomes, particularly among vulnerable populations. **Objective:** To identify clinical and sociodemographic factors associated with HL levels in a cohort of patients with liver cirrhosis in Cartagena, Colombia. **Methods:** A cross-sectional, observational, and analytical study was conducted in patients diagnosed with cirrhosis and evaluated between September and December 2024. The Spanish version of the Short Assessment of Health Literacy (SAHL-S) was administered, with scores  $\leq 14$  classified as inadequate. Additionally, a validated questionnaire from Brazil was used to assess disease knowledge in four domains: signs and symptoms, diagnosis, treatment, and medications. Descriptive statistics and univariate and multivariate logistic regression models were used to identify predictors of HL. **Results:** Ninety-three patients participated (mean age:  $63.9 \pm 11.7$  years; 61.2% women). Adequate HL was observed in 79.6% of participants. Mean knowledge scores were: signs and symptoms, 6.5; diagnosis, 7.2; treatment, 7.7; and medication, 4.1. In univariate analyses, education level, number of dependents, and active employment were associated with adequate HL, whereas older age and a history of hypertension were associated with inadequate HL. In multivariate analyses, education level (OR 1.64; 95% CI: 1.11–2.43) and number of dependents (OR 1.77; 95% CI: 1.06–2.96) remained independent predictors. **Conclusion:** Participants demonstrated overall adequate HL and solid knowledge regarding diagnosis and treatment, although understanding of symptoms and medication use remained limited. Targeted interventions are needed to strengthen HL among individuals living with chronic conditions such as cirrhosis.

## Keywords

Health literacy, liver cirrhosis, healthcare.

## INTRODUCTION

Health literacy (HL) has gained increasing relevance in the medical sciences. It is defined as individuals' capacity to obtain, process, and understand health-related information in order to make informed decisions about their care<sup>(1)</sup>. This concept encompasses both disease-specific knowledge (including etiology, prognosis, and complications) and the functional skills required to interact effecti-

vely with the health care system, such as completing forms, understanding medical recommendations, and managing medical appointments<sup>(2)</sup>.

Low health literacy has been associated with multiple adverse outcomes, including increased health care costs (ranging from an additional USD 143 to USD 7,798 per patient), a higher number of hospitalizations, reduced access to organ transplantation, and increased mortality<sup>(3,4)</sup>. These associations can be explained by poorer the-

rapeutic adherence, missed follow-up visits, inappropriate medication use, and difficulties recognizing symptoms or communicating effectively with health care personnel in this population<sup>(5,6)</sup>. In Latin America, these effects are even more pronounced due to structural limitations—such as poverty and low educational attainment—that constitute barriers to achieving adequate HL, particularly among the most vulnerable groups<sup>(7)</sup>. These challenges are amplified in the context of chronic diseases, whose management requires active and sustained patient participation, both in understanding complex instructions regarding medication, diet, and exercise and in ongoing interaction with an increasingly fragmented health care system<sup>(8,9)</sup>.

Liver cirrhosis (LC) represents the terminal stage of chronic liver disease and is characterized by progressive dysfunction of the hepatic parenchyma. Its main etiologies include chronic alcohol consumption, hepatitis C virus infection, fatty liver disease, and autoimmune liver diseases<sup>(10)</sup>. Potentially life-threatening complications include ascites, esophageal varices, hepatic encephalopathy, spontaneous bacterial peritonitis, hepatorenal syndrome, and hepatocellular carcinoma<sup>(11,12)</sup>.

Globally, LC was estimated to account for 2.4% of all deaths in 2019, and more than 122 million cases were reported in 2020<sup>(13)</sup>. In Colombia, LC is recognized as a public health problem. A recent analysis estimated that, between 2009 and 2016, premature mortality due to this condition resulted in a loss of 687,861 years of life and an economic cost ranging from USD 19.6 to USD 37.8 million<sup>(14)</sup>.

Several international studies have identified clinical and sociodemographic factors associated with low HL in patients with LC, including male sex, low educational level, living alone, being retired, alcoholic etiology of disease, and active smoking. These patients also more frequently exhibit functional impairment, poorer quality of life, a higher number of hospitalizations, multiple comorbidities, more advanced stages of liver disease (according to Child–Pugh and MELD scores), minimal hepatic encephalopathy (according to the West Haven scale), a history of ascites, and depressive symptoms<sup>(15–18)</sup>.

In Colombia, research on HL remains limited. Two studies conducted in the general population found that higher educational level, younger age, and affiliation with the contributory health insurance regime were associated with better HL<sup>(19,20)</sup>. Additionally, a study carried out at a specialized gastroenterology and hepatology center in Cartagena identified that the main information needs among patients with cirrhosis were related to complications, prognosis, pharmacotherapy, liver cancer, and transplantation<sup>(21)</sup>. Despite these findings, the literature on HL in patients with LC remains scarce compared with other conditions<sup>(17,19,22,23)</sup>, and inadequate health literacy constitutes a critical barrier to achieving equity in health care.

Various tools have been developed for the objective assessment of HL, most of them in English-speaking countries. Some have been adapted and validated for Spanish-speaking populations, such as eHEALS in Spain<sup>(24)</sup>, SAHLSA-50 in Chile<sup>(25)</sup>, the HLS-EU-Q in patients with hypertension in Mexico<sup>(26)</sup>, and a pilot version of the TOFHLA in Colombia, which achieved translation and cultural adaptation but did not reach formal validation<sup>(19)</sup>. Among these instruments, the Short Assessment of Health Literacy—Spanish and English (SAHL-S&E) has been validated in both English- and Spanish-speaking populations in the United States. Its Spanish version (SAHL-S) consists of 18 items and allows classification of low HL with a score  $\leq 14$ , demonstrating good reliability and ease of administration across diverse clinical settings<sup>(27)</sup>.

Currently, no scale has been specifically designed to measure HL in patients with liver cirrhosis<sup>(16)</sup>. However, a validated instrument is available to assess disease-specific knowledge across four domains: signs and symptoms, diagnosis, treatment, and medication<sup>(28)</sup>. Such tools allow us to identify, with greater precision, the areas of knowledge with the greatest opportunities for improvement.

Identifying the factors associated with HL in the Colombian population with cirrhosis is a priority. Cultural and social differences relative to high-income countries—where most of the available evidence has been generated—limit the generalizability of those findings to our population. Understanding these determinants allows us to implement more relevant interventions to improve the comprehensive management of patients with chronic liver disease in Colombia. The objective of this study is to identify the factors associated with health literacy in a population of patients with liver cirrhosis treated at a first-level outpatient center in Cartagena, Colombia.

## METHODOLOGY

### Study Design and Population

We conducted an observational, cross-sectional, analytical study. We included patients with a clinically or histologically confirmed diagnosis of liver cirrhosis who attended a first-level outpatient hepatology care center in Cartagena, Colombia, between September and December 2024.

After obtaining written informed consent, we administered the Spanish version of the Short Assessment of Health Literacy in Spanish (SAHL-S) to all participants, a validated tool for measuring health literacy. This scale consists of 18 items and classifies a score  $\leq 14$  as insufficient health literacy.

Additionally, we used a questionnaire originally validated in Brazil and designed to assess disease-specific knowledge about liver cirrhosis. This instrument includes 36 ques-

tions developed from information considered essential for patients to make informed decisions and to promote a better understanding of their disease. The questionnaire covers four domains: signs and symptoms, diagnosis, treatment, and medication. Each of the first three domains has a maximum score of 10 points, whereas the medication domain has a maximum score of 6 points.

### **Inclusion Criteria**

- Patients aged 18 years or older.
- Confirmed diagnosis of liver cirrhosis of any etiology.

### **Exclusion Criteria**

- Presence of physical or cognitive limitations that prevented adequate responses to the researcher's questions.
- Clinical diagnosis of overt hepatic encephalopathy at the time of assessment.

### **Instruments**

During the encounter with each participant, we collected sociodemographic and clinical data through a direct interview. Subsequently, we administered two validated instruments: the Spanish version of the Short Assessment of Health Literacy in Spanish (SAHL-S), used to assess general health literacy, and the structured questionnaire on liver cirrhosis-specific knowledge, which explores key areas such as signs and symptoms, diagnosis, treatment, and medication.

#### **Short Assessment of Health Literacy in Spanish (SAHL-S)**

The SAHL-S is a shortened version of the SAHLISA, which in turn is derived from the Rapid Estimate of Adult Health Literacy in Medicine (REALM). This tool, validated in Spanish-speaking populations, consists of 18 items and is easy to administer. For each item, participants are asked to read a medical term aloud and select, from two options, the word with the closest semantic relationship. This procedure allows us to assess both decoding ability and conceptual understanding of the term. A score between 0 and 14 is considered indicative of insufficient health literacy (see **Appendix**).

#### **Liver Cirrhosis Knowledge Questionnaire**

This instrument was developed and validated by Stelmach and colleagues<sup>(8)</sup> in Brazil and was subsequently translated into Spanish for use in this study. The questionnaire includes 36 true/false items organized into three main categories—signs and symptoms, diagnosis, and treatment—as well as a subcategory corresponding to medication. Each main category contains 10 questions, while the medication subcategory includes 6 items. The level of disease-specific

knowledge is quantified as the percentage of correct responses in each category, based on information considered essential for informed patient decision-making and comprehensive understanding of the disease.

### **Statistical Analysis**

We described quantitative variables using measures of central tendency and dispersion, depending on whether their distribution was parametric or nonparametric. We expressed qualitative variables as absolute and relative frequencies. To identify factors associated with health literacy (HL), we initially performed a univariate logistic regression analysis. Variables that reached statistical significance ( $p < 0.05$ ) were included in a multivariate logistic regression model, in which the dependent variable was the presence of an adequate level of HL, defined as a score of 15 points or higher on the SAHL-S scale.

### **Ethical Considerations**

We conducted this research in accordance with the ethical principles governing biomedical research involving human subjects, respecting the fundamental rights established in Article 11 (right to life) of the Political Constitution of Colombia, the guidelines of the World Medical Association set forth in the Declaration of Helsinki, Law 23 of 1981, and Resolution 8430 of 1993 of the Ministry of Health. The study protocol was approved by the Scientific Committee and the Bioethics Committee of Universidad de Cartagena and Centro Médico Gastropack.

## **RESULTS**

We included 93 patients in the study. Of these, 61.2% ( $n = 57$ ) were female, and the mean age was 63.9 years ( $SD \pm 11.7$ ). Most participants (74.2%) reported being in a stable relationship. Regarding educational attainment, 35.5% had completed secondary education and 33.3% had higher education. Most participants (86.0%) resided in urban areas, primarily belonging to socioeconomic strata 2 (38.7%) and 3 (35.5%). More than 60% were unemployed, retired, or pensioners; 77.4% were affiliated with the contributory health insurance regime, and 61.3% had dependents.

With respect to personal history, 11.8% ( $n = 11$ ) were active smokers. The most frequent comorbidities were arterial hypertension (46.2%), diabetes *mellitus* or prediabetes (44.1%), and obesity (32.3%), with a mean body mass index (BMI) of 27.6  $\text{kg}/\text{m}^2$  ( $SD \pm 4.81$ ). Regarding the etiology of liver cirrhosis, metabolic dysfunction-associated steatotic liver disease (MASLD) and cryptogenic cirrhosis predominated, each with a frequency of 30%. Most

patients (80.0%) were classified as Child–Pugh stage A, with a mean MELD score of 9 (SD  $\pm$  2.74). The mean time since cirrhosis diagnosis was 45.5 months (SD  $\pm$  43.83).

Regarding hepatic complications, 50% of patients had a history of esophageal varices, 18% had been hospitalized for ascites, and only 6% had experienced episodes of hepatic encephalopathy. None of the participants had undergone transjugular intrahepatic portosystemic shunt (TIPS). The mean SAHL-S score was 15.33, and 79.6% of patients achieved an adequate level of health literacy (defined as a score  $\geq$ 15) (**Table 1**).

Regarding the liver cirrhosis-specific knowledge questionnaire, the mean scores by domain were as follows: signs and symptoms, 6.5 (SD  $\pm$  1.9); diagnosis, 7.2 (SD  $\pm$  1.9); treatment, 7.7 (SD  $\pm$  1.8); and medication, 4.1 (SD  $\pm$  1.1). When we expressed these scores as a proportion of the maximum possible score for each domain, we observed a level of knowledge of 77% for treatment, 72% for diagnosis, 69% for medication, and 65% for signs and symptoms.

Univariate analysis showed that a higher educational level (OR: 1.81; 95% CI: 1.24–2.61;  $p < 0.001$ ), having dependents (OR: 2.03; 95% CI: 1.23–3.33;  $p = 0.01$ ), and being employed or economically active (OR: 2.20; 95% CI: 1.09–4.51;  $p = 0.03$ ) were associated with higher levels of health literacy (HL). In contrast, older age (OR: 0.95; 95% CI: 0.90–0.99;  $p = 0.02$ ) and a history of arterial hypertension (OR: 0.32; 95% CI: 0.12–0.85;  $p = 0.02$ ) were associated with lower HL levels (**Table 2**).

In the multivariate analysis, educational level (OR: 1.65; 95% CI: 1.12–2.44;  $p = 0.013$ ) and having dependents (OR: 1.77; 95% CI: 1.06–2.96;  $p = 0.028$ ) remained independent predictors of adequate health literacy (**Table 3**).

## DISCUSSION

People with chronic diseases often have limited access to health information, and factors such as educational level can restrict their ability to understand and process this information. Although they generally seek medical support, this support is not always available, which leads them to develop individual and subjective interpretations influenced by cognitive, social, psychosocial, and cultural processes. These interpretations may be inadequate and contribute to increased health care costs, constituting a public health problem that requires intervention<sup>(19)</sup>.

In our study, we observed an overall high level of health literacy (HL), as only 20.4% of participants scored below 14 points on the SAHL-S. In the liver cirrhosis-specific knowledge questionnaire, we found that patients experienced greater difficulties in recognizing signs and symptoms and in understanding medication-related information. Among social determinants, educational level and the

number of dependents emerged as the only independent predictors of adequate HL in the multivariate analysis.

Numerous studies have demonstrated an association between educational level and HL in patients with liver cirrhosis (LC). A prospective study conducted in Germany involving 89 patients showed that fewer years of education were associated with poorer comprehension of health information ( $\beta = -0.221$ ;  $p = 0.041$ ), using the Health Literacy Questionnaire (HLQ) as the assessment tool<sup>(17)</sup>. Similarly, at Aarhus University Hospital in Denmark, a study of 105 outpatients found that an educational level of fewer than 12 years was associated with lower HL (HR = 0.43; 95% CI: 0.84–0.01;  $p = 0.05$ ), particularly in the social support for health dimension<sup>(15)</sup>. Comparable findings have been reported in patients with other chronic conditions, such as heart failure, assessed using instruments like the TOFHLA<sup>(4,5)</sup>.

A prospective cohort study in the United States including 276 liver transplant candidates demonstrated lower HL levels among those with secondary education or less compared with those with higher education (56.4% vs. 36.7%;  $p = 0.005$ ). After adjusting for educational level and socioeconomic factors, low HL remained independently associated with greater physical frailty and a lower likelihood of being listed for transplantation<sup>(29)</sup>. Consistent with these findings, our study identified educational level as an independent predictor of adequate HL, likely reflecting a greater ability to understand medical instructions and navigate the health care system, even in highly complex contexts.

In our study, having dependents was positively associated with adequate HL. Patients responsible for the care of others may require stronger cognitive and organizational skills, which could facilitate their interaction with the health care system and the acquisition of knowledge about their own disease and that of those they care for. Similarly, a study of outpatients with LC found that cohabitation was associated with higher HL levels, although this association did not reach statistical significance across HLQ domains<sup>(15)</sup>. In contrast, a recent systematic review reported that informal caregivers with multiple dependents had lower HL levels than those caring for a single patient<sup>(30)</sup>.

Employment status also showed a direct relationship with HL. In Denmark, a cross-sectional study published in 2021 involving 8,767 participants found that unemployed individuals and those receiving social assistance or sickness benefits had lower HL levels, with the effect being more pronounced among unemployment benefit recipients (OR: 1.78; 95% CI: 1.23–2.56)<sup>(31)</sup>. Likewise, a 2022 Spanish study of 166 adult patients reported lower HL scores among unemployed individuals, those older than 65 years, and those with incomplete secondary educa-

**Table 1.** Clinical and Sociodemographic Characteristics of the Study Population\*

Variable	n = 93	Variable	n = 93
Female sex	61.3 (57)	Heart failure	3.2 (3)
Age (years)	63.9 (11.7)	Chronic kidney disease	8.6 (8)
Education level		Obesity	32.3 (30)
- No formal education	1.1 (1)	Thyroid disorders	19.4 (18)
- Incomplete primary education	5.4 (5)	Psychiatric disorders	3.2 (3)
- Complete primary education	17.2 (16)	Etiology	
- Incomplete secondary education	7.5 (7)	- Chronic alcohol consumption	6.5 (6)
- Complete secondary education	35.5 (33)	- HBV	7.5 (7)
- Higher education	33.3 (31)	- HCV	9.7 (9)
In a relationship	74.2 (69)	- AIH	12.9 (12)
Dependents		- PBC/AIH	3.2 (3)
- 0	38.7 (36)	- MASLD	30.1 (28)
- 1	18.3 (17)	- Cryptogenic	30.1 (28)
- 2	26.9 (25)	Time since diagnosis (months)	45.49 (43.83)
- 3	12.9 (12)	Child-Pugh classification	
- 4	3.2 (3)	- A	79.6 (74)
Urban residence	86 (80)	- B	18.3 (17)
Socioeconomic stratum		- C	1.1 (1)
- 1	8.6 (8)	MELD	9 (2.74)
- 2	38.7 (36)	History of ascites	18.3 (17)
- 3	35.5 (33)	History of hepatic encephalopathy	6.5 (6)
- 4	8.6 (8)	History of esophageal varices	49.5 (46)
- 5	7.5 (7)	Elastography (kPa)	28.32 (17.72)
Contribution-based health insurance regime	77.4 (72)	Sodium (mEq/L)	140.23 (3.27)
Employment status		Creatinine (mg/dL)	0.89 (0.83)
- Unemployed/retired/pensioner	60.2 (56)	Total bilirubin, (mg/dL)	1.21 (1.04)
- Informal employment	16.1 (15)	Albumin (g/dL)	3.94 (0.56)
- Formal employment	23.7 (22)	INR	1.13 (0.14)
Weight (kg)	71.91 (14.76)	Leukocytes (cells/mm <sup>3</sup> )	4742.06 (2009.48)
Height (m)	1.61 (0.09)	Platelets (cells/mm <sup>3</sup> )	137578.26 (68081.12)
Body mass index	27.61 (4.81)	Ferritin (ng/dL)	35.82 (18.49)
Active smoking	11.8 (11)	Transferrin saturation (%)	156.94 (185.95)
Arterial hypertension	46.2 (43)	SAHL-S score	15.33 (3.14)
Diabetes mellitus	44.1 (41)	Adequate health literacy	79.6 (74)

\*Numeric variables are expressed as mean (SD), and categorical variables as % (n). PBC: primary biliary cirrhosis; AIH: autoimmune hepatitis; HBV: hepatitis B virus; HCV: hepatitis C virus; INR: international normalized ratio; MASLD: metabolic dysfunction-associated steatotic liver disease; MELD: Model for End-Stage Liver Disease; SAHL-S: Short Assessment of Health Literacy–Spanish. Author’s own research.

**Table 2.** Factors Associated with Health Literacy: Univariate Logistic Regression Analysis\*

Variable	OR	95% CI	p-Value
Age	0.95	0.90-0.99	0.02
Sex	1.76	0.64-4.79	0.27
Education level	1.81	1.24-2.61	0.002
Relationship status	1.26	0.44-3.55	0.66
Dependents	2.03	1.23-3.33	0.01
Place of residence	0.84	0.21-3.36	0.81
Socioeconomic stratum	1.52	0.92-2.49	0.10
Health insurance regime	1.62	0.56-4.65	0.37
Employment status	2.22	1.09-4.51	0.03
BMI	1.02	0.92-1.12	0.73
Smoking	1.65	0.33-8.23	0.54
History of hypertension	0.32	0.12-0.85	0.02
History of diabetes mellitus	1.44	0.55-3.73	0.45
History of CKD	1.05	0.19-5.57	0.96
History of obesity	1.60	0.56-4.56	0.38
History of thyroid disease	1.27	0.37-4.32	0.70
Time since diagnosis	1.01	0.99-1.02	0.20
Child-Pugh classification	2.00	0.55-7.26	0.29
History of ascites	0.57	0.18-1.75	0.33
History of encephalopathy	0.68	0.11-3.95	0.66
History of esophageal varices	0.38	0.14-1.01	0.05
Elastography	1.00	0.96-1.03	0.93
Platelets	1.00	0.99-1.00	0.91
Albumin	2.19	0.77-6.16	0.14
Creatinine	1.09	0.53-2.19	0.81

\*The dependent variable was adequate health literacy (score  $\geq 15$  points on the SAHL-S scale). DM: diabetes mellitus; CKD: chronic kidney disease; HTN: arterial hypertension; 95% CI: 95% confidence interval; BMI: body mass index; OR: odds ratio; SAHL-S: Short Assessment of Health Literacy–Spanish. Author’s own research.

**Table 3.** Factors associated with health literacy: multivariate logistic regression analysis

Factor	OR	95% CI	p-Value
Education level	1.646	1.112-2.436	0.013
Dependents	1.774	1.063-2.960	0.028

95% CI: 95% confidence interval; OR: odds ratio. Author’s own research.

tion, according to the HLQ scale ( $\beta = 0.323$ ;  $p = 0.002$ ;  $\beta = 0.413$ ;  $p = 0.009$ ; and  $\beta = 0.176$ ;  $p = 0.03$ , respectively)<sup>(32)</sup>. These results are consistent with our findings, as patients who were actively employed showed higher HL levels. This phenomenon may relate to the need to resolve practical situations and to interact autonomously with the health care system—abilities that may be diminished in older adults or in those who are retired, who often require caregivers, potentially compromising their HL.

Regarding comorbid conditions, previous studies have consistently documented an association between arterial hypertension (HTN) and low HL levels. A systematic review published in 2021 found that patients with higher HL demonstrated better knowledge of hypertension and its management<sup>(33)</sup>. A cross-sectional study conducted in Brazil with 357 patients with HTN showed that low HL levels, assessed using the TOFHLA, were associated with older age and lower educational attainment<sup>(34)</sup>. In Iran, a study of 700 hypertensive patients reported that 75.5% had inadequate or partially adequate HL, and a positive correlation was observed between disease-related knowledge and HL level<sup>(35)</sup>. In line with these findings, our univariate analysis identified HTN as the only clinical history associated with low HL, possibly because these patients tend to be older, have multiple comorbidities, and experience cognitive decline, which limits their ability to acquire, understand, and apply health information.

Given the relevance of HL to clinical outcomes and health care costs, substantial efforts have focused on identifying its sociodemographic and clinical determinants. Disease-specific knowledge is also essential, particularly in chronic conditions such as LC, where social stigma can exacerbate information gaps<sup>(30)</sup>. In our population, we observed a good level of HL and satisfactory knowledge of LC, especially in the areas of diagnosis and treatment. This finding may be explained by the relatively high educational level observed (approximately 70% had completed secondary education or attained higher education), as well as by the fact that patients with cirrhosis typically receive more medical information than the general population.

In conclusion, low HL represents a critical challenge that must be addressed as an essential component of the comprehensive management of liver cirrhosis. Accessible, high-quality educational materials are needed for patients, family members, and health care personnel to improve knowledge and promote adequate HL<sup>(36,37)</sup>.

## CONCLUSION

Educational level and the number of dependents were identified as independent predictors of health literacy (HL) in our population. It is necessary to implement strate-

gies and public policies aimed at strengthening knowledge about chronic diseases and promoting HL as a key tool to improve clinical outcomes and reduce the economic burden on health care systems.

## LIMITATIONS

The main limitation of this study is that it was conducted at a single center located in the Colombian Caribbean region. This region has particular cultural, social, and educational characteristics, which may limit the generalizability of our findings to other populations in the country with different contexts. Additionally, the questionnaire used to estimate the level of disease-specific knowledge about liver cirrhosis was developed in Brazil and has not yet been validated in Colombia, which may affect the validity of the estimated knowledge level among participants. Validation of this type of instrument would allow multicenter studies with more robust results at the national level. Nevertheless, the primary objective of this study was not to estimate the level of knowledge about cirrhosis, but rather to identify factors associated with HL using a tool validated for this purpose. In this regard, our findings are consistent with previous studies conducted in diverse geographic regions and sociocultural contexts worldwide, suggesting that certain factors—such as educational level—may play a determining role in

HL across a wide spectrum of populations with significant social and cultural differences.

## STRENGTHS

Assessing health literacy is a simple method that does not require substantial additional time during routine medical visits, yet it can have short-, medium-, and long-term impacts on the quality of life of patients living with cirrhosis.

## RECOMMENDATIONS

Designing a multicenter study with a longer follow-up period could help better elucidate the factors involved in low health literacy levels and enable the implementation of public health strategies to optimize outpatient management and reduce complications and health care costs associated with cirrhosis within local and regional health systems.

## Conflict of Interest

None declared.

## Funding Sources

The authors' own resources.

## APPENDIX

### SAHL-S Scale

Stem	Key or Distractor		
1. employment	<input type="checkbox"/> work	<input type="checkbox"/> education	<input type="checkbox"/> I don't know
2. seizures	<input type="checkbox"/> dizzy	<input type="checkbox"/> calm	<input type="checkbox"/> I don't know
3. infection	<input type="checkbox"/> kills	<input type="checkbox"/> virus	<input type="checkbox"/> I don't know
4. medication	<input type="checkbox"/> instrument	<input type="checkbox"/> treatment	<input type="checkbox"/> I don't know
5. alcoholism	<input type="checkbox"/> addiction	<input type="checkbox"/> recreation	<input type="checkbox"/> I don't know
6. kidney	<input type="checkbox"/> urine	<input type="checkbox"/> fever	<input type="checkbox"/> I don't know
7. dose	<input type="checkbox"/> sleep	<input type="checkbox"/> quantity	<input type="checkbox"/> I don't know
8. miscarriage	<input type="checkbox"/> loss	<input type="checkbox"/> marriage	<input type="checkbox"/> I don't know
9. constipation	<input type="checkbox"/> blocked	<input type="checkbox"/> loose	<input type="checkbox"/> I don't know
10. pregnancy	<input type="checkbox"/> childbirth	<input type="checkbox"/> childhood	<input type="checkbox"/> I don't know
11. nerves	<input type="checkbox"/> bored	<input type="checkbox"/> anxiety	<input type="checkbox"/> I don't know
12. nutrition	<input type="checkbox"/> healthy	<input type="checkbox"/> soda	<input type="checkbox"/> I don't know
13. indicated	<input type="checkbox"/> instruction	<input type="checkbox"/> decision	<input type="checkbox"/> I don't know
14. hormones	<input type="checkbox"/> growth	<input type="checkbox"/> harmony	<input type="checkbox"/> I don't know
15. abnormal	<input type="checkbox"/> different	<input type="checkbox"/> similar	<input type="checkbox"/> I don't know
16. diagnosis	<input type="checkbox"/> evaluation	<input type="checkbox"/> recovery	<input type="checkbox"/> I don't know
17. hemorrhoids	<input type="checkbox"/> veins	<input type="checkbox"/> heart	<input type="checkbox"/> I don't know
18. syphilis	<input type="checkbox"/> contraceptive	<input type="checkbox"/> condom	<input type="checkbox"/> I don't know

## Liver Cirrhosis Knowledge Questionnaire<sup>(8)</sup>

### Signs and Symptoms

1. Malnutrition is responsible for patient weakness.
2. Itchy skin, yellow discoloration of the skin, ascites, mental confusion (hepatic encephalopathy), and esophageal varices are some of the signs and symptoms of liver cirrhosis.
3. The absence of symptoms indicates that liver cirrhosis is in the early stages of the disease.
4. The accumulation of fluid in the abdomen (ascites) is a common complication of liver cirrhosis.
5. Esophageal varices (dilation of the veins of the esophagus) are rare complications of liver cirrhosis.
6. In some cases, liver cirrhosis presents complications (esophageal varices, mental confusion, ascites) that must be treated and monitored by a physician to prevent worsening of the patient's health status.
7. Fatigue is not a complication of liver cirrhosis; fatigue is caused by major depression.
8. Hepatic encephalopathy presents with mental confusion, disorientation, hand tremors, slurred speech, slow movements, memory loss, and, in more severe cases, can lead to coma.
9. A cirrhotic liver releases toxic substances that can attack the heart and cause heart attacks.
10. Patients who experience episodes of hepatic encephalopathy with signs of mental confusion, disorientation, slow movements, among others, should always be accompanied when leaving home.

### Diagnosis

1. Cirrhosis is characterized by liver damage that causes the organ to lose its functions.
2. The only cause of liver cirrhosis is alcohol consumption.
3. It is possible to have liver cirrhosis and hepatocellular carcinoma (liver cancer) at the same time.
4. Liver cirrhosis requires continuous medical supervision to assess disease progression.
5. Liver cirrhosis can be caused by different factors, such as hepatitis B or C, alcohol use, fatty liver disease, and autoimmune diseases.
6. Liver cirrhosis is a contagious disease transmitted by mosquito bites.
7. The disease is often diagnosed when the patient presents complications such as ascites, mental confusion (encephalopathy), esophageal varices, and yellow discoloration of the skin.

8. Liver cirrhosis allows moderate alcohol consumption; that is, it is possible to drink one can of beer, one glass of wine, or one measure of spirits per day.
9. Liver cirrhosis is considered a chronic disease; that is, it will accompany the individual for life.
10. A higher MELD score indicates greater disease severity.

### Treatment

1. Treatment of liver cirrhosis requires only medical supervision.
2. When transplantation is indicated as treatment for liver cirrhosis, professional medical follow-up is required (physicians, nurses, psychologists, nutritionists, social workers), both in the preoperative and postoperative stages.
3. Dietary guidance from nutritionists is not indicated in the treatment of liver cirrhosis, as there are no foods that can worsen symptoms or the disease.
4. Liver transplantation is a surgical procedure in which the diseased liver (with cirrhosis) is replaced by a healthy liver.
5. When a patient is placed on the waiting list for liver transplantation, they must undergo evaluations and maintain regular follow-up with several professionals such as nurses, nutritionists, psychologists, social workers, among others.
6. Treatment of liver cirrhosis requires a social support network; that is, assistance from friends or family with hospital visits, medication use, and daily activities.
7. After being placed on the waiting list for liver transplantation, waiting for an organ can be stressful. During this period, symptoms of anxiety and depression may arise and require treatment by psychologists and psychiatrists.
8. To receive appropriate care after transplant surgery, the patient remains hospitalized for a period of time, and in severe cases or in the presence of complications may be admitted to the intensive care unit.
9. After recovery from transplant surgery, it is no longer necessary to continue medical follow-up, considering that the disease has been cured.
10. Patients may experience different emotional reactions (fear, anxiety, sadness, concern) during the treatment of liver cirrhosis, in the pre- and post-transplant stages; therefore, psychological treatment is important.

### Medication

1. Medications used to treat liver cirrhosis cause sexual impotence.

2. Medications are not intended to cure liver cirrhosis, but rather to control disease symptoms.
3. It is important that medications are taken according to medical advice, following the prescribed doses and schedules.
4. Transplantation aims to cure liver cirrhosis, which means that after the procedure it is no longer necessary to take any medications.
5. Adherence to medication treatment can be supported by family involvement, which can help, for example, with timing and correct use of medications.
6. After transplantation, the patient must take medications to prevent rejection (immunosuppressive drugs) for the rest of their life.