Effects of Self-Regulation Theory-Based Education on Psychological Response, Compliance, IDWG, and Perceived Complaints

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ARTICLE INFORMATION

ABSTRACT

Introduction: Although hemodialysis is effective in prolonging life expectancy, it often results in physical complaints such as shortness of breath, nausea, headache, edema, and chest pain, as well as psychological complaints including anxiety, depression, and non-compliance with treatment regimens. These issues may ultimately affect therapeutic outcomes, such as increased Interdialytic Weight Gain (IDWG) and other complications. This study aims to analize the effects of self-regulation theory-based education on psychological response, compliance, IDWG, and perceived complaints in hemodialysis patients

Methods: This study employed a quantitative approach with a one-group pretest-posttest randomized experimental design. A total of 21 hemodialysis patients from the Hemodialysis Unit were selected as participants. The Wilcoxon test was used to analyze the data.

Results: Significant results in Psychological Factors (p = 0.029), Compliance (p = 0.000), IDWG (p = 0.032), and Complaints (p = 0.049), the findings demonstrated significant improvements across all measured variables following the implementation of self-regulation-based health education

Conclusion: Self-regulation-based health education can effectively enhance self-management in hemodialysis patients by addressing their specific physical and psychological challenges

Keywords: Compliance; Health education; IDWG; Psychological responses; Self-management

INTRODUCTION

Hemodialysis is one of the most common renal replacement therapies used for patients with end-stage chronic kidney disease (Zahran et al., 2017); they have many very complex problems related to their health during therapy. Although effective in extending life expectancy, the hemodialysis process often poses significant physical and psychological challenges (Doan et al., 2024). Patients must undergo repeated procedures, restrict fluid and food intake, and face drastic lifestyle changes. This condition often

causes physical complaints such as shortness of breath, nausea, headache, edema, and chest pain (Sari et al., 2021a), and psychological such as anxiety, depression (Delgado-Domínguez et al., 2021), and non-compliance with the treatment regimen, which can ultimately affect the results of therapy, including increased interdialytic weight gain (IDWG) (Ramadhan et al., 2023) and other complications.

According to the 2024 Indonesian Renal Registry (IRR) from Pernefri, 77,892 individuals in Indonesia are undergoing regular hemodialysis. At the onset of their treatment, patients receive health education that includes dietary restrictions and guidelines for fluid intake. However, during subsequent hemodialysis sessions, many patients frequently report issues such as shortness of breath, often caused by excess fluid volume (defined as weight gain exceeding 5% of the patient's dry body weight), as well as uremic symptoms, including nausea, vomiting, and anorexia. (Santos et al., 2022). Patient adherence to dietary management, fluid regulation, and hemodialysis schedules is a critical factor influencing therapeutic interventions' success. (Kim et al., 2022). However, to achieve optimal Compliance, patients need understanding, motivation, and the ability to manage themselves.

Self-Regulation Theory is an approach that emphasizes an individual's ability to set goals, monitor behavior, and adjust actions to achieve desired outcomes (Haramaki et al., 2019). The self-regulation model is the most widely used theory for explaining and predicting how individuals adapt to disease and their behavior and self-management choices. While intradialysis complications are complex and involve many factors, it is essential to consider the psychological adaptation of patients in order to foster effective self-regulation among those undergoing hemodialysis. (Alfa et al., 2021). The use of learning theories that suit patient needs will help effective education. One theory that is effective in changing behavior is Self-Regulation. Self-regulation is an empowering problem-solving journey that applies to health like other challenges. It involves interpreting issues, developing coping strategies, and assessing their effectiveness. Patients can better manage their conditions and enhance their treatment adherence with effective self-regulation. Nurses are essential in this process, guiding patients toward effective coping mechanisms that unlock their potential for positive self-regulation. The critical support from self-regulation-focused health education significantly enhances health outcomes and fosters stronger patient empowerment. This study aims to analize the effects of self-regulation theory-based education on psychological response, compliance, IDWG, and perceived complaints in hemodialysis patients.

METHOD

The study employed a quantitative research design, specifically a randomized experimental framework with a one-group pretest-posttest format. The sample comprised 21 hemodialysis patients from a private home hemodialysis unit. Inclusion criteria for participation included individuals diagnosed with stage V Chronic Kidney Disease (CKD) who were currently undergoing hemodialysis, possessed the ability to read and write, and were not in critical condition. Patients

exhibiting decreased consciousness or experiencing adverse cond itions during the study were excluded from participation. Data collection used demographic and adherence questionnaires, a weight assessment sheet to calculate IDWG before and after HD, and an observation sheet to record complications during hemodialysis.

Health education intervention with Booklet media as a means used to provide self-regulation-based health education about Hemodialysis for three sessions, and was carried out once every 3 days and the provision of booklets (30 minutes each session), consisting of Session 1: Disease representation, Session 2: Problem-solving: coping procedures, Session 3: Self-assessment. Tested using Wilcoxon test.

RESULTS

There were 11 respondents aged over 50 years (52.4%), 17 respondents (80.9%) were female, 14 respondents (66.7%) were married, 12 respondents (57.1%) had completed high school as their highest level of education, and 17 respondents (80.9%) were employed.

Table 2 showed that most respondents reported feeling calm, with 15 individuals (71.4%) indicating this state. In the post-test, more patients expressed calmness, with 19 participants (90.5%) reporting this outcome. The results of the Wilcoxon test, conducted after the health education intervention focused on self-regulation, revealed a p-value of 0.029, which is less than the significance level of α (0.05).

The normality test results show that the pre-test's significance value is 0.411,

while the significance value for the post-test is 0.031.

Tabel 1. Frequency distribution of demograpic data

Demographic Data	Category	n	%
Age (year)	55-65	24	54.5
	66-75	16	36.3
	>75	4	9.0
Nutritional Status (BMI)	Less	5	11.3
	Normal	19	34.5
	Obesity	20	36.3
Educational level	SD	25	56.8
	SMP	8	18.1
	SMA	4	9.0
	D1	1	2.2
	S1	3	6.8
	S2	1	2.2
	S3	2	4.5
Job	Housewife	27	61.3
	Farmers	3	6.8
	Self-employed	7	15.9
	Privat	1	2.2
	Retired	4	9.0
	Lecturer	1	2.2
	Teacher	1	2.2
Sport	Yes	27	61.4
	No	17	38.6
Type of sport	Never	17	38.7
	Walking	26	59.0
	Gymnastics	1	2.3
Causes of stress	Never	5	11.4
	Health	38	86.4
	Family	1	2.2
Salted fish consumption	Never	18	40.9
	Consumption	26	59.0
History of Hormonal Birth Control Use	Never	1	2.2
	Injection	38	86.3
	Pills	1	2.2
	Implants	4	9.0
Income per month	Above UMR	4	9.1
	Below UMR	40	90.9
Total		**44**	**100**

Table 2. Statistics Result

Variable	Pre-Test		Post Test		Min	Max	Mean	SD	P value
	f	%	f	%					
Psychological Responses									0.029
Calm	15	71.4	19	90.5					
Anxious	3	14.3	0	0					
Fear	1	4.8	2	9.5					
Fear and anxious	2	9.5	0	0					
Compliance									0.000
Pre-test					49	79	59.38	6.823	
Post-test					61	84	67.71	5.506	
IDWG									0.032
< 3 kg	8	38.1	12	57.1					
>3 kg	13	61.9	9	42.9					
Perceived Complaints									0.049
No complaints	4	19	18	40.9					
Shortness of breath, Nausea or decreased appetite, Vomit, Swollen legs	1	4.8	0	0					
Nausea or decreased appetite	3	14.2	2	9.5					
Shortness of breath, Nausea or decreased appetite, Vomit	1	4.8	0	0					
Shortness of breath, Swollen legs	3	14.2	0	0					
Shortness of breath, Itching	2	9.5	0	0					
Nausea or decreased appetite, Vomit, Itching	1	4.8	0	0					
Swollen legs	2	9.5	0	0					
Nausea or decreased appetite, Itching, Swollen legs	1	4.8	1	4.8					
Shortness of breath,, Itching, Swollen legs	1	4.8	0	0					
Vomit	1	4.8	0	0					
Shortness of breat, Nausea or decreased appetite, Swollen legs	1	4.8	0	0					
Total	21	100	21	100					

This indicates that the pre-test data is normally distributed (since the significance value is greater than 0.05). In contrast, the post-test data is not normally distributed (as the significance value is less than 0.05). Because the post-test data does not meet the requirements for parametric statistical testing—specifically the paired t-test—we analyzed the data using a non-parametric statistical method, namely the Wilcoxon test.

The mean compliance of hemodialysis patients after receiving health education was 67.71, which is higher than the mean value before

receiving the education, based on self-regulation. The p-value was 0.000, less than the alpha level of 0.05.

Table 2 showed that most IDWG pre-tests in Hemodialysis patients are$\geq$ 3 kg in as many as 13 people (61.9%). In the post-test, the majority is < 3 kg in as many as 12 people (57.1%). The results of the Wilcoxon test after being given health education were based on self-regulation. The p value. (0.032) < α (0.05).

Table 2 showed that most respondents in the pre-test reported experiencing no complaints, with four individuals (19%) indicating this. In the post-test, this number increased significantly, with 18 respondents (85.7%) stating no complaints. The results of the Wilcoxon test conducted after providing health education indicated a statistically significant change in self-regulation, with a p-value of 0.049, which is less than the alpha level of 0.05..

DISCUSSION

Psychological Responses

In the psychological factor variable, the results of statistical tests showed a significant influence; before being given self-regulation-based health education, the majority of patients felt calm as many as 15 people (71.4%), and after being given self-regulation-based health education, as many as 19 people (90.5%), but there were still patients who felt afraid, namely two people (9.5%). The level of trait anxiety was significantly higher in patients who did not follow the recommendations compared to those who adhered to physical activity guidelines.(Hornik & Duława, 2019).

Chronic kidney disease (CKD) brings important psychological challenges that can affect patients' overall well-being. By navigating a life-changing diagnosis, embracing lifelong care, mastering dialysis, managing treatment side effects, and addressing complications, patients can thrive with resilience and support on their journey to better health.(Alshelleh et al., 2023). Research indicates that a significant number of patients experience anxiety following hemodialysis therapy. Various factors contribute to this anxiety, including the challenges associated with implementing necessary lifestyle changes both prior to and following treatment. Additionally, physical limitations resulting from fatigue and weakness and the effects of fluid restrictions and dietary modifications on overall health can exacerbate these concerns. These physical challenges can lead to disorders within the physical domain, which may, in turn, manifest as psychological issues among individuals undergoing hemodialysis.

Changes occur due to the evaluation and feedback process that increases the patient's understanding of CKD and coping strategies. Patients view CKD emotionally as something negative, but over time, the representation changes to be more cognitive after receiving adequate information. Perceptions of symptoms, causes, and impacts of the disease, and implementing coping strategies focusing on solving problems through treatment (Belinda & Dewi, 2021).

Health education based on Self-regulation theory provides stages in various sessions, in this case, session 1. Representations play a central role in procedure selection, performance, and maintenance. The central proposition of the Self-regulation model is that "disease

representations influence the plausibility or choice of procedures for threat control, determine the goals of the procedure, and maintain the performance of the procedure until the threat is eliminated, so that there is an increase in patients who feel calm in living their current lives.

Compliance

The analysis of the impact of self-regulation-based health education on compliance among hemodialysis patients revealed that the average post-test scores following the intervention increased by 8.33 points. This improvement can be attributed to several components of self-regulation-based health education, which include interpreting health risks, developing action plans or coping strategies, and assessing the patient's disease experience. The Common Sense Model of Self-Regulation posits that individuals act to prevent, treat, cure, or adjust to acute and chronic illnesses. A robust self-regulation process enables patients to manage their health conditions effectively, enhancing patient compliance and adherence to treatment regimens. (Chironda et al., 2019) According to researchers, self-regulation-based health education can increase patient self-motivation because patients can understand the disease they are experiencing and the threats that can occur if they do not comply with the established treatment program so that patients can control or prevent health threats by using positive coping strategies and can manage their diseases so that they can improve patient compliance.

Health education by developing a self-regulation model aimed at independence and regulation in patients can explain that the self-care regulation model will increase patient knowledge about the disease they are suffering from so that they will be aware of what they are suffering from and with this awareness will create motivation to make various efforts to accelerate the healing of the disease. According to researchers, if patients can understand the conditions they are experiencing from the perception of symptoms felt before and after the patient is more compliant with the treatment regimen, the patient will be able to formulate interventions or actions to cure or reduce the perceived health threats (Hagger & Orbell, 2022).

In this study, health education was given individually for approximately 30 minutes using a booklet after the pre-test. Education given individually allows contact between clients and researchers to be more intensive so that clients voluntarily, based on awareness and complete understanding, will accept the behavior given. Patients will also feel more cared for, whereas patients with chronic diseases need assistance, both bio-psycho-social and spiritual, in undergoing their treatment regimen.

IDWG Complaint

0In this study, the majority of IDWG (Interdialytic Body Weight Gains) in Hemodialysis patients at Budi Rahayu Hospital before self-regulation-based health education was ≥ 3 kg as many as 13 people (61.9%), after self-regulation-based health education was < 3 kg as many as 12 people (57.1%). The amount of water intake by hemodialysis patients will be seen in the weight gain at the beginning of each hemodialysis session compared to the weight after the previous one. More weight

gain means more water intake. According to researchers, excessive IDWG (Interdialytic Body Weight Gains) is due to patient non-compliance in limiting fluid intake (Wijayanti et al., 2021). Self-management for patients undergoing hemodialysis (HD) encompasses several critical aspects, including fluid management, emotional regulation, medication adherence, dietary compliance, vascular access maintenance, and potential complications management. Successful engagement in these areas necessitates a strong commitment to behavioral change and the sustained implementation of these practices. (Tao et al., 2024).

The provision of individualized health education grounded in self-management theory can significantly enhance understanding of fluid intake restrictions and improve adherence to the treatment regimens prescribed in relation to Interdialytic Body Weight Gains (IDWG). Self-management-based health education is efficacious in improving self-care for heart failure patients and has the potential to be applied clinically and generalized to other chronic diseases (Chew et al., 2021). The health education conducted in this study highlighted that self-regulation serves as a problem-solving model. This is because individuals actively solve problems, and their behavior reflects attempts to bridge the gap between their current status and goals. In the context of self-regulation, individuals take action to prevent, treat, cure, or adjust to the acute or chronic illnesses they are experiencing. Their behavior is influenced by their understanding of their current health status, goals plans to change their situation, and methods to assess their progress.

Perceived Complaints

Self-regulation-based health education has an influence, as evidenced by, before being given health education, the majority experienced complaints of shortness of breath, namely seven people (33.3%) after not feeling any complaints, 18 people (85.7%). Intradialytic complications were observed in up to 54.5% of patients receiving hemodialysis at two hospitals in Blitar City (Sari et al., 2021b). Hypotension was found to be the most common complication (28.7%), followed by hypertension (17.0%), nausea/vomiting (11.75%), fever (8.5%), and muscle cramps (8.5%) (Ali et al., 2021). Intradialytic hypertension is quite rare. IDWG, fluid compliance, and ultrafiltration are contributing factors to hypertensive complications occurring during dialysis.(Armiyati et al., 2021)

Factors contributing to the incidence of intradialytic complications of the 11 factors that are theoretically suspected to be related to the incidence of intradialytic complications, only five factors have a relationship, namely hemoglobin (Hb) laboratory results, hemodialysis patient compliance with fluids, venous access during hemodialysis, Intradialytic Body Weight Gains (IDWG), comorbidities or concomitant diseases other than chronic kidney failure (Arsa & Rahmawati, 2023).

Shortness of breath can occur due to fluid accumulation in the lung tissue or the chest cavity. Researchers have found that many people experiencing shortness of breath attributed it to a lack of compliance with fluid restrictions, leading to fluid buildup in the lungs. Ideally, weight gain should not exceed 3% to 5% of a person's initial body weight.

Additionally, shortness of breath can also be caused by anemia, which occurs when the number of red blood cells and their hemoglobin—responsible for carrying oxygen—is reduced.

According to researchers, if hemodialysis patients comply with the treatment program, undergo hemodialysis regularly, limit fluids and food, and take medication regularly, they will not feel or have minimal complaints. Self-regulation-based health education shows that health threats are processed as two parallel groups: information processing to control danger and information processing to control emotional responses caused by danger. The independence of danger processing and affect processing is seen in fears that generate communication to be reminded of knowledge through providing appropriate information and how to avoid the threat. This model shows that messages that describe the threat of disease Generate unreasonable attitudes and, sometimes, influence overt behavior.

CONCLUSION

Individual needs can significantly enhance practical education's effectiveness. Self-regulation is a convenient approach for facilitating behavior change among these theories. Self-regulation is a systematic problem-solving process that applies to health-related issues, akin to addressing other problems. Health education interventions grounded in self-regulation encompass materials designed to clarify disease representations and employ strategies for coping, as well as assess perceived threats, challenges, self-efficacy, and beliefs regarding personal control.

The self-regulation process involves several key components, including interpreting problems, implementing coping strategies, and evaluating their success. Self-management behaviors represent a crucial domain in which nephrology nurses can effect change to improve clinical outcomes, specifically regarding Interdialytic Weight Gain (IDWG). Effective self-management is vital for promoting appropriate IDWG levels.

Nevertheless, patients experiencing psychological challenges such as depression, anxiety, and stress may find it difficult to adhere to weight gain restrictions. By addressing the unique challenges hemodialysis patients encounter through self-management-based health education, healthcare professionals can mitigate symptoms such as nausea, vomiting, and dizziness. This approach is expected to enhance patient compliance and facilitate better management of their health conditions.

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