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THE EFFECT OF INTEGRATED EDUCATION ON THE KNOWLEDGE OF HEMODIALYSIS PATIENTS

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ABSTRACT

ESRD (End-Stage Renal Disease) patients receive inadequate information regarding fluid and dietary restrictions, and the current educational methods provided by nurses are not optimal and do not fully meet the needs of hemodialysis patients. This study aims to evaluate the effect of integrated education on the knowledge of hemodialysis patients at Raden Mattaher Public Hospital Jambi Method: The study is a quantitative research with a quasi-experimental design and a Pre-Test-Post-Test design. The sample size is 56, with 28 in the intervention group and 28 in the control group, using purposive sampling technique. The intervention group received integrated education for 4 weeks. The instrument used in this study measures knowledge using Curtin's knowledge The questionnaire met validity criteria with a Pearson correlation value > 0.40 and reliability with a Cronbach's alpha value > 0.70. The computerized data analysis results show a significant average difference in the intervention group's knowledge ($p < 0.05$). Based on this study, integrated education is effective in improving the knowledge of hemodialysis patients. The implementation of an integrated education program is recommended as the standard for educating hemodialysis patients.

Keywords: hemodialysis; integrated education; patient knowledge

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INTRODUCTION

End-Stage Renal Disease (ESRD) is a major health issue in Southeast Asia and is increasingly recognized globally (Mukakarangwa et al., 2018). ESRD occurs when the Glomerulus Filtrate Rate (GFR) reaches the final stage at ≤ 15 ml/min/1.73 m², with or without dialysis (Mina et al., 2019) This stage represents the terminal phase of chronic kidney disease, known as End-Stage Renal Disease (ESRD) (Ammirati, 2020). Currently, ESRD requires renal replacement therapy in the form of dialysis or kidney transplantation (Black & Hawk, 2009; Brunner & Suddarth, 2004; Ignatavicius & Workman, 2010). Patients will undergo lifelong hemodialysis until they receive a new kidney through transplantation (Smeltzer and Bare, 2002).

According to the World Health Organization (WHO), there was a 50% increase in ESRD cases in 2018 compared to the previous year. In Indonesia, the Institute for Health Metrics and Evaluation (IHME) reported in 2018 that ESRD ranked 13th among diseases causing the most deaths, with 35,217 cases or 2% of total deaths. The United States Renal Data System (USRDS) reported that the prevalence of ESRD increased by 20-25% annually (USRDS, 2020). According to the Indonesian Ministry of Health (2018), 3.8% of the population suffers from chronic kidney failure. The 2018 Riskesdas report indicated that Jambi Province ranked 22nd for chronic kidney failure patients undergoing hemodialysis, with 18.1% (Riskesdas,

2018). Medical records from the hemodialysis unit from 2019-2023 showed a 65% annual increase in kidney failure cases requiring hemodialysis therapy.

Hemodialysis therapy is a treatment strategy to address impaired kidney function. Without fluid restrictions, the body will accumulate fluids, leading to swelling and worsening heart function. Fluid intake restriction is a common issue among chronic kidney failure patients undergoing hemodialysis (Howren et al., 2016). A study by (Zhianfar et al., 2020) found that adherence to fluid restriction had a p-value of 0.008, emphasizing the need for fluid restriction in chronic kidney disease patients. Non-compliance with fluid restriction in hemodialysis patients reaches 79.5% (Mahyuvi & Hasina, 2021)

Lifestyle changes in patients undergoing hemodialysis are crucial for managing their condition. Fluid restriction is a key part of this care, especially considering substantial weight gain in patients (more than 0.5 kilograms in 24 hours) (Brunner & Suddarth, 2002; Hudak & Gallo, 2006). If a patient experiences weight gain exceeding 5% of their dry weight, it can lead to complications such as hypertension, intradialytic hypotension, left heart failure, ascites, pleural effusion, congestive heart failure, and potentially death (Tamaura et al., 2019). Non-compliance with fluid restriction is a significant issue among ESRD patients undergoing hemodialysis. According to (Saraswati & Ni Kadek Yuni Lestari, (2024), fluid restriction is the most challenging aspect of adherence for hemodialysis patients, with a non-compliance rate of 56.5%. This is consistent with findings by (Wulan & Emaliyawati, 2018), who reported that 66.7% of hemodialysis patients do not adhere to fluid restrictions. Lestari et al., (2021) also found that 55 respondents (96.5%) had poor fluid restriction management. (Zyga et al., (2015) reported that 76% of study subjects with hemodialysis did not adhere to fluid restrictions, and 53% experienced fluid overload. Uncontrolled fluid intake can lead to dangerous conditions (Ekinci et al., 2021). Non-compliance with fluid restrictions is influenced by a lack of knowledge and understanding of the disease.

Knowledge is a crucial domain in shaping a person's actions and behavior. It is essential for hemodialysis patients to effectively manage their symptoms and complaints. Studies have shown that people with chronic kidney disease (CKD) often have limited knowledge about their illness and its treatment (Wu et al., 2011). (Mailani et al., (2021) found that the average knowledge level of hemodialysis patients was 17.94% (range 0-25), which influenced their self-efficacy in managing CKD. Other studies have indicated that individuals with kidney disease often have insufficient knowledge about the condition (Chen et al., 2011; Levey & Coresh, 2012), and patients with more specific knowledge about kidney disease are better able to manage their illness (Levey et al., 2012)

Maksum et al., (2019) found that 27 (54%) patients had poor knowledge about fluid restriction. (Fikawati & Syafiq, 2012) stated that higher knowledge levels positively influence attitudes and behavior. Knowledge is essential for patients to address their health issues, especially to control their disease, cope with it, and make appropriate decisions, particularly in chronic kidney failure patients (Yuliaw, 2009). In her study, she noted that patients with broader knowledge are better equipped to control themselves in dealing with various problems, have higher self-confidence, possess more experience, and are better able to understand what is recommended by healthcare providers, thus reducing anxiety and enabling them to make better decisions in dealing with their problems.

Knowledge is a crucial domain in shaping a person's actions and behavior. Mailani et al., (2021) found that the average knowledge level of hemodialysis patients was 17.94 (range 0-

25). Behavior based on knowledge is more likely to persist than behavior not rooted in knowledge (Tresna Astutik, 2021). Other studies have shown that individuals with kidney disease often have insufficient knowledge about the condition (Chen et al., 2011; Levey & Coresh, 2012), and patients with more specific knowledge about kidney disease are better able to manage their illness (Levey et al., 2012)

Lack of knowledge is one of the causes of uncontrolled fluid intake, which can lead to death in ESRD patients undergoing hemodialysis. In the United States, it is reported that 9.7% - 49.5% of patients experience an increase in Interdialytic Weight Gain (IDWG). In Europe, 9.8% - 70% of patients experience an increase in IDWG (Hidayati et al., 2023). Dewi et al., (2022) found that many patients in Indonesia have uncontrolled IDWG. One of the dangerous conditions in chronic kidney disease patients is weight gain exceeding 5% of dry weight. If fluid overload occurs, it can cause various complications such as hypertension, intradialytic hypotension, left heart failure, ascites, pleural effusion, congestive heart failure, and potentially death Tamaura et al., (2019) Additionally, it can lead to problems for hemodialysis patients, such as physical, psychological, lifestyle, and social changes, which will affect the patient's quality of life (Nayana et al., 2017).

A preliminary study conducted by the researcher on August 3, 2023, in the Hemodialysis Unit of Raden Mattaher General Hospital in Jambi, showed a 40% increase in hemodialysis patients from 2022 to 2023. Interviews with 10 patients using knowledge and compliance questionnaires revealed that all 10 patients (100%) did not restrict fluid intake. Of these, 8 did not understand the risks associated with not limiting fluid intake, leading to IDWG exceeding 5%, and Quick Of Blood during hemodialysis < 200 because higher rates cause cramps, headaches, cold sweats, or inability to tolerate the procedure, and post-hemodialysis they feel weak and sometimes require hospitalization. Meanwhile, the other 2 patients understood the risks of fluid restriction, as evidenced by an IDWG of less than 5% and Quick Of Blood during hemodialysis at 250-300. These patients reported being able to control their fluid intake and knew that excessive fluid intake could cause swelling, shortness of breath, or other complaints, allowing them to engage in physical activities without issues after hemodialysis. Nurses mentioned that education about fluid restriction and weight management between hemodialysis sessions had been provided but not yet integrated.

The education provided at Raden Mattaher General Hospital in Jambi has been ongoing, with learning needs identified through general formats without detailing the specific learning needs of each healthcare provider. The educational format covers medical, nursing, nutritional, and pharmaceutical care needs but only asks whether these are needed without detailing specific educational needs, interdisciplinary collaboration, so no maximum and measurable outcomes have been achieved from the health education provided. (Mailani et al., 2021) reported that chronic kidney failure patients received inadequate information about fluid and dietary restrictions due to the non-detailed and patient-specific educational methods provided by nurses and medical staff in the hemodialysis unit (Mailani et al., 2021).

Based on the phenomenon mentioned above, it can be concluded that the main issue faced by ESRD patients in this study is the low level of patient knowledge regarding fluid restriction. This lack of knowledge influences the high IDWG values, low Quick of Blood values, and ultimately leads to a decrease in quality of life and reduced longevity among hemodialysis patients. Therefore, further efforts are needed to address this issue. Education is a potential strategy to improve knowledge and help patients manage the challenges they face during hemodialysis. Various efforts have been made by healthcare professionals regarding fluid

intake restrictions, including providing education, but adherence to these guidelines remains difficult for patients to achieve (Griva et al., 2018). The general objective of this study is to determine the impact of integrated education on knowledge among hemodialysis patients at Raden Mattaher Public Hospital, Jambi, in 2024.

METHOD

The study design is a quasi-experimental with a pre-test and post-test non-equivalent control group design. This design aims to reveal causal relationships by involving both a control group and an experimental or intervention group. The intervention group receives educational treatment, while the control group is given standard interventions provided in the hemodialysis unit. The sample size for this study is 25, but because the research includes a control group, the total sample size is 50 respondents. These are randomly divided into 25 for the intervention group and 25 for the control group. To account for potential dropouts, an additional 10% (3 individuals) is added, making the final sample size 28 patients per group. The researcher uses purposive sampling to select 28 patients for the intervention group and 28 for the control group, based on inclusion and exclusion criteria, ensuring that the sample is suitable for providing adequate information for the study.

The implementation phase of the study begins with screening, where the researchers and enumerators assess whether hemodialysis patients at RSUD Raden Mattaher Jambi meet the inclusion criteria, which include willingness to participate as respondents, undergoing routine hemodialysis twice a week for more than 3 months, having an IDWG > 2.5%, and a Quick of Blood (QB) ≤ 200. After determining the inclusion and exclusion criteria, eligible patients are provided with explanations about the study's objectives, benefits, procedures, and potential consequences. If the patients agree to participate, they sign the informed consent. Following this, during the pre-test phase, respondents are divided into intervention and control groups. Both groups complete a questionnaire regarding their knowledge and quality of life, and assessments of IDWG and QB are conducted. The intervention phase begins with the treatment group receiving education on fluid and nutrition management through demonstrations and provision of a module. In the first week, a pre-test is conducted, followed by two integrated education sessions lasting 30-45 minutes each, covering topics such as the concept of ESRD, kidneys, hemodialysis, and nutritional management. Monitoring of IDWG and QB is also carried out. In the second week, additional education sessions on fluid management and diet for hemodialysis patients are provided, along with monitoring of IDWG and QB, followed by an evaluation with the first post-test and distribution of the module. In the third week, further explanations about the provided module are given, and monitoring of IDWG and QB continues. Finally, in the fourth week, the final monitoring of IDWG and QB is conducted, followed by the second post-test evaluation. The data are then analyzed using univariate and bivariate analyses.

RESULTS

Tabel 1.
Mauchly's Test of Sphericity

Effectiveness	Intervention Group		Control Group	
	Chi-Square	p	Chi-Square	p
Knowledge	0,717	0,699	5,897	0,055

The Mauchly's Test of Sphericity assesses whether the assumption of sphericity is met in a Repeated Measures ANOVA, which requires that the variances of the differences between all pairs of measurements are equal. If this assumption is violated, the results can be biased, and corrections such as Greenhouse-Geisser or Huynh-Feldt may be necessary.For the variable "Knowledge," the test results for the intervention group show an Approximate Chi-Square

value of 0.717 with a p-value of 0.699. Since the p-value is greater than 0.05, the assumption of sphericity is not violated in the intervention group, and no additional correction is required. In the control group, the Approximate Chi-Square value is 5.897 with a p-value of 0.055. Although the p-value is close to 0.05, it is still slightly above the threshold, indicating that the assumption of sphericity is not significantly violated. Therefore, the analysis can proceed without additional correction.

Table 2.
Analysis of Knowledge Variable for Control Group of Hemodialysis Patients

Periode Test	Z	P-Value
Pretest-Midtes	-3,684	0,000
Pretest - Posttest	-4,278	0,000
Midtes -Posttest	-3,538	0,000

Post-hoc testing using the Wilcoxon Signed-Rank test with Bonferroni correction shows that the knowledge score of the control group at Midtest (Median=16) is higher than at Pretest (Median=15). This increase results in a significant difference (Z=3.684, p=0.001). Furthermore, the knowledge score of the control group at Posttest (Median=17) is higher compared to the Midtest (Median=16). This increase results in a significant difference (Z=3.538, p=0.001).

DISCUSSION

The increase in knowledge in the intervention group is clearly visible after the intervention. At the pretest, the median knowledge score was 16.00. After the intervention, the median score increased to 18.00 at the midtest and 20.00 at the posttest. The Wilcoxon Signed-Rank test with Bonferroni correction shows that this increase is statistically significant. Comparing the midtest to the pretest, the increase results in $Z = 4.398$, $p = 0.001$, and comparing the posttest to the midtest, the increase results in $Z = 4.590$, $p = 0.001$. This indicates that integrated health education significantly improves patients' knowledge from pretest to posttest. According to (Fikawati & Syafiq, 2012), knowledge is a crucial domain that influences an individual's attitudes and behaviors towards their health. Increased knowledge can enhance adherence to treatment and disease management. Comprehensive and structured education provides a better understanding of the importance of chronic kidney disease management. Mailani et al. (2021) demonstrated that higher knowledge is associated with better self-efficacy in patients with chronic kidney disease. Wu et al., (2011) found that patients with better knowledge about kidney disease can manage their condition more effectively.

Levey et al., (2012) state that good knowledge about kidney disease enables patients to make better care decisions. The integrated education provided in this study includes information about kidney disease, hemodialysis, and the importance of fluid restriction and diet control. The educational material is delivered interactively, allowing patients to better understand and remember the information. Many hemodialysis patients at RSUD Raden Mattaher Jambi have limited knowledge about their condition and how to manage it. Integrated education helps fill this gap and enhances their understanding of the importance of disease management. The researchers argue that this increase in knowledge will positively impact patients' adherence to their treatment and management of chronic kidney disease. Integrated education should be a routine part of care to ensure patients have adequate knowledge to manage their condition effectively.

In the control group, knowledge scores increased following routine education interventions. The median knowledge score at pretest was 15.00, which rose to 16.00 at midtest and 17.00 at

posttest. The Wilcoxon Signed-Rank test with Bonferroni correction showed that the increase in knowledge from pretest to midtest and from midtest to posttest was statistically significant, with $Z = 3.684$, $p = 0.001$, and $Z = 3.538$, $p = 0.001$, respectively. Although knowledge improvement in the control group was significant, it was lower compared to the intervention group. According to Fikawati & Syafiq, (2012) knowledge is a crucial domain influencing individuals' attitudes and behaviors towards their health. Good knowledge can affect how individuals respond to their illness and adhere to medical treatment plans. Routine education, while not as comprehensive and structured as integrated education, still provides essential basic information for patients.

Increasing knowledge through routine education can help enhance adherence to treatment and disease management. Patients who understand their condition, its causes, and consequences are more likely to follow medical advice and required treatments. This aligns with findings by (Mailani et al., 2021) which showed that higher knowledge is associated with better self-efficacy in patients with chronic kidney disease. Patients with a better understanding of their condition manage their illness more effectively, improving their quality of life (Ezdha et al., 2023). Wu et al., (2011) also found that patients with better knowledge of kidney disease manage their condition more effectively. The routine education provided in this study improved patients' basic knowledge about kidney disease and hemodialysis management. Although not as comprehensive as integrated education, routine education still plays a role in enhancing patient understanding, highlighting the importance of clear and understandable information in patient care (Saraswati & Ni Kadek Yuni Lestari, 2024). Many hemodialysis patients at RSUD Raden Mattaher Jambi receive basic education about their condition, but this education is often unstructured and superficial. It usually covers basic information about kidney disease, how hemodialysis works, and the importance of adhering to dialysis schedules and recommended diets(Tamaura et al., 2019). However, this education is often sporadic and not part of a structured program, which may limit its effectiveness.

The researchers argue that while routine education improves knowledge, there is a need for a more structured and comprehensive approach, such as integrated education, for optimal results. Integrated education involves systematic sessions covering various aspects of patient care, including diet, fluid management, medication, and adherence to dialysis schedules. This approach also includes psychosocial support, which is crucial for patients who often experience stress and anxiety about their condition (Aprilia & Fayasari, 2022). Routine education has limitations, such as a lack of emphasis on ongoing learning. Patients may receive information at a single point in time, but without reinforcement and repetition, this knowledge can quickly be forgotten. Additionally, routine education often lacks interactive methods that help patients better understand and retain the information(Nayana et al., 2017). To address these limitations, integrated education can be adopted. Integrated education uses various teaching methods, such as lectures, group discussions, and visual aids, which can enhance patient understanding. It also involves ongoing assessment of patients' knowledge and adjustments to educational materials based on their needs and progress(Armiyati et al., 2021). Implementing integrated education requires the involvement of various healthcare professionals, including doctors, nurses, nutritionists, and social workers. This multidisciplinary approach ensures that all aspects of patient care are addressed, providing comprehensive support. For example, nutritionists can provide education on proper diet, while social workers can help patients manage stress and anxiety related to their condition (Maksum et al., 2019).

In the long term, integrated education can significantly improve patient health outcomes. Patients who are better educated and more capable of managing their disease are likely to experience fewer complications, have a better quality of life, and reduce overall healthcare costs. Therefore, while routine education has benefits, healthcare providers should consider transitioning to a more structured and comprehensive education approach (Zuliani et al., 2023). In conclusion, while routine education plays an important role in improving hemodialysis patients' knowledge, a more structured and comprehensive educational approach is needed for optimal results. Integrated education, covering various aspects of patient care and involving multiple healthcare professionals, can provide better support for patients and help them manage their conditions more effectively (Naryati et al., 2023). Thus, implementing integrated education can enhance patients' quality of life and reduce complications associated with hemodialysis(Ezdha et al., 2023).

CONCLUSION

Integrated education significantly improves patient knowledge in the intervention group compared to the control group. In the intervention group, the median knowledge score increased from 16.00 at the pretest to 18.00 at the midtest, and 20.00 at the posttest, with statistically significant improvement. On the other hand, the control group also showed improvement, but not as much as the intervention group, with the median knowledge score increasing from 15.00 at the pretest to 16.00 at the midtest, and 17.00 at the posttest.

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