



Research Article

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Determinants of Social Functioning in Peritoneal Dialysis Patients: A Cross-Sectional Analysis

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Abstract

Objective: This study aimed to assess the status of social functioning and identify associated factors among patients undergoing peritoneal dialysis (PD).

Methods: A cross-sectional study was conducted between January 2023 and February 2025 to determine the relative factors for social functioning in peritoneal dialysis patients. Participants completed the General Information Questionnaire, the Chinese version of the Social Dysfunction Screening Scale, the Family APGAR Index, the Hospital Anxiety and Depression Scale, the Medical Coping Modes Questionnaire, and the Social Support Rating Scale.

Results: A total of 292 patients were enrolled in our study. A significant difference was observed between social functioning and employment, current or former occupation, monthly income, family and economic burden, primary disease and peritoneal transport type ($P < 0.05$). Correlation analyses indicated that social functioning was positively associated with depression ($r = 0.692$, $P < 0.001$). Higher levels of social dysfunction were negatively correlated with family functioning ($r = -0.614$), total social support ($r = -0.258$), subjective social support ($r = -0.141$), social support utilization ($r = -0.557$), confrontation ($r = -0.542$), and acceptance-resignation ($r = -0.690$) (all $P < 0.001$). Multiple linear regression identified age, family and economic burden, family functioning, subjective social support, social support utilization, confrontation, acceptance-resignation, and depression as independent predictors of social functioning in PD patients.

Conclusions: This study identified key factors influencing social functioning among PD patients. Health care providers should comprehensively evaluate these determinants and implement individualized rehabilitation strategies to facilitate social reintegration in this population.

Keywords: Peritoneal dialysis; social functioning; factors

Introduction

End-stage renal disease (ESRD) has been a major public health problem worldwide. ESRD represents a clinical condition with an irreversible loss of kidney function and a degree sufficient to

render the patient permanently dependent on renal replacement therapy to avoid life-threatening uremia [1]. Dialysis, a long-term and time-consuming treatment, remains the major choice for ESRD

patients at present [2]. Peritoneal dialysis (PD) is a well-established and common renal replacement therapeutic modality for ESRD patients [3-5].

With the transformation of the health care model and the development of the concept of health, treatment of ESRD patients aims not only at prolonging life, but also achieving the greatest possibility of well-being and functional capacity. Patients on PD often face lifelong pharmacological therapy, strict dietary and fluid restrictions, and limitations in physical and social activities [6-8]. Meanwhile, they have to deal with the complications of their disease, such as peritonitis, catheter exit site infections and dialysis efficiency [9-11], as well as psychosocial challenges including changes in body image and redefinition of personal and professional roles [12-13]. On these grounds, PD patients might develop psychological, physical and social problems in the process of pertaining to their new lifestyle. Those problems might adversely affect patients' quality of life (QOL) by disrupting their adaptation mechanisms [14-15], potentially having a reflect on dialysis patients' social functioning and well-being. Therefore, understanding the relative factors of social functioning is essential for optimizing individualized treatment strategies, enhancing rehabilitation outcomes, and improving the quality of care.

While prior research mostly focused on medical and technical aspects of renal replacement therapy, social functioning was recently being explored as a critical outcome in dialysis patients. Previous studies have suggested that age and socioeconomic status may influence the social functioning of PD patients [16]. However, other potentially important determinants including marital status, primary disease, depression, and anxiety have received limited attention. Therefore, the present study aimed to assess the status of social functioning and to identify associated factors among patients undergoing peritoneal dialysis.

Methods

Subjects

This cross-sectional observational study recruited patients who were receiving PD therapy at a tertiary hospital between January 2023 and February 2025. Eligible participants were identified through the hospital dialysis registry and screened according to predefined criteria. The inclusion criteria were as follows: patients diagnosed with ESRD who had been undergoing continuous PD therapy for at least 3 months. Exclusion criteria included: (1) patients with comorbid conditions that could interfere with the accurate assessment of social functioning, such as dementia, severe hearing impairment, or clinically significant cognitive dysfunction; and (2) patients who had received other forms of renal replacement therapy (e.g., hemodialysis, renal transplantation) prior to or during the study period.

All eligible patients were approached by trained research staff and informed about the purpose and potential implications of the study. Written informed consent was obtained prior to enrollment. Demographic and clinical data, including age, sex, primary renal

disease, duration of dialysis, comorbidities, and socioeconomic status, were collected from medical records and structured questionnaires.

Study Design and Procedure

Patients who fulfilled the predefined inclusion and exclusion criteria were consecutively recruited during routine follow-up visits at the PD center. To ensure the accuracy and reliability of data collection, all participants were interviewed individually by trained research staff with a medical background. Interviews were conducted in a private and comfortable environment within the PD center to protect patient confidentiality and minimize potential distractions or discomfort.

Each participant was required to complete a comprehensive set of standardized questionnaires, administered in the validated Chinese versions, which included:

- a) General Information Questionnaire - to collect demographic and clinical data such as age, sex, marital status, educational level, occupation, monthly income, family and economic burden, primary disease, peritoneal transport type.
- b) Social Dysfunction Screening Scale (SDSS) - to assess the degree of social functioning impairment.
- c) Family APGAR Index - to evaluate family functioning and perceived family support.
- d) Hospital Anxiety and Depression Scale (HADS) - to measure levels of anxiety and depressive symptoms.
- e) Medical Coping Modes Questionnaire (MCMQ) - to assess coping styles, including confrontation, avoidance, and acceptance-resignation.
- f) Social Support Rating Scale (SSRS) - to evaluate the level and utilization of social support.

All questionnaires were administered in paper-and-pencil format and checked for completeness immediately after completion. Where necessary, research staff provided standardized clarifications to participants. The collected data were subsequently entered into a database.

Statistical analysis

All statistical analyses were performed using R (version 4.4.0). Continuous variables were described by using means and standard deviations or medians with inter-quartile ranges. Categorical variables were summarized using frequencies and percentages. The univariate analysis was performed between social functioning and demographic and clinical factors. The correlations of social functioning, social support, coping style, anxiety, depression and family functioning were analyzed by Pearson correlation coefficient or Spearman's rank correlation coefficient. The relationship between the social functioning and related variables was evaluated by Multiple linear regression analysis. All statistical analyses were two-sided, and $P < 0.05$ was considered statistically significant.

Results

Demographic Characteristics and Social Functioning of Patients

A total of 292 patients undergoing PD successfully completed

the questionnaires. Of these, 156 (53.42 %) were male and 136 (46.58 %) were female. The mean age of participants was 42 years. The median duration of PD treatment was 23.0 months, with a range of 13 to 142 months. Detailed sociodemographics and clinical characteristics of the study population are summarized in Table 1.

Table 1: Distribution of the sociodemographics and clinical features of the patients undergoing peritoneal dialysis(n=292).

Characteristics	n(%) or Mean $\pm$ SD
Age,years	42.18 $\pm$ 11.98
Sex	
Male	156(53.42)
Female	136(46.58)
Marriage	
Married	268(91.78)
Unmarried	24(8.22)
Educational Levels	
(Pre)primary	104(35.62)
Junior high school	112(38.36)
High school and college	48(16.43)
University and upper	28(9.59)
Employment	
Employed	48(16.44)
Unemployed	244(83.56)
Current or Former Occupation	
Worker	32(10.96)
Farmer	168(57.53)
Cadre	16(5.48)
Office worker	20(6.85)
Businessman	28(9.59)
Teacher	4(1.37)
Others	24(8.22)
Monthly Income	
<1000RMB	94(32.19)
1000-3000RMB	123(42.12)
3000-5000RMB	32(10.96)
>5000RMB	43(14.73)
Family and Economic Burden	
None	12(4.11)
Light	36(12.33)
Severe	244(83.56)
Primary Renal Disease	
hypertensive renal injury	64(21.92)
Diabetic nephropathy	16(5.48)
Chronic glomerulonephritis	180(61.64)
Polycystic kidney disease	12(4.11)

Others	20(6.85)
Peritoneal Transport Type	
High peritoneal transport	100(34.25)
High average peritoneal transport	136(46.58)
Low average peritoneal transport	52(17.81)
Low peritoneal transport	4(1.36)

Demographic and Clinical Factors of Social Functioning

Univariate analyses demonstrated that social functioning significantly differed across subgroups defined by employment status, current or former occupation, monthly household income, family and economic burden, primary renal disease, and peritoneal

transport type ($P < 0.05$ for all). In contrast, no significant associations were observed between social functioning and gender, marital status, or educational attainment (Table 2). These findings suggest that socioeconomic and disease-related factors may exert a greater influence on social functioning in PD patients compared with basic demographic variables.

Table 2: Effect of sociodemographics and clinical features on the social functioning in patients undergoing peritoneal dialysis(n=292).

Characteristics	SDSS score*	F/t	P
Gender		-1.816	0.07
Male	4.51±0.17		
Female	4.97±0.18		
Marriage		0.351	0.728
Married	4.72±0.14		
Unmarried	4.83±0.31		
Educational Status		0.399	0.754
(Pre)primary	4.58±0.19		
Junior high school	4.89±0.19		
High school and college	4.67±0.35		
University and upper	4.71±0.47		
Employment		-2.181	0.033
Employed	4.00±0.38		
Unemployed	4.87±0.13		
Current or Former Occupation		8.797	<0.001
Worker	6.38±0.31		
Farmer	4.40±0.16		
Cadre	3.50±0.74		
Office worker	4.60±0.34		
Businessman	6.29±0.34		
Others	4.00±0.42		
Monthly Income		15.135	<0.001
<1000RMB	5.59±0.14		
1000-3000RMB	4.77±0.19		
3000-5000RMB	4.09±0.43		
>5000RMB	3.19±0.36		
Family and Economic Burden		13.18	<0.001
None	3.00±0.49		
Light	3.44±0.38		
Severe	5.00±0.13		
Primary Disease		6.396	<0.001

Hypertensive renal injury	5.69±0.19		
Diabetic nephropathy	4.00±0.78		
Chronic glomerulonephritis	4.62±0.16		
Polycystic kidney disease	3.00±0.85		
Others	4.20±0.39		
Peritoneal Transport Type		8.156	<0.001
High peritoneal transport	4.84±0.19		
High average peritoneal transport	4.94±0.18		
Low average peritoneal transport and low peritoneal transport	3.69±0.31		

Correlations between Social Functioning, Social Support, Coping Style, Anxiety, Depression and Family Functioning

Correlation analyses further clarified the psychosocial dimensions associated with social functioning. A positive correlation was observed between social functioning and depressive symptoms ($r = 0.692$, $P < 0.001$), indicating that higher levels of depression were associated with poorer social functioning. Conversely, social

functioning was negatively correlated with several protective psychosocial factors, including family functioning ($r = -0.614$), overall social support ($r = -0.258$), subjective social support ($r = -0.141$), social support utilization ($r = -0.557$), confrontation coping style ($r = -0.542$), and acceptance-resignation coping style ($r = -0.690$) (all $P < 0.001$). These results underscore the complex interplay between psychosocial resources, coping mechanisms, and mental health in shaping social functioning outcomes (Table 3).

Table 3: Correlation of social functioning, family functioning, social support, coping style, anxiety and depression.

Items	Social functioning score(r)	P
Family functioning	-0.614	<0.001
Social Support		
Total score	-0.258	<0.001
Objective social support	-0.006	0.921
Subjective social support	-0.141	0.016
Degree of social support utility	-0.557	<0.001
Coping Style		
Confrontation	-0.542	<0.001
Acceptance-resignation	-0.69	<0.001
Depression	0.692	<0.001

Independent Factors Associated with Social Functioning: Multiple Linear Regression Analysis

To identify independent predictors of social functioning, multiple linear regression analysis was performed. The final model revealed that age, family and economic burden, family functioning, subjective social support, degree of social support utilization,

confrontation coping, acceptance-resignation coping, and depression remained significant determinants of social functioning in PD patients (all $P < 0.05$). Together, these factors explained a substantial proportion of the variance in social functioning scores, highlighting the multidimensional nature of social adaptation in this population (Table 4).

Table 4: Multiple linear regression analysis of the factors associated with social functioning in patients undergoing peritoneal dialysis.

	Coefficient	Standardized Coefficient	t	P
Age	0.012	0.066	2.212	0.028
Family and Economic Burden	0.616	0.142	4.660	<0.001
Family Functioning	-0.223	-0.219	-5.856	<0.001
Subjective Social Support	-0.066	-0.129	-4.476	<0.001
Degree of Social Support Utility	-0.294	-0.281	-7.085	<0.001
Confrontation	-0.122	-0.166	-4.948	<0.001
Acceptance-Resignation	0.116	0.133	3.533	<0.001
Depression	0.169	0.315	8.813	<0.001

Discussion

Dialysis treatment is frequently accompanied by a range of debilitating symptoms, including reduced functional capacity, physical and psychological fatigue, and impaired cognitive performance. These complications may further result in altered sexual function, fear of death, and loss of social roles [17,18]. In the present study, we found that 84.93% of patients undergoing PD experienced social dysfunction, underscoring the substantial burden of the disease beyond its physiological impact. Our main findings demonstrated that social dysfunction was independently associated with age, family and economic burden, impaired family functioning, inadequate social support, maladaptive coping styles, and depressive symptoms.

Our study indicated that age was a key determinant of social functioning in PD patients, which is consistent with previous reports [16]. Elderly individuals receiving PD are more vulnerable to frailty, disability, and frequent hospitalizations due to age-related physiological decline and dialysis-related metabolic alterations [19,20]. These factors may lead to functional limitations and loss of independence in daily living activities, thereby reducing the ability to maintain social roles and interactions [21]. In addition, the present study highlighted the importance of family and economic burden as independent predictors of social dysfunction. With a mean age of 42 years, many patients in our cohort were within the prime of their working and family-supporting years. The dual stress of family responsibilities and financial strain -particularly due to medical expenses-may exacerbate social withdrawal. Similar findings were reported by Xu et al. [22], who demonstrated that poor economic conditions and heavy family burden not only impaired health care access but also adversely affected long-term survival, further contributing to social dysfunction.

Furthermore, the family functioning and social support turned out to be significant related factors for social functioning. Family support and broader social networks are recognized as critical facilitators of adjustment, enabling patients to cope with lifestyle changes and psychosocial challenges imposed by chronic dialysis [23-26]. Prior studies confirmed that family function played an important role in quality of life among hemodialysis patients [27,28]. Similarly, enhanced social support has been linked to improved health outcomes, suggesting that interventions aimed at strengthening patients' support systems may have tangible benefits for clinical prognosis [29,30].

Our findings showed that coping style and depression were independently associated with social functioning in our cohort. Chronic dialysis imposes physical limitations, reduces opportunities for social participation, and creates uncertainty about the future, all of which challenge psychological resilience [31]. Confrontation coping, as an adaptive strategy, may positively influence well-being by encouraging proactive learning, treatment adherence, and disease management. This observation aligns with findings by Taylor et al. [32], who demonstrated that active coping was associated with better physical health outcomes. Conversely, reliance on acceptance-resignation coping was associated with

pessimism, poor adherence to medical regimens, and reduced rehabilitation engagement [33], thereby exacerbating social dysfunction. Moreover, our study reinforced the well-established association between depression and impaired social functioning in dialysis patients [34,35]. Depression is highly prevalent in ESRD and has been consistently linked with increased mortality risk and diminished quality of life [36-38].

Despite these important findings, several limitations should be acknowledged. First, the cross-sectional design precludes causal inference, and longitudinal studies are warranted to explore dynamic changes in social functioning over time. Second, the study sample was drawn from a single PD center, which may limit the generalizability of our results. Future multicenter investigations with larger and more diverse populations are needed to validate and extend our findings.

Conclusion and Clinical Implications

In conclusion, the majority of PD patients in our study experienced social dysfunction, with independent risk factors including older age, heavy family and economic burden, poor family functioning, limited social support, maladaptive coping strategies, and depressive symptoms. These findings emphasize the need for a multidimensional approach to patient care. Health care providers should systematically assess psychosocial as well as clinical factors and implement multidisciplinary rehabilitation strategies, such as psychological counseling, family support programs, social reintegration training, and targeted coping interventions, to promote holistic recovery and improve the social functioning of patients undergoing peritoneal dialysis.

Declarations

All the authors declared no competing interests.

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