

Review Article

The effects of extended nursing combined with health education on cirrhosis patients' medication compliance, self-efficacy, and quality of life

Yangmei Huang^{1,2}, Xia Deng³

¹Department of Hepatobiliary Surgery, Chongqing University Central Hospital, Chongqing, China; ²Department of Hepatobiliary Surgery, Chongqing Emergency Medical Center, Chongqing, China; ³General Practice Department of Chongqing General Hospital, University of Chinese Academy of Sciences, Chongqing 401121, China

Received May 24, 2020; Accepted July 21, 2020; Epub October 15, 2020; Published October 30, 2020

Abstract: To explore the effects of extended nursing (EN) combined with health education (HE) on the medication compliance (MC), mental health, and quality of life (QOL) of patients with cirrhosis, in this study, 112 patients diagnosed with cirrhosis who were admitted to our hospital from January 2017 to December 2018 were included. They were randomly divided into two groups of 56. One group received routine nursing (RN) and regular HE and was classified as the routine group (RG). The other group received EN and regular HE and was classified as the extended group (EG). Seven months later, a self-made MC questionnaire was used to evaluate the MC of the two groups of patients. The self-rating anxiety scale (SAS) and the self-rating depression scale (SDS) were used to evaluate the degrees of depression and anxiety of the patients in the two groups, so as to evaluate the influence of the different nursing methods on the patients' moods. Sf-36 (a QOL questionnaire) was used to assess the differences in the QOL. The results showed that the MC of the EG was much higher than the MC of the RG ($P < 0.05$). The SAS and SDS scores showed that the anxiety and depression levels in the two groups were greatly improved compared with their levels 7 months earlier, and the anxiety and depression levels in the EG were much lower than they were in the RG ($P < 0.05$). The sf-36 scores indicated that the QOL of the patients in the two groups was improved compared with the levels 7 months earlier, and the QOL of the EG was much higher than it was in the RG ($P < 0.05$). The data indicate that EN combined with HE can greatly improve the MC, self-efficacy, and QOL of cirrhosis patients. This finding provides evidence-based guidance for clinical cirrhosis nursing and ideological guidance for other disease-related nursing.

Keywords: EN, HE, MC, self-efficacy, QOL

Introduction

Cirrhosis is a kind of chronic, progressive, and diffuse liver lesion with multiple causes which is manifested as a diffuse proliferation of fibrous tissue in addition to extensive necrosis of stem cells. The formation of stem cell regeneration nodules and pseudo lobules leads to the destruction of normal hepatic lobules [1, 2]. Viral hepatitis is the most common cause of liver cirrhosis in China, chiefly hepatitis B, C, B and C, or D virus overlapping infections which can accelerate the development of liver cirrhosis. The most common cause of cirrhosis in Europe and America is chronic alcoholism. Long-term alcoholism (the intake of 80 g of alcohol per day for more than 10 years) can

cause alcoholic hepatitis, which then develops into cirrhosis [3, 4]. Clinically, the course of cirrhosis can be divided into the compensatory period and the decompensated period. The symptoms in the compensatory period are relatively mild and nonspecific, and the patients may experience fatigue, abdominal distension, diarrhea, and normal or mildly abnormal liver function. The decompensated stage is mainly manifested by decreased liver function and portal hypertension, and the patients may suffer from liver disease, dry skin, vomiting, jaundice, anemia, and other symptoms [5, 6]. The incidence of cirrhosis in China is on the rise, and it seriously affects patients' QOL and has become the most serious public health problem in China [7, 8].

Cirrhosis is a chronic disease which is more and more difficult to cure with the passage of time, and the prognosis of patients is poor [9]. It can't be treated radically by the conventional treatment currently, and liver transplantation is the only radical treatment for end-stage cirrhosis. However, due to limited liver resources, high matching accuracy requirements, and high clinical costs, liver transplantation can't be used as a routine treatment for cirrhosis [10]. However, due to the long course of cirrhosis, limited treatment methods, and numerous complications, it has seriously affected the patients' mood and causes huge psychological pressure [11]. Therefore, the corresponding solutions to improve the status quo of patients with cirrhosis are sought all over the world. Some studies have shown that nursing can improve patients' negative emotions and reduce their psychological pressure to a certain extent. At the same time, some scholars in China have published studies finding that taking certain nursing measures during the treatment of patients with cirrhosis can improve their MC [12]. At present, nursing has been used in the treatment of cirrhosis in many countries, but due to the lack of specific nursing measures, relevant studies and literature reports, nursing staff can only take RN measures, which have little impact on patients [13]. Therefore, the QOL of patients can be improved by implementing comprehensive nursing measures.

In this study, the compliance scale, the sf-36 scale, and the SAS and SDS scales were used to compare and analyze the effects of RN combined with HE and EN combined with HE on patients' MC, mental health, and QOL to find a more effective nursing method to provide practical and reliable solutions for the clinical nursing of liver cirrhosis patients.

Materials and methods

Clinical data

The clinical data of 112 patients diagnosed with cirrhosis in our hospital from January 2017 to December 2018 were collected. The patients were randomly divided into the RG (56 cases) and the EG (56 cases). The patients in the RG received RN and HE for seven months, and the patients in the EG received EN and HE for seven months.

The inclusion criteria were as follows: patients willing to voluntarily participate in the study, patients who agree to undergo a regular standard examination in our hospital, and patients who meet the diagnostic criteria of cirrhosis [14]. The exclusion criteria were as follows: patients who have other digestive diseases, patients who have other mental or trunk diseases, patients who are pregnant or lactating, patients who have other serious systemic diseases, patients who have brain lesions, patients who are drug and alcohol abusers, and patients who have incomplete medical histories.

RN and EN

Routine care: the patients' wards should be cleaned promptly to ensure cleanliness, the humidity and temperature should be maintained as required by the patients in the ward, and the windows should be open for ventilation according to the patients' conditions during the day. The patients should be encouraged to lift their spirits. It was necessary to communicate with the patients' families promptly and to disinfect the patient ward on time. Before discharge, the patients should be given HE, asked to take their medicine on time, and are given a regular re-examination. Two weeks after discharge, it was necessary to contact the patient or the patient's family on time to inquire about the patient's condition and to urge the patient to come to the hospital for a re-examination. After discharge, the patients received no additional treatment.

EN: during their hospital stays, in addition to the conventional care, the patients received intervention and guidance in psychology, diet, sleep, medication, and other things. It was necessary to communicate with the patients and their families regularly to correct their mistakes and misunderstandings. It was necessary to guide the patients to develop correct eating and sleeping habits, to urge the patients to take their medicine on time, and to explain the possible drug side effects to the patients. Comfort and encouragement were given to the patients who suffer side effects and to eliminate the patients' psychological hidden troubles. It was necessary to understand their family situations and to develop each patient's condition, and the patients who experienced anxi-

ety and depression were promptly helped to reduce their psychological burdens. When necessary, the patient was referred to a psychologist for relief. It was necessary to ask the patient if there is any other discomfort and to ask the patient to exercise more and follow a reasonable diet. For patients discharged from the hospital, a special nursing team was set up, and a weekly telephone follow-up was conducted to inquire about each patient's condition, to instruct the patient to take their medicine on time, to understand the patients' current psychological status, and to give some corresponding guidance. It was necessary to give some guidance on diet and sleep at home and to urge the patients to schedule a follow up exam on time and to contact the hospital if there were any adverse medical issues.

For the two groups of patients in the hospital, HE was carried out once every 7 days. The main content included an explanation of the disease of liver cirrhosis, the patient's self-psychological adjustment, diet and sleep conditioning, matters needing attention, the prevention of infections, reasonable exercise, rest, and family nursing measures. After their discharge, HE books were issued to the patients, and the patients were encouraged to review the books regularly during the telephone follow-up.

Compliance evaluation form

Compliance refers to each patient's treatment and care as prescribed by the doctor. It can reflect the patient's condition and psychological activity, whether the patient was willing to actively cooperate with the treatment. Seven months later, the compliance of the two groups of patients was evaluated with the self-made compliance evaluation table of our hospital. Its content mainly includes the sleep and diet adjustments, taking medicine on time, reasonable exercise, and quitting bad habits. The total possible score of the test was 100, among which <50 meant non-compliance, >70 meant complete compliance, and 50-70 meant partial compliance. The complete compliance and partial compliance rates were consolidated as the total compliance rate to explore the influences of the different nursing methods on the patients' total compliance rates.

Anxiety and depression scale

The SAS is a standard anxiety assessment, and it was used to measure the severity of the anxiety

state and its changes during the treatment, so it was used to evaluate the patients' conditions. It was considered normal, mild, moderate, or severe when the scores were lower than 50, 50-60, 61-70, and higher than 70, respectively. With its simple operation, the SDS can clearly and intuitively reflect the patients' subjective feelings and their status in the treatment process. According to the Chinese standard, it was normal when the score <53, and it was considered mild depression, moderate depression, and severe depression when the score was 53-62, 63-72, and >73, respectively. The SAS and SDS scores were used to assess the emotional statuses of the patients before and after the nursing. The effects of the different nursing methods on the patients' emotions were compared and analyzed.

QOL questionnaire

The QOL questionnaire (sf-36) can accurately assess the QOL of patients. After grouping the patients, the QOL questionnaire was used to evaluate the QOL of the patients in the two groups. QOL was assessed again after seven months in both groups. The contents of the sf-36 questionnaire included physiological function, social function, mental state, and energy. The data were compared and analyzed to evaluate the impact of the different nursing methods on the patients' QOL.

Statistical analysis

SPSS 19.0 software was used for the statistical analysis. The obtained measurement data were expressed as $\bar{x} + SD$, and T-tests were used to compare the groups. The obtained enumeration data were expressed as a percentage (%), and the comparisons between groups were done using χ^2 tests. When $P < 0.05$, it was considered that there was a significant difference between the compared groups.

Results

Basic patient information

The basic clinical data of the two groups of patients are given in **Table 1**. The differences in gender, age, course of the disease, and type of cirrhosis for the patients in the two groups were not statistically significant ($P > 0.005$).

Table 1. Basic patient clinical information

	RG (n=56)	EG (n=56)	t/ χ^2	P
Male patients (cases)	33	38	2.332	0.065
Female patients (cases)	23	18	1.876	0.123
Age (years)	45 ± 4.34	44 ± 4.89	0.254	0.342
The course of disease (years)	7.12 ± 1.56	6.87 ± 2.23	1.865	0.076
Viral cirrhosis (cases)	23	22	2.341	0.098
Alcoholic cirrhosis (cases)	12	14	1.762	0.351
Toxic liver cirrhosis (cases)	8	9	0.654	0.102
Biliary cirrhosis (cases)	6	5	2.976	0.745
Other types (cases)	7	6	3.546	0.876

Table 2. Comparison of the treatment compliance of patients in the two groups after the treatment [n (%)]

	RG (n=56)	EG (n=56)	χ^2	P
Full compliance (cases)	27 (48.21)	37 (66.07)	6.254	0.023
Partial compliance (cases)	10 (17.86)	12 (21.43)	2.334	0.005
Noncompliance (cases)	19 (33.92)	7 (1.25)	2.765	0.008
total compliance rate (%)	66.07	87.5	8.212	0.012

Effects of different nursing methods on the patients' MC

Seven months after their treatment, the two groups of patients were evaluated with our hospital's self-made compliance scale to explore the influences of the different nursing methods on the patients' MC. The comparison of the treatment compliance of the patients in the two groups after the treatment is shown in **Table 2**. It should be noted that the complete compliance and partial compliance of the patients receiving EN were much higher than they were in the patients receiving conventional nursing ($P<0.05$). However, the non-compliance of the RG was much higher than it was in the EG ($P<0.05$). The total compliance rate of the EG was 87.50%, and the total compliance rate of the RG was 66.07%, much lower than that of the EG ($P<0.05$).

The effect of the different nursing methods on the patients' moods

The SAS and SDS instruments were used to evaluate the patients' psychological emotions, to analyze the changes in the patients' emotions before and after the nursing, and to compare and analyze the influence of the different nursing methods on the patients' emotions. A comparison of patients' emotional changes

before and after the nursing in the RG is shown in **Figure 1A**, and a comparison of the patients' emotional changes before and after the nursing in the EG is shown in **Figure 1B**. According to **Figure 1A**, the SAS score in the RG was 66.02 ± 8.39, and the SDS score was 63.21 ± 8.21 before the nursing. The SAS and SDS scores in the RG after the nursing were 39.34 ± 8.39 and 44.23 ± 6.25, respectively. The patients' degrees of anxiety and depression greatly improved after the RN ($P<0.05$). According to **Figure 1B**, the SAS score in the EG was 65.12 ± 8.11, and the SDS score was 64.21 ± 7.16 before the nursing. The SAS and SDS scores in the EG after the nursing were 50.23 ± 7.37

and 51.4 ± 7.62, respectively. After the EN, the patients' moods were greatly improved ($P<0.05$).

The influence of different nursing methods on the patients' QOL

The QOL questionnaire was used to evaluate the patients' QOL. The improvement in the patients' QOL before and after the nursing was compared and analyzed, and the impact of the nursing on the QOL of the patients was evaluated. A comparison of the patients' QOL before and after the nursing in the RG is shown in **Figure 2A**, and a comparison of the patients' QOL before and after the nursing in the EG is shown in **Figure 2B**.

According to **Figure 2A**, it should be noted that the physiological function, social function, mental state, and energy scores before the nursing in the RG were 45.43 ± 5.20, 46.85 ± 6.35, 47.04 ± 6.08, and 45.34 ± 7.13, respectively, and after the nursing the scores were 62.78 ± 7.12, 65.16 ± 7.12, 64.96 ± 7.13, and 63.80 ± 8.14, respectively. The patients' physiological function, social function, mental state, and energy scores were greatly improved after the RN ($P<0.05$). As shown in **Figure 2B**, it should be noted that the physiological function, social function, mental state, and energy scores

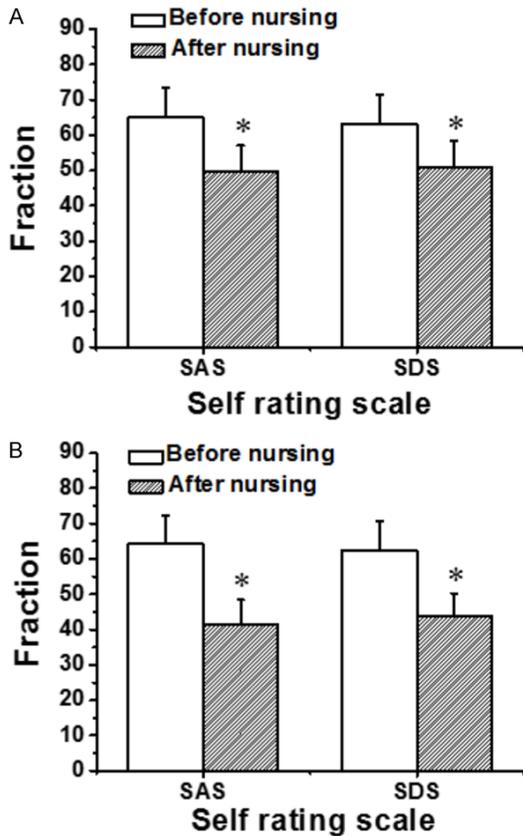


Figure 1. Comparison of the anxiety and depression levels before and after the nursing care in the two groups. Note: * in the figure indicates that there were SSD between before and after nursing, $P < 0.05$. (A) shows a comparison of the anxiety and depression before and after the nursing care in the RG; and (B) shows a comparison of the anxiety and depression before and after nursing care in the EG.

before the nursing in the EG were 46.97 ± 4.98 , 47.12 ± 5.72 , 47.51 ± 5.78 , and 46.20 ± 7.28 , respectively, and after the nursing the scores were 69.54 ± 8.90 , 73.45 ± 5.78 , 72.18 ± 7.56 , and 71.82 ± 8.34 , respectively. The patients' physiological function, social function, mental state, and energy scores were greatly increased before the EN.

Discussion

Liver cirrhosis has no significant symptoms in the early stages, so patients may be unaware of it, and the symptoms develop in the middle or late stages when it is then confirmed. In addition, liver cirrhosis has a longer course of disease, a higher treatment difficulty, and higher incidence of complications. Patients often lose confidence in the treatment, so the treatment

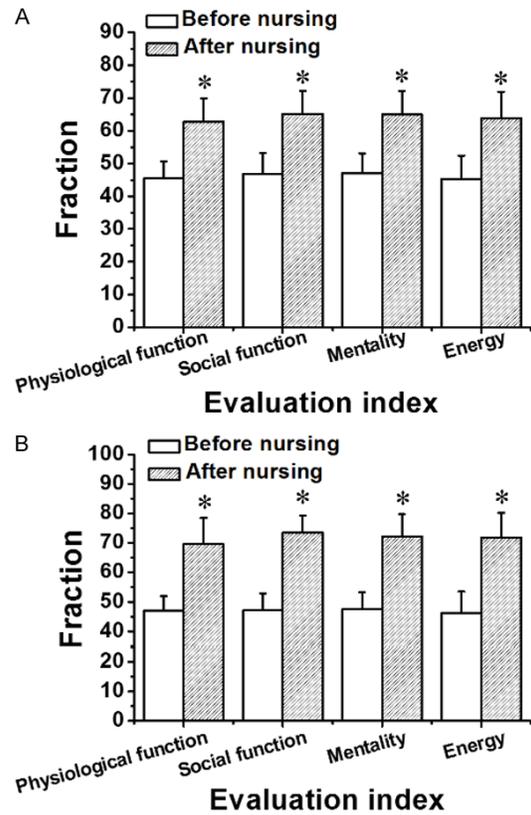


Figure 2. Comparison of the QOL before and after the nursing care in the two groups. Note: * in the figure indicates SSD after the comparison with before the nursing, $P < 0.05$. (A) shows the comparison of the QOL index before and after the nursing care in the RG; and (B) shows a comparison of the QOL index before and after the nursing care in the EG.

compliance is decreased. A significant decrease in MC and QOL can greatly affect the patients' therapy [15, 16]. Therefore, it is necessary to seek other ways to improve the psychological states of the patients and to improve their QOL.

Nursing can bring psychological sympathy to patients to some extent and improve their QOL [17]. However, traditional nursing methods are not comprehensive enough and have little impact on patients in various aspects. After discharge, EN continues to provide high-quality nursing services in psychological counseling, lifestyle, and other aspects, pays multi-dimensional attention to each patient's condition, enhances the patient's enthusiasm for treatment, and fundamentally improves the patient's MC [18]. Through HE, patients with cirrhosis have a deeper understanding of their disease pathogenesis and treatment methods, which

enhance their confidence in the disease treatment, and help the patients to actively cooperate with treatment [19]. It was found in this study that after 7 months, the MC of the EG was much higher than it was in the RG ($P < 0.05$), indicating that EN combined with HE can effectively improve patients' MC, which is consistent with the research results of Kim et al. (2016) [20].

After the patient was discharged from the hospital, the EN can provide timely guidance to each patient's psychological problems and low self-care ability through telephone follow-up, which can help the patients to adjust their mentality, reduce negative emotions, and improve self-efficacy. Comparing the anxiety and depression indexes before and after the nursing, we note that they were much lower than before the nursing care in the RG group ($P < 0.05$), and the anxiety and depression indexes in the EG were much lower than they were in the RG ($P < 0.05$), suggesting that the improvement effect of EN on the patients' anxiety and depression levels is better than that of RN. Xueqin et al. (2016) found that the follow-up compliance and sf-36 QOL scores were greatly improved in the EN group after the hospitalization ($P < 0.05$). The SAS and SDS scores in the EN group were much lower than they were in the conventional care group [21], which is almost consistent with the research results in this study.

Studies have shown that the EN model can delay the progress of the disease and effectively improve patients' QOL [22]. It was found in this study that the physiological functions, social functions, mental states, and energy of the patients in both groups were much higher than they were before the nursing ($P < 0.05$), and the QOL of the EG was much higher than it was in the RG ($P < 0.05$), which is similar to the research results of Khodaveisi et al. (2017) that the QOL at 1 or 2 month(s) after the intervention in the EN group was greatly higher than it was in the RN group by comparing the RN and EN for patients with multiple sclerosis ($P < 0.05$) [23].

In conclusion, EN combined with HE has a better improvement effect on the treatment compliance, self-efficacy, and quality of life of patients with liver cirrhosis than the RN combined with HE. This provides an experimental basis for the nursing of patients with clinical cir-

rhosis and provides guidance for the nursing of other diseases. However, the number of cases in this experiment was limited, and the grouping was relatively single. There was no clear proof of the influence of HE on the patients' MC, self-efficacy, or QOL. For patients in the discharge RG, the HE was limited, so it needs to be improved and further studied. At the same time, it is necessary to continue to explore and seek more effective nursing means, so that patients with cirrhosis can lead healthier lives.

Disclosure of conflict of interest

None.

Address correspondence to: Xia Deng, General Practice Department of Chongqing General Hospital, University of Chinese Academy of Sciences, No. 118 Xingguang Dadao, Liangjiang New Area, Chongqing 401121, China. Tel: +86-138-8322-1572; E-mail: xiadexiazhi9@126.com

References

- [1] Xu S, Zhang Z, Wang A, Zhu J, Tang H and Zhu X. Effect of self-efficacy intervention on quality of life of patients with intestinal stoma. *Gastroenterol Nurs* 2018; 41: 341-346.
- [2] Bajaj JS, Liu EJ, Kheradman R, Fagan A, Heuman DM, White M, Gavis EA, Hylemon P, Sikaroodi M and Gillevet PM. Fungal dysbiosis in cirrhosis. *Gut* 2018; 67: 1146-1154.
- [3] Lu J, Zeng X, Liao J, Zhang Y, Yang L, Li Y and Lv J. Effectiveness of an intervention to promote self-efficacy on quality of life of patients with nasopharyngeal carcinoma of the Zhuang tribe minority in Guangxi, China: a prospective study. *Med Sci Monit* 2017; 23: 4077-4086.
- [4] O'Sullivan ML, Shelby RA, Dorfman CS, Kelleher SA, Fisher HM, Rowe Nichols KA, Keefe FJ, Sung AD and Somers TJ. The effect of pre-transplant pain and chronic disease self-efficacy on quality of life domains in the year following hematopoietic stem cell transplantation. *Support Care Cancer* 2018; 26: 1243-1252.
- [5] Weersink RA, Burger DM, Hayward KL, Taxis K, Drenth JPH and Borgsteede SD. Safe use of medication in patients with cirrhosis: pharmacokinetic and pharmacodynamic considerations. *Expert Opin Drug Metab Toxicol* 2020; 16: 45-57.
- [6] Deng H, Qi X and Guo X. Computed tomography for the diagnosis of varices in liver cirrhosis: a systematic review and meta-analysis of observational studies. *Postgrad Med* 2017; 129: 318-328.

Extended nursing and health education in cirrhosis patients

- [7] Hewett ZL, Pumpa KL, Smith CA, Fahey PP and Cheema BS. Effect of a 16-week bikram yoga program on perceived stress, self-efficacy and health-related quality of life in stressed and sedentary adults: a randomised controlled trial. *J Sci Med Sport* 2018; 21: 352-357.
- [8] Jönsson T, Hansson EE, Thorstensson CA, Eek F, Bergman P and Dahlberg LE. The effect of education and supervised exercise on physical activity, pain, quality of life and self-efficacy-an intervention study with a reference group. *BMC Musculoskelet Disord* 2018; 19:198.
- [9] Johansson AC, Brink E, Cliffordson C and Axelsson M. The function of fatigue and illness perceptions as mediators between self-efficacy and health-related quality of life during the first year after surgery in persons treated for colorectal cancer. *J Clin Nurs* 2018; 27: e1537-e1548.
- [10] Shahsavari H, Ghiyasvandian S, Houser ML, Zakerimoghdam M, Kermanshahi SSN and Torabi S. Effect of a clinical skills refresher course on the clinical performance, anxiety and self-efficacy of the final year undergraduate nursing students. *Nurse Educ Pract* 2017; 27: 151-156.
- [11] Giesler JM, Keller B, Repke T, Leonhart R, Weis J, Muckelbauer R, Rieckmann N, Müller-Nordhorn J, Lucius-Hoene G and Holmberg C. Effect of a website that presents patients' experiences on self-efficacy and patient competence of colorectal cancer patients: web-based randomized controlled trial. *J Med Internet Res* 2017; 19: e334.
- [12] Lien YJ, Chang HA, Kao YC, Tzeng NS, Lu CW and Loh CH. The impact of cognitive insight, self-stigma, and medication compliance on the quality of life in patients with schizophrenia. *Eur Arch Psychiatry Clin Neurosci* 2018; 268: 27-38.
- [13] Hu ZD, Zhang KP, Ying H and Shu Z. Compliance to self-monitoring of blood glucose among patients with type 2 diabetes mellitus and its influential factors: a real-world cross-sectional study based on the tencent tdf-i blood glucose monitoring platform. *Mhealth* 2017; 3: 25.
- [14] Simon K, Orłowska I and Pazgan-Simon M. The risk of complications of endoscopic procedures in patients with liver cirrhosis. *Clin Exp Hepatol* 2017; 3: 135-140.
- [15] Kamimura K, Sakamaki A, Kamimura H, Setsu T, Yokoo T, Takamura M and Terai S. Considerations of elderly factors to manage the complication of liver cirrhosis in elderly patients. *World J Gastroenterol* 2019; 25: 1817-1827.
- [16] Jang ES, Kim YS, Kim KA, Lee YJ, Chung WJ, Kim IH, Lee BS and Jeong SH. Factors associated with health-related quality of life in Korean patients with chronic Hepatitis C infection using the SF-36 and EQ-5D. *Gut Liver* 2018; 12: 440-448.
- [17] Yu Y, Hu L, Chen X, Ge M, Zhu H and Yan Y. The impact of the predictive nursing education process on degree of comfort and quality of life for patients in the oncology department. *Iran J Public Health* 2017; 46: 1231-1236.
- [18] Wang C, Song Z, Li S and Tai S. Extended nursing for the recovery of urinary functions and quality of life after robot-assisted laparoscopic radical prostatectomy: a randomized controlled trial. *Support Care Cancer* 2018; 26: 1553-1560.
- [19] Chang SF, Hung CH, Hsu YY, Liu Y and Wang TN. The effectiveness of health education on maternal anxiety, circumcision knowledge, and nursing hours: a quasi-experimental study. *J Nurs Res* 2017; 25: 296-303.
- [20] Kim HJ, Moon K, Park TH, Park SY, Yoon SJ and Oh IH. Factors affecting TC in new hypertensive patients in Korea. *Clin Exp Hypertens* 2016; 38: 701-709.
- [21] Xueqin Li, Zhang Y, Gao H, Sun X, Lv W and Xu G. The value of extended nursing services on patients with bladder cancer after endoscopic bladder resection. *Iran J Public Health* 2016; 45: 48-53.
- [22] Miu DK, Chan CW and Kok C. Delirium among elderly patients admitted to a post-acute care facility and 3-month outcome. *Geriatr Gerontol Int* 2016; 16: 586-592.
- [23] Khodaveisi M, Ashtarani F, Beikmoradi A, Mohammadi N, Mahjub H, Mazdeh M and Ashtarani E. The effect of continuous care on the lifestyle of patients with multiple sclerosis: a randomized clinical trial. *Iran J Nurs Midwifery Res* 2017; 22: 225-231.