The Influence of SDM-Based Individualized Management Model on the Health Outcome and Quality of Life of Maintenance Hemodialysis Patients

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Abstract： Background Chronic kidney disease is a common clinical problem that endangers human physical and mental health and life safety. It eventually evolves into end-stage renal disease, and the incidence has increased year by year. It has been reported that the incidence of chronic kidney disease in China is about 10 %, and most patients need to carry out dialysis to maintain life.
Objective To observe the influence of an individualized management model based on shared decision-making (SDM) between doctors, nurses and patients on the health outcomes and quality of life of maintenance hemodialysis patients.
Methods A total of 100 end-stage renal disease patients treated with maintenance hemodialysis intervention in the Department of Nephrology, Changyisha City Fourth Hospital from May 2020 to May2021 were selected. According to the order of admission, they were randomly divided into control groups (n=50)) And the observation group (n=50). The control group received conventional management mode intervention, and the observation group received SDM-based individualized management mode intervention. The blood pressure and fluid control of the two groups were recorded, and the self-management behavior scale for hemodialysis patients (SMSH), the satisfaction survey questionnaire for patient participation in medical decision-making, and the kidney disease-related quality of life scale (KDTA) were used to evaluate the self-management ability of the two groups, Satisfaction and quality of life.
Results After the intervention, fluid intake, weight gain between dialysis intervals, and the number of dialysis-related complications in the observation group decreased significantly ($P<0.05$), while the number of dialysis-related complications in the control group decreased ($P<0.05$), but fluid The intake and weight gain between dialysis intervals were similar to those before the intervention ($P>0.05$), and the fluid control in the observation group improved more significantly than the control group after the intervention ($P<0.05$). After the intervention, the systolic and diastolic blood pressure of the observation group decreased significantly ($P<0.05$), and the systolic and diastolic blood pressure of the control group were similar to those before the intervention ($P>0.05$). The blood pressure of the observation group improved more significantly than the control group after the intervention ($P<0.05$). After the intervention, the two groups of SMSH scale scores (problem solving, self-care, partnership, emotional processing, etc.), satisfaction scores (information, communication and negotiation, decision-making, total satisfaction and confidence, etc.), quality of life scores (symptoms, kidney disease, etc.) The impact of kidney disease, the burden of kidney disease, work status, cognitive function, social quality, sleep, social support, etc.) have been greatly improved ($P<0.05$), and the SMSH scale score, satisfaction score, quality of life of the observation group after intervention The score improved more significantly than the control group ($P<0.05$).
Conclusion Intervention of maintenance hemodialysis patients based on an individualized management model of SDM can improve the self-management ability and satisfaction of patients, improve the quality of life, and reduce the occurrence of adverse events and complications.

Keywords: Shared decision-making by doctors, Nurses and patients; Individualized management model; Maintenance hemodialysis; Self-management ability; Quality of life
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Hemodialysis has always been the main treatment technology to help patients with end-stage renal disease to obtain effective life maintenance, but hemodialysis patients still have high mortality, which is related to complications such as dialysis-related hypotension during hemodialysis [1].Studies have shown that controlling interdialytic weight gain within the allowable range is an important measure to reduce the mortality of hemodialysis patients and dialysis-related hypotension and other complications during hemodialysis. The effect depends largely on the compliance of patients with fluid intake, which requires patients to implement strict fluid intake control behavior during dialysis to avoid hypertension, left ventricular hypertrophy and even death caused by chronic volume load growth. Therefore, patients ' fluid management is a professional, long-term and dynamic practice process. How to improve the compliance of fluid intake control in patients with maintenance hemodialysis has become one of the important propositions that have long plagued the industry [2].This study observed the effect of individualized management model based on doctor-nurse-patient sharing decision-making on health outcomes and quality of life in maintenance hemodialysis patients, in order to find a more reliable management method for patients during dialysis.

MATERIALS AND METHODS

General information

Case selection criteria

Inclusion criteria: (1) Clinically clearly diagnosed as chronic renal failure, and has entered the uremia stage, but no serious complications have been seen; (2) Age ≥18 years old, ≤75 years old; (3) Hemodialysis treatment ≥1 Months, regular dialysis 2 to 3 times a week, 4 hours each time; (4) Clear consciousness, have the ability to understand and execute correctly; (5) Patient's informed consent.

Exclusion criteria: (1) unable to take care of themselves; (2) severe cardiovascular and cerebrovascular diseases; (3) malignant tumors; (4) severe immune and blood system diseases; (5) accompanied by severe depression or anxiety. Dropout criteria: (1) Withdrawal or loss to follow-up; (2) Receiving kidney transplantation; (3) Transfer or death.

Baseline data of cases

A total of 100 patients with end-stage renal disease undergoing maintenance hemodialysis intervention were selected from the Department of Nephrology, the Fourth Hospital of Changyisha City, from May 2020 to May 2021, and were divided into control groups (n=50) by random number method according to the order of admission ， And observation group (n=50). Comparison of baseline data between the two groups, thedifferencewasnotstatisticallysignificant（P>0.05）. See table 1

Methods

Control group: Intervened by conventional management mode, mainly using bedside education, teaching the basic knowledge of fluid control, and informing patients of the nursing measures, skills and effective self-management of fluid control.

Observation group: Intervened by SDM-based individualized management model and designed the "Auxiliary Manual for Decision-making of Individualized Management Plan for Maintenance Hemodialysis Patients" in an easy-to-understand way. The content of the manual mainly includes maintenance hemodialysis patients' diet plan, exercise management, and self. Weight monitoring, etc., provide practical and easy-to-understand basic knowledge of fluid control and alternative self-management programs based on the patient's willingness and demand for medical information.Help patients understand the pros and cons of specific solutions, the applicable population, and the selection table of fluid control treatment options by focusing on the auxiliary tools for relevant decision-making, such as "fluid control treatment plan selection form", "exchange table of diet content", "fluid control tips scheme selection form", etc. The implementation method, combined with the patient's individual disease characteristics, needs and preferences, etc., to

formulate the best management plan.The handbook integrates fluid control management knowledge and skills, respects patients ' independent choice, and improves their management participation and compliance. After the completion of the first draft, patients with maintenance hemodialysis in our hospital were randomly selected and modified according to the feedback based on the principle of self-participation. Using 《 Maintenance hemodialysis patients individualized management program decision support manual》 to discuss management plan with patients, combined with their personal needs and preferences, let patients participate in the formulation of management plans. The patients were followed up for 1, 2, 3, 4, 6, 8 and 12 weeks, and the patients were evaluated at 12 weeks.

Observation indicators and detection methods

① Fluid control: Refer to the "Chinese Food Composition Table (Second Edition)" evaluation [3], including fluid intake, weight gain between dialysis intervals and the number of dialysis-related complications.

② Blood pressure test: Patients were not allowed to smoke, drink beverages such as thick tea or coffee within 30 minutes before blood pressure measurement, and the bladder was emptyed. They were sitting in a chair with backrest in a quiet environment for at least 5 minutes to relax the whole body. The direct measurement method was measured by a mercury column sphygmomanometer. Measure 3 times to take average and record.

③The self-management behavior scale for hemodialysis patients (SMSH): includes 4 dimensions including problem solving (5 items), self-care (7 items), partnership (4 items), emotional processing (4 items), and single item scores are used The Likert 4-level scoring method is assigned sequentially from 1 to 4 points, and the SMSH score ranges from 20 to 80 points. The higher the score, the better the self-management behavior.

④Satisfaction: Refer to the questionnaire evaluation of patients' satisfaction with participation in medical decision-making: The questionnaire includes 4 dimensions including information, communication and negotiation, decision-making, total satisfaction and confidence, with a total of 16 items, which are given sequentially by Likert 5-level scoring It is 1 to 5 points. In order to facilitate comparison, the score of each item is converted into a percentile system.The score of a single dimension is the sum of all items in the dimension and then divided by the number of items in a single dimension. The higher the score, the higher the satisfaction.

⑤Quality of life: The kidney disease-related quality of life scale (KDTA) is used to evaluate the scale, which includes symptoms, influence of kidney disease, burden caused by kidney disease, work status, cognitive function, social quality, sexual function, sleep, and social support for 9 fields, a single field uses a percentile system for scoring. The higher the score, the higher the quality of life. Among them, the area ofsexual function involves patient privacy and is deleted.

Statistical methods

Data were processed with SPSS19.0, （$\bar{\chi}\pm s$） was used to describe measurement indicators, t-test was used for comparison, count data was used for the number of cases (percentage), and χ^2 test was used for comparison, with a test level of 0.05.

RESULTS

Comparison of the two groups of liquid control

The fluid control situation before the intervention was similar (P>0.05). After the intervention, the fluid intake of the observation group, the weight gain between dialysis intervals, and the number of dialysis-related complications were significantly reduced (P<0.05), and the control group had dialysis-related complications The number of occurrences decreased (P<0.05), but fluid intake and weight gain between dialysis intervals were similar to those before the intervention (P>0.05). After the intervention, fluid control in the observation group was improved more significantly than that in the control group (P<0.05). See table 2.

Comparison of blood pressure between the two groups

The blood pressure before the intervention was similar (P>0.05). After the intervention, the systolic and diastolic blood pressure of the observation group decreased significantly (P<0.05). The systolic and diastolic blood pressure of the control group were similar to those before the intervention

(P>0.05). The blood pressure of the observation group after the intervention Compared with the control group, the improvement was more obvious (P<0.05). See Table 3.

Comparison of the two groups of SMSH scale scores

Before the intervention, the scores of the SMSH scale were similar (P>0.05). After the intervention, the scores of the two groups of SMSH scales, such as problem solving, self-care, partnership, emotional handling, etc., were greatly improved (P<0.05), and after the intervention of the observation group The SMSH scale score improved more significantly than the control group (P<0.05). See table 4.

Comparison of satisfaction scores between the two groups

Before intervention, the satisfaction score was similar (P>0.05). After intervention, the scores of information, communication and consultation, decision-making, confidence and total satisfaction of the two groups were significantly improved (P<0.05), and the satisfaction score of the observation group was better than that of the control group (P<0.05). See table 5.

Comparison of quality-of-life scores between the two groups

The quality-of-life scores before intervention were similar (P>0.05). After intervention, the quality-of-life scores such as symptoms, the impact of kidney disease, the burden caused by kidney disease, work status, cognitive function, social quality, sleep and social support in the two groups were significantly improved (P<0.05), and the quality-of-life scores in the observation group were improved more significantly than those in the control group (P<0.05). See table 6.

DISCUSSIONS

Studies have shown that there is a micro-inflammatory state in patients with renal failure. Patients with increased volume load and decreased glomerular filtration rate led to excessive residual toxins in the body. At the same time, lipid peroxidation is enhanced, and plasma antioxidant activity is reduced. Enhanced oxidative stress leads to lipid peroxidation and changes in lipoprotein structure and function. Enhance the adhesion and migration of leukocytes and vascular endothelial cells, resulting in increased inflammation after entering the injured site[4]. Hemodialysis has always been an important treatment option for clinical end-stage renal disease. Dialysis treatment can remove toxins from the body and prolong the survival time of patients. However, hemodialysis cannot improve the imbalance of molecular ion metabolism in the body, and prolonged dialysis time will also cause related complications. resulting in interruption of dialysis treatment [5,6]. Most dialysis patients generally use indwelling double vena cava catheters to facilitate treatment, simple operation, low puncture risk, long indwelling time, and high compliance with the human body. It can not only provide patients with continuous intravenous infusion therapy, but also reduce the effect of chemotherapy drugs on blood vessels. However, due to the long catheterization time, some patients need to bring the catheter home during intermittent periods, and the ability to care for the catheter is poor, which ultimately leads to various dialysis complications [7]. In recent years, some scholars have pointed out that active health education and guidance for patients with indwelling double vena cava catheters for dialysis and improving the self-care ability of patients can reduce the occurrence of catheter complications. Therefore, how to carry out out-of-hospital care for patients is essential for the smooth progress of dialysis [8].

At present, the current status of fluid control management for maintenance hemodialysis patients in China is still dominated by traditional preaching passive management. There are problems such as mismatch of doctor-patient information, poor communication, lack of individualization, low patient acceptance and compliance, and asynchrony between management guidance and behavior changes. Related guidelines propose that self-management should be patient-centered and respect their preferences, needs and values, so as to guide clinical decision-making and improve clinical outcomes. Therefore, clinically, a scientific and individualized management model is urgently needed to optimize the control of maintenance hemodialysis patients. Liquid self-management [9].

The importance of ShareDecision Making (SDM) is increasingly emphasized in clinical nursing work. Shared decision making is a decision-making method in which doctors, nurses and patients participate together. Under the premise of fully considering the values and decision-making preferences of patients, medical staff and patients fully discuss decision-making options, give sufficient evidence to support and point out the advantages and disadvantages of the options, and finally reach an agreed decision-making process. In recent years, a large number of studies have confirmed that sharing decision-making and evidence-based practice can improve the patient ' s health outcomes, improve patient satisfaction, trust and compliance, and reduce the occurrence of adverse events, and promote patient safety [7,10]. In this study, the personalized management model of maintenance hemodialysis patients based on SDM intervention, through WeChat push health education knowledge, catheter maintenance methods and other knowledge to improve patients' awareness and ability to maintain catheters and facilitate patients and their families. Looking at it at any time stimulates the patient's initiative to learn, and significantly improves the patient's knowledge of catheter maintenance and disease prevention and health [7], On the one hand, it can improve the patient's knowledge of out-of-hospital health education. On the other hand, this method can improve the quality of life of patients and improve negative emotions. By allowing patients to actively participate in nursing work, the psychological pressure caused by lack of patient knowledge can be buffered, and the negative Sexual emotion improves the patient's mastery of health education knowledge and enhances the patient's treatment compliance [11]. In addition, this model is convenient for nursing staff to communicate with patients at any time, understand the patient's out-of-hospital situation, continue to give patients guidance and solve problems and accidents in the process of taking the tube, and help establish the confidence of patients in self-management[12,13.]

This study showed that after the intervention, the fluid intake of the observation group, the weight gain between dialysis intervals, and the number of dialysis-related complications were significantly reduced, and the fluid control of the observation group after intervention was improved more significantly than that of the control group, suggesting that individuals based on SDM Intervention of maintenance hemodialysis patients with chemical management mode helps to control the patient's fluid during dialysis. After the intervention, the systolic and diastolic blood pressure of the observation group decreased significantly, and the blood pressure of the observation group improved more significantly than that of the control group after the intervention, suggesting that the SDM-based individualized management model intervention for maintenance hemodialysis patients can help improve blood pressure. After the intervention, the scores of the SMSH scale for problem solving, implementation of self-care, partnership, and emotional processing in the two groups were greatly improved, and the SMSH scale scores of the observation group improved more significantly than the control group after the intervention, suggesting that the SDM-based individualized management mode intervention Maintenance hemodialysis patients can help improve the self-management ability of patients. After the intervention, the satisfaction scores of the two groups of information, communication and negotiation, decision-making, total satisfaction, and confidence were greatly improved, and the satisfaction scores of the observation group after the intervention improved more significantly than those of the control group, suggesting that the SDM-based individualized management model intervention is maintained. Hemodialysis patients can help improve patient satisfaction. After the intervention, the quality of life scores of the two groups of symptoms, the impact of kidney disease, the burden of kidney disease, work status, cognitive function, social quality, sleep, social support, etc., were greatly improved, and the quality of life scores of the observation group improved compared with the control group after the intervention More obviously, it suggests that SDM-based individualized management model intervention in patients with maintenance hemodialysis can help improve the quality of life. In this study, by drawing on the shared decision-making model of foreign doctors, nurses and patients, it was applied to the fluid control management of maintenance hemodialysis patients in our country, and the "Individualized Management Plan Decision

Assistant Manual for Maintenance Hemodialysis Patients" was designed in an easy-to-understand manner, based on patients Provide practical and easy-to-understand basic knowledge of fluid control and alternative self-management schemes for the desire and demand for medical information, provide a new theoretical basis for the application of SDM individualized self-management in clinical nursing work, and explore patients with maintenance hemodialysis The new strategy of liquid control management and a scientific intervention model. However, the number of patients enrolled in this study was small, and biochemical indicators were not selected for dynamic monitoring. It is necessary to further expand the sample size and extend the follow-up time for in-depth demonstration.

In summary, SDM-based individualized management model intervention for maintenance hemodialysis patients can improve patient self-management ability and satisfaction, improve the quality of life, and reduce the occurrence of adverse events and complications.

In summary, the personalized management model based on SDM can improve the self-management ability and satisfaction of maintenance hemodialysis patients, improve the quality of life, and reduce the occurrence of adverse events and complications.

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Table 1
Comparison of baseline data between the two groups（n=50）

Parameter	Control group	Observation group	χ^2/t	P
Gender（%，n）				
Male	28（56.00）	25（50.00）	0.361	0.548
Female	22（44.00）	25（50.00）		
Age（$\bar{\chi}$±s，year）	52.12±8.36	52.63±9.75	0.281	0.779
Marital status（%，n）				
Married	39（78.00）	38（76.00）	1.113	0.573
Unmarried	5（10.00）	3（6.00）		

Divorced or widowed	6（12.00）	9（18.00）		
Primary disease（%，n）				
Glomerulonephritis	19（38.00）	23（46.00）		
Interstitial nephritis	13（26.00）	12（24.00）	0.759	0.859
Diabetic nephropathy	10（20.00）	9（18.00）		
Hypertensive nephropathy	8（16.00）	6（12.00）		
Education（%，n）				
Junior high school and below	10（20.00）	6（12.00）	1.223	0.543
Technical secondary school and senior high school	12（24.00）	14（28.00）		
Junior college or above	28（56.00）	30（60.00）		
Hemodialysis time（$\bar{\chi}$±s，month）	36.96±5.85	35.78±6.87	0.925	0.357
Dialysis times（$\bar{\chi}$±s，Times / week）	2.45±0.32	2.51±0.33	0.923	0.358

Table 2
Comparison of liquid control between the two groups（$\bar{\chi}$±s）

Group	Number of cases	Fluid intake（ml/d）		Body mass gain during dialysis interval（%）		Number of dialysis related complications（次）	
		Beforeintervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group	50	1785.69±315.26	1749.25±338.67	4.25±1.23	4.41±1.28	4.85±1.27	4.31±1.03*
Observation group	50	1801.21±326.35	1324.56±289.12*	4.31±1.08	3.32±1.03*	4.76±1.32	3.23±0.75*
t		0.242	6.744	0.259	4.691	0.347	5.994
P		0.809	0.000	0.796	0.000	0.729	0.000

Note: Compared with this pre - intervention group，*P<0.05。

Table 3
Comparison of blood pressure between the two groups（$\bar{\chi}$±s，mmHg）

Group	Number of cases	Systolic pressure		Diastolic pressure	
		Before intervention	After intervention	Before intervention	After intervention
Control group	50	158.23±10.14	154.23±11.02	87.69±6.21	86.87±5.36
Observation group	50	160.14±8.92	132.25±7.66*	88.02±5.87	81.25±4.02*
t		0.100	11.581	0.273	5.931
P		0.320	0.000	0.785	0.000

Note: Compared with this pre - intervention group，*P<0.05。

Table 4
Comparison of smsh scores between the two groups（$\bar{\chi}$±s，Minute）

Group	Number of cases	Problem solving		Perform self-care		Partnership		Emotional processing	
		Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group	50	11.52±1.55	13.54±2.06*	15.69±3.63	19.24±2.27*	10.21±2.13	12.46±1.88*	9.56±1.85	11.84±2.04*
Observation group	50	11.47±2.36	16.82±1.24*	14.51±3.52	23.01±2.06*	10.28±2.09	14.27±1.13*	9.49±1.93	13.68±1.69*
t		0.152	9.646	1.650	8.696	0.166	5.835	0.185	4.911
P		0.901	0.000	0.102	0.000	0.869	0.000	0.853	0.000

Note: Compared with this pre - intervention group，*P<0.05。

Table 5
Comparison of satisfaction scores between the two groups（$\bar{\chi}$±s，Minute）

Group	Number of cases	Information		Exchange and consultation		Policy decision		Total satisfaction and confidence	
		Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group	50	64.56±5.36	72.25±4.16*	53.69±4.28	62.05±4.85*	55.96±5.36	64.89±4.39*	57.28±4.92	66.32±4.75*
Observation group	50	63.98±6.01	79.36±5.21*	54.11±4.13	70.23±5.13*	56.02±6.05	73.22±4.91*	57.55±5.03	75.69±5.11*
t		0.509	7.541	0.499	8.193	0.052	8.943	0.271	9.497
P		0.612	0.000	0.619	0.000	0.958	0.000	0.787	0.000

Note: Compared with this pre - intervention group，*P<0.05。

Table 6
Comparison of quality-of-life scores between the two groups（ $\bar{\chi}$±s，Minute）

Parameter	时间	Control group（n=50）	Observation group（n=50）	t	P
Symptom	Before intervention	68.96±6.96	69.14±7.36	0.126	0.966
	After intervention	74.36±5.36*	79.81±6.54*	4.557	0.000
The impact of kidney disease	Before intervention	50.23±5.17	49.93±5.54	0.280	0.780
	After intervention	57.36±5.23*	64.74±4.99*	7.219	0.000
The burden of kidney disease	Before intervention	31.23±4.11	30.98±4.09	0.304	0.762
	After intervention	35.89±3.59*	41.02±4.22*	6.547	0.000
Working conditions	Before intervention	34.66±5.20	32.69±4.72	1.984	0.050
	After intervention	41.25±4.28*	53.33±5.02*	12.948	0.000
Cognitive function	Before intervention	64.85±8.22	63.96±7.82	0.555	0.580
	After intervention	68.25±5.98*	75.45±6.96*	5.548	0.000
Social quality	Before intervention	70.23±6.02	69.01±5.89	1.024	0.308
	After intervention	75.22±5.36*	81.63±4.74*	6.335	0.000
Sleep	Before intervention	54.28±4.23	54.05±5.31	0.240	0.811
	After intervention	60.74±4.29*	66.36±5.17*	5.915	0.000
Social support	Before intervention	72.05±4.96	71.46±5.36	0.571	0.569
	After intervention	76.98±5.14*	82.03±5.11*	4.927	0.000

Note: Compared with this pre - intervention group，*P<0.05。