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RELATIONSHIP BETWEEN INTERDIALYTIC WEIGHT GAIN (IDWG) AND FATIGUE LEVELS WITH DIALYSIS ADEQUACY IN CHRONIC KIDNEY FAILURE PATIENTS UNDERGOING HEMODIALYSIS

Meisya Tri Utami[1)], Santi Herlina[2)*]
Fakultas Ilmu Kesehatan, Universitas Pembangunan Nasional "Veteran" Jakarta, Indonesia [1,2)]

ABSTRACT

Hemodialysis is the most widely used renal replacement therapy in Indonesia. Complications that may occur during hemodialysis include interdialytic weight gain (IDWG) and intradialytic fatigue. The effectiveness of hemodialysis therapy can be evaluated through the calculation of dialysis adequacy Kt/V, which is the ratio of urea clearance to urea distribution volume. This study aims to analyze the relationship between IDWG and fatigue levels on dialysis adequacy in chronic kidney failure patients undergoing hemodialysis at Pertamina Central Hospital. This quantitative research used purposive sampling with a sample size of 90 respondents. IDWG and Kt/V data were collected through observation sheets, while fatigue levels were assessed using the Piper Fatigue Scale (PFS) questionnaire. The statistical analyses used were Spearman correlation, Pearson correlation, and one-way ANOVA. The results showed a relationship between IDWG and dialysis adequacy (p-value 0.008) with a Pearson coefficient (r=0.278), indicating a moderate and positive correlation. However, no significant relationship was found between fatigue levels and dialysis adequacy (p-value 0.151). Additionally, relationships were found with confounding factors such as dialysis duration, blood flow rate, and ultrafiltration on dialysis adequacy (p-value 0.001; 0.003; 0.006). It is recommended that hemodialysis patients manage their weight gain to prevent complications that can affect the adequacy of the hemodialysis process.

Keywords: Dialysis Adequacy, Fatigue Levels, Hemodialysis, Interdialytic Weight Gain

*Correspondence email: santiherlina@upnvj.ac.id

INTRODUCTION

Chronic kidney disease (CKD) is a progressive kidney disease characterized by irreversible damage to nephrons, leading to the accumulation of waste products, fluid and electrolyte imbalance, metabolic acidosis, anemia, and hypertension (Brady et al., 2014). The decline in kidney function is indicated by a Glomerular Filtration Rate (GFR) of <60 mL/min/1.73 m² (Daugirdas et al., 2015).

According to the World Health Organization in 2020, chronic kidney disease ranks 10th among the leading causes of death globally (WHO, 2020). In Indonesia, the prevalence of CKD in 2018 was 0.38%, marking an increase of 0.18% since 2013, according to Riskesdas 2018. The highest cases were recorded in North Kalimantan Province (0.64%) and DKI Jakarta Province (0.1%) (Kemenkes RI, 2018). Patients with chronic kidney disease require Renal Replacement Therapy (RRT), which includes dialysis and kidney transplantation. Dialysis therapy includes two modalities, namely hemodialysis and peritoneal dialysis. According to the Indonesia Renal Registry 2018, the most commonly used renal replacement therapy (RRT) in Indonesia is hemodialysis, with a prevalence of 98% (Indonesia Renal Registry, 2018).

During hemodialysis, the patient's blood is drawn out of the body through an artery to be cleaned by a dialysis machine (dialyzer), which filters and removes waste products and excess fluids (Kim & Kawanishi, 2018). Hemodialysis patients may experience complications either between two dialysis sessions (interdialytic) or during the dialysis session itself (intradialytic) (Feehally et al., 2019).

The increase in body weight between two dialysis sessions in chronic kidney disease (CKD) patients indicates fluid retention from their actual body weight. An increase of 1 kg in body weight is equivalent to approximately 1 liter of retained fluid (Ignatavicius et al., 2017). Interdialytic Weight Gain (IDWG) that is still tolerable ranges from 1.5 kg or less than 3% of dry body weight (Kallenbach, 2020). IDWG is a factor that influences the determination of dialysis dose, as the amount of fluid to be removed during hemodialysis is calculated based on the patient's weight gain between dialysis sessions (Kim & Kawanishi, 2018). To determine the appropriate dose, the patient's body fluid volume is calculated. The V value is obtained by multiplying the patient's body weight by the estimated fluid volume (60%) (Daugirdas et al., 2015). An increase in IDWG is associated with a higher V value, which may lead to decreased dialysis adequacy (Ladesvita & Sukmarini, 2019).

Fatigue is a subjective feeling experienced by patients, characterized by exhaustion, muscle weakness, and reduced energy levels (Levy et al., 2016). Fatigue may occur during the hemodialysis process (intradialytic), referred to as Intradialytic Fatigue (Bossola et al., 2023). Rapid removal of fluids and urea from the body to the dialysis machine during intradialysis can lead to fatigue (Djamaludin et al., 2020). This occurs because the fluid removal process (ultrafiltration) causes a drop in blood pressure. When blood pressure decreases (hypotension), blood flow to the body is disrupted, affecting energy levels and causing fatigue (Sajidah et al., 2021). Patients experiencing complications during intradialysis, such as fatigue and hypotension, often have a reduced dialysis duration. The average dialysis duration is 227 minutes (3 hours and 27 minutes), which is less than the recommended 4 hours. The duration of hemodialysis therapy is critical in achieving dialysis adequacy (Azmi et al., 2023).

The effectiveness of removing solutes and excess fluids during the hemodialysis process is referred to as dialysis adequacy. Quantitative evaluation of dialysis adequacy is measured using the Kt/V ratio or Urea Reduction Rate (URR). Kt/V is the ratio of urea clearance and dialysis duration to the volume of urea distributed in the patient's body fluids (Kim & Kawanishi, 2018). The National Health Service Guidelines set a minimum target Kt/V of 1.8 for hemodialysis conducted twice a week. According to data from the Indonesian Renal Registry in 2018, only 19% of the 31,000 patients undergoing hemodialysis twice a week achieved a Kt/V adequacy of ≥1.8. The inadequate adequacy levels may result from most patients not receiving sufficient dialysis doses (Indonesia Renal Registry, 2018).

Complications such as increased IDWG during interdialysis and fatigue during intradialysis can affect the dialysis dose administered to patients. The dose, including duration, blood flow rate (Qb), and ultrafiltration, will be adjusted to achieve adequate dialysis doses without compromising patient comfort (Daugirdas et al., 2015). Based on these issues, the researcher formulated the problem statement for this study in the form of a question asking whether there is a relationship between interdialytic weight gain (IDWG) and fatigue levels with dialysis adequacy in chronic kidney disease patients undergoing hemodialysis.

METHODS

This study is a quantitative research with a correlational design using a cross-sectional method. The sampling technique applied in this research is non-probability sampling with a purposive sampling approach. The study was conducted in the hemodialysis unit at Pertamina Central Hospital in May 2024. Sample size calculation determined that 90 respondents were required. The inclusion criteria for this study were: patients diagnosed with chronic kidney disease undergoing hemodialysis at Pertamina Central Hospital, patients who were fully conscious, patients who signed informed consent, and patients who were fluent in Indonesian. Ethical approval for this study was obtained from the Ethics Committee of UPN "Veteran" Jakarta with reference number 254/V/2024/KEP.

Demographic data collection included age, gender, education, occupation, frequency of hemodialysis, and duration of hemodialysis, which were recorded on the respondent characteristics sheet. Data collection for Interdialytic Weight Gain (IDWG), dialysis adequacy, and confounding factors was performed using observation sheets to record observations such as pre-HD2 body weight, post-HD1 body weight, duration of hemodialysis (time of dialysis), blood flow rate (Qb), ultrafiltration (UF), and adequacy value (Kt/V). Patient fatigue levels were measured using the Piper Fatigue Scale (PFS) questionnaire, which consists of 22 questions on a scale of 1 to 10. The scoring results were interpreted as follows: a score of 0 indicates no fatigue, scores of 1-3 indicate mild fatigue, scores of 4-6 indicate moderate fatigue, and scores of 7-10 indicate severe fatigue. Higher scores reflect greater levels of fatigue.

Statistical analysis was performed using SPSS version 26. The Kolmogorov-Smirnov test was used for normality testing to observe significance values. Bivariate analysis for the independent, dependent, and confounding variables was conducted using Spearman's correlation, Pearson's correlation, and ANOVA tests. Results were considered significant if the p-value was < 0.05.

RESULTS

Table 1 shows the distribution of respondent characteristics. The gender distribution is dominated by females, with 49 respondents (54.4%). Most of the hemodialysis patients were unemployed, totaling 56 respondents (62.2%). Regarding the highest level of education, the majority of respondents had reached higher education, with 56 respondents (62.2%). The frequency of hemodialysis among the respondents indicates that almost all of them, 85 respondents (94.4%), underwent hemodialysis twice a week. In terms of hemodialysis duration, the majority of patients received 4 hours of dialysis, totaling 49 respondents (54.4%), followed by 4.5 hours for 30 respondents (33.3%), and 11 respondents (12.22%) underwent 5-hour dialysis sessions.

For the fatigue level variable, the majority of patients undergoing hemodialysis experienced moderate fatigue, with 57 respondents (63.3%), followed by mild fatigue in 28 respondents (31.1%), and only 5 respondents (5.6%) experienced severe fatigue.

Table 1. Frequency Distribution of Respondents Based on Gender, Occupation, Education, Hemodialysis Frequency, Hemodialysis Duration, and Fatigue Level (n=90)

Characteristics	Frequency	%
Gender		
Male	41	45.6
Female	49	54.4
Occupation		
Housewife	16	17.8
Private Employee	11	12.2
Others	1	1.1
Entrepreneur	3	3.3
Civil Servant (PNS)	3	3.3
Unemployed	56	62.2
Education		

No School	1	1.1
Elementary School (SD)	2	2.2
Junior High School (SMP)	6	6.7
Senior High School (SMA)	25	27.8
Higher Education	56	62.2
Hemodialysis Frequency		
2x/week	85	94.4
3x/week	5	5.6
Hemodialysis Duration		
4 Hours	49	54.4
4.5 Hours	30	33.3
5 Hours	11	12.2
Fatigue Level		
Mild	28	31.1
Moderate	57	63.3
Severe	5	5.6

The majority of respondents in this study were female, with a total of 49 individuals (54%). A similar result was found in a study by Muharrom et al. (2018), where the majority of patients were female. According to a study by Kao et al. (2022), although the prevalence of chronic kidney disease is higher in women compared to men, the disease progresses faster in men. As a result, men represent a larger proportion of the population of kidney failure patients undergoing dialysis therapy.

The results show that the majority of patients, 56 individuals (62.2%), were unemployed. This finding is consistent with the study by Maesaroh et al. (2020), which reported that most hemodialysis patients are unemployed. Based on interviews conducted by the researcher, since most of the patients are elderly, they mentioned that they only perform minimal activities and are not given heavy tasks by their families. Additionally, complaints of other complications such as anemia, arthritis, glaucoma, retinopathy, gastritis, and heart disease also limit their ability to be active.

The majority of respondents had higher education, with 56 individuals (62.2%). A similar result was found in a study by Maesaroh et al. (2020), which stated that people with higher education tend to have better awareness of monitoring their health compared to those with lower education. Limited knowledge can make them reluctant to undergo hemodialysis therapy.

This study shows that almost all patients undergo hemodialysis therapy twice a week, with 85 individuals (94.4%). A similar finding was obtained from a study by Herlina & Rosaline (2021), where the majority of patients, 92%, undergo hemodialysis twice a week. Patients undergoing hemodialysis twice a week can achieve similar results in hemoglobin, albumin, and quality of life scores as those undergoing hemodialysis three times a week, provided the duration of each session is increased (2016).

This study shows that the majority of respondents underwent hemodialysis sessions lasting 4 hours, with 49 individuals (54.4%). This finding is consistent with the Indonesian Renal Registry in 2018, which states that the majority of hemodialysis patients in Indonesia undergo therapy sessions lasting 4 hours (Indonesia Renal Registry, 2018). The duration of each session impacts the quality of the dialysis session, as the length of time is one of the factors determining the adequacy of therapy. The longer the duration of each session, the more likely dialysis adequacy is achieved (Fatonah et al., 2021).

The majority of patients experienced moderate fatigue, with 57 individuals (63.3%). This result is consistent with studies conducted by Bhatti et al. (2023) and Mistik et al. (2022), which found that patients undergoing hemodialysis experienced moderate fatigue. This is in line with the theory outlined by Parker Gregg et al. (2021), who stated that patients experiencing fatigue during dialysis sessions (intradialytic fatigue) may experience it due to intradialytic hypotension and ultrafiltration volume. Similarly, the study by Sajidah et al. (2021) suggested that a drop in blood pressure can disrupt blood flow, impairing the delivery of oxygen and nutrients to the body's cells. As a result, the energy production process is hindered, leading to energy depletion in patients.

Table 2. Distribution of Mean Values of Respondents Based on Age, Duration of Hemodialysis, Quick of Blood, Ultrafiltration, IDWG, and Kt/V (n=90)

Characteristics	Mean	Median	SD	Min-Max	95% CI	
					Lower	Upper
Age	61.40	64.50	13.86	31-83	58.50	64.30
Duration of Hemodialysis	25.48	12.00	31.71	1-204	18.84	32.12
Quick of Blood (Qb)	236.61	250.00	24.51	180-275	231.48	241.75
Ultrafiltration (UF)	10.79	10.28	3.91	3.20-20.21	9.97	11.61
Interdialytic Weight Gain (IDWG)	3.84	3.75	1.90	0.50-10.30	3.44	4.24
Kt/V	1.63	1.60	0.34	1.00-2.40	1.55	1.70

Table 2 shows that the average age of the respondents was 61.40 years (SD 13.86), with a median value of 64.50 years. The youngest respondent was 31 years old, and the oldest was 83 years old. The average duration of hemodialysis was 25.48 months (SD 31.71), equivalent to 2 years, with a median value of 12 months. The shortest duration of hemodialysis was 1 month, and the longest was 204 months, equivalent to 17 years. The average Quick of Blood (Qb) dose administered was 236.61 ml/min (SD 24.51), with a median value of 250 ml/min. The lowest dose given was 180 ml/min, and the highest dose was 275 ml/min. The Qb measurement was taken during the second hour when the blood flow rate from the patient to the dialysis machine had stabilized. The average Ultrafiltration (UF) dose administered was 10.79 ml/kg/hour (SD 3.91), with a median value of 10.28 ml/kg/hour. The lowest dose given was 3.20 ml/kg/hour, and the highest was 20.21 ml/kg/hour. The average Interdialytic Weight Gain (IDWG) measured in the respondents was 3.84% (SD 1.90), with a median value of 3.75%. The lowest IDWG recorded was 0.5%, and the highest was 10.30%. The average dialysis adequacy measured by the Kt/V formula in the respondents was 1.63 (SD 0.34), with a median value of 1.60. The lowest Kt/V value recorded was 1, and the highest was 2.4.

The average age of the respondents in this study was 61.4 years. This finding is in line with the Indonesian Renal Registry report in 2018, which states that the majority of hemodialysis patients are in the 45-64 years age range (Indonesia Renal Registry, 2018). Aging is associated with an increased risk of chronic kidney disease (CKD) factors such as hypertension, obesity, and cardiovascular disease, which can increase the prevalence of CKD (Yu et al., 2016).

The average duration of hemodialysis in this study was 25 months, or about 2 years. This result is consistent with the study by Darmawan et al (2019), which found that patients who have undergone dialysis therapy for more than 24 months have better adherence to their treatment regimen. They have had enough time to adapt and accept the reality of lifelong renal replacement therapy.

The mean value of Quick of Blood (Qb) in all respondents was found to be 236.61 ml/min. This dosage aligns with the theory outlined by the Indonesian Renal Registry in 2018, which states that the most commonly used blood flow rates range from 200 to 249 ml/min. A higher blood flow rate with the same duration can increase the effectiveness of hemodialysis therapy (Indonesia Renal Registry, 2018).

In this study, the mean ultrafiltration (UF) rate for the respondents was found to be 10.79 ml/kg/hour. A similar result was found in a study conducted by Flythe in Fernandez-Prado et al. (2021), where the average UF rate was 12.1 ml/kg/hour. The UF rate of 10-13 ml/kg/hour is the maximum dose that can be given to patients undergoing hemodialysis. It has been stated that each increase in UF rate by 1 ml/kg/hour above the recommended dose can increase the risk of death by 3%.

The mean Interdialytic Weight Gain (IDWG) for the respondents was found to be 3.84%. This calculation indicates that the percentage of weight gain between two dialysis sessions falls into the mild category, which is less than four percent. However, this is not a tolerable weight gain, as the acceptable IDWG increase is ≤ 3%. A similar finding was found in a study by Wahyuni & Indarti (2019), where the mean IDWG was 3.56%, which still falls under the mild intradialytic weight gain category but is not a tolerable increase.

The average dialysis adequacy (Kt/V) for the respondents was found to be 1.63. In this calculation, it was found that the adequacy value was still below the minimum recommendation established by PERNEFRI in the National Health Service Guidelines, which set a minimum target of Kt/V 1.8 (Indonesia Renal Registry, 2018). A similar finding was found in a study by Daya et al. (2023), where the mean Kt/V was 1.62.

Table 3. Analysis of the Relationship Between Interdialytic Weight Gain and Dialysis Adequacy (Kt/V) (n=90)

Variable	Kt/V	
	r	p-value
Interdialytic Weight Gain	0.278	0.008

Table 3 presents a p-value of < 0.05, indicating a significant relationship between Interdialytic Weight Gain (IDWG) and dialysis adequacy (Kt/V). The Pearson correlation coefficient (r = 0.278) indicates a moderate positive relationship between the two variables.

The results of the study indicate a significant relationship between interdialytic weight gain (IDWG) and dialysis adequacy. This finding is consistent with the studies conducted by Daya et al. (2023) and Ladesvita & Sukmarini (2019), which also identified a correlation between IDWG and dialysis adequacy (Kt/V).

Utilizing the Kt/V formula as outlined by the National Institute of Health in 2009, it is evident that V represents the fluid volume within the patient's body, which directly influences the calculation of dialysis adequacy. In this formula, K corresponds to the blood flow rate into the dialysis machine, commonly referred to as the Quick of Blood, while t represents the duration of dialysis in minutes. The value of V functions as the divisor, meaning that a reduction in the value of V leads to an increase in dialysis adequacy (National Institute of Health, 2009).

Therefore, when a patient exhibits a high interdialytic weight gain, increasing the blood flow rate (K) or Quick of Blood and/or extending the dialysis duration (t) during a session may improve the Kt/V value, thus ensuring the patient receives adequate hemodialysis therapy (Fatonah et al., 2021). However, the study by Kahraman et al. (2015) revealed that in patients with a low IDWG (<3%), albumin, potassium, phosphorus levels, and normalized protein catabolic rate (nPCR) were significantly lower than in patients with IDWG ≥ 3%. This is because increased interdialytic weight gain results from salt and fluid intake between dialysis sessions, which is also influenced by the consumption of carbohydrates, proteins, and fats. Furthermore, high Kt/V values greater than 1.7 may suggest potential malnutrition, as latent malnutrition can lead to a decrease in the distribution volume of urea.

Table 4. Analysis of the Relationship Between Fatigue Level and Dialysis Adequacy (Kt/V) (n=90)

Variable	Kt/V		
	Mean ±SD	**F**	**p-value**
Fatigue Level		1.930	0.151
Mild	1.593 ± 0.331		
Moderate	1.626 ± 0.340		
Severe	1.920 ± 0.476		

Table 4 shows a p-value of 0.151, indicating that the result does not meet the significance criterion of $p < 0.05$. This means there is no significant relationship between the fatigue level and dialysis adequacy (Kt/V).

The study findings indicate no significant relationship between fatigue levels and dialysis adequacy. This is in line with the results of Suparti et al. (2020), who also found no significant relationship between fatigue and dialysis adequacy. Fatigue is defined as a subjective sensation of exhaustion experienced by patients. It was observed that patients can still achieve dialysis adequacy, despite experiencing severe fatigue symptoms. This suggests that fatigue is not directly associated with dialysis adequacy, and that fatigue is not the primary factor influencing a patient's ability to achieve dialysis adequacy.

Based on the respondent characteristics in this study, it was found that the majority of respondents were elderly (over 60 years old), with 62% being unemployed, which aligns with the finding that the average age of respondents was at or near retirement age. These findings support the conclusion that fatigue can occur even with minimal physical activity or limited social engagement. In line with the research by Zuo et al. (2018), fatigue was found to be significantly more pronounced in patients with minimal daily activities and social isolation.

In contrast, a different outcome was observed in the study by Khaerudin et al. (2019), which reported a relationship between dialysis adequacy and fatigue levels. However, dialysis adequacy was found to be an independent variable that influenced fatigue levels. It was suggested that adequate hemodialysis helps to reduce the accumulation of metabolic waste products and excess fluid, which in turn decreases the cytokines responsible for triggering fatigue.

Table 5. Analysis of the Relationship Between Dialysis Duration and Dialysis Adequacy (Kt/V) (n=90)

Variable	Kt/V		
	Mean ±SD	**F**	**p-value**
Dialysis Duration		8.170	0.001
Mild	1.506 ± 0.305		
Moderate	1.783 ± 0.329		
Severe	1.781 ± 0.384		

In Table 5, the analysis shows that the p-value is less than 0.05, indicating that the alternative hypothesis (Ha) is accepted. This means there is a significant relationship between dialysis duration and dialysis adequacy (Kt/V).

The results of this study demonstrate a relationship between dialysis duration and dialysis adequacy. These findings are consistent with the research by Fatonah et al. (2021), which concluded that longer hemodialysis durations are associated with improved dialysis adequacy. This is due to the enhanced clearance of solutes such as urea, creatinine, and phosphorus, as well as the more effective removal of excess fluid.

According to an interview with the head nurse in the hemodialysis unit, healthcare providers at the hospital encourage patients to extend their dialysis sessions. However, many patients are unable to comply, citing complaints of cramping when the duration is extended. This aligns with the findings of Abideen et al. (2018), which indicated that prolonged dialysis durations were significantly associated with the development of restless legs syndrome. Non-pharmacological interventions, such as stretching exercises, may be implemented during hemodialysis therapy to mitigate the discomfort associated with prolonged dialysis durations (Salib et al., 2020).

Table 6. Analysis of the Relationship Between Quick of Blood and Dialysis Adequacy (Kt/V) (n=90)

Variable	Kt/V	
	r	**p-value**
Quick of Blood	0.307	0.003

In Table 6, the analysis shows that the p-value is less than 0.05, indicating a significant relationship between Quick of Blood (Qb) and dialysis adequacy (Kt/V). This is supported by the Spearman's correlation coefficient (r=0.307), which indicates a moderate and positive relationship.

The results of the study indicate a significant relationship between the Quick of Blood (Qb) and dialysis adequacy. This finding is supported by the study conducted by Wayunah et al. (2023), which also identified a significant correlation between Qb and dialysis adequacy. The Qb dose is a crucial factor affecting solute clearance, as the blood flow rate from the patient's body to the dialysis machine determines how much and how rapidly the blood will be processed during hemodialysis. Ideally, Qb should be set between 170-300 ml/min, with an initial dose of < 200 (150-180) ml/min, which is then adjusted according to patient tolerance and condition. The greater the volume of blood processed per minute, the more uremic toxins and excess fluid can be removed (Fadlilah et al., 2020).

However, based on the researcher's observations, certain conditions may require adjustments to the Qb dose. Factors such as fatigue, restlessness, and significant changes in vital signs (e.g., hypotension or hypertension) may necessitate reducing the blood flow rate to the dialysis machine. In accordance with the research by Nanda et al. (2023), it is recommended that Qb be maintained between 150-200 ml/min to ensure patient comfort and tolerance without excessively elevating the flow rate.

Table 7. Analysis of the Relationship Between Ultrafiltration and Dialysis Adequacy (Kt/V) (n=90)

Variable	Kt/V	
	r	p-value
Ultrafiltration	0.289	0.006

In Table 7, the analysis shows that the p-value is less than 0.05, indicating a significant relationship between ultrafiltration and dialysis adequacy (Kt/V). This is supported by the Pearson's correlation coefficient (r=0.289), which indicates a moderate and positive relationship.

The study's results demonstrate a significant relationship between ultrafiltration (UF) rate and dialysis adequacy. These findings are consistent with the study by Uduagbamen et al. (2021), which also identified a relationship between UF and dialysis adequacy (Kt/V). High UF rates are often a response to increased fluid retention or high IDWG, particularly when dialysis duration is short. In such cases, higher UF rates are required to achieve adequate hemodialysis within a limited session.

However, if the UF rate is set excessively high, above 13 ml/kg/hour, without an extended dialysis duration, it may increase the risk of intradialytic hypotension and mortality. An overly high fluid removal rate that exceeds plasma refilling, caused by changes in oncotic pressure during hemodialysis, can lead to a significant drop in blood volume, resulting in intradialytic hypotension (Kim & Kawanishi, 2018). To mitigate this, UF rates can be reduced by extending dialysis duration or decreasing the ultrafiltration volume through a reduction in IDWG (Flythe et al., 2017).

Laboratory limitations regarding urea measurements prevent the evaluation of dialysis adequacy using the Urea Reduction Ratio (URR), meaning no comparative results were available to assess dialysis adequacy in the respondents.

CONCLUSION

Results indicate a significant relationship between Interdialytic Weight Gain (IDWG) and dialysis adequacy, while no significant relationship was found for the variable of Fatigue Levels. As for the confounding variables, including dialysis duration, Quick of Blood (Qb), and Ultrafiltration (UF), all three were found to have a significant association with dialysis adequacy.

SUGGESTION

Based on the findings of this study, it is recommended that hemodialysis patients manage their weight gain to prevent complications that could negatively impact the adequacy of hemodialysis therapy.

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