

**Self-Care Strength and Exercise Perception in Dialysis Patients: Benefits, Barriers, and Affecting Factors****Zehra ESKİMEZ<sup>1\*</sup>, Pınar YEŞİL DEMİRCİ<sup>1</sup>, Saliha BOZDOĞAN YEŞİLOT<sup>1</sup>**  
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INFO****ABSTRACT**

This study was presented as an oral presentation at the 16th International Hippocrates Congress on Medicine and Health Sciences, held on October 3-4, 2024.

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**Keywords**

Dialysis  
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This cross-sectional study examined the influence of self-care strength and related factors on perceptions of exercise barriers and benefits among dialysis patients. The population included all individuals receiving dialysis in Adana, Turkey. The sample size was determined through power analysis (minimum 149), and the study was completed with 162 participants. Data were collected using the "Personal Information Form," the "Self-Care Strength Scale for Dialysis Patients (SSSDP)," and the "Scale of Exercise Benefits/Barriers in Dialysis Patients (SEBDP)." Participants' mean age was 42.69±12.63 years. The mean SSSDP score was 29.92±5.4, the Exercise Barriers score was 36.14±5.46, and the Exercise Benefits score was 30.72±5.08. The models explained 14.1% and 23.1% of the variance for exercise barriers and benefits, respectively. The findings highlighted moderate self-care strength and exercise benefit perceptions. Regular exercise significantly reduced perceived barriers and increased perceived benefits. Education level and health status were key factors influencing exercise perceptions. These results emphasize the importance of tailored interventions to enhance exercise engagement and self-care among dialysis patients.

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**Diyaliz Hastalarında Öz Bakım Gücü ve Egzersiz Algısı: Faydalar, Engeller ve Etkileyen Faktörler****MAKALE BİLGİSİ ÖZ**

Bu çalışma, 03-04 Ekim 2024 tarihleri arasında 16. Uluslararası Hipokrat Tıp ve Sağlık Bilimleri Kongresinde sözlü bildiri olarak sunulmuştur.

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**Anahtar Kelimeler**

Diyaliz  
Öz Bakım  
Egzersiz  
Algı

Bu kesitsel çalışma, diyaliz hastalarında öz bakım gücü ve kapsamlı egzersiz engelleri ve dayanıklılık algılaması üzerinde yoğunlaşmıştır. Araştırma evrenini Adana ilinde diyaliz tedavisi alan tüm bireyler oluşturuldu. Örneklem büyüklüğü güç analizi ile belirlenmiş (en az 149 kişi), çalışma 162 sonuçları ile tamamlanmıştır. Veriler, "Kişisel Bilgi Formu", "Diyaliz Hastaları için Öz Bakım Gücü Ölçeği (SSSDP)" ve "Diyaliz Hastalarında Egzersiz Faydaları/Engelleri Ölçeği (SEBDP)" yoluyla toplanmıştır. Katılımcıların yaşlanmayan 42,69±12,63 yıl, SSSDP toplam puanı değiştirilmeyen 29,92±5,4, Egzersiz Engelleri puan kaybetmeyen 36,14±5,46, Egzersiz ve Faydaları puanları değişmeyen 30,72±5,08 olarak . Modeller, egzersiz engelleri için %14,1'ini varyansın, egzersiz faydası için ise %23,1'ini açıklamıştır. Bulgular, günlük öz bakım gücü ve egzersiz kolaylığı algılarının orta düzeyde olduğu gösterilmiştir. Düzenli egzersizin algılanan engelleri önemli ölçüde koruduğu ve algılanan dayanıklılığı artırdığı şekilde uygulanır. Eğitim düzeyi ve sağlık durumu, egzersiz algısını şekillendiren önemli bölümler olarak ortaya çıktı. Bu sonuçlar, diyaliz hastalarında egzersiz miktarını ve öz bakım gücünü arttırmaya yönelik özel müdahalelerin gerekliliğini vurgulamaktadır.

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## INTRODUCTION

Chronic kidney disease is a common health problem worldwide, and its incidence is increasing (1). In the United States, 7-8% of the total population, about 23 million people, have chronic kidney disease, and 570,000 of them receive dialysis treatment or kidney transplantation (2). In Turkey, the prevalence of end-stage renal failure is stated as 1,007.6 per million population, and the incidence is 150.5 per million population (3).

Dialysis regulates the patient's fluid and electrolyte imbalance, prevents metabolic and extrarenal complications that may occur due to uremia, provides self-care, and thus improves the patient's quality of life (4, 5). Even though dialysis has positive effects, significant changes occur in patient's lives, including the necessity of going to a health institution and being connected to a machine on certain days and times of the week causes disruptions in the patient's family, work, and social life, and these disruptions negatively affect the patient's self-care strength (6,7).

Self-care is how individuals manage their lives and health and do their part to maintain their well-being (8). Self-care is an essential component that improves patients' ability to cope with the consequences of chronic conditions. Furthermore, self-care improves patients' ability to cope with the consequences of chronic conditions (9). Self-care levels of dialysis patients are essential in controlling the disease process and symptoms (10). Studies have shown that demographic factors such as individuals' age, gender, marital status, and educational status affect self-care strength (11,12). In addition, Moattari's study found a correlation between the level of self-care in dialysis patients and compliance with treatment, health-promoting behaviors, and reduction of physical and psychological symptoms (13).

Most dialysis patients have a sedentary lifestyle. The lack of exercise and sedentary lifestyles in kidney patients lead to several problems, including muscle atrophy and a decrease in capillary density, which in turn leads to a decrease in muscle strength (14,15,16). However, physical exercise is recognized as a crucial tool to correct or halt these problems (17,18). Physical exercise not only improves the exercise capacity, muscle strength, and functional capacity of patients receiving dialysis treatment, but also provides blood pressure control, reduces the risk of developing diabetes and cardiovascular disease, alleviates symptoms of depression and anxiety, and significantly increases survival and dialysis efficiency (16,18). Studies have also shown that regular exercise affects dialysis patients' self-care strength and improves physical power (19,20). However, it is emphasized that there is a significant deficiency in regular physical activity, optimal participation in exercise, and maintenance of these in individuals receiving dialysis treatment (21). Considering the effects of dialysis treatment on lifestyle and the positive effects of physical exercise, knowing the perception of barriers and benefits of exercise in individuals receiving dialysis treatment can be guiding in managing their lifestyle. Considering the benefits of exercise in individuals receiving dialysis treatment, this study aimed to examine the effect of the self-care strength and influencing factors of hemodialysis patients on their perceptions of exercise benefits and barriers.

## MATERIALS AND METHODS

### Study design and sampling

The study population consisted of individuals over the age of 18 living in Adana province and receiving dialysis treatment. The sample was calculated based on an a priori multiple regression analysis of 0.20 (~medium) for Self Care Strength for Dialysis (five subscales) and 21 affecting factors, with 80% Power and 5% Type I error. The sample was determined to be at least 149, and the study was completed with 162 participants who met the criteria. The study sample was reached using the snowball method.

## Inclusion Criteria for Research?

- Living in the city center of Adana,
- Having a dialysis treatment,
- Being 18 age or over
- Volunteering to take part in the research

## Data Collection Tools

**Personal information Form:** The personal information form prepared by the researcher on the subject consists of 13 questions (age, duration of dialysis treatment, number of treatments per week, gender, education level, marital status, living together with whom, working situation, income status, health insurance, dialysis treatment type, regular exercise status, additional chronic diseases) questioning the socio-demographic and dialysis process information about the individual (10,18,19).

**Self-Care Strength Scale for Dialysis Patients (SSSDP):** It was developed by Ören in 2010 and its validity and reliability was established (10). The scale is a triple Likert-type scale scored between 0-2. The individual is asked to choose one of the appropriate options on the scale according to the application of self-care behavior in daily life and is marked. Each item is answered as 'I always apply it', 'I sometimes apply it' and 'I never apply it'. The total score of the scale is between 0-44 low scores obtained from the scale are considered to indicate that self-care power is not good, while high scores are considered to be good. The reliability of the scale was examined in terms of internal consistency and it was reported that the cronbach alpha values in the hemodialysis group were between 0.56 and 0.68 on the basis of sub-dimensions and 0.75 in the whole scale (9). In this study, Cronbach Alpha was found to be 0.77.

**Scale of Exercise Benefits/Barriers in Dialysis Patients (SEBDP):** It is a 4-point Likert scale (1- Strongly Disagree 4- Strongly Agree) developed by Zheng et al. in 2010 to evaluate the exercise benefits/obstacles thoughts of dialysis patients (18). The Turkish validity and reliability study of the scale was conducted by Taş and Akyol (2019) (17). The scale consists of 24 items and two open-ended questions. The scale consists of five sub-dimensions: "Daily Life (7 items)", "Unintended consequences of exercise (7 items)", "Quality of Life (4 items)", "Effects of Exercise (3 items)" and "Benefits of Exercise (3 items)". The undesirable consequences related to daily life and exercise sub-dimension of the scale constitutes the barriers of exercise, while the quality of life, exercise effects and exercise benefits sub-dimensions constitute the benefits of exercise. The benefits sub-dimension consists of items 3, 4, 6, 7, 7, 10, 13, 16, 20, 22, 23; the barriers sub-dimension consists of items 1, 2, 5, 8, 9, 9, 11, 12, 14, 15, 17- 19, 21 and 24. The items in the disability factors in the SEBDP scale are reverse coded. The scale is evaluated on a total score (min=24, max= 96). Higher scores indicate a perception of more exercise benefits and less exercise barriers. The Cronbach's alpha value for internal consistency was reported to be 0.80 (14). In this study, Cronbach Alpha was found to be 0.84.

## Data Collection

The data were collected using a web-based platform, with Google Forms utilized for the design of the questionnaire. The survey link was distributed to dialysis patients in Adana through widely used social media networks (such as WhatsApp and Facebook). To minimize missing data, the questionnaire was designed to prevent participants from proceeding to the next question

without answering the previous one. The estimated completion time for the survey was 15 minutes: 2 minutes for the Personal Information Form, 8 minutes for the SSSDP, and 5 minutes for the SEBDP.

While web-based data collection offers advantages such as accessibility and efficiency, it also presents potential limitations, including selection bias and limited control over the response environment. To mitigate these biases, participation was restricted to individuals who met the inclusion criteria, and clear instructions were provided to ensure accurate and thoughtful responses. Additionally, to enhance the reliability of the data, duplicate submissions were prevented, and responses were monitored for inconsistencies or unusually short completion times. Future studies could benefit from combining online data collection with alternative methods to further validate the findings.

### Statistical Analysis

Normality control of continuous variables was evaluated by Shapiro Wilk test. Since the variables did not conform to normal distribution, nonparametric methods were used. Mann Whitney U test was used to compare scale scores for two independent groups and Kruskal Wallis test was used for more than two groups. Spearman Rho correlation coefficients were calculated to examine the linear relationship between continuous variables. Multiple Linear Regression Backward elimination method was used to determine the variables affecting the barriers and benefits of exercise scores. The reliability coefficient of the scales was expressed by Cronbach's Alpha. Data analysis was evaluated in IBM SPSS 21 package program and statistical significance level was taken as 0.05.

### Ethical Considerations

Ethics approval (2022-128/45) was provided by the Scientific Research and Publication Ethics Committee of Çukurova University. Participants provided their verbal and written consent through a web form that featured an acceptance button at the top of the page.

### Limitations of the study

The limitations of this study should be considered when interpreting the findings. The results are specific to the patients included in the study and cannot be generalized to all individuals undergoing dialysis. Data collection was conducted online, which introduces certain challenges. Patients' responses may have been influenced by factors such as their understanding of the questions, the environment in which they completed the forms, and potential distractions. Additionally, the study excluded individuals without access to digital tools or those unfamiliar with online platforms, which might have led to selection bias. These limitations underscore the importance of cautious interpretation and the need for further studies employing diverse data collection methods.

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## RESULTS AND DISCUSSION

The mean age of the patients was  $42.69 \pm 12.63$  years, the mean duration of dialysis treatment was 4 years, and the mean number of dialysis sessions per week was 3. 54.9% of the participants were male, 43.8% were high school graduates, 59.9% were married, 75.3% were not employed, 47.5% had less income than expenses, 92.0% had health insurance, 85.2% received hemodialysis treatment, 71.6% did not exercise, 93.8% lived with their families and 52.5% had an additional chronic disease (Table 1).

**Table 1. Findings Socio-Demographic and Disease-Related Characteristics of the Participants**

Variables		Mean $\pm$ SD	Min-Max %25-%75
Age		42.69 $\pm$ 12.63	20-72
Duration of dialysis treatment (year)		4	2-8.25
Number of treatments per week		3	3-3
		<b>n*</b>	<b>%</b>
Gender	Male	89	54.9
	Female	73	45.1
Education level	Literate	5	3.1
	Primary school	19	11.7
	Hihg school	71	43.8
	Bachelor's degree and over	67	41.4
Marital status	Single	65	40.1
	Married	97	59.9
Working situation	No	119	73.5
	Yes	43	26.5
Income status	Income less than expenditure	77	47.5
	Income equal to expenditure	70	43.2
	More income than expenditure	15	9.3
Health insurance	No	13	8.0
	Yes	149	92.0
Dialysis treatment type	Hemodialysis	138	85.2
	Peritoneal dialysis	24	14.8
Regular exercise status	No	116	71.6
	Yes	46	28.4
Living together with whom	Lonely	10	6.2
	Family	152	93.8
Additional chronic diseases	No	77	47.5
	Yes	85	52.5

\*n: Number%; Percent

The mean total score of the SSSDP was  $29.92 \pm 5.4$  and the cronbach alpha value was 0.775 in the study. The mean total score of the SEBDP was  $66.86 \pm 8.52$  and the cronbach alpha is 0.846 in the study (Table 2).

**Table 2. Distributions of SSSDP and SEBDP Scores**

Scales	Mean±SD	Median [IQR]	Min-Max
Medication Use	9.3±1.91	10 [8-10.25]	2-12
Diet	6.07±1.57	6 [5-7]	2-10
Self-monitoring	5.36±1.63	5 [4-7]	1-8
Hygienic Care	6.52±1.27	7 [6-8]	3-8
Mental Status	2.66±1.43	3 [2-4]	0-6
<b>Total SSSDP</b>	<b>29.92±5.4</b>	<b>30 [27-34]</b>	<b>14-41</b>
Daily Life	16.42±3.3	16.5 [14-19]	7-26
Unintended consequences of exercise	19.72±3.02	20 [18-21]	11-28
Quality of Life	12.51±2.13	12 [12-14]	4-16
Effects of Exercise	8.69±1.7	9 [8-9]	3-12
Benefits of Exercise	9.52±1.86	9 [9-12]	3-12
<b>Barriers of Exercise</b>	<b>36.14±5.46</b>	<b>36.5 [33-39]</b>	<b>21-52</b>
<b>Exercise Benefits</b>	<b>30.72±5.08</b>	<b>30 [28-34]</b>	<b>10-40</b>
<b>Total SEBDP</b>	<b>66.86±8.52</b>	<b>67 [61-72]</b>	<b>44-90</b>

SD: Standard Deviation, Min: Minimum, Max: Maximum

There is a significant positive relationship between self-care strength and perception of exercise benefits ( $r=0.264$ ,  $p=0.001$ ), and a weak but significant negative relationship between exercise barriers ( $r=0.162$ ,  $p=0.040$ ) (Table 3).

**Table 3. The Relationship Between Participants SSSDP and SEBDP**

		Medication Use	Diet	Self-monitoring	Hygienic Care	Mental Status	SSSDP
Daily Life	Diet	00.044	0.090	-0.066	0.163	0.216	0.126
	Self-monitoring	00.578	0.252	0.401	0.038	0.006	0.111
Unintended consequences of exercise	Hygienic Care	00.110	0.196	0.074	0.283	0.033	0.204
	Mental Status	00.163	0.013	0.352	<0.001	0.674	0.009
Quality of Life	r	00.132	0.215	0.110	0.204	-0.005	0.215
	p	00.094	0.006	0.163	0.009	0.945	0.006
Effects of Exercise	r	00.175	0.196	0.098	0.149	0.070	0.237
	p	00.026	0.012	0.216	0.058	0.379	0.002
Benefits of Exercise	r	00.185	0.264	0.109	0.191	0.051	0.261
	p	00.018	0.001	0.168	0.015	0.517	0.001
<b>Exercise Benefits</b>	r	00.096	0.162	0.021	0.236	0.144	0.191
	p	00.223	0.040	0.795	0.003	0.068	0.015
<b>Barriers of Exercise</b>	r	00.168	0.239	0.114	0.196	0.063	0.258
	p	00.033	0.002	0.148	0.012	0.427	0.001
<b>DPEBBS</b>	r	00.160	0.254	0.068	0.263	0.091	0.261
	p	00.042	0.001	0.387	0.001	0.247	0.001

p: Pearson Correlation, DPEBBS: Scale of Exercise Benefits/Barriers in Dialysis Patients, SSSDP: Self-Care Strength Scale for Dialysis Patients

In Table 4, Multiple Linear Regression models were created using the backward elimination method to determine the variables affecting the barriers and benefits of exercise.

Being a primary school graduate ( $B = -2.997$ ,  $p = 0.024$ ) and being a high school graduate ( $B = -2.020$ ,  $p = 0.020$ ) decreases the patients' perception of exercise barriers. Regular exercise ( $B = 3.578$ ,  $p < 0.001$ ) increases the perception of exercise barriers. The model explains 14.1% of the variance in the perception of exercise benefits ( $p < 0.05$ ).

Being a primary school graduate ( $B = -2.321$ ,  $p = 0.045$ ), having a postgraduate education ( $B = -4.495$ ,  $p = 0.004$ ), receiving peritoneal dialysis ( $B = -2.091$ ,  $p = 0.044$ ) and living with family ( $B = -3.090$ ,  $p = 0.048$ ) decreases the perception of exercise benefits. Regular exercise ( $B$

= 2.280,  $p = 0.007$ ), having social security ( $B = 3.848$ ,  $p = 0.005$ ) and having high income ( $B = 2.462$ ,  $p = 0.058$ ) increase the perception of exercise benefits. Although self-care strength ( $B = 0.125$ ,  $p = 0.078$ ) seems to be effective in the perception of exercise benefits, this variable has a value close to the significance limit ( $p = 0.078$ ). The model explains 23.1% of the variance in the perception of exercise benefits ( $p < 0.05$ ).

**Table 4. The Effect of Participants' Self-Care Strength and Some Characteristics on Their Perceptions of Exercise Barriers and Benefits**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	95,0% Confidence Interval for B		t	p
		B	Std. Error		Lower Bound	Upper Bound		
<b>Barriers</b> R <sup>2</sup> :0.141 F:8.619 $p < 0.001$	(Constant)	36.363	0.672		35.035	37.691	54.078	<b>&lt;0.001</b>
	Primary school	-2.997	1.318	-0.177	-5.599	-0.394	-2.274	<b>0.024</b>
	High school	-2.020	0.861	-0.184	-3.721	-0.319	-2.346	<b>0.020</b>
	Exercise regularly	3.578	0.899	0.297	1.802	5.354	3.979	<b>&lt;0.001</b>
<b>Benefits</b> R <sup>2</sup> :0.231 F:5.748 $p < 0.001$	(Constant)	28.406	2.931		22.616	34.196	9.693	<b>&lt;0.001</b>
	Primary school	-2.321	1.148	-0.147	-4.589	-0.053	-2.021	<b>0.045</b>
	Postgraduate	-4.495	1.544	-0.213	-7.545	-1.444	-2.911	<b>0.004</b>
	Higher income	2.462	1.288	0.141	-0.082	5.007	1.912	0.058
	Social security	3.848	1.358	0.206	1.165	6.530	2.833	<b>0.005</b>
	Receiving peritoneal dialysis	-2.091	1.032	-0.147	-4.129	-0.053	-2.027	<b>0.044</b>
	Exercise regularly	2.280	0.841	0.203	0.618	3.943	2.710	<b>0.007</b>
	Living with family	-3.090	1.547	-0.147	-6.146	-0.034	-1.998	<b>0.048</b>
	Self-care strength	0.125	0.071	0.133	-0.014	0.265	1.775	0.078

*p*:Multiple Linear Regression, *B*:regression coefficient, *R2*: explanatory coefficient. Bold element is used in the meaning of statistically significant.

This study investigated the influence of self-care strength and related factors on perceptions of exercise barriers and benefits among individuals undergoing dialysis. The findings revealed that participants moderately perceived the benefits of exercise, while reporting relatively few barriers. Factors influencing perceived exercise barriers included education level (primary school and high school) and regular exercise habits. Factors influencing perceived exercise benefits included primary and postgraduate education, higher income, social security, peritoneal dialysis treatment, regular exercise, and living with family.

The study found that participants' self-care strength was at a moderate level, consistent with similar findings in the literature (9, 22, 23). Self-care encompasses activities individuals perform to maintain their health and well-being. However, the frequent hospital visits and machine-dependent lifestyle associated with dialysis may limit patients' self-care abilities (23).

Participants in this study reported moderate perceptions of exercise benefits and relatively few barriers, aligning with previous research by Doğru and Kasar (2022) (21, 24, 25). Other studies have noted insufficient physical activity levels among hemodialysis patients (26, 27). These findings suggest that, despite recognizing the benefits of exercise, dialysis patients face challenges in implementing regular physical activity. Therefore, strategies should focus on not only raising awareness of exercise benefits but also addressing barriers to its practice.

The multiple regression model predicting exercise barriers explained 14.1% of the variance, indicating moderate explanatory power. According to the model, patients with primary or high school education perceived fewer exercise barriers. This suggests that lower education levels may reduce perceptions of barriers. Similarly, Doğru and Kasar (2022) found that individuals with high school education or higher reported greater exercise barriers (21). Another study identified barriers such as disease-related distress, safety concerns, environmental restrictions, and hospital policies (28). Interestingly, participants who exercised regularly

perceived more barriers, potentially reflecting greater awareness or higher expectations. Regular exercisers have noted that the positive outcomes of exercise motivated them to continue (29).

The multiple regression model predicting exercise benefits explained 23.1% of the variance, demonstrating strong explanatory power. According to the model, living with family, receiving peritoneal dialysis, and having primary or postgraduate education were associated with lower perceptions of exercise benefits. Conversely, higher income, social security, and regular exercise were linked to higher perceptions of benefits. While self-care strength was near the threshold of significance in its influence on exercise benefit perceptions, it appears to play a role.

Exercise is a proven strategy to manage some complications of dialysis, offering physical and mental health benefits (30, 31, 32). This study have important implications for clinical practice. Given that self-care strength and exercise perceptions are interrelated, dialysis care programs should integrate structured exercise interventions alongside self-care education. Healthcare professionals, particularly nurses and physiotherapists, should assess patients' self-care capacities and develop personalized exercise plans that accommodate individual barriers. Additionally, providing targeted counseling on the benefits of exercise, particularly for patients with lower income or education levels, could enhance motivation and engagement in physical activity. The finding that regular exercisers perceived more barriers suggests that clinical guidance should also address patients' concerns about safety, accessibility, and disease-related limitations. By incorporating exercise support into routine dialysis care, healthcare teams can promote long-term adherence and improve overall patient well-being. Although many studies examine self-care abilities and exercise perceptions separately, this study suggests that diminished self-care abilities in dialysis patients may negatively impact physical activity levels and, consequently, their perceptions of exercise benefits and barriers.

The findings indicate that educational programs play a critical role in reducing exercise barriers and enhancing the perception of exercise benefits. Specifically, awareness can be increased by using simple and comprehensible educational materials tailored for individuals with lower educational levels. It is crucial for these programs to address topics such as the safety of exercise, strategies to overcome environmental barriers, and the long-term benefits of physical activity. Additionally, implementing personalized approaches and social support mechanisms to encourage regular exercise habits can be highly beneficial.

In this context, healthcare professionals providing guidance and support for exercise education can facilitate the development of regular exercise routines. Group activities involving dialysis patients and their families, as well as simple home-based exercise programs, may serve as effective strategies to promote exercise habits among this population.

## CONCLUSION and RECOMMENDATIONS

This study aimed to examine whether self-care agency in hemodialysis patients influences their perception of exercise benefits and barriers. The findings indicate that self-care agency is a significant factor affecting patients' perceptions of exercise benefits and barriers, with weak but positive linear relationships observed. Additionally, regular exercise habits, social security coverage, and higher income levels were associated with more favorable perceptions of exercise benefits and barriers. These results highlight the importance of identifying and strengthening factors that enhance self-care agency in dialysis patients through targeted support programs. Furthermore, reducing exercise barriers and emphasizing its benefits may serve as effective strategies to improve self-care agency. Future research should investigate this relationship in larger and more diverse patient populations.

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