Analysis of the Current Situation and Influencing Factors of Psychosocial Adaptation of Hemodialysis Patients

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Abstract: *Objective:* To investigate the current status and influencing factors of psychosocial adaptation of hemodialysis patients, and to provide a reference basis for the development of nursing interventions. *Methods:* 435 hemodialysis patients from the hemodialysis centers of three tertiary A hospitals in Xi'an City were conveniently selected from April to August 2023, and were investigated using the General Information Questionnaire, the Psychosocial Adaptation to Disease Scale, the Fear of Disease Progression Simplification Scale, and the Personal Sense of Control Scale. *Results:* The psychosocial adaptation score of hemodialysis patients was (56.68 ± 18.32); the results of multiple linear regression analysis showed that marital status, the form of payment for medical expenses, work status, degree of self-care in daily life, number of co-morbid chronic illnesses, fear of disease progression, and sense of personal mastery were the main influencing factors of psychosocial adaptation of hemodialysis patients. *Conclusion:* The psychosocial adaptation of hemodialysis patients is at the level of severe maladaptation, and healthcare professionals should formulate scientific and reasonable nursing intervention programs according to their influencing factors to enhance their psychosocial adaptation.

Keywords: Hemodialysis; Psychosocial adaptation; Fear of disease progression; Sense of personal control

1. Introduction

End-stage renal disease (ESRD) is caused by various primary or secondary factors leading to irreversible kidney damage, requiring renal replacement therapy. Currently, the main renal replacement therapies are kidney transplantation, hemodialysis (HD), and peritoneal dialysis. Due to the shortage of kidney donors and the high degree of self-management required for peritoneal dialysis, HD has become the primary replacement therapy for ESRD patients [1]. Although HD can slow disease progression and extend survival, strict self-management protocols, treatment burdens, loss of sexual function, changes in body image, and cognitive impairment can all exacerbate patients' psychological distress [2]. This can lead to low self-esteem, anxiety, depression, fear, strained family relationships, marital discord, loss of the ability to work, a decline in socioeconomic status, deficits in self-care ability, and social isolation, significantly affecting disease treatment, prognosis, and the physical and

mental health of patients [3]. Fear of progression (FoP) refers to all the fears related to an individual's actual condition, which is not only the most common negative emotion among HD patients but also a significant stressful event, leading to various adverse physiological, psychological, and social impacts [4,5]. Personal control is a positive psychological variable that influences patients' cognition, emotions, and behaviors. Research has shown that a sense of personal control can enhance positive cognitive experiences, reduce negative emotions, promote positive coping strategies, increase happiness, and improve disease adaptation in HD patients [6,7]. Therefore, this study investigates the psychosocial adaptation status and influencing factors of hemodialysis patients, providing a reference for developing scientific and reasonable psychological intervention programs to help patients better adapt to their disease and integrate into society.

2. Study subjects and methods

2.1. Study subjects

A convenience sampling method was used to select 435 hemodialysis patients from the blood purification centers of three tertiary hospitals in Xi'an from April to August 2023. Inclusion criteria: (1) patients with ESRD undergoing regular HD; (2) age ≥ 18 years, with normal reading, writing, and expression abilities; (3) signed informed consent and voluntarily participated in the study. Exclusion criteria: (1) patients with a history of mental illness and cognitive impairment; (2) those who experienced major life events (e.g., bereavement, disability) in the past month; (3) patients with severe comorbidities (e.g., heart failure, respiratory failure, malignant tumors).

2.2. Research methods

2.2.1. Survey tools

2.2.1.1. General information questionnaire

The self-designed general information questionnaire includes sociodemographic factors (age, gender, education level, marital status, primary caregiver, place of residence, medical expenses payment method, monthly household income, and employment status) and disease-related factors (degree of daily self-care, number of chronic comorbidities, frequency, and duration of dialysis).

2.2.1.2. Psychosocial Adjustment to Illness Scale – Self-Report (PAIS-SR)

The scale, developed by Derogatis [8] and later translated by Chinese scholar Yao Jingjing [9], aims to assess patients' psychological and social adjustment. The scale consists of 44 items across seven dimensions: healthcare (7 items), family relationships (7 items), working ability (6 items), social communication (5 items), recreational activities (6 items), psychological distress (7 items), and sexual relationships (6 items). It uses a 4-point Likert scale, where "good" scores 0 and "poor" scores 3. The total score ranges from 0 to 132, with higher scores indicating more psychosocial adjustment problems. The Cronbach's α coefficient of the scale is 0.872. In this study, Cronbach's α coefficient of the scale is 0.921.

2.2.1.3. Fear of Progression Questionnaire – Short Form (FoP-Q-SF)

The scale, developed by Mehnert et al. [10] and translated by Chinese scholars Wu Qiyun et al. in 2015 [11], mainly measures the fear of disease recurrence or progression in cancer and chronic disease patients. It includes 12 items across two dimensions: physical health (6 items) and social/family (6 items). Each item uses a 5-point Likert scale (1–5 points), with a total score ranging from 12 to 60. Higher scores indicate higher levels of fear of disease progression, with scores ≥ 34 indicating clinically significant fear. The Cronbach's α coefficient of

the scale is 0.883. In this study, Cronbach's α coefficient of the scale is 0.921.

2.2.1.4. Personal Mastery Scale (PMS)

The scale, developed by Pearlin *et al.* [12], measures individuals' sense of control over events in their lives. It is a unidimensional scale with 7 items, using a 5-point Likert scale where "strongly disagree" scores 1 and "strongly agree" scores 5. Items 1-5 are reverse-scored. The total score ranges from 7 to 35, with higher scores indicating a higher sense of control. The Cronbach's α coefficient of the scale is 0.81. In this study, Cronbach's α coefficient of the scale is 0.857.

2.3. Data collection methods

Before the survey, a unified guideline was used to introduce the study's purpose and significance to patients, obtain their informed consent, and explain how to fill out the general information questionnaire, PAIS-SR, FoP-Q-SF, and PMS to ensure they understood the content. After patients completed the questionnaires, they were collected and checked on the spot. Missing items were filled in immediately to ensure completeness. This study has been approved by the ethics committee (No.: LLSCP2023038).

2.4. Statistical methods

Two people checked and entered the data, which were then statistically analyzed using SPSS 26.0. The measurement data in this study followed a normal distribution and are presented as mean ± standard deviation (SD). Count data are presented as frequency and percentage (%). Group analysis of general information on the psychosocial adjustment of hemodialysis patients used *t*-tests and one-way analysis of variance (ANOVA). Pearson correlation was used for correlation analysis between variables. Multiple linear stepwise regression was used to analyze factors influencing the psychosocial adjustment of hemodialysis patients. A *P*-value of < 0.05 was considered statistically significant.

3. Results

3.1. Scores of psychosocial adjustment, fear of disease progression, and personal mastery in HD patients

Table 1 shows the scores of psychosocial adjustment, fear of disease progression, and personal mastery in HD patients.

Table 1. Scores of psychosocial adaptation, fear of disease progression, and sense of personal control in HD patients (mean ± SD, score; $n = 435$)

Item	Score range	Total score	Item average score
Psychosocial adaptation	10–112	56.68 ± 18.32	1.27 ± 0.42
Health care	0–16	6.50 ± 3.39	0.93 ± 0.48
Family relationships	0–19	7.68 ± 3.85	1.10 ± 0.55
Working ability	0–17	9.73 ± 3.35	1.62 ± 0.56
Communication	0–15	5.11 ± 3.39	1.02 ± 0.68
Sexuality	1–17	9.05 ± 2.90	1.51 ± 0.48
Recreation	0–18	10.50 ± 4.47	1.75 ± 0.74
Psychological condition	0–21	7.11 ± 5.09	1.02 ± 0.73

Table 1 (Continued)

Item	Score range	Total score	Item average score
Fear of disease progression	12–53	29.43 ± 8.15	2.45 ± 0.68
Physical health	6–29	15.01 ± 4.33	2.50 ± 0.72
Social family	6–30	14.42 ± 4.35	2.40 ± 0.72
Sense of personal control	7–35	20.07 ± 5.71	2.87 ± 0.82

3.2. Univariate analysis of psychosocial adaptation in HD patients

Univariate analysis results show that the psychosocial adjustment scores differ among HD patients with different marital statuses, places of residence, methods of paying medical expenses, monthly household incomes, employment statuses, degrees of daily self-care, and numbers of chronic diseases. These differences are statistically significant ($P < 0.05$; **Table 2**).

Table 2. Comparison of scores of psychosocial adaptation in hemodialysis patients with different characteristics (mean ± SD, score; $n = 435$)

Item	Classification	n	Psychosocial adaptation score	t / F	P
Age (years)	< 40	105	58.49 ± 18.68	1.705[b]	0.183
	40–59	203	54.47 ± 17.99		
	≥ 60	127	55.30 ± 18.44		
Gender	Male	270	55.39 ± 19.09	-0.433[a]	0.665
	Female	165	56.17 ± 17.02		
Educational level	Elementary and below	21	56.57 ± 19.97	2.164[b]	0.072
	Junior high school	110	58.39 ± 16.91		
	High school or junior college	149	52.21 ± 18.28		
	College	91	56.98 ± 19.66		
	Bachelor's degree or above	64	56.97 ± 17.53		
Marital status	Unmarried	34	63.59 ± 20.84	5.348[b]	0.005
	Married	389	54.71 ± 17.74		
	Divorced or widowed	12	64.92 ± 22.79		
Primary caregiver	Family	144	55.63 ± 19.11	1.513[b]	0.210
	Friends	9	62.89 ± 14.46		
	Attendant	6	68.50 ± 19.15		
	No caregiver	276	55.20 ± 17.93		
Residence	Rural	82	60.44 ± 17.01	2.628[a]	0.009
	Urban	353	54.58 ± 18.46		
Form of payment for medical expenses	Medical insurance	349	54.75 ± 18.63	3.389[b]	0.018
	Rural cooperative medical insurance	76	61.04 ± 16.04		
	Self-funded	8	49.75 ± 18.02		
	Public expense	2	38.50 ± 2.12		

Table 2 (Continued)

Item	Classification	n	Psychosocial adaptation score	t / F	P
Monthly household income (yuan)	< 2,000	90	62.02 ± 17.20	8.435[b]	< 0.001
	2,000–4,999	234	55.15 ± 17.74		
	≥ 5,000	111	51.67 ± 19.19		
Working status	Employed	113	50.05 ± 17.80	8.984[b]	< 0.001
	Unemployed	170	59.31 ± 17.46		
	Sick or retired	152	55.82 ± 18.70		
Degree of self-care in daily life	Completely self-supporting	330	52.06 ± 17.83	32.981[b]	< 0.001
	Mostly self-care	93	65.75 ± 14.87		
	Dependent on others	12	77.17 ± 11.58		
Number of combined chronic disease types	0	42	49.67 ± 15.58	8.761[b]	< 0.001
	1	124	50.80 ± 16.89		
	2	154	57.08 ± 17.60		
	≥ 3	115	61.27 ± 19.83		
Dialysis sessions per 2 weeks	4	121	56.46 ± 17.85	0.625[b]	0.536
	5	212	56.08 ± 18.82		
	6	102	53.93 ± 17.88		
Duration of dialysis (years)	< 1	59	59.58 ± 18.88	1.630[b]	0.197
	1–3	119	54.50 ± 18.87		
	≥ 3	257	55.33 ± 17.88		

Note: [a] Two independent samples *t*-test; [b] One-way ANOVA.

3.3. Correlation analysis of fear of disease progression, personal mastery, and psychosocial adjustment in HD patients

Table 3 shows the correlation analysis of fear of disease progression, personal mastery, and psychosocial adjustment in HD patients.

Table 3. Correlation analysis of psychosocial adaptation, personal mastery, and fear of disease progression in HD patients (r-value)

	Psychosocial adaptation	Personal mastery	Fear of disease progression	Social family	Physical health
Psychosocial adaptation	1				
Personal mastery	0.606**	1			
Fear of disease progression	0.299**	-0.244**	1		
Social family	0.265**	-0.226**	0.939**	1	
Physical health	0.297**	-0.233**	0.939**	0.763**	1

** At the 0.01 level (two-tailed), the correlation is significant.

3.4. Multivariate analysis of psychosocial adjustment in HD patients

Using the total psychosocial adjustment score as the dependent variable and the statistically significant factors

from univariate analysis and correlation analysis as independent variables (values assigned as shown in **Table 4**), a multiple linear stepwise regression analysis was performed. First, the presence of significant multicollinearity between variables was tested using the variance inflation factor (VIF). Generally, VIF > 10 indicates significant multicollinearity between independent variables. The results showed that VIF ranged from 1.017 to 2.656, indicating no significant multicollinearity between variables. Using the criteria α_in = 0.05 and α_out = 0.10, a stepwise regression analysis was performed. The results showed that "married" in marital status, "self-pay" in medical expense payment method, "unemployed" in employment status, "mostly self-care, basically dependent on others" in daily self-care degree, the number of chronic diseases, fear of disease progression, and personal mastery entered the regression model. These factors can explain 48.0% of the total variance in psychosocial adjustment. The results are detailed in **Table 5**.

Table 4. Assignment of independent variables

Variable	Assign a value
Psychosocial adaptation	Entry as a raw value
Fear of disease progression	Entry as a raw value
Personal mastery	Entry as a raw value
Marital status	Dummy variables for "unmarried" as reference: married (1,0); divorced or widowed (0,1)
Home location	1 = rural, 2 = urban
Forms of payment for medical expenses	Dummy variables for "health insurance" as a reference: rural cooperative (1,0,0); self-payment (0,1,0); public payment (0,0,1)
Monthly family income	1 = < 2,000, 2 = 2,000–4,999, 3 = ≥ 5,000
Work status	Dummy variables: unemployed (1,0); retired or on sick leave (0,1), using "in employment" as a reference
Degree of self-care in daily life	Dummy variables for "complete self-care" as reference: mostly self-care (1,0); largely dependent (0,1)
Number of combined chronic diseases	1 = None, 2 = 1, 3 = 2, 4 = ≥ 3

Table 5. Multiple linear stepwise regression analysis of psychosocial adjustment in HD patients

	Regression coefficient	Standard error	Standardized regression coefficient	t	P	VIF
(Constant)	69.863	7.876		8.871	< 0.001	
Marital Status						
Married	-6.828	2.444	-0.115	-2.794	0.005	1.407
Divorced or widowed	2.302	4.544	0.021	0.506	0.613	1.380
Resident	0.265	2.602	0.006	0.102	0.919	2.581
Payment methods						
Rural cooperative medical insurance	1.268	2.719	0.026	0.466	0.641	2.656
Self-payment	-13.700	4.855	-0.101	-2.822	0.005	1.060
Public expense	-7.780	9.442	-0.029	-0.824	0.410	1.017
Monthly family income	-1.651	1.125	-0.061	-1.468	0.143	1.449

Table 5 (Continued)

	Regression coefficient	Standard error	Standardized regression coefficient	t	P	VIF
Work status						
Unemployed	5.335	1.830	0.142	2.915	0.004	1.986
Sick or retired	3.359	1.797	0.088	1.870	0.062	1.829
Degree of self-care						
Mostly self-care	7.898	1.752	0.177	4.508	< 0.001	1.286
Dependent on others	14.752	4.127	0.132	3.574	< 0.001	1.139
Number of comorbid chronic diseases	1.695	0.749	0.087	2.262	0.024	1.245
Fear of disease progression	0.469	0.087	0.208	5.392	< 0.001	1.247
Personal mastery	-1.447	0.125	-0.451	-11.531	< 0.001	1.277

Note: $R^2 = 0.497$, adjusted $R^2 = 0.480$, $F = 29.586$, $P < 0.001$.

4. Discussion

4.1. Psychosocial adaptation of HD patients is at the level of severe maladaptation

The study showed that the psychosocial adaptation score of HD patients was 56.68 ± 18.32, which was in the state of severe maladaptation, which was consistent with the findings of patients with chronic diseases such as ischemic stroke [13], diabetes mellitus [14], and nasopharyngeal carcinoma [15]. HD patients need to rely on dialysis to sustain their lives for a lifetime, and at the same time, they are faced with huge medical expenses, changes in lifestyle, strained family relationships, marital disharmony, loss of working ability, decline in socioeconomic level, anxiety, depression, fear, social isolation, and a series of other problems [3], which greatly affects the treatment and prognosis of patients' diseases as well as their physical and mental health, and results in the vulnerability of patients to psychosocial maladaptation.

Among the dimensions of psychosocial adaptation, recreation, working ability, and sexuality had the highest scores, indicating that patients had more serious problems in these four areas. Analyzing the reasons: firstly, patients need to receive hemodialysis two to three times a week for three to four hours each time, and after the end of dialysis, patients will suffer from fatigue, nausea, pain, itchy skin, and negative emotions, which seriously affects their daily recreational life and working ability [16]. Secondly, patients on long-term dialysis may have a disturbed self-image due to complications and are very likely to adopt avoidance to minimize others' knowledge of their condition, which leads to reduced social activities and social alienation [17]. Social alienation can exacerbate patients' social adjustment problems, and the two form an adverse cycle that brings more negative impacts on patients.

Several studies have shown that sexual dysfunction exists in HD patients [18,19]. Influenced by traditional Chinese culture, most patients are unwilling to talk about sex-related issues, and some attribute sexual dysfunction to normal aging and are unwilling to seek help, which in the long run not only affects the quality of life of patients but also creates family and marital tensions. Therefore, healthcare professionals should pay attention to the psychosocial adaptation status of HD patients, especially the need to pay attention to the assessment of patients' recreation, working ability, and sexuality, and take timely and targeted interventions when problems are found, thereby helping patients look at the negative impacts of diseases and treatments in

a moderate state of mind and actively cope with them, which is conducive to the enhancement of the ability of psychosocial adaptation.

4.2. Factors influencing psychosocial adaptation in HD patients

4.2.1. Psychosocial adaptation of HD patients is influenced by socio-demographic factors

The results of this study showed that among the socio-demographic data, marital status, form of payment for healthcare, and work status were the influencing factors of psychosocial adaptation ($P < 0.05$). Divorced or widowed HD patients have the most psychosocial problems, which is consistent with the findings of colorectal cancer patients [18]. On the one hand, HD treatment requires long-term adherence, and the lack of family support may lead to feelings of loneliness and helplessness; on the other hand, HD treatment requires high expenses, and the burden of treatment for patients with no support system will be aggravated, which will be manifested as poor psychological and social adaptation [20]. The psychosocial adaptation of patients whose medical expenses are paid by health insurance is better than that of self-funded and agricultural cooperative patients, which is consistent with the results of the study of young and middle-aged kidney transplant patients [21]. The popularization and improvement of the national health insurance policy reduce the economic burden of patients to a large extent, enabling them to obtain more affordable treatment options, reducing the psychological pressure and anxiety due to the high cost of treatment, and contributing to the treatment and rehabilitation of patients [22]. The highest psychosocial adjustment scores were found in jobless patients, followed by those who were sick or retired, and the lowest in those who were employed, indicating that jobless HD patients have the most serious psychosocial adjustment problems, which is consistent with the findings of Lee *et al.* [23] but inconsistent with the findings of Lv *et al.* [24]. Possible reasons may be jobless patients face greater economic pressure and social isolation [25], leading to more severe psychosocial adjustment problems. It is suggested that caregivers should focus on the psychosocial adaptation status of divorced or widowed, self-funded, and jobless patients, help patients establish social support networks, and guide them to participate in social activities or support groups to reduce loneliness and social isolation. At the same time, appropriate recommendations should be made to the relevant departments and patients should be provided with information and education on employment opportunities and social welfare, thereby helping them reintegrate into society, improve their psychosocial adjustment problems, and enhance the stability and well-being of their lives.

4.2.2. HD patients are affected by disease-related factors

The results of this study show that the degree of self-care in daily life and the number of co-morbid chronic diseases are the factors influencing the psychosocial adaptation of HD patients ($P < 0.05$). A decrease in self-care ability can lead to the reduction of HD patients' ability to live and work, and changes in family and social roles, which in turn can affect their psychosocial adaptation. It is suggested that healthcare professionals should pay attention to the physical activity of HD patients, assess the activity ability of patients promptly, and give corresponding exercise intervention programs to improve the daily life self-care ability and social value of HD patients, reduce the psychological burden, and improve the quality of life [26]. The greater the number of combined chronic diseases in patients, the more psychosocial adaptation problems, consistent with the findings of Zhang *et al.* in nasopharyngeal carcinoma patients [15]. On the one hand, multiple chronic diseases may require different treatment regimens and medication management, and patients need to deal with multiple treatment plans at the same time, which makes them prone to confusion and anxiety [27]. On the other hand, a high number of chronic diseases may lead to impaired physical functioning and make patients more prone to psychological problems, such as anxiety and depression, which affect their psychosocial adaptability [28]. It is suggested that healthcare professionals need to comprehensively consider the physical and psychological

health status of HD patients with multiple chronic diseases and provide appropriate psychosocial support and intervention.

4.2.3. Fear of disease progression decreases psychosocial adaptation in HD patients

This study showed that the FoP score of HD patients was 29.43 ± 8.15, which was at a moderately low level compared with the middle value of the scale, 36, and was consistent with the results of the study by Zhang *et al.* [5] and lower than that of the study by Zhang *et al.* [4]. The more severe the degree of FoP of HD patients was, the more the problem of psychosocial adaptation was, which was consistent with the results of the study on patients with breast cancer [29]. FoP is the most common negative emotion and is closely related to quality of life [30]. It has been pointed out that prolonged and/or excessive fear reduces patients' adherence to disease treatment, increases healthcare costs, and affects their psychosocial functioning, which in turn affects their quality of life [11]. Patients with a high degree of FoP are often accompanied by psychological problems, such as depression and sleep disorders [31], and they may also take an avoidant approach to face their lives, which may reduce their social activities and produce social alienation [32]. In addition, long-term FoP may lead to a psychological imbalance in which patients are unable to mobilize their positive psychological resources to cope with the disease and are prone to negative emotions such as depression, which in turn affects the ability to adapt to the disease [4]. It is suggested that healthcare professionals can adopt methods such as self-expression intervention to help patients overcome their fear [33], which is conducive to enhancing their psychosocial adaptability.

4.2.4. Improving personal mastery helps to improve the psychosocial adaptation of HD patients

This study shows that personal mastery is an influential factor in the psychosocial adaptation of HD patients. The score of HD patients' personal mastery is 20.07 ± 5.71, which is at a medium level compared with the scale's median value of 21. The higher the patient's sense of personal control, the higher the level of psychosocial adaptation. However, the score found in this study is lower than that of the study by Zhao *et al.* [34] on kidney transplant patients. The possible reason for this is that hemodialysis treatment requires two to three trips to and from the hospital each week, which is highly likely to consume patients' confidence in controlling their lives and illnesses, and some patients also have to endure various complications brought about by dialysis, and thus pessimism can occur, resulting in a lower sense of psychological control. It is suggested that healthcare workers can carry out cognitive-behavioral interventions for HD patients to strengthen their motivational beliefs, enhance their sense of control, and prompt them to better adapt to the disease.

5. Summary

The psychosocial adaptation of HD patients is at the level of severe maladaptation, and marital status, form of payment for medical expenses, work status, degree of self-care in daily life, number of comorbid chronic diseases, fear of disease progression, and sense of personal control are the main influencing factors of the psychosocial adaptation of HD patients. Based on the findings of this study, future qualitative research can be conducted to deeply explore the psychosocial adaptation of HD patients, based on which nursing programs to enhance psychosocial adaptation can be formulated and interventional studies can be conducted to ultimately enhance their psychosocial adaptation.

Disclosure statement

The authors declare no conflict of interest.

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