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Self-efficacy and its Correlations Among Patients on Hemodialysis: A Cross-sectional Study

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Abstract

Background and Purpose: Promoting self-efficacy levels in hemodialysis patients is an effective method for improving their self-care and rehabilitation. Therefore, better estimating the factors that affect self-efficacy can help nurses find an appropriate method to promote self-efficacy. This study aimed to examine the correlation between self-efficacy and knowledge among patients on hemodialysis in Yazd, Iran, in 2016.

Methods: This cross-sectional study was conducted in four hemodialysis centers. All patients who were referred to these centers were selected. The data was collected using the demographic characteristics form, chronic diseases self-efficacy scale, and hemodialysis knowledge questionnaire. Descriptive and analytic statistics analyzed information.

Results: The mean self-efficacy score was 5.24 ± 1.99, and the mean knowledge score was 16.15 ± 2.91 (Minimum = 3 and Maximum = 21). A positive correlation was found between self-efficacy and knowledge (r = 0.20, p = 0.01). Knowledge about hemodialysis, marital status, and job were significant predictors of self-efficacy of chronic diseases in patients treated with hemodialysis ($p < 0.05$).

Conclusion: Patients undergoing hemodialysis exhibit an average degree of self-efficacy and knowledge. Effective interventions, such as educational programs focusing on the dialysis process, understanding laboratory results, and dietary management, are needed to enhance self-efficacy in these patients.

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INTRODUCTION

Chronic kidney diseases (CKDs) have become a growing health problem throughout the world and are increasing with aging in the world(Sanyaolu et al., 2018). The worldwide prevalence of CKD is estimated between 8-16% and around 3,346,000 people suffered from end-stage kidney disease (results from CKD) at the end of 2014 (Kiajamali et al., 2017; Mahmoodpoor et al., 2018). It is estimated that more than 24,000 people with end-stage kidney disease (ESKD) live in Iran, and their number has increased drastically in recent years (Morovatdar et al., 2019).

ESKD can be defined as the requirement for lifesaving dialysis or kidney transplantation (Kiajamali et al., 2017). Dialysis is a stressful process and follows various psychological complications that can lead to patients' mental disturbances in patients (Poorgholami et al., 2016). The sense of inability, lack of control and treatment of disease, financial problems, failure to keep occupation, taking several medications, specific diets, and acquiring abilities for adaptation with psychophysical disabilities are practical in the quality of life (Bahadori et al., 2018; Krishnan et al., 2020). Therefore, such patients will face risk factors, including early aging, physical and nutritional limitations, heart failure, and depression. The disease not only endangers physical health but is also risky for other dimensions of health (Daniel et al., 2020; Sun et al., 2019). The active participation of patients in disease control, the ability to self-care, patient education, and social support will lead to better results in their health (Jebraeily & Makhdoomi, 2018). Since nursing deals with the promotion of patient health, such as nutrition, physical activity, stress management, health responsibilities, interpersonal relationships, and spiritual growth (Dashtidehkordi et al., 2019), it is necessary to have an effective care model for the hemodialysis unit to support patient personal needs, ensure standard care, and maintain quality of care and keep care quality(Dobson & Tranter, 2008).

Improving patient knowledge can improve patients' care quality under hemodialysis (Ramezani et al., 2019). The results of many studies showed that the understanding of the patients was practical in adhering to diets (Ebrahimi et al., 2016; Gibson et al., 2016), managing the amount of body phosphorus (Lee et al., 2020), controlling diseases resulting from hemodialysis and mental-spiritual pressures (Molina-Robles et al., 2018). On the other hand, the lack of knowledge of the self-care behaviors of patients leads to clinical outcomes, death, and different complications (Ramezani et al., 2019).

Self-efficacy is another influential factor that improves patient care quality and quality of life (Rayyani et al., 2014; Wright & Wilson, 2015). Self-efficacy effectively perceives performance, takes adaptive behaviors, and selects the environment and conditions in which people try to reach them (Oktarina & Sulistiawan, 2020). Self-efficacy generally influences individual selections, desires, degree of effort to achieve goals and ambitions, degree of resistance to problems and failures, thinking models, degree of experienced stress, and sensitivity to depression (Hui & Bella, 2012). self-efficacy increases the motivation for self-care (Ramezani et al., 2019). Nurses can help these patients improve their quality of life and reinforce self-efficacy (Wright & Wilson, 2015). Strengthening self-efficacy, patients will rely on their self-efficacy and self-care to manage chronic kidney failure disease (Poorgholami et al., 2016). Yun and Choi (2016) showed that a self-efficacy-based diet was an effective nursing intervention program to improve adherence to diet and maintain quality of life in hemodialysis patients (Yun & Choi, 2016).

Since few studies have been conducted on self-efficacy and knowledge of patients with chronic kidney disease in Iran and there is not much information on self-efficacy and understanding of patients under hemodialysis in Iran, the present study aimed to study self-efficacy and knowledge of patients under hemodialysis who referred to hemodialysis centers in Yazd, Iran, in 2016 and also to determine the correlation between self-efficacy and understanding of such patients.

MATERIALS AND METHODS

Study design and setting

This cross-sectional study was conducted in 2016 at four hemodialysis centers in Yazd, Iran.

Sample Size and Sampling

In Yazd, 130 patients underwent hemodialysis at Shahid Rahnamoun Hospital, 65

at Shahid Sadoughi Hospital, 45 at Seyedolshohada Hospital, and 20 at Goodarz Hospital. Given the limited number of participants, 260 patients were considered for the study, out of which 159 were deemed eligible to participate.

The instruments

Two questionnaires, in addition to a form detailing demographic characteristics, were employed to assess variables such as age, gender, marital status, economic and educational background, supplementary health insurance, duration of hemodialysis, and the underlying causes of renal failure.

Chronic disease self-efficacy scale

The questionnaire, created by Lorig et al. in 1996, is designed to assess self-efficacy using a scale ranging from zero to ten. The total score is divided by ten to calculate the self-efficacy score, with higher scores indicating greater self-efficacy. In Lorig's research, the reliability of the questionnaire was confirmed with a Cronbach's alpha of $\alpha = 0.91$.

Hemodialysis knowledge

Curtin et al. created the 25-item questionnaire in 2004. It evaluated anemia, diet, medication, kidney function, hemodialysis, treatment, and rehabilitation with questions that could be answered with true or false. One point was given for each correct answer, while incorrect answers were given zero points. The total score for the questionnaire ranged from 0 to 25. In Curtin's study, the reliability of the questionnaire was found to be $\alpha = 0.94$, and its content validity index (CVI) was 0.70.

The Persian versions of the questionnaires were unavailable, so the research team hired two translators to translate them into Persian - one of whom was an approved medical translator. Afterward, another translator edited the two translations. The Persian versions of the questionnaires were then sent to two English translators for back translation. The research team and translators reached a primary consensus on the Persian versions of the questionnaires, which should be equal to the original in terms of semantic, idiomatic, experiential, and conceptual equivalences.

To assess the content validity of the questionnaires, ten faculty members of the Faculty of Nursing at Kerman University of Medical Sciences reviewed and assessed their content. Based on expert opinions, an item related to the hemodialysis knowledge questionnaire was removed - using the same hemodialyzer (filter) more than once for the same patient.

To examine reliability, thirty patients from the target population were given the questionnaires, and the internal consistency of the items was calculated using Cronbach's alpha. The Cronbach's alpha coefficients for the self-efficacy and knowledge questionnaires were 0.95 and 0.73, respectively.

Procedure and data collection

The study aimed to include patients who met specific criteria. The inclusion criteria were patients who had undergone hemodialysis for at least three months, were 18 years or older, could read and write in Persian, and were willing to participate in the study. However, patients admitted to the hospital at the time of the study and who had a history of psychological disease or physical limitations in self-care were excluded from the study. After obtaining their agreement and completing the consent form, the researchers collected data from the patients and their medical records. At the patient's convenience, the researcher completed the patient's self-efficacy and knowledge during, before, or after dialysis. The data collection lasted from December 2015 to May 2016 and took around 15 minutes.

Statistical analysis

The data collected was analyzed using SPSS version 18. Demographic characteristics were described using frequency, percent, mean, and standard deviation. Quantitative variables, such as skewness and kurtosis, were checked for normalization using the Kolmogorov-Smirnov test. Self-efficacy and knowledge scores were found to have normal distributions. Pearson's correlation test was used to study the correlation between self-efficacy and knowledge. An independent t-test and analysis of variance were used to determine the differences between chronic disease and expertise based on demographic characteristics. In addition, multiple linear regression was used to identify predictors of chronic disease self-efficacy in hemodialysis patients. The significance level was considered $p < 0.05$.

Ethical Considerations

The study was started after acquiring the ethics code (No.Ir.kmu.rec.2016.90) from the ethics committee of the Kerman University of Medical Science and receiving a letter of introduction from the Razi School of Nursing & Midwifery. To respect and protect patients' privacy, patients completed the consent form and participated in the study. The confidentiality of the information and voluntary participation were explained.

RESULTS

Demographic data

The average age of the participants was 58.69 years, with a standard deviation of 14.39. The average duration of hemodialysis among the participants was 5.07 years, with a standard deviation of 4.61 years. Most participants, approximately 69.8%, were male, and 95% were married. Most of the subjects, about 93.7%, had educational qualifications of a diploma or lower. Only 21.4% of the participants were employed, and 77.2% had a monthly income of less than one million tomans. Less than half, or 43.4%, had complementary health insurance coverage. A significant majority, 82.8%, underwent dialysis thrice a week for four hours each session, as detailed in Table 1.

Self-efficacy

The average self-efficacy score among participants was 5.24, with a standard deviation of 1.99, ranging from a minimum of 1 to a maximum of 9.33. Within the self-efficacy questionnaire, the item receiving the highest average score was 5.5 for the question, "How confident do you feel that you can do the different tasks and activities needed to manage your health condition to reduce your need to see a doctor?" The item with the lowest average score was 4.95, associated with the question, "How confident do you feel that you can prevent the fatigue caused by your disease from interfering with the things you want to do?" These details are presented in Table 2. **Knowledge of hemodialysis**

The average score for hemodialysis knowledge among participants was 16.15, with a standard deviation of 2.91, and scores ranged from a minimum of 3 to a maximum of 21. Over 70% of the patients correctly answered 15 of the questionnaire items. The highest rates of correct responses included statements such as "Low fluid intake between dialysis treatments helps make treatments comfortable" (86.2%), "People with chronic diseases such as kidney failure will do their best if they learn all they can and participate in their care" (85.5%), "Healthy kidneys control the balance of fluid, glucose, proteins, sodium, and potassium" (84.3%), and "The access arm & needles should be visible to the staff during dialysis treatment" (84.3%). Conversely, the items with the lowest correct response rates were "When kidneys fail, they stop making the hormone called erythropoietin" (80.5%), "Damaged kidneys can repair themselves" (65.4%), and "Phosphorus is quite rare and is not present in many foods" (60.4%). These findings are detailed in Table 3.

The correlation between self-efficacy, knowledge, and demographic characteristics

A significant positive correlation was found between self-efficacy and knowledge ($r = 0.20$, p-value = 0.01), meaning that the higher the patient's knowledge about hemodialysis, the higher their self-efficacy. As presented in Table 1, only marital status and job were associated with self-efficacy among demographic characteristics. Single and unemployed individuals had lower self-efficacy than married and employed individuals (Table 1). All variables with a value of < 0.25 were included in the multiple linear regression analysis for further analysis. Knowledge of hemolysis, marital status, and job were significant predictors of chronic disease self-efficacy in patients treated with hemodialysis (Table 4).

Furthermore, among demographic characteristics, only education had a significant association with knowledge of hemodialysis. The Bonferroni post hoc test showed that only the hemodialysis knowledge of the diploma patients was higher than that of the patients who could write and read ($p = 0.002$) (Table 1).

Table1. Demographic characteristics and chronic disease self-efficacy and hemodialysis knowledge differences according to demographic characteristics

Variable	Frequency (%)	Chronic disease self-efficacy		Statistic test (*p*-value)	Hemodialysis Knowledge		Statistic test *(p-value)*
		Mean	SD		Mean	SD	
Age (year)							
≤ 40	17 (10.6)	4.76	1.74	F = 1.74 (0.18)	16.35	1.93	F = 1.0 (0.37)
41 - 60	71 (44.7)	5.56	1.95		16.46	2.59	
> 60	71 (44.7)	5.04	2.08		15.79	3.37	
Gender							
Man	111 (69.8)	5.24	2.06	t = -0.04 (0.97)	16.44	2.80	t = 1.93 (0.06)
Woman	48 (30.2)	5.25	1.88		15.48	3.09	
Marital status							
Married	151 (95)	5.32	1.97	t = 2.23 (0.03)	16.13	2.94	t = -0.35 (0.73)
Single	8 (5)	3.73	1.98		16.50	2.33	
Education							
Being able to write and read	83 (52.2)	5.04	2.1	F = 0.91 (0.40)	15.40	3.39	F = 6.30 (0.003)
Diploma	66 (41.5)	5.48	1.92		17.03	1.98	
Academic	10 (6.3)	5.38	1.5		16.60	2.91	
Job							
Employed	34 (21.4)	6.60	1.88	t = 4.75 (<0.001)	16.97	2.26	t = 1.86 (0.06)
Unemployed	125 (78.6)	4.88	1.88		15.93	3.04	
Monthly income (million tomans)*							
< 1	122 (77.2)	5.30	2.07	F = 0.70 (0.50)	16.11	3.11	F = 0.19 (0.83)
1- 1.5	31 (19.6)	5.18	1.78		16.38	2.03	
> 1.5	5 (3.2)	4.23	1.29		15.60	2.88	
Complementary insurance							
Yes	69 (43.4)	4.97	1.99	t = -1.54 (0.13)	16.17	2.59	t = 0.09 (0.93)
No	90 (56.6)	5.46	1.98		16.13	3.15	
History of being under hemodialysis							
1-5 years	100 (62.9)	5.17	2.05	F = 0.40 (0.67)	16.13	2.97	F = 0.01 (0.99)
6-10 years	46 (28.9)	5.27	1.9		16.17	3.09	
> 10 years	13 (8.2)	5.69	2.03		16.23	1.79	
Dialysis sessions per week (times)*							
2	11 (7)	5.77	0.93	F = 0.70 (0.50)	17.18	2.23	F = 0.98 (0.38)
3	130 (82.8)	5.2	2.02		16.00	2.94	
4	16 (10.2)	4.85	2.08		16.50	3.10	
Duration of dialysis sessions (hour)							
3	6 (3.8)	4.50	1.04	F = 0.49 (0.62)	16.00	2.61	F = 1.14 (0.32)
3:30	23 (14.4)	5.40	2.63		17.00	2.35	
4	130 (81.8)	5.25	1.91		16.01	3.01	
Cause of renal failure*							
HTN	69 (43.9)	5.21	1.86	F = 0.02 (0.98)	16.32	2.35	F = 0.38 (0.68)
D.M.	61 (38.9)	5.26	2.02		15.87	3.63	
Others	27 (17.2)	3.88	2.62		16.11	2.36	

* Missing value, S.D. = standard deviation, t = Independent t-test, F = analysis of variance, HTN: Hypertension, D.M.: Diabetes mellitus

Table 2. Patients' responses to the chronic disease self-efficacy scale

Items	Minimum	Maximum	Mean	SD
1. How confident do you feel that you can keep the fatigue caused by your disease from affecting the things you want to do?	1	10	4.95	2.2
2. How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?	1	9	5.28	2.28
3. How confident do you feel that you can keep the emotional distress caused by your disease from interfering with the things you want to do?	1	9	5.04	2.14
4. How confident do you feel that you can keep any other symptoms or health problems from interfering with what you want to do?	1	10	5.26	2.22
5. How confident do you feel that you can do the different tasks and activities needed to manage your health condition to reduce your need to see a doctor?	1	10	5.5	2.29
6. How confident do you feel that you can do things other than just taking medications to reduce the effects of your illness on your everyday life?	1	10	5.35	2.32
Total	1	9.33	5.24	1.99

SD = standard deviation

Table 3. Patient Responses to the Hemodialysis Knowledge Questionnaire

Items	Accurate response (frequency/%)
1. Laboratory tests: Hematocrit and hemoglobin are used to detect anemia.	130 (81.8)
2. During dialysis, good things (such as meds) are removed along with waste.	118 (74.2)
3. Kidney patients use phosphate binders mainly to prevent gas/ upset stomach.	84 (52.8)
4. When the kidneys fail, they stop making the erythropoietin hormone.	31 (19.5)
5. Damaged kidneys can be repaired themselves.	55 (34.6)
6. Healthy kidneys control the balance of fluid, glucose, proteins, sodium, and potassium.	134 (84.3)
7. Creatinine is a laboratory test that measures kidney function.	132 (83)
8. The pump pushes the blood through the dialyzer at a constant speed.	107 (67.3)
9. Healthy kidneys produce hormones to trigger the production of red blood cells and to convert vitamin D for bone health.	127 (79.9)
10. The target blood phosphorus for dialysis patients is approximately 3.5 to 5.3.	115 (72.3)
11. Regular exercise has been associated with fewer hospital stays and better overall health for dialysis patients.	126 (79.2)
12. Untreated anemia can cause heart damage in people with kidney failure.	130 (81.8)
13. Phosphorus is quite rare and is not present in many foods.	63 (39.6)
14. The machine alarms mean patients never have to worry about safety.	88 (55.3)
15. A low-protein diet may be recommended while the kidneys are failing, but a high-protein diet is better once they fail.	77 (48.4)
16. Untreated anemia causes low energy, a feeling of coldness all the time, and sometimes shortness of breath	129 (81.1)
17. Limiting dietary potassium helps prevent heart problems in kidney patients.	123 (77.4)
18. Low fluid intake between dialysis treatments makes them comfortable.	137 (86.2)
19. Dry weight is your weight without the excess fluid that builds up between dialysis treatments.	126 (79.2)
20. blood moves into the dialysis fluid or "bath during dialysis."	120 (75.5)
21. More dialysis is better - healthy kidneys work 24 hours daily.	72 (45.3)
22. Once your access is "mature," there is no need to check for a thrill/bruit.	74 (46.5)
23. The access arm needles should be visible to the staff during dialysis treatment.	134 (84.3)
24. People with chronic diseases such as kidney failure do their best if they learn all they can and take part in their care.	136 (85.5)

Table 4. Predictors of Chronic Disease Self-Efficacy by Multiple linear regression analysis

Predictors	**Unstandardized coefficients**			**Standardized coefficients**	**t**	***p-value***
	B	Std. error	95% CI for B	Beta		
Constant	7.45	1.55	4.40 – 10.53		4.81	<0.001
Age (year)	-0.01	0.01	-0.03 – 0.02	-0.04	-0.50	0.61
Hemodialysis Knowledge (score)	0.11	0.05	0.01 – 0.21	0.16	2.10	0.04
Marital status (Married versus Single)	-1.50	0.69	-2.87 - -0.13	-0.16	-2.16	0.03
Job (Employed versus Unemployed)	-1.53	0.36	-2.25 - -0.81	-0.32	-4.20	<0.001
Complementary health insurance (yes versus no)	0.44	0.30	-0.15 – 1.04	0.11	1.47	0.14

DISCUSSION

The results showed that the mean self-efficacy score in patients under hemodialysis was moderate (5.24). This result agreed with Naghibi et al. (2018), who revealed that self-efficacy, the most critical determinant of self-care behaviors, should be promoted among diabetic patients and emphasized in educational programs (25). Rahimi et al. (2015) (Rahimi et al., 2015), Soltani et al. (2013) (SOLTANI et al., 2013) and Aziz et al. (2019) (Aziz et al., 2019) reported a moderate level of self-efficacy in patients. However, the results of Harooni et al. (2013) did not agree with the present study's results due to the population and type of patients under study (Harooni J, 2013). Mikaeili et al. (2018) studied self-efficacy in patients with type 2 diabetes mellitus. They found that those who believed in their self-efficacy did their best to overcome their problems (Mikaeili & Samadifard, 2018). Kanbara et al. (2008) showed that self-efficacy reduced stress and increased resistance against disease in diabetic patients (Kanbara et al., 2008). Li et al. (2014) also showed a positive correlation between self-efficacy and self-care in hemodialysis patients (Li et al., 2014). Therefore, it is necessary to identify factors affecting self-efficacy, take interventions and proper policymaking about such diseases, and prepare educational programs to increase self-efficacy.

The mean score of knowledge in the study patients was 16.15. In the study by Li et al. (2014), the mean knowledge score of knowledge of patients was 16.89 ± 4.03, which was similar to the present study (Li et al., 2014). However, this score was lower than that of Ghannadi et al. (2016) in dialysis-type two diabetic patients (Ghannadi et al., 2016). Enough knowledge of the disease and caring behaviors helps people make correct decisions about self-care (Alikari et al., 2019; Brown, 2015).

The study's results suggest a positive and significant correlation between self-efficacy and patient knowledge, such that people with high expertise had better self-efficacy. This result agreed with Bonsaken et al. (2012), who showed that a good perception of the disease was associated with high self-efficacy in patients (Bonsaksen et al., 2012). Aliasgharpour et al. (2012) also showed that self-efficacy training improved adherence to treatment and dietary fluid restriction. Although they conducted a quasi-experimental study, their results could support our findings (Aliasgharpour et al., 2012). The hemodialysis knowledge questionnaire in our study focused on all aspects of hemodialysis treatment, including medication adherence, fluid restriction, and weight gain between dialysis sessions. Chan et al. (2012) (Chan et al., 2012) showed that inadequate knowledge and self-efficacy skills were the main barriers to better fluid and dietary restrictions adherence among hemodialysis patients. Although the mentioned study has focused on the adherence of hemodialysis patients to the treatment regimen and their instrument to measure knowledge and self-efficacy was different from that of our research, their findings indicated a positive

correlation between self-efficacy, fluid restriction, and medication adherence. These items were all covered in our knowledge questionnaire.

Furthermore, the results of the present study showed a significant correlation between work, marital status, and self-efficacy of patients. Li et al. (2014) (Li et al., 2014) showed a significant correlation between age, sex, and education in patients on hemodialysis, which did not agree with the present results. One of the reasons for this difference may be the concept under study. In other words, although self-efficacy and self-management have similar ideas to some extent, patients' perceptions of these concepts are different. The present study showed a significant correlation between knowledge and education, which is in agreement with the results of Le et al. (2014) (Li et al., 2014) and Dawood et al. (2020) (Dawood, 2020). They found that patients' low education level could be an obstacle to acquiring enough information and knowledge of the disease, and they did not search the Internet or library to find answers to their questions.

The main limitation of this study was the convenience of sampling and the large number of excluded patients (N=101). Although some patients were not eligible to be included in the study, others refused to participate. Therefore, it is unclear whether your self-efficacy and knowledge of hemodialysis are lower or higher than those of patients who participated in the study. Thus, the generalization of the present result should be made with caution.

CONCLUSION

Regarding the results, the amount of self-efficacy in patients on hemodialysis has been less than ideal. A significant correlation was also found between self-efficacy and knowledge. Therefore, the higher the self-efficacy, the higher the patients' knowledge. Caregivers, especially nurses, should provide comprehensive education to improve the knowledge and level of the patients under dialysis. It is suggested that longitudinal studies be conducted to show the causal relationship between self-efficacy and factors that affect it. Furthermore, interventional studies, such as self-efficacy interventions, are recommended to improve patient self-efficacy.

DECLARATION SECTION

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Ethical Considerations

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Conflict of interest

The authors declare that they have no competing interests.

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Data are available by contacting the corresponding author by email.

Authorship

All authors have read and approved the manuscript.

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