



Original Article

Canonical Correlation Between Self-Care Agency and Health-Related Self-Efficacy with Chronic Viral Hepatitis Patients

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ABSTRACT

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Objectives: The purpose of this study was to examine the relationship between self-care agency and health self-efficacy measures, in patients with viral hepatitis.

Methods: Data were collected from 116 outpatients over the age of 19 years who were diagnosed with viral hepatitis between February 20, 2019 and April 30, 2019. This study used the Appraisal of Self-care Agency Scale-Revised and the Health Self-Efficacy measures. Descriptive statistics, Pearson's correlation coefficients, and canonical correlations were used during data analysis [SPSS version 25.0 for Windows (SPSS, Chicago, IL, USA)].

Results: The first canonical correlation coefficient was 0.65 (Wilks' $\lambda = 0.44$, $F = 5.63$, $p < 0.001$) and the second was 0.42 (Wilks' $\lambda = 0.76$, $F = 3.08$, $p = .001$). The first variate indicated a higher perception of having power for self-care (0.85) and developing power for self-care (0.92), and this was related to exercise (0.66), illness (0.76), emotion (0.75), nutrition (0.81), stress (0.60), and health practice (0.85). The second variate indicated a higher perception of having power for self-care (0.42), whilst lacking power for self-care (-0.82), was related to illness (0.35) and stress (0.72).

Conclusion: Nursing interventions and education aimed at enhancing the self-care of viral hepatitis patients are needed to assist patients to improve their health care behaviors.

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Introduction

Hepatitis is a condition involving persistent inflammation of the hepatic parenchyma which causes necrosis. It is caused by a variety of contagious and non-contagious factors such as hepatitis viruses, excessive alcohol consumption (over many years), needle sharing through drug use, autoimmunity, and secondary syphilis [1].

Viral hepatitis is a systemic infection caused by viral replication in the liver by Types A, B, C, D, and E hepatitis. All hepatitis viruses may cause acute viral hepatitis; however, hepatitis B virus (HBV) and hepatitis C virus (HCV) infections may lead to chronic viral hepatitis, which can develop into liver cirrhosis and primary liver cancer. The mortality rate

associated with viral hepatitis caused by HBV and HCV is 96% [2], and HBV and HCV are 50–100 times and 10 times, respectively, more contagious than human immunodeficiency virus (HIV) [3]. Thus, treatment of patients with viral hepatitis places a huge burden on the public health system [2], and therefore, preventive measures for controlling the transmission of viral hepatitis must be implemented at a national level.

Both chronic HBV and HCV infection are associated with complicated disease progression characteristics, and the reasons for these complications are diverse. Elderly or obese patients with hepatitis B are more likely to develop hepatic steatosis or fatty liver disease, compared with healthy people [4]. Furthermore, a previous study discovered that hypertriglyceridemia and metabolic syndrome are related to

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infections caused by HBV in male patients [5]. Patients with chronic hepatitis B and metabolic syndrome have a higher viral load than those without metabolic syndrome [6]. Furthermore, HCV is known to increase insulin resistance which is closely related to the development of metabolic diseases [7]. As such, patients with hepatitis often have concurrent diseases, and thus require management of various complications of liver disease and their causes.

Hepatitis is a chronic disease, however, its symptoms can be nonexistent, mild or non-specific [1], thereby making early detection difficult, and treatment is focused on only the acute symptoms [8]. In addition, most patients with hepatitis are either not aware of the root cause of the condition [9] or due to the negative stigma associated with hepatitis do not present with any symptoms, making the treatment of the disease difficult [10]. Hepatitis often requires lifelong care as it has a negative influence on a patient's life.

Self-care activities are known to reduce the complications associated with hepatitis, and with support for patient recovery, hospitalization periods shorten and the rate of readmission decreases [11]. Depending on how well patients take care of themselves (symptoms and bodily functions), and make informed decisions regarding their hepatitis treatment, the spread of hepatitis virus can be contained [8], and the patient's quality of life improved. Increasing evidence supports the positive effect of self management on patients' overall health outcome [12-14]. Self-care is important in controlling the serious complications that are associated with HVB and HVC, and is also important for managing symptoms, medications, lifestyle changes, and psychological and social problems caused by the illness [1]. Patients who are proactive in self-care can reduce their psychological and physical symptoms and improve their quality of life, as well as reduce their health care costs [11,12,14].

Orem [15] defined self-care as changing one's own condition or environment to maintain quality of life, health, and well-being. Self-care agency is defined as one's ability to fulfill ongoing self-care needs. In other words, individuals with a high level of self-care agency are more likely to fulfill self-care commitments. However, previous studies have revealed that patients with HBV or HCV demonstrate a low level of self-care, are less likely to attempt to improve their health [8,9,16], and have a low level of self-efficacy [17]. In order to help patients with chronic conditions/diseases fulfill self-care commitments, information on treatments must be provided, and self-efficacy is required [18]. Self-efficacy, a concept which stemmed from the social cognitive theory, has been highlighted as a crucial element in numerous health-related studies [19].

In previous studies, self-efficacy was reported as the major predictive variable associated with medication compliance among hepatitis C-infected patients [17], and performance

of self-care activities among patients with hepatitis B and patients with liver cirrhosis [20,21]. Moreover, a correlation between self-care agency and self-efficacy, has been confirmed in many studies regarding high blood pressure [22] and diabetes [23,24]. However, previous studies have mostly focused on finding a causal relationship with self-care agency set as an independent variable. Hence, studies that focus on finding mutual relationships between different variables are still needed.

This study aimed to determine whether there was a correlation between self-care agency and health-related self-efficacy using canonical correlation analysis [25]. This is a statistical test used to examine the correlation between variable groups, by assigning independent variables and dependent variables into 2 groups.

Materials and Methods

1. Study design

This was a cross-sectional correlation study which examined the level of self-care agency and health-related self-efficacy in patients with chronic viral hepatitis to investigate the relationship between 2 variable groups.

2. Study participants

The study population comprised of gastroenterology outpatients treated at a hospital located in Busan Metropolitan City. Participants were adults aged 19 years or above, who were able to read and write Korean, gave voluntary consent to participate in the study, were diagnosed with chronic viral hepatitis 6 months ago or more, and did not have a serious illnesses (e.g. cancer).

The variable groups in this study were based on 3 subcategories of self-care agency and 6 subcategories of health-related self-efficacy, giving a total of 9 variable groups. In terms of statistical assumptions, a canonical correlation analysis requires the number of samples to be 10 times the number of variables [25], thus at least 90 participants were required for this study. Of the total individuals ($N = 148$) who voluntarily requested to participate in this study (after seeing an advertisement posted at the hospital), there were 4 people excluded who did not meet the selection criteria, 6 who provided unclear answers, 2 who withdrew their consent, and 20 who did not respond to the invitation letter (77.3% response rate). In total there were 116 participants selected ($n = 116$) for the final analysis.

3. Data collection and ethical considerations

This study was approved by the Institutional Review

Board (IRB) of Pukyong National University (IRB approval no.: PKNUIRB-2019-10) and was conducted between February 20 and April 30, 2019. Data were collected directly from participants during the recruitment process or via post. Patients with chronic viral hepatitis who voluntarily participated in the study were selectively sampled as the target population. These participants were informed of the purpose and details of this study, and were provided with sufficient time to decide whether to participate. Participants could withdraw their consent to participate at any time during the study, and were asked to return the questionnaire within 2 weeks in the returns envelopes provided. The time required to complete the questionnaire was approximately 20–30 minutes.

4. Study tools

For self-care agency, the tool known as Appraisal of Self-care Agency Scale-Revised which was developed by Soderhamn et al [26], revised by Sousa et al [27], and translated into Korean by Kim [28], was used. It consisted of a total of 15 questions in 3 areas, of which the area lacking self-care agency was reversely coded. Based on a 5-point Likert scale, a higher total score signified a higher level of self-care agency. With regard to the reliability of the tool, in previous studies, both Sousa et al [27] and Kim [28] showed a Cronbach α reliability value of 0.87, and the Cronbach α value in this study was 0.85.

For health-related self-efficacy, the tool known as the Korean Self Rated Abilities for Health Practices, developed by Becker et al [29], and validity verified by Lee et al [30] in Korean, was also used in this study. It consisted of a total of 24 questions in 6 areas. Based on a 5-point Likert scale, a higher total score signified a higher level of health-related self-efficacy. With regard to the reliability of the tool, in previous studies, Becker et al [29] showed a Cronbach α reliability value of 0.91, Lee et al [30] reported Cronbach α value of 0.52–0.86, and this study showed a value of 0.94.

5. Statistical analysis

The data were analyzed using SPSS version 25.0 for Windows (IBM Corp., Armonk, NY, USA). Descriptive properties of the variables were examined using numeric values, percentages, averages, and standard deviations. The canonical correlation analysis was conducted using a multivariate analysis of variance to explore the correlation between variable groups. After checking the prerequisites for using the canonical correlation analysis, which are normality, linearity, and homoscedasticity, Pearson's correlation was used to check multicollinearity, and a scatter plot was used to check multivariate abnormalities for interpreting the canonical correlation analysis results.

Results

1. General and disease-related characteristics of participants

The average age of the participants was 55.72 years. Among them, 53 participants (45.7%) were in their 40s–50s, 50 (43.1%) were in their 60s – 70s, and 13 (11.2%) were in their 20s–30s. There were 60 participants (51.7%) who were males and 56 (48.3%) who were females. In 73 participants (62.9%), the education level was high school or less, and there were 43 participants (37.1%) who had a university degree or higher. There were 39 participants (33.6%) who lived alone, 39 (33.6%) lived with a spouse or children, and 38 (32.8%) who lived with a spouse and children. There were 66 participants (56.9%) who were not currently smoking and 50 (43.1%) who were smokers. There were 63 participants (54.3%) who were current drinkers and 53 (45.7%) who did not consume alcohol (Table 1).

Regarding disease-related characteristics of the participants, 71 (61.2%) had HCV while 45 (38.8%) had HBV. Hepatitis virus was detected in 57 participants (49.1%), while it was undetectable in 59 participants (50.9%). There were 59 participants (50.9%) who were not taking antiviral drugs, while 57 (49.1%) were. Furthermore, 56.0% (65) of the participants had concurrent liver-related diseases, 25.0% (29) had concurrent diseases unrelated to the liver, and 19.0% (22) did not have a concurrent disease (Table 1).

2. Differences in self-care agency and health-related self-efficacy based on general characteristics and disease-related characteristics of the participants

In terms of general characteristics of the participants, education level had a significant positive influence on self-care agency ($t = -3.01, p = 0.003$). In other words, participants with an education level of high school or less (2.99 ± 0.61 points) reported a lower level of self-care agency than those with a university degree or higher (3.34 ± 0.60 points). Age ($F = 8.92, p < 0.001$) and education level ($t = -2.51, p = 0.014$) also showed a significant positive influence on health-related self-efficacy. According to the post-hoc test, participants in their 20s–30s (2.71 ± 0.57 points) reported a higher level of health-related self-efficacy ($F = 8.92, p < 0.001$) than those in their 40s–50s (1.95 ± 0.65 points) and 60s–70s (1.88 ± 0.65 points). Participants with an education level of high school or less (1.89 ± 0.62 points) reported a lower level of health-related self-efficacy ($t = -2.51, p = 0.014$) than those with a university degree or higher (2.21 ± 0.74 points; Table 1).

3. Self-care agency and health-related self-efficacy of the participants

In order to further examine characteristics of the participants' self-care agency and health-related self-efficacy,

Table 1. Self-care agency and health-related self-efficacy according to characteristics of participants (n = 116).

Variable	Category	n (%)	Self-care agency			Health-related self-efficacy		
			Mean ± SD	t/F (p)	Scheffé	Mean ± SD	t/F (p)	Scheffé
Age (y) (55.72 ± 12.35)	20–39a	13 (11.2)	3.14 ± 0.68			2.71 ± 0.57		b, c < a
	40–59b	53 (45.7)	3.15 ± 0.61	0.11 (0.893)		1.95 ± 0.65	8.92 (< 0.001)	
	60–79c	50 (43.1)	3.09 ± 0.64			1.88 ± 0.65		
Gender	Male	60 (51.7)	3.21 ± 0.63			2.12 ± 0.65		1.91 (0.059)
	Female	56 (48.3)	3.02 ± 0.61	1.65 (0.102)		1.88 ± 0.70		
Educational status	≤ High school	73 (62.9)	2.99 ± 0.61			1.89 ± 0.62		-2.51 (0.014)
	≥ University	43 (37.1)	3.34 ± 0.60	-3.01 (0.003)		2.21 ± 0.74		
Family member	Spouse and children	38 (32.8)	3.16 ± 0.55			2.04 ± 0.67		0.54 (0.948)
	Spouse or children	39 (33.6)	3.19 ± 0.65	0.75 (0.473)		1.99 ± 0.72		
	Single	39 (33.6)	3.02 ± 0.67			2.00 ± 0.68		
Smoking (currently)	No	66 (56.9)	3.15 ± 0.69			2.08 ± 0.74		-1.23 (0.222)
	Yes	50 (43.1)	3.08 ± 0.53	-0.69 (0.494)		1.92 ± 0.59		
Drinking	No	53 (45.7)	3.09 ± 0.64			2.05 ± 0.73		-0.65 (0.516)
	Yes	63 (54.3)	3.14 ± 0.62	0.44 (0.658)		1.97 ± 0.64		
Virus type	Hepatitis B	45 (38.8)	3.15 ± 0.65			2.06 ± 0.71		0.70 (0.483)
	Hepatitis C	71 (61.2)	3.10 ± 0.61	0.41 (0.683)		1.97 ± 0.66		
Virus detection	Not detected	59 (50.9)	3.20 ± 0.68			2.03 ± 0.70		0.33 (0.745)
	Detected	57 (49.1)	3.04 ± 0.55	1.46 (0.148)		1.99 ± 0.67		
Antiviral agents	Not taking	59 (50.9)	3.11 ± 0.55			1.94 ± 0.54		-1.14 (0.255)
	Taking	57 (49.1)	3.13 ± 0.70	-0.17 (0.869)		2.08 ± 0.80		
Comorbidity	No	22 (19.0)	3.17 ± 0.62			1.99 ± 0.60		0.05 (0.955)
	Disease related to liver (Liver cirrhosis, Fatty liver)	65 (56.0)	3.08 ± 0.59	0.28 (0.758)		2.02 ± 0.71		
	Disease unrelated to liver (DM, HT et al)	29 (25.0)	3.17 ± 0.73			1.98 ± 0.71		

Table 2. Descriptive statistics of self-care agency and health-related self-efficacy ($n = 116$).

Variables (unit / No. of items)	Mean \pm SD	Actual range	Potential range
Self-care agency (15)	3.12 \pm 0.63	1.00 - 5.00	1.00 - 5.00
Lacking power for self-care (4)	3.61 \pm 0.93	1.00 - 5.00	1.00 - 5.00
Having power for self-care (6)	2.97 \pm 0.87	1.33 - 5.00	1.00 - 5.00
Developing power for self-care (5)	2.78 \pm 0.83	1.00 - 4.40	1.00 - 5.00
Health related self-efficacy (24)	2.01 \pm 0.68	0.00 - 4.00	0.00 - 4.00
Stress (3)	2.14 \pm 0.94	0.00 - 4.00	0.00 - 4.00
Health practice (3)	2.09 \pm 0.97	0.00 - 4.00	0.00 - 4.00
Nutrition (3)	2.01 \pm 0.78	0.33 - 4.00	0.00 - 4.00
Exercise (7)	1.99 \pm 0.80	0.29 - 4.00	0.00 - 4.00
Illness (5)	1.95 \pm 0.84	0.40 - 4.00	0.00 - 4.00
Emotion (3)	1.86 \pm 0.98	0.00 - 4.00	0.00 - 4.00

Table 3. Correlation between self-care agency and health-related self-efficacy ($n = 116$).

	Self-care agency			Health-related self-efficacy					
	1	2	3	4	5	6	7	8	9
1. Having power for self-care	1								
2. Developing power for self-care	0.62***	1							
3. Lacking power for self-care	-0.12	-0.20*	1						
4. Exercise	0.41***	0.36***	-0.36***	1					
5. Illness	0.52***	0.48***	-0.20*	0.60***	1				
6. Emotion	0.41***	0.50***	-0.20*	0.43***	0.60***	1			
7. Nutrition	0.43***	0.49***	-0.20*	0.46***	0.52***	0.40***	1		
8. Stress	0.44***	0.36***	-0.14	0.46***	0.59***	0.59***	0.35***	1	
9. Health practice	0.45***	0.51***	-0.44***	0.55***	0.54***	0.54***	0.53***	0.53***	1

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

the average score of each question was compared. Among the subareas of self-care agency, "lack of self-care agency" scored the highest (3.61 \pm 0.93), followed by "acquiring self-care agency" (2.97 \pm 0.87) and "developing self-care agency" (2.78 \pm 0.83). Among the subareas of health-related self-efficacy, "stress management" scored the highest (2.14 \pm 0.94), followed by "health-related activities" (2.09 \pm 0.97), "nutritional management" (2.01 \pm 0.78), "exercise" (1.99 \pm 0.80), "disease management" (1.95 \pm 0.84), and "emotional management" (1.86 \pm 0.98; Table 2).

4. Correlation between variable groups of self-care agency and health-related self-efficacy

No missing data or abnormal values were observed in the 2 variable groups, and the linear relationship and homoscedasticity between the 2 variable groups were verified. By verifying the multicollinearity between variables using a correlation matrix, the correlation between self-care agency and health-related self-efficacy was expressed as $r = -0.44 - 0.62$, meaning that the assumptions above were not violated (Table 3).

The analysis showed that 2 of the 3 confirmed canonical correlations were statistically significant. The Wilks' Lambda value for all 3 canonical correlations was significant at 0.44 ($F = 5.64$, $p < 0.001$), and for canonical correlations 2 and 3

Table 4. Canonical correlation between self-care agency variables and health-related self-efficacy variables ($n = 116$).

	Canonical	
	1	Variate 2
Set 1: Self-care agency variables		
Having power for self-care	0.85	0.42
Developing power for self-care	0.92	0.08
Lacking power for self-care	-0.29	-0.82
% redundancies	13.28	3.99
Set 2: Health-related self-efficacy variables		
Exercise	0.66	0.05
Illness	0.76	0.35
Emotion	0.75	0.18
Nutrition	0.81	0.16
Stress	0.60	0.72
Health practice	0.85	0.09
% redundancies	13.38	1.08
Canonical correlation	0.65	0.42
Significance test: $F(p)$	5.64 (< 0.001)	3.08 (0.001)
Variance explained	42%	17%

(and not correlation 1) at 0.76 ($F = 3.08$, $p = 0.001$). However, the canonical correlation of correlation 3 was not statistically significant. The canonical correlation coefficient for canonical variate 1 and canonical variate 2 were 0.65 (42% of shared variance) and 0.42 (17% of shared variance), respectively. The structure coefficients, canonical correlation coefficients, and explanatory power of the 2 statistically significant canonical correlations are shown in Table 4.

The structure coefficients derived from the 2 significant canonical correlations indicated the load value of the correlation between the variables, in which a coefficient of 0.30 or higher meant that the correlation had an explanatory power of 9% or higher, and was considered as the standard for interpreting the load value [25].

With respect to the first variate, acquiring self-care agency (0.85) and developing self-care agency (0.92) were significantly loaded among the self-care agency variables, whilst among the health-related self-efficacy variables, exercise (0.66), disease management (0.76), emotional management (0.75), nutritional management (0.81), stress management (0.60), and health-related activities (0.85) showed correlations with the first variate.

Specifically, the first variate signified that participants who acquired and developed self-care agency were more competent

at exercising, disease management, emotional management, nutritional management, stress management, and health-related activities. With respect to the second variate, acquiring self-care agency (0.42) and lack of self-care agency (-0.82) were significantly loaded among the self-care agency variables, whilst among the health-related self-efficacy variables, disease management (0.35) and stress management (0.72) showed significant correlations with the second variate. Specifically, the second variate signified that participants who acquired self-care agency or did not lack self-care agency were more competent at disease management and stress management with respect to health-related self-efficacy. The explanatory power was 59%.

Discussion

This study was conducted to verify the bidirectional correlation between self-care agency and health-related self-efficacy in patients with viral hepatitis, focusing on the characteristics within and relationship between the variables.

Among the general characteristics of the study participants, education level showed a significant influence on self-care agency, and age and education level showed a significant

influence on health-related self-efficacy. Self-care agency is affected by various personal factors including age, gender, health condition, development condition, socio-cultural factors, health-care system, family system, lifestyle pattern, environmental factors, and the availability of resources [24]. Thuy [16] determined that education level and knowledge of self-care differed significantly in patients with chronic hepatitis B, and predicted that patients with a higher education level may also have a higher level of self-care knowledge. Furthermore, it has been reported that the provision of education aimed at changing an individual's behavior, had a greater correlation with improvement in self-care agency than personal characteristics (based on the fact that educated patients better understand the complexities of hepatitis) [16], and patients who received an education on hepatitis C also exhibited improvement in self-efficacy [8].

In this study, the 20s–30s age group showed a higher level of health-related self-efficacy than the 40s–50s and 60s–70s age groups. This result suggests that younger people are more capable of retrieving and remembering the relevant information related to health care. The education level had a statistically significant influence on health-related self-efficacy in this current study. However, no statistically significant influence was observed in the study performed by Lee et al [9] on patients with HBV. Such phenomenon may be related to the fact that each individual is unique [15].

For disease-related characteristics of the study participants, the virus type, detection of the virus, use of antiviral drugs, and concurrent diseases were examined. However, these characteristics had no significant influence on self-care agency and health-related self-efficacy. In previous studies, it was observed that HBV and HCV are more contagious than HIV [3], and patients fear transmitting the hepatitis virus to others [10], and have lower quality of life or self-care agency [31]. In addition, hepatitis B is associated with fatty liver disease [4], whereas hepatitis C is closely related to diabetes because it increases insulin resistance [7]. These results may differ from the results of this current study because patients with serious liver diseases were excluded from this study. Therefore, the effects of exogenous variables must be examined further.

The average self-care agency score of the study participants was 3.12 (out of 5.0). This was lower than the average score of 3.63 from the study conducted by Sousa et al [27] on healthy participants where the average age was 35.2 years, and lower than 3.47, which was the score from the study conducted by Kim [28] among lung cancer patients with an average age of 64.7 years who had undergone pneumonectomy.

Treatments recommended for patients with hepatitis B or C include periodical hospital visits, hematologic examination, restriction of alcohol consumption, avoiding specific food or drugs, and antiviral treatment [1]. However, in one study, about

half of the hepatitis B patients had a low level of knowledge regarding self-care agency [16]. Similar results have been shown in studies conducted in patients with liver cirrhosis where it was demonstrated that they lacked knowledge about efficient disease management [21]. Participants in this current study, also did not have sufficient knowledge or skills to follow the recommended treatment methods. Therefore, measures must be taken to adequately educate all patients in disease management, or medical personnel must be available to provide the relevant education to assist the patients.

The average health-related self-efficacy score of the study participants was 2.01 (out of 4.0), which was lower than the average score of 2.80 (out of 4.0) from a study conducted on healthy participants [32] and lower than 2.50 (out of 4.0) from a study conducted on patients who underwent hip arthroplasty [33]. It can be inferred that patients with viral hepatitis commonly have no symptoms [1] which makes early detection difficult, while 43.1% of the participants in this study still smoked and 54.3% drank, despite the need for lifestyle changes to manage their disease and avoid metabolic syndrome [4,7], this may have contributed to the lower health-related self-efficacy score. Therefore, a health-related self-efficacy improvement program must be provided to patients with viral hepatitis.

By performing a canonical correlation analysis to discover the correlation between variable groups of self-care agency and health-related self-efficacy, and determining the reliability of such correlations, it can be observed that for the first variate, acquiring and developing self-care agency correlated with pursuing exercise, disease management, emotional management, nutritional management, stress management, and health-related activities for health-related self-efficacy. In previous studies, self-care agency of patients with chronic diseases was related to their self-efficacy [17,24,34]. In particular, patients with chronic hepatitis are required to manage physiological demands as well as having a work-life balance, and preventing life-threatening diseases [31]. Moreover, those with a high level of self-efficacy are more motivated to exercise to improve their health [35]. Accordingly, motivating the participants to care for their health can improve their level of self-care agency.

Regarding the second variate, patients who acquired or did not lack self-care agency, performed better at disease management and stress management for health-related self-efficacy. Self-care for diseases requires information or knowledge of the disease, which can be obtained through education. In previous studies conducted on patients with HIV, the participants who received education on self-care, had better disease management skills [36]. In a study conducted on hepatitis C infected patients, the experimental group who had their self-care agency enhanced, showed greater improvements in knowledge of diseases, self-efficacy, and quality of life than the

control group who only received other relevant information [8].

Patients with chronic diseases typically have a lower level of self-care agency than healthy individuals [27,28], which results in a vicious cycle of neglecting disease management and deterioration in disease severity. Thus, nursing interventions aimed at improving participants' self-care agency may produce beneficial results for fighting diseases and improving their quality of life.

One limitation of this study was that the participant sampling was performed from the gastroenterology outpatients, so the generalization of the findings may be limited. In the future, it may be necessary to repeat this study with the application of expanded methods for recruitment of participants.

Overall, it can be concluded that self-care agency and health-related self-efficacy of patients with chronic viral hepatitis were lower, and there was a correlation between the 2 variable groups. Specifically, acquiring self-care agency was related to improving the level of health-related self-efficacy. The significance of this study is that it provides the grounds for developing nursing intervention measures that can reduce the severity of liver disease by improving the patients' self-care agency and self-efficacy for managing their health.

Conflicts of Interest

All authors have no conflicts of interest to declare.

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