

# The Effect of Nutrition Education on Nutrition Treatment of Chronic Kidney Disease

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**ABSTRACT** Chronic kidney disease (CKD) is a common chronic disease in the clinic. Patients are often at the risk of malnutrition due to impaired renal function [1-3]. In order to reduce the risk of malnutrition, it is advocated to implement nutritional therapy for patients with chronic kidney disease, but some patients have poor compliance and irregular dietary behavior, so effective intervention means are needed. Nutritional education is a specialized nutritional intervention measure. In order to assess the application effect of nutritional education in the nutritional therapy of chronic kidney disease, a randomized control trial was conducted on 100 patients with chronic kidney disease who received nutritional therapy in our hospital from August 2020 to October 2020.

**Keywords** effect of nutrition education; nutrition treatment; chronic kidney disease

## 1 Materials and methods

### 1.1 general data of patients

100 patients with chronic kidney disease receiving nutritional therapy in our hospital were selected as the research objects, and randomly divided into 50 patients per group from August 2020 to October 2020. Control group: 32 males and 18 females, aged from 40 to 84 years old, with an average of (62.13±10.34) years old; Observation group: 33 males and 17 females, aged from 40 to 83 years old, with an average of (61.68±10.29) years old. Comparison of age and sex between groups, P>0.05. The study was approved by the Board of Medical Ethics and patients were given informed consent to the study.

### 1.2 Methods

Nutritional therapy: according to patients' quality to calculate daily intake of energy (about 30 ~ 35 kcal/kg), fat intake accounted for 25% of total calories, protein intake are different in various stages of renal injury (mild renal damage stage daily intake of 0.8 ~ 1.0 g/kg, moderate renal impairment stage 0.6 ~ 0.7 g/kg,

severe kidney damage stage 0.5 ~ 0.6 g/kg, uremia phase 0.3 ~ 0.5 g/kg).

Both groups received initial nutritional education before starting nutritional therapy, briefly explained the considerations during nutritional therapy, and distributed nutritional therapy health handbook to patients.

Nutritional education was carried out by nutritionists in the department of Nutrition in the observation group during the nutritional therapy, while nutritional education was not carried out in the control group.

The Specific contents of nutritional education, 1) The restriction of water intake. during hemodialysis treatment, patients should control the daily weight gain rate within 5% as much as possible, and patients with excessive water intake easily lead to Oedema and weight gain, so we should strictly Limit water intake, and understand the water content in food, reducing the food with high water content. For an example, when a patient is thirsty, he or she can contain a sip water or chew gum. 2) The restriction in sodium intake. The daily sodium intake of the patient is strictly controlled, and the intake is determined based on whether the patient has high blood pressure. If the patient's blood pressure is normal, the daily salt intake should be 3 to 5g. If the patient has mild to moderate hypertension, the daily salt intake should be controlled within 2g. If the patient has severe hypertension, the daily salt intake should be controlled within 1g, and the consumption of preserved food should be avoided as much as possible. 3) The restriction in Potassium Intake. We need to explain the dangers of excessive potassium intake to patients and chart the potassium content of various foods. Especially need to pay attention to mushrooms, oranges, red dates and other high potassium content of food, and avoid eating high potassium food in the daily diet. When cooking dishes, appropriate measures can be taken to remove potassium, such as slicing and soaking vegetable rhizome parts before cooking, blanching vegetables and so on. 4) The limitation in phosphorus Intake. we need to explain to patients about the danger of excessive intake of phosphorus, and make a table of phosphorus content of various foods, especially the seafood, animal offal, egg yolk and other foods rich in phosphorus, which should be forbidden to eat.

### 1.3 Observation index

The scores of dietary knowledge awareness, dietary behavior management, the indexes of calcium and phosphorus metabolism (blood calcium, blood phosphorus), nutritional status (proalbumin, transferrin, albumin, hemoglobin), life quality score, duration of nutritional therapy, and hospitalization time were compared between the two groups.

The score of Nephrotic diet knowledge awareness. patients were investigated by using self-made Nephrotic diet knowledge awareness questionnaire on admission and discharge, the total score of the volume was 100, the higher the score, the more knowledge the patients know about Nephrotic diet.

The score of diet behavior management [4]. The diet compliance behavior scale of kidney disease was used to evaluate on admission and discharge, which was divided into five areas: self-care, water restriction, low-salt diet, low-potassium diet, and facing difficulties. The highest score in each area was 100, which was positively correlated with dietary behavior compliance.

Quality of Life score [5]. The World Health Organization Quality of Life Assessment (WHOQOL-BREF) was used to evaluate the quality of life on admission and discharge. The scale was divided into 4 fields, including physiology, psychology, environment and social relations. The score of each field was 0-100, and the score was directly proportional to the quality of life.

### 1.4 The method of statistics

$\chi^2$  test was performed on the enumeration data (n), t test was performed on the measurement data ( $\bar{x} \pm s$ ) by SPSS 26.0, and  $P < 0.05$  indicates that the difference is statistically significant.

## 2 Result

### 2.1 The Comparison of knowledge on nephropathy

The scores of dietary knowledge of nephropathy on discharge were higher in the two groups than on admission, while the scores of which on discharge were higher in the observation group than in the control group,  $P < 0.05$ .

**Table 1 The awareness score on Nephropathy diet knowledge ( $\bar{x} \pm s$ , point)**

Group (n=50)	on admission	on discharge
Control group	60.56±12.27	78.39±10.78 <sup>#</sup>
observation group	60.89±12.15	87.76±9.54 <sup>#*</sup>

Note: To compare with the group on admission,  $\#P < 0.05$ ; To compare with the control group,  $*p < 0.05$ .

## 2.2 The comparison of dietary behavior management scores

The scores of dietary behavior management on discharge were higher in both groups than on admission, while those in observation group were higher than those in control group,  $p < 0.05$ .

**Table 2. The comparison of dietary behavior management scores ( $\bar{x} \pm s$ , point)**

Group (n=50)	time	self-care	water restriction	low-salt diet	low-potassium diet	facing difficulties
Control group	on admission	71.84±5.46	72.19±6.02	71.92±5.91	71.35±5.48	71.64±5.13
	on discharge	78.21±6.35 <sup>#</sup>	78.94±6.75 <sup>#</sup>	78.35±6.43 <sup>#</sup>	77.64±6.30 <sup>#</sup>	77.90±6.29 <sup>#</sup>
observation group	on admission	71.97±5.52	72.32±6.14	72.07±5.98	71.47±5.56	71.83±5.27
	on discharge	85.30±7.09 <sup>#*</sup>	86.07±6.83 <sup>#*</sup>	86.12±6.76 <sup>#*</sup>	85.09±6.45 <sup>#*</sup>	85.78±6.92 <sup>#*</sup>

Note: To compare with the group on admission,  $\#P < 0.05$ ; To compare with the control group,  $*p < 0.05$

## 2.3 The Comparison in the indexes of calcium and phosphorus metabolism.

The levels of serum calcium and phosphorus in the two groups were lower on discharge than on admission, while those in the observation group were lower than those in the control group,  $P < 0.05$ .

**Table 3. The Comparison in the indexes of calcium and phosphorus metabolism.**

Group (n=50)	Time	Serum calcium (mmol/L)	Serum phosphate (mmol/L)
Control group	on admission	2.58±0.72	2.34±0.24
	on discharge	1.76±0.39 <sup>#</sup>	2.10±0.19 <sup>#</sup>
observation group	on admission	2.53±0.75	2.30±0.26
	on discharge	1.37±0.34 <sup>#*</sup>	1.81±0.18 <sup>#*</sup>

Note: To compare with the group on admission,  $\#P < 0.05$ ; To compare with the control group,  $*p < 0.05$ .

## 2.4 The comparison in Quality of life score.

The quality of life scores in both groups were higher on discharge than on admission, while those in the observation group were higher on discharge than those in the control group,  $P < 0.05$ .

**Table 5. The comparison in Quality of life score**

Group (n=50)	Time	Physiological field	Psychological field	Environmental field	social relationship field
Control group	on admission	74.56±5.09	75.38±5.20	74.27±4.81	75.09±5.18
	on discharge	82.09±6.53 <sup>#</sup>	83.12±6.17 <sup>#</sup>	81.35±5.03 <sup>#</sup>	82.94±5.23 <sup>#</sup>
observation group	on admission	74.68±5.04	75.52±5.13	74.39±4.75	75.20±5.04
	on discharge	88.45±6.37 <sup>#*</sup>	89.34±6.28 <sup>#*</sup>	87.46±5.14 <sup>#*</sup>	88.57±5.69 <sup>#*</sup>

Note: To compare with the group on admission, <sup>#</sup>P<0.05; To compare with the control group, \*p<0.05.

### 2.5 The Comparison of duration of nutritional treatment and hospital stay.

Compared with the control group, the duration of nutritional treatment and hospital stay were significantly shortened in the observation group, p<0.05.

**Table 5. The Comparison of duration of nutritional treatment and hospital stay, ( $\bar{x} \pm s$ , d) .**

Group (n=50)	duration of Nutritional treatment	hospital stay
Control group	8.63±1.72	17.45±3.96 <sup>#</sup>
observation group	6.81±1.40*	13.29±3.21 <sup>#*</sup>

Note: Compared with the control group, p<0.05.

### 3 Discussion

Chronic kidney disease (CKD) is a kind of common chronic disease, which occurs all over the world. According to the survey, the probability of CKD among adults in the United States is about 13.1%, and the prevalence rate of CKD among adults in most parts of China is about 8%. This disease is one of the public health problems that endanger human health worldwide [6-8].

Clinically, maintenance hemodialysis is usually used in the treatment of chronic kidney disease, which can effectively remove the toxin molecules in the blood of patients and reduce the damaging effect of toxin on their renal function [9-11]. During maintenance hemodialysis treatment, patients with chronic kidney disease are at risk of malnutrition and prone to anemia. In order to reduce the risk of malnutrition in patients with chronic kidney disease, nutritional therapy is advocated clinically for patients with chronic kidney disease, and nutritional therapy has become the main treatment for chronic kidney disease [12-14].

However, the formulation of nutritional therapy diet for patients with chronic kidney disease is affected by many factors such as renal function, blood pressure, hemodialysis and so on. Low-salt diet often affects the color and flavor of food, resulting in the loss of appetite and poor dietary compliance among patients. Therefore, intervention measures are needed [15].

For this situation, our hospital carried out nutritional education and therapy for patients with chronic kidney disease (CKD), mainly explain nutritional knowledge for patients and guide the rational diet, which can improve the knowledge of kidney disease diet. what is more, this can make them fully understand the importance of nutritional therapy on kidney disease, and pay attention to diet, actively cooperate with nutritional therapy [16].

Our study showed that: 1) The knowledge score of nephropathic diet and the score of diet behavior management were higher in the observation group than in the control group on discharge,  $P < 0.05$ , indicating that nutritional education can improve the nephrotic diet cognition of patients with chronic kidney disease, which can regulate their dietary behavior, and form a good dietary habit. 2) The levels of serum calcium and phosphorus in the observation group were lower than those in the control group, the levels of proalbumin, transferrin, albumin and hemoglobin in the observation group were higher than those in the control group on discharge, and the duration of nutritional treatment and hospital stay in the observation group were shorter than those in the control group,  $P < 0.05$ . This is mainly because nutritional education can improve the cognition of diet and compliance among patients, which can make sure that the implementation of nutrition treatment, thereby reducing the risk of malnutrition and correcting water- electrolyte disorders. 3) The quality of life scores in the observation group were higher than those in the control group on discharge,  $P < 0.05$ , this is mainly because nutritional education indirectly improves the nutritional status of patients, which is beneficial to reduce the impact of malnutrition on the quality of life of patients.

In conclusion, the implementation of nutritional education during nutritional treatment for patients with chronic kidney disease can effectively improve the dietary knowledge of kidney disease among patients, and is conducive to improving their compliance with dietary behavior management. Furthermore, the nutritional therapy can also improve the nutritional status and the metabolism of calcium and phosphorus, which would improve the quality of life and shorten the treatment time.

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