International Journal of General Medicine

Dovepress
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ORIGINAL RESEARCH

Incidence and Influencing Factors of Demoralization Syndrome in Elderly Maintenance Hemodialysis Patients: A Multi-Center Cross-Sectional Study

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Objective: This observational study aimed to investigate the prevalence and influencing factors of demoralization syndrome (DS) in elderly maintenance hemodialysis (MHD) patients, with a focus on improving their psychological distress levels.

Methods: Convenient sampling was used to select 350 MHD patients aged 60 or older from three tertiary hospitals in China. Data was collected using questionnaires, including the Chinese version of the DS Scale. Statistical analysis was conducted using SPSS 26.0 software.

Results: Single factor analysis revealed that sex, average monthly household income, living alone, dialysis duration, complications, and self-care abilities were significant influencers of DS levels. The average DS score was moderately high, with 59.4% of patients scoring in the high range. Multivariable linear regression identified average monthly household income, dialysis duration, complications, and self-management abilities as independent factors impacting DS.

Conclusion: The study highlighted the importance of addressing complications, enhancing social support, improving self-management skills, and tailoring individualized hemodialysis plans to reduce DS levels and alleviate psychological distress in elderly MHD patients. These findings provide valuable insights for healthcare providers aiming to enhance patient well-being in this population.

Keywords: demoralization syndrome, hemodialysis, end-stage renal disease

Introduction

End-stage renal disease (ESRD), which is the fifth and final stage of chronic kidney disease (CKD), can develop from a variety of causes and is known for significantly reducing quality of life and increasing mortality rates.[1] Kidney transplantation is considered the best renal replacement therapy. However, due to the limitations of kidney transplantation, hemodialysis often becomes a more common choice and is a highly effective treatment for ESRD. Recent studies have projected that around 5 million ESRD patients worldwide will require HD as their kidney replacement therapy by the year 2030.[2] Despite significant advancements in the treatment and management of HD patients, the long-term outlook for these individuals continues to be bleak. Regardless of the type of dialysis received, individuals with ESRD typically experience a reduced health-related quality of life compared to the general population.[3] A variety of factors contribute to this decrease in quality of life, including diminished physical abilities and social engagement, heightened psychological distress, and the presence of distressing symptoms such as frailty, restless legs, itching skin, and fatigue.[4] Furthermore, the lifelong necessity of undergoing dialysis treatments to sustain the lives of ESRD patients has a profound impact on both their physical and mental well-being. Advanced age, decreased physical activity levels, and unemployment have all been identified as factors that exacerbate depression in individuals undergoing HD.[5] Unfortunately, many healthcare

Received: 11 December 2024
Accepted: 4 February 2025
Published: 15 February 2025

providers overlook the psychological issues of depression and anxiety in this patient population, especially in those nearing the end stages of their illness. It is imperative to gain a more comprehensive grasp of the frequency of these disorders and the underlying factors that intensify their impact on elderly HD patients.

Demoralization syndrome (DS) is a psychological state of distress triggered by a series of life events, characterized by feeling unable to cope or a subjective sense of incapability when faced with stress.[6] It manifests primarily as a sense of powerlessness, loneliness, and despair, commonly observed in terminally ill, cancer patients, and individuals with chronic illnesses.[7–9] Research suggests that DS is closely associated with demographic characteristics, psychological capital, disease cognition, and coping mechanisms, and can lead to patients losing a sense of purpose in life and experiencing poor outcomes, including suicidal ideation.[10] Research indicates that 27.4% to 59.1% of patients with chronic diseases experience DS.[11] DS not only leads to sleep disorders, decreased quality of life, and increased family burden, but can also result in suicidal thoughts or behaviors in severe cases, thereby reducing their life expectancy.[12] Therefore, healthcare providers should pay attention to DS in patients with chronic diseases and take appropriate measures to reduce the incidence of apathy syndrome in this population.

Long-term patients with DS will have negative impacts on both their physical and mental health, hindering the recovery and treatment of the disease. Some DS patients may be overlooked by clinical doctors because they do not meet the diagnostic criteria for depression, which could be a hidden danger that hinders the patient's recovery and treatment. Currently, domestic scholars have expressed interest in DS, yet research primarily focuses on cancer patients, with scant studies specifically addressing maintenance hemodialysis (MHD) patients.[13] Studies on delirium in younger or middle-aged MHD patients may not be generalizable to the elderly due to aging-related factors. There is a lack of literature on delirium in elderly MHD patients. Our study is the first to focus on this high-risk elderly MHD population, aiming to improve understanding and identify effective interventions to improve outcomes.

Materials and Methods

Research Subjects

Convenient sampling was used to select MHD patients from three tertiary hospitals in Baoding, Hebei Province in China, as the survey subjects from April 2024 to October 2024. Inclusion criteria: diagnosed with ESRD, undergoing MHD for at least 3 months; aged 60 or older; clear consciousness and capable of unobstructed communication. Exclusion criteria: a history of mental illness; recent major life events such as accidents or bereavement. Sample size calculation: Multiple linear regression analysis will be employed in this study, requiring a sample size of 5–20 times the number of independent variables. With an estimated 20 independent variables and accounting for a 20% non-response rate, the calculated sample size should range from 80 to 360 cases. This study was approved by the Ethics Committee of Baoding No.1 Central Hospital (Ethics Approval Number: 2024198), and according to the Declaration of Helsinki, all participants have provided informed consent forms. The flowchart can be seen in Figure 1.

Research Tools

Patient General Information Questionnaire

Designed by the researchers themselves, this questionnaire includes two parts. Part 1: Demographic information such as age, sex, smoking, drinking, education, marital status, living alone, healthcare payment methods, average monthly household income, and self-care abilities. Part 2: Disease-related information, including dialysis duration and number of complications.

Chinese Version of the DS Scale

DS is a psychological condition characterized by distress resulting from a series of life events, manifesting as an inability to cope or a subjective perception of incompetence in stressful situations.[6] The DS Scale was developed by Hong Xiaoqi et al based on the English version of the Kissane DS Scale,[14] with cultural adaptation by Liu Peipei, et al, to assess the condition of patients experiencing DS. It includes items related to feelings of meaninglessness (5 items), depression (5 items), unrest (5 items), failure (5 items), and helplessness (4 items). Scores range from 0 to 4 based on the severity level,

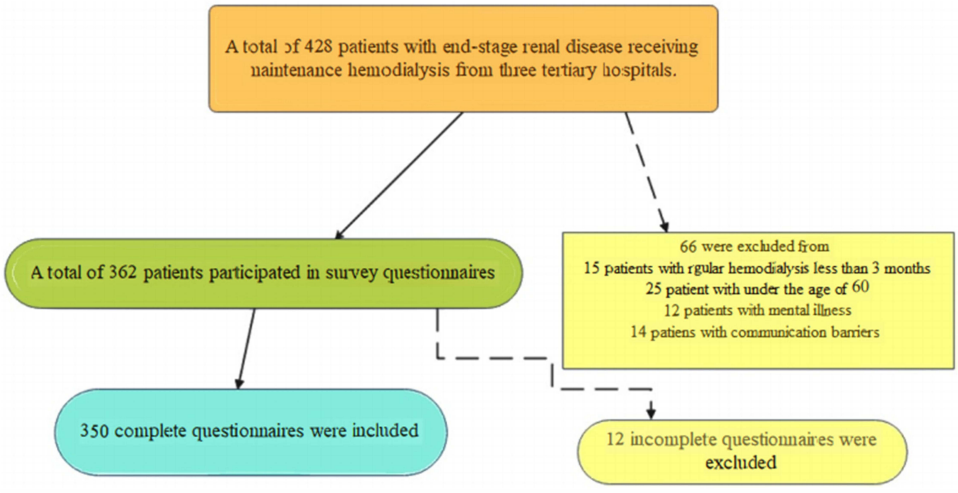

Figure 1 Flowchart illustrating the process of selecting patients for the study.

with a total score of 96. Higher scores indicate a more severe DS, with 0 to 30 points classified as low level, 31 to 60 points as moderate level, and 61 to 96 points as high level. The total Cronbach's α coefficient for the scale is 0.97.

Dialysis Mode

All patients underwent MHD using polysulfone membrane dialyzers, dialysis machines, and bicarbonate dialysate manufactured by Fresenius Medical Care in Germany. Hemodialysis sessions occurred thrice weekly. During each session, low molecular weight heparin served as an anticoagulant to prevent coagulation. Blood flow was maintained at 220 mL/min, while dialysate flow was set at 500 mL/min.

Data Collection Methods

The data was collected using a combination of paper-based questionnaires and electronic surveys. The researchers provided uniform training to the surveyors, who used standardized guidelines to explain the requirements to the participants before conducting the surveys. Consistent answers were given to any queries raised by the participants. For those with difficulty in writing or reading, the surveyors read out each item in a non-leading manner and assisted them in filling out the questionnaire. Upon completion, the survey was collected on the spot, checked for any missing items, and promptly supplemented to ensure full completion.

Statistical Methods

Statistical analysis was conducted using SPSS 26.0 software. Normality tests were performed on quantitative data, with data conforming to a normal distribution presented as x±s. Non-normally distributed data was represented using median and quartiles. Group comparisons were made using *t*-tests or one-way analysis of variance. Descriptive statistics such as frequencies and percentages were used for categorical data, with group comparisons analyzed using chi-square tests. Multiple linear regression was employed to analyze the factors impacting the development of DS. A significance level of $P<0.05$ was considered statistically significant for detecting differences.

Results

Comparison of Baseline Characteristics for DS in Elderly MHD Patients

A total of 362 questionnaires were distributed, with 350 valid questionnaires returned, yielding an effective recovery rate of 96.7%. A total of 350 elderly MHD patients were included, with 62.3% being male and 37.7% female. Among them, 65.1% were between 60–70 years old, 30.0% were between 71–80 years old, and 4.9% were over 80 years old. The results indicate that female MHD patients are more susceptible to DS ($P<0.01$). MHD patients who live alone are

similarly more prone to developing DS (P<0. 01). Patients with a higher number of complications and poor self-care abilities also have an increased probability of developing it (P<0. 01). As dialysis duration extends, the likelihood of patients developing DS gradually increases (P=0.006). Additionally, the prevalence of DS is inversely proportional to the family's average monthly income (P<0. 01). On the other hand, there were no significant differences in age, smoking status, alcohol consumption, education level, marital status, healthcare payment methods, duration of hemodialysis, dry weight target, over-dry weight target, ultrafiltration rate, blood flow rate, and dialysis fluid flow rate (P > 0.05). For specific details, refer to Table 1.

Table 1 The General Data of Demoralization Syndrome for These Elderly Patients with Maintenance Hemodialysis (n=350)

Variables	N(%)	Scores of Demoralization Syndrome	*P*
Gender, n(%), Men	218 (62.3%)	42.3±6.90	**<0. 01**
Women	132 (37.7%)	58. 5±8.60	
Age, (Years), 60~ 70	228 (65.1%)	59. 4 ±7.60	0.186
71~ 80	105 (30.0%)	56.3 ±6.80	
>80	17 (4.9%)	62. 6 ±9.30	
Smoking, n(%), Yes	148 (42.3%)	48. 5 ±7.30	0.486
No	202 (57.7%)	46. 7 ±5.90	
Drinking, n(%), Yes	264 (75.4%)	48.5±6.40	0.531
No	86 (24.6%)	46. 3 ±7.80	
Education, n(%),			0.243
Middle school or below	88 (25.1%)	42. 3 ±6.90	
High school or vocational school	76 (21.7%)	45.8 ±8.70	
College or above	186 (53.2%)	47. 3 ±6.50	
Marital Status n(%), Married	275 (78.6%)	45.6 ±5.20	0.732
Unmarried	17 (4.9%)	44.3±6.30	
Divorced	48 (13.7%)	48.9±6.90	
Windowed	10 (2.8%)	42. 3 ±7.90	
Average Monthly Household Income (Yuan), n(%)			
<3000	124 (35.4%)	68. 3±8.60	**<0. 001**
3000~ 5000	171 (48.9%)	49. 2±9.60	
>5000	55 (15.7%)	40. 3±6.70	
Living Alone, n(%), Yes	48 (13.7%)	68.2±8.60	**<0.001**
No	302 (86.3%)	48. 9±7.30	
Healthcare Payment Methods, n(%)			0.238
Rural Cooperative Medical Scheme	167 (47.7%)	48. 3 ±6.70	
Health insurance	86 (24.6)	52. 3±6.80	
Urban residents	76 (21.7%)	46. 8±8.70	
Others	21 (6.0%)	48.5±8.60	
Dialysis Duration (Years), n(%)			**0.006**
<2	48 (13.7%)	42. 8±7.20	
2~ 5	135 (38.6%)	51. 8±8.60	
>5	167 (47.7%)	66. 3±8.40	
Complications, n(%)			**<0.001**
<3	56 (16.0%)	40. 6±5.30	
3~ 5	186 (53.1%)	49. 4±8.40	
>5	108 (30.9%)	71. 7±11.40	

(*Continued*)

Table 1 (Continued).

Variables	N(%)	Scores of Demoralization Syndrome	*P*
Self-care abilities, n(%)			
All	186 (53.1%)	45.2±5.90	**<0. 001**
Partly	127 (36.3%)	57.6 ±8.30	
No	37 (10.6%)	70. 4±9.30	
Duration of hemodialysis (hrs)	4.0 (3.5, 4.0)	4.0 (3.5, 4.0)	0.99
Dry weight target (kg)	74.8 (64.0, 109.8)	81.7 (39.5, 110.3)	0.37
Over dry weight target (kg)	4.2 (2.4, 4.9)	4.5 (3.7, 6.2)	0.51
Ultrafiltration rate (mL/kg/hr)	10.5 (7.3, 14.8)	10.8 (8.8, 14.2)	0.63
Blood flow rate (mL/min)	220.4 (175.3, 238.6)	225.6 (182.5, 242.9)	0.54
Dialysis fluid flow rate (mL/min)	500 (480, 500)	500 (480, 500)	0.99

Note: The bolded text indicates statistical significance.

The Level of DS in Elderly MHD Patients

The total score on the DS Scale for these patients was (68.7 ± 9.4) points, with item scores averaging (2.8 ± 0.7) points. Overall, the level of DS was moderately high, with 59.4% of patients scoring in the high range, 27.3% in the moderate range, and 13.3% in the low range (Figure 2). Dimension scores were represented by the item average score, as shown in Table 2 and Figure 3.

Correlation Analysis of DS and Each Statistically Significant Variable

We analyzed the correlation between DS and factors such as gender, average monthly household income, living alone, duration of dialysis, comorbidities, and self-care ability. The results indicated that these factors have significant statistical relevance with depressive symptoms. Please refer to Table 3 for specific coefficients.

Multivariable Linear Regression Analysis of DS in Elderly MHD Patients

Using the DS score as the dependent variable in the Chinese version, significant variables from the univariate analysis were selected as independent variables. Categorical variables were assigned values as shown in Table 4, while the

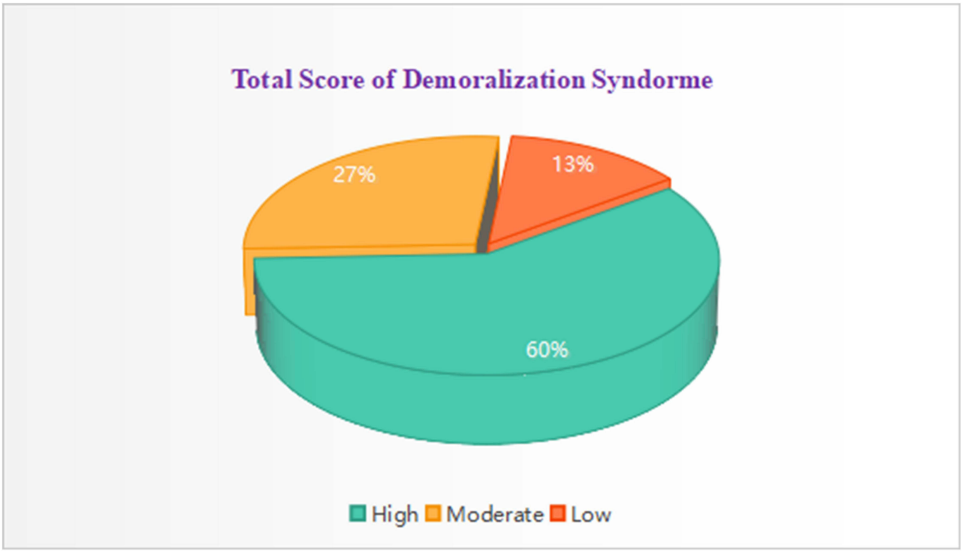

Figure 2 Chart showing the distribution of high, moderate and low total scores in these patients with demoralization syndrome.

https://doi.org/10.2147/IJGM.S511458

Table 2 Score of Demoralization in These Elderly Maintenance Hemodialysis Patients

Item	Unmeaning	Discouraged	Unrest	Failure	Helplessness	Total Score
Scoring Range	0~20	0~20	0~20	0~20	0~16	0~96
Scoring (x±s)	18.2±8.40	15.3±6.80	12.3±9.40	11.9±8.60	10.6±5.30	68.7±9.40

remaining variables were inputted as their original values. The results of the multivariable linear regression analysis showed that average monthly household income, dialysis duration, complications, and self-management abilities were independent influencing factors of DS ($P<0.05$). Patients with longer dialysis duration and more complications had higher DS scores, while patients with higher average monthly household income and stronger self-management abilities had lower DS scores. Refer to Table 5 for details.

Discussions

The results of the study showed that the Chinese version of the DS score for MHD patients was (68.7±9.4) points, with the overall level being in the moderate-to-high range. This could be due to ESRD causing patients to experience symptoms such as nausea, vomiting, and other discomfort, leading to a lower quality of life.[15] Additionally, as there is currently no specific cure for ESRD, patients may have lower hopes for treatment. Furthermore, the need for MHD may impact a patient's ability to work and carry out normal activities, potentially leading to an increased level of despair.[16] The highest scoring dimension in this study is "meaninglessness". When patients with uremia face challenges in treatment, such as the long-term impact of MHD, they may experience emotional loss, lose confidence in life, and feel a sense of meaninglessness. Compared to patients with cancer or post-heart transplantation, our MHD patients exhibited higher levels of demoralization, with psychological distress needing improvement. This could be attributed to the anxiety, depression, physical disabilities, and social role dysfunction commonly seen in these elderly MHD patients, leading to reduced self-efficacy.[17] Among patients undergoing MHD through arteriovenous fistula dialysis, frequent pain can indeed lead to the development of DS. Studies have shown a positive correlation between DS, depression, and suicidal ideation, with DS exhibiting a stronger association with suicide ideation and higher rates of suicide compared to depression.[18] However, the persistent feelings of low mood associated with DS can often be masked by other symptoms, making diagnosis challenging. Therefore, healthcare professionals should pay attention to the psychological status of elderly MHD patients, regularly assess them using the Chinese version of DS, identify high-risk patients of DS early, and provide targeted interventions such as meaning-centered therapy, dignity therapy, and narrative nursing to prevent the emergence of suicidal thoughts and improve their mental health and quality of life. Healthcare providers should prioritize

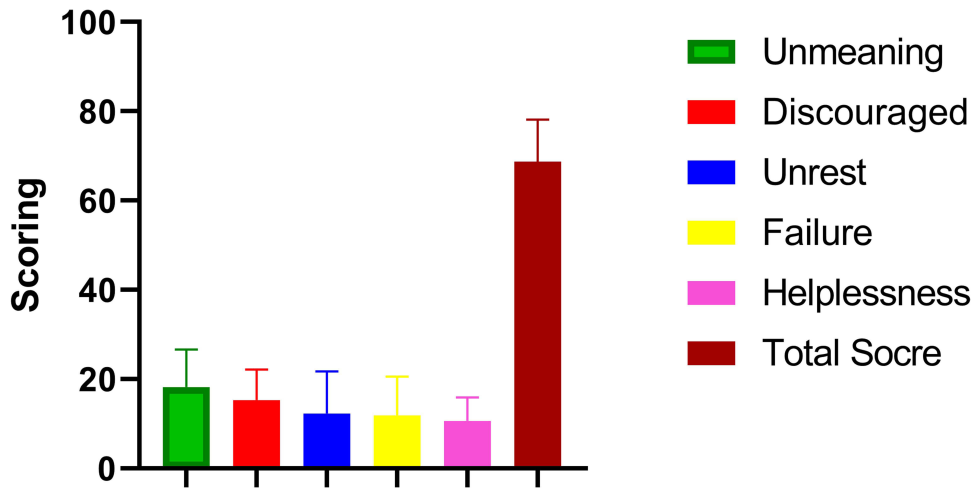

Figure 3 The mean ± standard deviation of various dimensions of demoralization syndrome in these patients.

Table 3 Correlation Analysis of Demoralization Syndrome (Y) and Each Statistically Significant Variable (X)

Variables	Demoralization Syndrome (Y)					
	Gender	**Average Monthly Household Income**	**Living Alone**	**Dialysis Duration**	**Complications**	**Self-Care Abilities**
r-value	0.374	−0.596	0.678	0.534	0.721	−0.572
P-value	<0.05	<0.01	<0.001	<0.01	<0.001	<0.001

Table 4 Categorical Variables Assignment Methodology

Variables	Values
Gender	Men=1, Women=2
Age (Years)	60~ 70=1, 71~ 80=2, >80=3
Smoking	No=0, Yes=1
Drinking	No=0, Yes=1
Education	Middle school or below=1, High school or vocational school=2, College or above=3
Marital Status	Married (Z1=0, Z2 =0, Z3=0), Unmarried (Z1=1, Z2 =0, Z3=0,), Divorced (Z1=0, Z2 =1, Z3=0), Windowed (Z1=0, Z2 =0, Z3=1)
Average Monthly Household Income(Yuan)	<3000=1, 3000~ 5000=2, >5000=3
Living Alone	No=0, Yes=1
Healthcare Payment Methods	Rural Cooperative Medical Scheme (Z1=0, Z2 =0, Z3=0), Health insurance (Z1=1, Z2 =0, Z3=0), Urban residents (Z1=0, Z2 =1, Z3=0), Others (Z1=0, Z2 =0, Z3=1)
Dialysis Duration (Years)	<2=1, 2~ 5 =2, >5=3
Complications	<3=1, 3~ 5 =2, >5=3
Self-care abilities	All=1, Partly=2, No=3

Table 5 Multiple Linear Regression Analysis of Factors Influencing Demoralization Syndrome in These Elderly Patients with Maintenance Hemodialysis (n=350)

Independent Variables	Regression Coefficient	Standard Error	Standardized Regression Coefficients	t	*P*
Constant	18.15	2.76	—	13.46	< 0.05
Female	4.90	0.79	0.16	6.76	0.253
Average monthly household income	−3.24	0.45	−0.17	4.60	**0.004**
Living alone	4.86	0.19	0.25	2.46	0.076
Dialysis duration	1.22	0.53	0.07	3.43	**0.008**
Complications	0.76	0.13	0.06	5.16	**<0.001**
Self-care abilities	−5.46	0.45	−0.19	6.42	**0.014**

Notes: R2=0.542, adjusted R2=0.516, F=56.319, P<0.001, The bolded text indicates statistical significance.

https://doi.org/10.2147/IJGM.S511458

understanding the family and social support of elderly MHD patients, offering them appropriate assistance, while also providing health education to enhance their coping abilities.

This study found that the higher the average monthly income per person in a household, the lower the level of DS in ESRD patients. Patients with uremia require long-term HD, which can be costly. In addition to the HD expenses, there are also additional medication costs to consider. HD can lead to various complications, necessitating long-term medication to control these complications. This results in ESRD patients from economically disadvantaged households bearing a heavier financial burden. Some financially strapped patients with uremia may even consider abandoning treatment, leading to a higher level of despair. Therefore, healthcare providers should pay special attention to individuals with low incomes or unemployment, actively providing information on medical insurance reimbursement, assistance for chronic diseases, and other related support services to help these patients save on treatment costs and alleviate their financial pressures. A cross-sectional study was conducted on DS in burn patients, which involved a total of 381 individuals.[19] The results showed that 17.3% of these patients exhibited mild demoralization, 63.3% had moderate demoralization, and 19.4% suffered from severe demoralization. The study also identified the average monthly income as a significant factor associated with the severity of DS in burn patients. These findings align with the results of our own research.

This study also found that the duration of MHD in patients with ESRD affects the level of DS, with a positive correlation observed between the duration of a single MHD session and DS levels. Previous studies have shown that the longer the duration of HD, the more complications arise.[20] In this study, there were patients who had been on MHD for over 5 years, experiencing complications such as pulmonary infections, electrolyte imbalances, strokes, heart failure, leading to long-term suffering and despair. The repetitive hospitalizations for MHD exacerbate the patients' exhaustion and depression, with some patients enduring the agonizing wait for a kidney donor, feeling helpless.[21] Healthcare providers can implement appropriate nursing interventions to help patients reduce their level of DS. Therefore, the interventions tailored to the different stages of DS in ESRD patients vary, focusing on symptom relief when patients face the pain and physical discomfort brought on by the illness itself, while providing informational support and comfort to those feeling powerless in the face of despair. It is essential for medical staff to identify the genuine needs of MHD patients, and tailor interventions based on the patients' stage of despair to prevent any negative psychological impact on the treatment outcomes.

In our study, we found a positive correlation between the number of complications and the levels of DS in elderly MHD patients. Specifically, we observed that as the number of complications increased, the severity of DS also increased. Previous studies have also reported similar associations between complications and DS in various patient populations.[22] This indicates that the presence of multiple health issues may contribute to the development or exacerbation of DS. One potential explanation for this relationship is the physiological impact that chronic illness and its related complications can have on the brain and cognitive function.[23] Chronic diseases often lead to inflammation, oxidative stress, and other pathways that can affect neurobiological processes and neurotransmitter systems involved in mood and motivation, potentially contributing to the development of DS.[24] Furthermore, the burden of managing multiple medical conditions may also lead to a sense of overwhelm and helplessness in patients, further contributing to feelings of DS in engaging with their healthcare or adhering to treatment plans. By highlighting the importance of considering the overall health status of these patients in relation to DS, our study underscores the need for a holistic approach to care that addresses both the physical and psychological well-being of individuals with ESRD.

In our research, we examined the relationship between self-management ability and DS in elderly MHD patients. We found that a stronger self-management ability was associated with lower levels of DS, indicating a negative correlation between the two variables. This finding is consistent with previous research on the topic. An observational study was conducted to examine the impact of self-management ability on the quality of life of HD patients.[25] The study found that health and nursing education play a crucial role in improving the well-being of patients with ESRD. Self-management, including symptom management, treatment adherence, and lifestyle changes, was identified as a key factor in maintaining and enhancing the quality of life for these patients. Another qualitative observational study conducted on Chinese older adults with chronic diseases revealed that improving self-management abilities can enhance the quality of life for patients.[26] The study identified three key self-management behaviors: self-monitoring, self-evaluating, and self-intervening. The findings of the study provide valuable insights for older adults and care providers in supporting and

enhancing self-management of chronic diseases, ultimately contributing to healthy aging. This suggests that interventions aimed at improving self-management abilities in elderly MHD patients may also help reduce DS. Further research is needed to clarify the relationship between self-management ability and DS in elderly MHD patients. Overall, Future studies should explore the underlying mechanisms of this relationship and evaluate the effectiveness of interventions targeting self-management skills in improving these patients outcomes.

This study has some limitations. Firstly, the convenience sampling method used may limit the generalizability of the results. The sample size is relatively small and includes only elderly MHD patients, which may not be applicable to other populations. Future studies could use multi-center data with a larger sample size to validate the results. Secondly, this study is a cross-sectional design. Longitudinal studies should be conducted to further investigate the incidence of DS in MHD patients and identify influencing factors, leading to the development and implementation of targeted intervention strategies. Additionally, some factors that may influence DS, such as HD mode and specific medications, were not included. It is recommended to consider these factors in future research to provide a more comprehensive understanding of DS in MHD patients.

Conclusions

This study aimed to investigate the prevalence and influencing factors of DS in elderly MHD patients. The study found that DS was moderate to moderately high in this population, with average monthly household income, hemodialysis duration, number of complications, and self-management ability identified as the main influencing factors. Healthcare professionals may help improve patient outcomes by addressing complications, enhancing social support, boosting self-management skills, developing individualized HD plans, and providing guidance on lifestyle modifications. These interventions can assist patients in effectively managing their condition, thereby reducing levels of DS and alleviating psychological distress, ultimately leading to better prognoses. The study was conducted across three tertiary hospitals, enhancing the reliability of its findings and providing a strong, scientific basis for reducing DS in MHD patients. This research offers valuable insights for healthcare providers seeking to improve patient well-being and quality of life in this population.

Data Sharing Statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of Baoding No.1 Central Hospital (Ethics Approval Number: 2024198), and according to the Declaration of Helsinki, all participants have provided informed consent forms. All methods were performed in accordance with the relevant guidelines and regulations.

Consent for Publication

Written informed consent was obtained from the patients for publication of this study.

Acknowledgment

We acknowledge the contributions of the colleagues in Baoding No 1 Central Hospital that aided the efforts.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

This study was supported by Baoding Science and Technology Plan Self-financing Project (2441ZF235,2441ZF236).

Disclosure

The authors declare no competing interests in this work.

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