

EFFECT OF HEALTH LITERACY ON CHRONIC HEPATITIS B VIRUS INFECTION MANAGEMENT AND PROGNOSIS

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42

ABSTRACT

Aim: In this study, we aimed to examine the relationship of health literacy with the diagnostic stage of the disease, the risk of encountering complications, and other prognostic variables in chronic hepatitis B patients.

Methods: A total of 264 patients (146 male and 118 female) with chronic hepatitis B disease who presented to the gastroenterology outpatient clinic of Mersin University Faculty of Medicine Hospital in 2019 were included in the study. The HLS-EU-47 scale was used to measure the level of health literacy.

Results: The health literacy of patients taking antivirals was significantly lower than those who did not use them ($p=0.031$). The health literacy of patients who underwent regular follow-up after chronic hepatitis B was significantly higher than those who did not ($p<0.001$). The health literacy of patients with the chronic form of hepatitis B was significantly higher than the others ($p<0.001$). The health literacy of patients with cirrhosis development was significantly lower than those without ($p<0.001$). In the group that needed paracentesis, health literacy was observed to be lower than in the group that did not need paracentesis ($p<0.004$). The health literacy of patients hospitalized in the last year was significantly lower than that of non-hospitalized patients ($p<0.002$). The number of hospitalizations in the last year was associated with health literacy ($p<0.009$).

Conclusions: Health literacy is associated with the course of the disease in chronic hepatitis B patients. Frequent hospitalization, frequent visits to the emergency department, the need for frequent paracentesis, and the need for antiviral therapy were more common in the group with low health literacy than those with signs of a poor prognosis. Improving health literacy will positively affect the prognosis of these patients.

Keywords: hospitalization; chronic hepatitis B; paracentesis; prognosis; health literacy

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INTRODUCTION

The World Health Organization (WHO) estimates that 296 million people were living with chronic hepatitis B infection in 2019, with 1.5 million new infections added every year. It is estimated that 820,000 deaths occurred because of hepatitis B in 2019, mostly due to cirrhosis and hepatocellular carcinoma. As of 2019, worldwide awareness of hepatitis B was 10.5%, while 22% of the people diagnosed were receiving treatment [1].

The progression of cirrhosis can be slowed down, the incidence of liver cancer can be reduced, and improvement in long-term survival can be achieved with the treatment of chronic hepatitis B infection. The WHO has estimated that 12% to 25% of people with chronic hepatitis B infection will require antiviral treatment in 2021, depending on the settings and eligibility criteria. Guidelines recommend the use of oral medications (tenofovir or entecavir) as the most potent treatment modality to suppress the hepatitis B virus. Many of the patients who start antiviral treatment for hepatitis B virus must continue the treatment for life [2].

Most people diagnosed with liver cancer in low-income settings die within a short time. In high-income countries, patients with symptoms present to the hospital earlier, and have easier access to surgery and chemotherapy, which can prolong life for months to years. Liver transplantation is sometimes performed for people with cirrhosis or liver cancer in high-income countries.³

Health literacy can be defined as the capacity to acquire, understand, and interpret basic health information and services in order to protect and improve human health and improve deteriorating Health [2]. Health literacy includes having the ability to make decisions and being able to use this ability in health-related issues [3-5]. Those with low health literacy have difficulty understanding health information and following the necessary instructions, and have problems getting adequate health care [6-10].

Among the chronic diseases, health literacy is most commonly investigated in association with diabetes mellitus, chronic obstructive pulmonary disease, obesity, and hypertension. It has been reported that people with better health literacy as regards these chronic diseases are easier to treat, face fewer complications, or are diagnosed earlier [11-14]. A limited number of studies on the relationship of health literacy with chronic hepatitis B disease and its complications are present in the literature [15-19].

The aim of the current study was to evaluate the relationship of health literacy with the diagnostic stage of the disease, the risk of encountering complications, and other prognostic variables in chronic hepatitis B patients.

METHODS

Approval for the study was obtained from the hospital's ethics committee. A total of 146 male and 118 female patients with chronic hepatitis B disease who presented to the

gastroenterology outpatient clinic of Mersin University Faculty of Medicine Hospital in 2019 were included in the study. A questionnaire on the sociodemographic characteristics of the patients was used, and the HLS-EU-47 scale was employed to measure the level of health literacy [20]. The questionnaires were applied with the face-to-face interview technique. Patients who could not communicate verbally, did not have the mental capacity to understand and respond to the questions of the European Health Literacy Survey Questionnaire 47 (HLS-EU-Q47), or did not agree to participate in the study were excluded from the study.

Diagnostic criteria for chronic hepatitis B

These were as follows:

- HBsAg positive in the blood for more than 6 months,
- Serum HBV DNA >20,000 IU/ml in HBeAg-positive patients,
- Serum HBV DNA >2,000 IU/ml in HBeAg-negative patients,
- Persistent or intermittent high levels of AST and ALT,
- A liver biopsy showing signs of chronic hepatitis B disease with moderate or severe necroinflammation.

HLS-EU-47 Scale

The HLS-EU form consists of 47 questions. Each of the 47 questions was evaluated on a scale scored between 1 and 4 (1: very difficult, 2: difficult, 3: easy, 4: very easy). This scale is based on the assessment of how difficult or easy the behavior specified in each question is

according to one's own perception. Within the framework of the HLS-EU-Q47 concept, sub-indexes are created by taking the average values of the health literacy parameters [20].

Statistical Analysis

The data obtained were analyzed using the Statistical Package ® 21.0 for the Social Sciences (SPSS). With all statistical analyses, $p < 0.05$ was accepted as the significance level and relationships were evaluated within the 95% confidence interval. Descriptive findings of the study group were number and percentage distributions for categorical variables, and mean, standard deviation, and median for continuous variables. The percentiles are given by their lowest and highest values. The relationships between the numerically dependent and independent variables were analyzed by Spearman correlation analysis. Shapiro-Wilk test and Kolmogorov-Smirnov test were used to assess whether the variables followed a normal distribution. According to the normality test results, the Mann-Whitney U and Kruskal Wallis tests were used to compare the groups.

RESULTS

The comparisons between the general characteristics of the participants and the HLS-EU-Q47 results are given in Table 1. Accordingly, the health literacy of university and high school graduates was found to be significantly higher than those who were illiterate or only had primary education. The health literacy of working participants was found to be significantly higher than that of non-working participants. The health

literacy of public employees was found to be higher than that of housewives and the self-employed groups. It was observed that the health literacy of the participants with good socioeconomic status was higher than those with low socioeconomic status. The health

literacy of those with a high body mass index was significantly lower compared to those with a low body mass index. The health literacy of older participants was significantly lower than younger participants.

Table 1. Comparisons between general characteristics of the patients and the HLS-EU-Q47

		European Health Literacy Scale Scores					p-value
		Mean	Standard Deviation	Median	Minimum	Maximum	
Gender	Male	30.48	9.18	30.14	10.64	46.81	0.293 ^a
	Female	29.22	9.17	29.26	9.22	46.81	
Marital Status	Single	29.82	9.17	30.65	12.77	46.10	0.316 ^b
	Married	30.12	9.07	30.14	9.22	46.81	
	Divorced	25.30	11.40	21.19	10.64	44.68	
Education	Illiterate	19.09	5.97	17.91	9.22	31.56	<0.001 ^b
	Primary	25.35	7.14	24.11	10.64	42.91	
	High School	32.86	8.05	34.04	13.48	46.81	
	University	38.51	5.00	38.83	25.53	46.81	
Occupation	Yes	31.94	9.20	34.04	10.64	46.81	<0.001 ^a
	No	27.98	8.75	27.31	9.22	46.81	
Occupation	Self-employed	28.68	9.13	28.19	10.64	46.10	<0.001 ^b
	Officer	36.91	5.93	37.59	14.54	45.39	
	Retired	31.40	8.80	32.26	14.54	46.81	
	Housewife	25.50	8.45	24.47	9.22	44.68	
Income	500-1000 ₺	20.12	6.47	17.73	12.77	30.14	<0.001 ^b
	1001-2000 ₺	25.62	7.75	24.65	10.64	45.74	
	2001-3000 ₺	32.56	8.46	34.40	12.77	46.81	
	>3000 ₺	37.05	6.33	37.59	19.50	46.81	
Smoking	Yes	29.65	8.73	29.43	10.64	46.81	0.869 ^b
	No	30.13	9.45	30.85	9.22	46.81	
	Quit	29.39	9.17	27.66	13.48	45.39	
Alcohol	Yes	34.26	10.14	36.88	16.31	45.04	0.127 ^b
	No	29.96	9.17	30.32	9.22	46.81	
	Quit	26.09	7.77	25.00	15.96	41.49	
Chronic Disease (Other than Chronic Hepatitis)	Yes	29.26	9.27	28.55	9.22	46.81	0.100 ^a
	No	31.20	8.89	34.04	10.64	46.10	
		Correlation Coefficient (Rho)					
Age		-0.166					0.007
Body Mass Index (kg/m ²)		-0.195					0.001

^a: Mann Whitney u test; ^b: Kruskal Wallis H test; rho = Spearman Correlation Coefficient

The mean score of the participants on the health literacy scale was calculated as 29.92 ± 9.18 . Table 2 presents the comparisons of the health literacy scores with hepatitis B variables and Table 3 presents the comparisons of the health literacy scores with cirrhosis complications. The health literacy of patients taking antivirals was significantly lower than of those who were not use them. The health literacy of patients who underwent regular follow-up after chronic hepatitis B was significantly higher than those

who did not. The health literacy of patients continuing in the form of chronic chronic hepatitis B was significantly higher than those who did not. The health literacy of patients with the cirrhosis development was significantly lower than those without this complication. The relationship between paracentesis needs and health literacy of cirrhosis patients with ascites is shown in Figure 3. In the group that needed paracentesis, health literacy was observed to be lower than in the group that did not need paracentesis.

Table 2. Comparisons of the health literacy scores with variables related to Hepatitis B

		Mean	Standard Deviation	Median	Minimum	Maximum	p-value
Using Antiviral drug	Yes	29.35	9.21	28.72	10.64	46.81	0.031^a
	No	32.50	8.66	34.04	9.22	46.81	
Regular follow-up	Yes	31.56	8.68	32.44	10.64	46.81	<0.001^a
	No	24.98	8.91	24.64	9.22	42.91	
Persisting as Chronic Hepatitis B	Yes	32.70	9.08	34.04	14.18	46.81	<0.001^a
	No	26.15	8.60	26.06	9.22	45.74	
Cirrhosis	Yes	26.26	8.66	26.06	9.22	45.74	<0.001^a
	No	32.70	8.58	34.04	14.18	46.81	
Cirrhosis Stage	Compensated	26.75	8.98	28.01	9.22	45.74	0.261 ^a
	Decompensated	24.26	6.68	30.14	12.77	35.82	
HCC	Yes	22.70	9.17	17.73	14.54	35.82	0.075 ^a
	No	30.06	9.14	30.14	9.22	46.81	

^a: Mann Whitney u test; HCC: Hepatocellular carcinoma

The comparisons between health literacy scores and hospitalization history is given in Table 4. The health literacy of patients hospitalized in the last year was significantly lower than that of non-hospitalized patients. The number of

hospitalizations in the last year also decreased as health literacy increased.

Table 3. Comparisons of the health literacy scores with cirrhosis complications

		Mean	Standard Deviation	Median	Minimum	Maximum	p-value
Ascites	No	29.81	9.22	30.14	9.22	46.81	0.425 ^a
	Yes	31.60	8.48	32.09	16.67	41.49	
Varices	No	29.79	9.07	30.14	9.22	46.81	0.506 ^a
	Yes	31.07	10.23	30.83	14.54	45.74	
Varices hemorrhage	No	29.86	9.18	30.14	9.22	46.81	0.611 ^a
	Yes	31.21	9.51	35.82	16.67	41.84	
Peritonitis	No	29.82	9.18	30.14	9.22	46.81	-
	Yes	-	-	-	-	-	
Encephalopathy	No	29.89	9.10	30.14	9.22	46.81	0.609 ^a
	Yes	31.03	13.14	35.46	10.64	42.20	
Hospitalization due to encephalopathy	Yes	22.55	7.43	23.40	14.54	33.33	0.066 ^a
	No	30.06	9.16	30.14	9.22	46.81	
Paracentesis	Yes	21.32	5.31	21.28	14.54	28.72	0.004 ^a
	No	30.22	9.14	30.85	9.22	46.81	
Rate of paracentesis	>1 in a week	20.92	9.64	20.92	12.77	31.56	0.724 ^b
	Once in a week	20.28	6.14	16.67	14.54	28.72	
	Once in a month	22.61	4.58	21.99	17.13	28.72	
	No	-	-	-	-	-	

^a: Mann Whitney u test; ^b: Kruskal Wallis H test

Table 4. Comparisons between health Literacy scores and hospitalization history

		Mean	Standard Deviation	Median	Minimum	Maximum	p-value
Hospitalization within the last year	No	30.87	9.16	31.56	10.64	46.81	0.002 ^a
	Yes	26.76	8.56	25.72	9.22	45.04	
Hospitalizations within the last year	None	30.87	9.16	31.56	10.64	46.81	0.009 ^b
	Once	26.76	8.98	27.31	9.22	45.04	
	More than once	26.77	7.52	25.18	16.67	42.91	
Visits to the emergency department within the last year	None	30.68	9.28	32.09	10.64	46.81	0.210 ^b
	Once	29.41	9.38	28.72	13.48	44.33	
	More than once	28.12	7.99	27.31	9.22	45.74	

^a: Mann Whitney u test; ^b: Kruskal Wallis H test

DISCUSSION

The health literacy of patients taking antivirals was significantly lower than those who did not use them. The health literacy of patients who underwent regular follow-up after chronic hepatitis B was significantly higher than those who did not. Also, the health literacy of patients continuing in the form of chronic hepatitis B was significantly higher than those who did not. In addition, the health literacy of patients with the development of cirrhosis was significantly lower than that of those without this complication. In the group that needed paracentesis, health literacy was observed to be lower than in the group that did not need paracentesis. The health literacy of patients hospitalized in the last year was significantly lower than that of non-hospitalized patients. The number of hospitalizations in the last year was similarly related to health literacy.

In previous studies, it was found that seeking treatment and the adherence to medication were high in individuals with good health literacy for chronic diseases [9, 13, 21, 22]. In this study, antiviral use was associated with low health literacy. The guidelines recommend antiviral therapy and close monitoring of patients in cases of active chronic hepatitis B. Since there are patients who are admitted to a university hospital, they can be considered patients who are looking for treatment. However, the patients recommended antiviral treatment have slightly worse progression and are probably cases that have remained away from regular follow-up.

In one study, the researchers found that among untreated patients, the annual cirrhosis and HCC incidence ranged from 0.26% to 1.30% and 0.04% to 3.80% in inactive patients, and 0.55 to 4.05% and 0.19 to 6.03% in active patients, respectively [23]. They claimed that transition rates increased with age, male sex, the presence of fibrosis/cirrhosis, and active disease and/or antiviral treatment. It is known that these transitions are less common in cases that have regular follow-up and comply with the recommendations. Although the unique characteristics of the virus and the host also affect the transition to cancer or cirrhosis, the transition to advanced stage disease slows down in individuals with good health literacy. This situation can be interpreted in two ways. First, individuals with low health literacy should be monitored more closely. Secondly, the prognosis and survival of patients can be improved with health literacy training.

It is also expected that the need for paracentesis will be lower in cases with good health literacy, which is a positive result. Patients can achieve a decrease in the need for paracentesis by following the warnings about nutrition and taking medications. In the studies conducted, the need for paracentesis was associated with multiple factors [24]. One of the most important results of the research is that paracentesis, which is an interventional practice and indicates a poor prognosis, is associated with health literacy. In addition, paracentesis is also associated with concomitant cardiac problems, and health literacy

has also been known to be protective in patients with heart disease in previous studies.

There is a lot of research available on hospitalization and health literacy [25-27]. Frequent hospitalization of patients is a sign that the course of the disease is poor. Disease severity has been associated with an increase in the frequency of hospitalization in patients. As a result of the research, hospitalization, which is one of the signs of a poor prognosis, was found to be associated with health literacy. Hospitalization is a sign that the course of the disease is bad, and it is also accompanied by an increase in medical expenses. Considering the costs of hospitalization, paracentesis, and antiviral treatment, it can be predicted that health literacy will save both the individuals and governments from a significant financial burden.

Limitations

Our research was conducted in a single-center manner, and generalizations cannot be made. The number of our cases remained low due to the Covid pandemic. The limited number of participants also limited the study. It may be a bias to conduct research in a third-line university hospital. The health literacy of patients who came to the university hospital may be different from the patients who did not care about the treatment at all or who had low treatment compliance. For this reason, our collection of cases at the university hospital outpatient clinic may have negatively affected our results.

Conclusions

Health literacy is associated with the course of the disease in chronic hepatitis B patients. Frequent hospitalization, frequent visits to the emergency department, the need for frequent paracentesis, and the need for antiviral therapy are observed more commonly in the group with low health literacy than those with signs of a poor prognosis. Improving health literacy will positively affect the prognosis of these patients. It may be necessary to be more descriptive in patients with poor health literacy. Patients with chronic hepatitis B who have been found to have poor health literacy should be monitored more closely, and support from their companions could be requested for their treatment and control.

Conflicts of interest

The authors have nothing to disclose.

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