

# Research on the Intervention of Internet+ Health Education Model on Hemodialysis Patients with Psychological Distress

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**Abstract:** *Objective:* To observe the status quo of patients' psychological distress, and to explore the effect of Internet+ health education model (IHEM) on patients who experienced psychological distress during their first hemodialysis treatment, with the goal of reducing their psychological distress and improving their quality of life. *Methods:* IHEM was conducted on 120 first-time hemodialysis patients for 3 months while a distress thermometer and a list of questionnaires were used to screen patients and provide corresponding psychological intervention. The incidence rate of psychological distress was analyzed statistically to explore the difference in psychological distress at various periods. *Results:* The incidence rate (score  $\geq 4$ ) of psychological distress in first-time hemodialysis patients was 46.67%, and their distress was mainly rooted in physical, emotional, practical problems (economy, time, and energy), etc. Through IHEM, the psychological distress scores of the patients decreased to  $3.29 \pm 1.02$  at one month after their discharge, and the incidence rate was 32.14%; the psychological distress scores of the patients were  $2.29 \pm 1.02$  at 3 months after their discharge, and the incidence rate was 21.14%. The difference before and after the intervention was statistically significant ( $P < 0.05$ ). *Conclusion:* A psychological distress thermometer can timely detect the degree and causes of psychological distress among first-time hemodialysis patients, and the use of IHEM may significantly alleviate the psychological distress among hemodialysis patients.

**Keywords:** Internet+ health education model; Psychological distress thermometer; Hemodialysis

*Online publication:* July 27, 2023

## 1. Introduction

End-stage renal disease (ESRD) refers to the end stage of a chronic kidney disease, when the kidney function gradually declines. At this stage, ESRD patients can only maintain their normal lives through alternative treatments like kidney transplantation, hemodialysis, or peritoneal dialysis. In recent years, with the increase of ESRD patients in China, more and more patients have to undergo hemodialysis to maintain their normal lives. Hemodialysis is time-consuming and expensive, causing great distress to patients physically and psychologically. Psychological distress refers to the unpleasant emotional experience caused by various reasons, including psychological, emotional, and social problems, which might trigger certain emotions: sadness, fear, etc., or even social isolation in severe cases <sup>[1]</sup>. Psychological distress is a continuum that requires early detection and appropriate treatment when patients are receiving a medical treatment. ESRD patients have to face serious economic problems brought about by the disease and suffer from various problems due to volatile changes in their physical conditions. This disease puts both the patient

and the patient's family under tremendous psychological distress<sup>[2,3]</sup>. Hemodialysis patients are often prone to negative emotions such as anxiety and distress. Studies have shown that the incidence of distress in hemodialysis patients is as high as 20% to 71%<sup>[4]</sup>. One unique advantage of the Internet is that patients are not limited by time, distance, and living habits. With the Internet as a carrier, comprehensive health education information can be provided to patients to alleviate their distress caused by a lack of related knowledge and additional treatment. Therefore, the effect of IHEM on hemodialysis patients who suffer from psychological distress is studied in this paper, and suggestions are provided for clinical nursing work.

## **2. Materials and methods**

### **2.1. Common materials**

A total of 120 patients diagnosed with ESRD who received hemodialysis for the first time in Affiliated Hospital of Hebei University from January to July 2021 were selected for this study. The patients consisted of 85 males and 35 females, aged 32–70 years old, with an average of  $45.7 \pm 7.5$  years old.

### **2.2. Inclusion and exclusion criteria**

#### **2.2.1. Inclusion criteria**

(i) Patients diagnosed ESRD, (ii) first-time hemodialysis patients receiving over 3-month treatment, (iii) clear-minded and literate patients without any language barriers, (iv) have access to the Internet and able to use smart phones to give feedback, (v) agreed to participate in this research, (vi) did not participate in other clinical trials within 3 months.

#### **2.2.2. Exclusion criteria**

(i) Patients with acute kidney injury; (ii) patients with language barriers, (iii) patients with severe cardiovascular and cerebrovascular diseases or cognitive impairment, (iv) patients who have had major changes in their physical conditions in recent 3 months; (v) non-internet users, (vi) those who do not use smart phones; (vii) those who and whose family members were reluctant to participate in this research.

## **2.3. Methods**

### **2.3.1. Establishment of IHEM Team**

The IHEM team was mainly composed of doctors and nurses of the relevant departments, specifically 2–3 full-time hemodialysis physicians, 3–4 hemodialysis nurses, 1 psychological counselor, and 1 head nurse. Hemodialysis physicians were mainly responsible for formulating and adjusting the patients' hemodialysis plans, monitoring their biochemical indicators, and adjusting prescriptions. Hemodialysis nurses were in charge of following up patients after their discharge, and providing professional guidance on medication, diet, and exercise programs. When a patient was found to be psychologically distressed during the follow-up session, the counselor who was responsible for the patient was informed. The patient's psychological state would then be evaluated, and they would be given positive guidance to eliminate negative emotions at an early stage. The head nurse coordinated and managed the IHEM team, assisted in the tripartite communication among doctors, nurses and patients, and ensured the smooth operation of IHEM.

### **2.3.2. Establishment of patients' records**

In the process of treating hemodialysis patients, the IHEM team established records based on the relevant information of inpatients, which included general information (demographic information, medical and family support systems, etc.), relevant indicators during hospitalization, health publicity and education plans, etc.

### 2.3.3. Investigation of psychological distress in patients by DMSM

On the second day after the patients were admitted to the hospital for hemodialysis, the Distress Management Screening Measure (DMSM) was used to evaluate the degree of psychological distress and related factors of the patients who underwent hemodialysis for the first time, and their psychological distress scores were calculated. DMSM consists of a psychological distress thermometer (DT) and a problem list (PL). (i) DT consists of 10 points, ranging from 0 point (no distress) to 10 points (extreme distress). DT was adopted to detect patients' distress level they have experienced in the past week, and the scores were used to determine the degree of distress: mild distress, 1–3 points; moderate distress, 4–6 points; severe distress, 7–9 points; extreme distress, 10 scores. (ii) PL contains 39 factors related to psychological distress, including 5 aspects: family, physical, emotional, practical problems, as well as spiritual, religious and belief [5-7]. Questionnaires on factors related to psychological distress were then distributed to the patients, and the patients were guided on how to answer them.  $DT \geq 4$  means that patients have experienced psychological distress, which has clinical significance, so hemodialysis patients with a  $DT \geq 4$  were defined as positive cases. In this study, there were 56 positive cases, which is a 46.67% positive rate in the initial evaluation of patients who took hemodialysis for the first time. According to the description of first-time hemodialysis patients, there were three factors that affected the degree of psychological distress: physical, emotional, and practical problems (economy, time, and energy). Based on the patients' response to the PL, the IHEM team identified specific problems that may cause psychological distress and provided corresponding clinical intervention and treatment [8]. **Table 1** shows the results of the initial psychological distress survey of first-time hemodialysis patients.

**Table 1.** Incidence rate list of psychological distress and problems

Variables	Patients with psychological Distress (56 cases)		
	Negative	Positive	Positive rate
Practical problems	35	21	37.5%
Family problems	42	14	25%
Emotional problems	21	35	62.5%
Physical problems	10	46	82.1%
Belief/religion problems	53	3	5.4%

### 2.3.4. Formulation of health education plan

By referring to the latest literature, the IHEM team members discussed and formulated the content health education plans based on the results of the survey on the patients' psychological distress. There were 10 aspects to the plan (basic knowledge of hemodialysis, nursing and intervention methods of various symptoms in hemodialysis, diet for hemodialysis patients, meanings of various hemodialysis inspection indicators, self-care of arteriovenous fistula, maintenance of hemodialysis pipelines, guidance on medication during hemodialysis, prevention of complications during hemodialysis, psychological adjustment of hemodialysis patients, exercise guidance for hemodialysis patients).

### 2.3.5. Implementation of IHEM

Targeted health information was given to the patients based on their results DT and PL results. Specifically speaking, during the 3 months when IHEM was implemented, the patients were guided to subscribe to and follow the hospital's WeChat official account on their mobile phones during their hospitalization, and join the WeChat group of IHEM. One or two posts on health were uploaded onto the Internet platform, and every Sunday, online guidance was given by full-time hemodialysis physicians and nurses. Elderly patients

can leave a voice message on the platform. At the same time, the online guidance of hemodialysis physicians and nurses focused on patients' psychological state and family-related problems. During the follow-up communication, if the patients encountered psychological adjustment problems, the psychological counselor would offer online guidance. Combining the weekly categorization of messages on the platform, patients' medical records and physical conditions, IHEM members responded to patients' questions and supplied targeted one-on-one guidance.

### **2.3.6. Evaluation of the effect of IHEM**

On the first and third month after hemodialysis patients were discharged from the hospital, psychological distress questionnaires on psychological DMSM were distributed to the patients again, and their DT scores were evaluated.

## **3. Results**

A *t*-test was performed using SPSS 25.0. The initial psychological distress scores of hemodialysis patients after hospitalization were  $4.19 \pm 1.72$ . On account of the fact that a rating  $\geq 4$  points indicate that patients are diagnosed psychological distress, the results show that the positive incidence rate was 46.67%. After 3 months of IHEM nursing intervention, the psychological distress scores of hemodialysis patients obtained one month after their discharge decreased to  $3.29 \pm 1.02$ , with 32.14% positive incidence rate. The psychological distress scores of hemodialysis patients obtained 3 months after their discharge were  $2.29 \pm 1.02$ , and the positive rate was 21.14%. The results of IHEM indicate that there was a statistically significant difference in the psychological distress scores of 120 hemodialysis patients before and after the intervention ( $P < 0.05$ ), which means that the use of IHEM can significantly alleviate the psychological distress of hemodialysis patients.

## **4. Discussion**

Nursing time during hemodialysis treatment is an important factor affecting the mortality of hemodialysis patients, and sufficient nursing time can reduce the mortality of hemodialysis patients<sup>[9]</sup>. However, due to a severe shortage of nurses, which may lead to less attention to hemodialysis patients and inadequate follow-up of patients after they are discharged, their psychological distress may amount to a relatively high level. In this survey, the incidence rate of psychological distress was 46.67% (scores  $\geq 4$ ) among first-time hemodialysis patients, which is much higher than the 20.78% (score  $\geq 4$ ) incidence rate of psychological distress in tumor radiotherapy patients in Ge's survey<sup>[10]</sup>. The reason may be that 2021 is a special period when Covid-19 hit the whole world. The prevention and control policies and measures against the pandemic may have significantly impacted the lives of hemodialysis patients in the process of their hospitalization and treatment, ultimately aggravating their psychological distress.

## **5. Conclusion**

IHEM can reduce the work pressure of medical staff while ensuring that hemodialysis patients receive continuous education from medical staff even under special circumstances such as a pandemic. With the help of online care from medical staff, the patients' problems can be solved in time even when they are at home, and complications can be detected and prevented earlier. All of these are of great help for patients to improve their quality of life, relieve their economic pressure, and alleviate their psychological distress. However, further research is still needed for issues like designing a better publicity and education platform that is conducive for hemodialysis patients to obtain relevant knowledge and increasing the utilization rate among hemodialysis patients, and the implementation rate of measures. Medical staff and information collectors are recommended to invest more time and energy in this field and develop more appropriate

platforms.

### **Funding**

This work was supported by Baoding Science and Technology Plan Project (Grant number: 2041ZF311)

### **Disclosure statement**

The authors declare no conflict of interest.

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