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*Research Article*

# Application of Health Education Model Based on Theory of Behavior Change in Nursing Care of Patients with Chronic Hepatitis B

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Chronic hepatitis B (CHB) is a lifelong disease that harms human health. Bad lifestyle can induce and aggravate liver dysfunction of patients with CHB and even cause liver cirrhosis and liver cancer. Therefore, it is very important to help patients with CHB establish a good lifestyle to control their liver function deterioration. In this study, the theory of behavior change was applied to the nursing process of patients with CHB. The results showed that this method could help to improve liver function of patients with CHB, improve patients' compliance behavior, and promote the development of self-management behavior ability and then improve patient satisfaction, which was worthy of promotion.

## 1. Introduction

Chronic hepatitis B (CHB) is a systemic infectious disease caused by hepatitis B virus infection, with clinical manifestations of liver inflammation and necrotizing lesions [1]. To control the adverse effect of disease progression on prognosis, patients with CHB often require long-term medication to nourish and protect the liver. However, clinical investigations have revealed that disease cognition deficiency is common in patients with CHB [2]. In addition, the disease needs long treatment period and high cost, which may result in low self-management ability and insufficient medication compliance and affect the prognosis [3]. Therefore, it is necessary to adopt effective means of health education in order to improve the self-management ability of this group of patients.

Health education is not only the main way to improve CHB patients' understanding of the disease, but also the key step in clinical nursing of CHB [4]. The theory of behavior change is an intervention model that provides targeted behavioral support and helps those in need to change or establish healthy behaviors according to needs [5]. At present, there is no literature report that health behavior change theory is applied to health education of CHB patients. This study analyzes the application effect of health education model based on theory of behavior change in the nursing of patients with chronic hepatitis B, aiming at providing theoretical support for broadening the health education methods in CHB nursing, which is reported as follows.

## 2. Information and Methods

*2.1. General Information.* A total of 110 patients with CHB who visited our hospital from January 2020 to January 2021 were selected as the research subjects, including 59 males and 51 females. Their age ranged from 43 to 70 years old, and the average age was $59.84 \pm 6.33$ years old. According to the difference in nursing methods, the patients were divided into study group and control group, 55 cases in each group. There were 30 males and 25 females in the research group. Their age ranged from 44 to 70 years old, with an average age of $59.51 \pm 6.74$ years old. There were 29 males

and 26 females in the control group. Their age ranged from 43 to 69 years old, with an average age of $59.52 \pm 6.46$ years old. There was no statistically significant difference in general information between the two groups, and they were comparable ($P > 0.05$).

*2.2. Inclusion Criteria.* The inclusion criteria are as follows: (i) serological indicators HBsAg-HBc positive, diagnosed as CHB; (ii) the patients' consciousness and thinking are clear; (iii) the patient himself/herself agreed to participate in this trial; (iv) the patients with primary school education or above were able to cooperate with the trial; and (v) the patients are over 18 years of age.

*2.3. Exclusions Criteria.* The exclusion criteria are as follows: (i) patients with combined cardiopulmonary insufficiency; (ii) patients with severe hearing impairment or aphasia; (iii) patients with psychiatric disorders; (iv) patients with diseases of immune system; and (v) patients with hematological diseases and other chronic or acute infectious diseases.

*2.4. Methodology.* The patients in the control group received routine nursing intervention. The causes, transmission routes, relevant protective measures, treatment methods, possible complications, and prognosis of CHB were explained in detail to patients by PPT, short video, animation, and other methods. Carry out psychological nursing to help patients maintain a stable mood. Inform them of the adverse effects of bad emotions on disease recovery, and urge them to actively cooperate with treatment. The patients were guided to establish regular living habits and maintain adequate sleep. It is suggested that the patients should take easily digested and light food as their main dietary habit, eat more fresh fruits and vegetables, strictly prohibit spicy and excitant food, and give up smoking and drinking. The nursing staff should always keep ward environment clean and tidy. Explain the harmfulness of irrational drug use to patients, ask them to take drugs on time and according to the amount, and explain the adverse reactions of various drugs and the corresponding treatment measures. After the patient's condition is stable, he can be assisted to carry out appropriate amount of exercise. After discharge, patients were followed up by telephone to strengthen their ability to cope with adverse events.

The patients in study group were intervened by adding the theory of behavior change on the basis of routine nursing. (i) Set up a nursing intervention group: Set up a nursing intervention group including one attending physician, one head nurse, one dietitian, and several responsible nurses. Organize all members to learn the clinical treatment and nursing knowledge of CHB and behavior change theory, and develop health education programs for CHB patients on the basis of behavior change theory. When the patients were admitted to the hospital, they were evaluated by the CHB behavioral stage change questionnaire made by the hospital, and the behavioral stages of the patients were comprehensively analyzed, and then targeted nursing, health education and behavioral guidance were provided to the

patients at different stages. (ii) Intervention during the prethinking: The patients in the prethinking stage had no intention of changing their health behaviors and did not understand the role of behavior change. Therefore, upon admission, nursing staff could issue targeted self-management cards to let them understand that the recovery of the disease was closely related to their management abilities. The contents of the card include knowledge about chronic hepatitis, exercise advice, dietary guidance, psychological care, regular check-ups, and other aspects. Subsequently, the patients were followed up for more than 15 minutes once or twice a week to consolidate their understanding of chronic hepatitis. (iii) Intervention during the thinking period: The patients in this stage have the idea to changing their behaviors and are willing to accept the related changes but did not take action. At this point, the nursing staff should formulate daily behavior management requirements according to the patient's situation, explain and demonstrate when necessary, and standardize its code of conduct. (iv) Intervention during the preparation period: The patients at this stage made some preparations for the paying action. At this stage, the nurse needs to formulate daily behavior management requirements according to the patient's situation. Explain and demonstrate the rules when necessary to regulate patient behavior. (v) Intervention during the action period: The patients at this stage have taken certain actions, but the state is not stable and may return to the previous state. And the nursing staff needs to strengthen the patient's ability at this time. In the nursing work, the patients' changes can be recognized and encouraged through regular lectures or communication meetings. At the same time, the patients with good therapeutic effects are encouraged to share their experiences, so as to help patients learn how to overcome the problems encountered in self-management. At the same time, the nurses should also guide the patients' failed behaviors to improve the patients' enthusiasm to maintain change. (vi) Intervention during the maintenance period: The patients at this stage have changed their behavior into habits and have confidence, and the possibility of returning to the original stage is reduced. The doctors and nurses can regularly hold seminars and other activities to supplement the knowledge of patients and inform them of the various hazards of chronic hepatitis. At the same time, the patient's family members can also be encouraged to participate so that the family members can have more understanding and confidence in the patient and inform the family members to urge the patient to take medicine on time and develop good living habits. In addition, the medical staff can use the relevant WeChat groups or WeChat official account to prevent patients from being unable to maintain established healthy behaviors due to environmental changes or insufficient self-efficacy and urge them to return to society.

The patients in both groups received nursing intervention for 6 months.

*2.5. Observation Indicators*

(i) To evaluate the changes of liver function indexes of all patients before and after six months of

Table 1: Comparison of liver function indicators between the two groups before and after intervention ($\bar{x}\pm s$).

| Group | ALT (U/L) | | TBIL ($\mu$mol/L) | | DBIL ($\mu$mol/L) | | ALB (g/L) | | HBV-DNA (cps/mL) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Before intervention | After intervention | Before intervention | After intervention | Before intervention | After intervention | Before intervention | After intervention | Before intervention | After intervention |
| Study group (n = 55) | 79.18 ± 4.66 | 43.59 ± 5.41[a] | 26.57 ± 3.49 | 16.55 ± 2.17[a] | 7.59 ± 1.82 | 4.31 ± 1.08[a] | 40.72 ± 8.51 | 65.18 ± 7.65[a] | 1019.25 ± 96.46 | 1006.45 ± 90.88[a] |
| Control group (n = 55) | 78.83 ± 4.71 | 49.94 ± 5.27[a] | 26.74 ± 3.51 | 19.94 ± 3.24[a] | 7.64 ± 1.71 | 5.26 ± 1.17[a] | 41.08 ± 8.44 | 60.17 ± 7.33[a] | 1020.87 ± 97.58 | 1015.98 ± 91.65[a] |
| t | 0.392 | 6.235 | 0.255 | 6.447 | 0.148 | 4.425 | 0.223 | 3.507 | 0.088 | 0.548 |
| P | 0.696 | <0.001 | 0.799 | <0.001 | 0.882 | <0.001 | 0.824 | 0.001 | 0.930 | 0.585 |

Note: comparison with before intervention, [a]$P < 0.05$.

intervention, including alanine amino transferase (ALT), serum total bilirubin (TBIL), serum direct bilirubin (DBIL), albumin (ALB), and HBV-DNA. 3 ml fasting venous blood was taken from all patients before admission and after treatment, and supernatant was taken after centrifugation. Architectc-8000 automatic biochemical analyzer (made by ABBOTT) was used to measure the level of each indicator, strictly following the instructions.

(ii) Medication compliance: The self-made medication compliance questionnaire was used to investigate the medication compliance of the two groups before and after intervention. There were seven questions in the questionnaire, and the answer "Yes" was 0 point, and the answer "No" was 1 point, with full scores of 8. The score below 6 points was low compliance, 6–7 points was medium compliance, and 8 points was high compliance [6].

(iii) Self-management ability: The health self-management ability scale (AHSNSRS) was used to assess the self-management ability of patients in two groups before and after intervention. The scale totally included three contents: self-management cognition (14 items), self-management behavior (14 items), and self-management environment (40 items), which was scored according to the Likert5-level scoring method. A higher score means more self-management [7].

(iv) Self-efficacy: Self-efficacy was assessed using the General Self-Efficacy Scale (GSES) and Likert 4-level scoring system. Each item was rated as L–4, and there were 10 items in total as 10–40 points. The higher the score was, the stronger the self-efficacy was [8].

(v) Hope level: The Herth Hope Scale (HHI) [9] was used to assess the change of hope level before and after intervention in the two groups. The 12 items included three dimensions: maintaining close relationship with others (I), positive attitude towards reality and the future (T), and taking positive action (P). According to the Likert4-level scoring system, the higher the score was, the higher the desired level would be.

(vi) Nursing satisfaction: The nursing service satisfaction was evaluated for all patients by self-made nursing satisfaction questionnaire. The total score of this scale is 100 points, with the score ≥90 points was considered as satisfactory, with the score of 90–70 points as basic satisfactory, the score of 69–50 points as general satisfaction, and the score of <50 points as unsatisfactory. The total satisfaction is the sum of satisfaction rate and basic satisfaction rate [10].

2.6. *Statistical Methods.* SPSS22.0 software was used for processing. The continuous variable data of experimental

TABLE 2: Comparison of medication compliance between the two groups after intervention [$n$ (%)].

| Group | Low compliance | Medium compliance | High compliance |
|---|---|---|---|
| Study group ($n = 55$) | 2 (3.64) | 18 (32.73) | 35 (63.63) |
| Control group ($n = 55$) | 8 (14.55) | 21 (38.18) | 26 (47.27) |
| $\chi^2$ | | 3.960 | |
| $P$ | | 0.047 | |

data were expressed as mean standard deviation ($\bar{x}\pm s$) and adopted t test. The classified variable data and descriptive analysis were expressed as (%) and adopted $\chi^2$ test.

## 3. Results

3.1. *Comparison of Liver Function Indicators between the Two Groups before and after Intervention.* ALT, TBIL, DBIL, ALB, and HBV-DNA in patients between the two groups before intervention were not statistically significant ($P > 0.05$). ALT, TBIL, and DBIL in the two groups after intervention were lower than those before intervention, while ALB was higher than that before intervention ($P < 0.05$). After intervention, ALT, TBIL, and DBIL of the treatment group were lower than those of the control group, while ALB was higher than those of the control group ($P < 0.05$). There was no significant difference in HBV-DNA level between the two groups before and after intervention ($P > 0.05$, Table 1).

3.2. *Comparison of Medication Compliance between the Two Groups after Intervention.* The patients with high compliance in the study group were significantly higher than those in the control group, and the medication compliance between the two groups was statistically significant ($P < 0.05$, Table 2).

3.3. *Comparison of Self-Management Ability and Self-Efficacy between the Two Groups before and after Intervention.* There was no significant difference in self-management cognition, self-management behavior, self-management environment, and self-efficacy between the two groups before the intervention ($P > 0.05$). After the intervention, the self-management cognition, self-management behavior, self-management environment, and self-efficacy of the two groups increased compared with those before the intervention ($P < 0.05$). And the study group was higher than the control group ($P < 0.05$, Table 3).

3.4. *Comparison of Self-Efficacy between the Two Groups before and after Intervention.* There was no significant difference in self-efficacy between the two groups before intervention ($P > 0.05$), but the self-efficacy of the two groups increased after intervention as compared with that before intervention ($P < 0.05$). And the level in the study group was higher than that in the control group ($P < 0.05$, Table 4).

TABLE 3: Comparison of self-management ability and self-efficacy between the two groups before and after intervention ($\bar{x}\pm s$, score).

| Group | Self-management cognition | | Self-management behavior | | Self-management environment | | Self-efficacy | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Before intervention | After intervention | Before intervention | After intervention | Before intervention | After intervention | Before intervention | After intervention |
| Study group (n = 55) | 40.19 ± 7.54 | 67.59 ± 5.63[a] | 46.81 ± 5.97 | 66.12 ± 6.17[a] | 38.58 ± 6.19 | 47.99 ± 7.14[a] | 21.59 ± 6.43 | 35.14 ± 3.75[a] |
| Control group (n = 55) | 41.85 ± 7.43 | 60.11 ± 5.76[a] | 47.18 ± 5.66 | 61.08 ± 6.25[a] | 39.23 ± 6.21 | 41.84 ± 6.52[a] | 22.25 ± 6.17 | 30.39 ± 3.87[a] |
| t | 1.163 | 6.887 | 0.334 | 12.700 | 0.550 | 4.717 | 0.549 | 6.537 |
| P | 0.247 | <0.001 | 0.739 | <0.001 | 0.584 | <0.001 | 0.584 | <0.001 |

Note: comparison with before intervention, [a]$P < 0.05$.

TABLE 4: Comparison of self-efficacy between the two groups before and after intervention ($\bar{x}\pm s$, score).

| Group | Before intervention | After intervention |
| --- | --- | --- |
| Study group (n = 55) | 21.59 ± 6.43 | 35.14 ± 3.75[a] |
| Control group (n = 55) | 22.25 ± 6.17 | 30.39 ± 3.87[a] |
| t | 0.549 | 6.537 |
| P | 0.584 | <0.001 |

Note: comparison with before intervention, [a]$P < 0.05$.

### 3.5. Comparison of Hope Levels between the Two Groups before and after Intervention.

There was no significant difference in the desired level between the two groups before intervention ($P > 0.05$). After intervention, the hope levels of the two groups were higher than those before intervention, and the hope levels in the research group were higher than those in the control group ($P < 0.05$, Table 5).

### 3.6. Comparison of Nursing Satisfaction between the Two Groups.

The nursing satisfaction degree in the research group was higher than that in the control group ($P < 0.05$, Table 6).

## 4. Discussion

CHB is a public health problem of global concern. Clinical data show that there are individual differences in the prognosis of CHB patients, and some studies have pointed out that such a variety of clinical manifestations are the result of the combined effects of environmental factors, genetic factors, viral factors, and individual factors [11]. Individual factors were mainly related to disease cognition, including unscientific eating habits, drinking alcohol, poor lifestyle such as long-term lack of sleep, and not taking drugs according to the doctor's advice. And these factors can induce a variety of psychological stress reactions, leading to a decrease in patients' hope level and negative treatment of the disease and treatment [12]. Therefore, in the long-term treatment of CHB, it is of great significance to promote the patients to develop self-management behavior ability, help them to correctly understand the disease, and maintain good compliance with the doctor's advice [13].

All the subjects in this study were in the active stage of hepatitis, so all the indexes of liver function were abnormal at admission. After the intervention, the ALT, TBIL, and DBIL of patients in the study group were lower than those before the intervention, and ALB was higher than those before the intervention ($P < 0.05$). This indicates that the health education model based on behavior change theory has a significant effect in improving the liver function of patients with CHB. The theoretical model of behavioral transformation in stages points out that the change of human behavior or the establishment of a healthy behavior is a dynamic and continuous process in stages [14]. In this study, the behavior changes of patients with CHB during clinical treatment were divided into five stages, i.e., prethinking stage, thinking stage, preparation stage, action stage, and maintenance stage. Through personalized and targeted care for patients, they can be promoted to advanced stages of transformation so that they establish a healthy lifestyle.

Previous findings found that most patients were in the prethinking stage and the thinking stage during hospitalization [15]. At this stage, some patients are not aware of their problematic behaviors, so they do not want to take action. Other patients have realized the positive benefits of behavior change, but they are still weighing the cost of behavior change. Therefore, for patients at this stage, it is necessary to strengthen the publicity of disease-related knowledge, so as to improve patients' awareness of lifestyle change and timely evaluation of patients' unhealthy lifestyle, according to the evaluation results to formulate reasonable nursing strategies [16]. For the patients in the preparation stage and the action stage, it is necessary to adjust the daily life precautions, diet, medication guidance, and emotional adjustment [17]. At the same time, the patients at this stage have not fully mastered the disease knowledge, and their compliance behavior is relatively poor. Therefore, at this stage, we should improve their sense of responsibility, strengthen their self-management ability, and make use of the liver function results with improved self-efficacy, so as to improve patients' confidence in treatment and promote patients to establish a healthy lifestyle [18]. At the initial stage after discharge, the patients' treatment environment changes, they will forget relevant knowledge, and the bad behavior may still recur [19]. Therefore, the nurses need to continue to urge and guide patients in outpatient follow-up, so as to prevent patients from returning to the previous stage of behavior. In the later stage, the patients have learned the importance of controlling and maintaining

TABLE 5: Comparison of hope levels between the two groups before and after intervention ($\bar{x}\pm$s, score).

| Group | T Before intervention | T After intervention | I Before intervention | I After intervention | P Before intervention | P After intervention |
|---|---|---|---|---|---|---|
| Study group (n = 55) | 8.43 ± 2.13 | 13.79 ± 1.74[a] | 8.51 ± 1.96 | 13.28 ± 2.17[a] | 8.47 ± 2.18 | 13.59 ± 1.66[a] |
| Control group (n = 55) | 8.51 ± 2.14 | 10.44 ± 1.87[a] | 8.66 ± 1.78 | 11.49 ± 1.94[a] | 8.55 ± 2.14 | 10.38 ± 1.74[a] |
| t | 0.197 | 9.726 | 0.420 | 4.555 | 0.194 | 9.899 |
| P | 0.845 | <0.001 | 0.675 | <0.001 | 0.846 | <0.001 |

Note: comparison with before intervention, [a]P<0.05.

TABLE 6: Comparison of nursing satisfaction between the two groups [$n$ (%)].

| Group | Satisfactory | Basic satisfactory | General satisfaction | Unsatisfactory | Nursing satisfaction |
|---|---|---|---|---|---|
| Study group ($n$ = 55) | 26 (45.45) | 20 (36.36) | 7 (12.73) | 2 (3.64) | 83.64 |
| Control group ($n$ = 55) | 21 (38.18) | 16 (29.09) | 14 (25.45) | 4 (7.27) | 67.27 |
| $\chi^2$ | | | 3.976 | | |
| P | | | 0.046 | | |

liver function, and a good lifestyle has become a habit, but there is still the possibility of insufficient self-efficacy and difficulty in resisting external temptation [20]. At this time, giving support and strengthening management can better help patients to maintain healthy behaviors [21]. The results showed that with the improvement of cognitive level, the self-management cognition, self-management behavior, self-management environment, and self-efficacy of patients in the study group were significantly higher than those in the control group. This further indicates that health education based on the integration theory of health behavior change is helpful to improve the self-management ability of CHB patients. In addition, this may also be the main reason for the improvement of patient satisfaction in the study group.

In summary, the addition of health education model based on the theory of behavior change in the care of patients with CHB contributes to the improvement of liver function, improves patients' compliance behavior, promotes the development of self-management behavior ability, and improves patient satisfaction, which is worthy of promotion.

## Data Availability

The primary data to support the results of this study are available at reasonable request to the Corresponding Author.

## Ethical Approval

This study was approved by the Ethics Committee of our hospital.

## Conflicts of Interest

The authors declare no conflict of interest, financial or otherwise.

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