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CORRELATION OF ADEQUATE UREA REDUCTION RATE (URR) WITH THE DEGREE OF UREMIC PRURITUS AND SLEEP QUALITY IN CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING HEMODIALYSIS

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ABSTRACT
Chronic kidney disease (CKD) patients undergoing hemodialysis are at risk of dialysis inadequacy, which can be assessed through the Urea Reduction Rate (URR) parameter. A low URR reflects a suboptimal hemodialysis process, leading to the accumulation of uremic toxins in the body. This inadequacy can trigger complications such as uremic pruritus, a chronic itching sensation that disrupts comfort and reduces the patient's quality of life. Furthermore, the accumulation of toxic substances due to inadequate URR impacts sleep quality, characterized by difficulty falling asleep, frequent awakenings, and restless sleep. These two conditions are often overlooked in clinical practice, yet they significantly contribute to the decline in the physical and psychosocial well-being of hemodialysis patients. The study aims to analyze the Correlation of Adequate Urea Reduction Rate (URR) with the Degree of Uremic Pruritus and Sleep Quality in Chronic Kidney Failure Patients Undergoing Hemodialysis. This study used a correlational analytical design with a cross-sectional approach. The sample consisted of 50 respondents of chronic kidney failure patients undergoing hemodialysis using a purposive sampling technique. URR data were obtained from laboratory records and using the URR calculation formula using the formula URR = 100 × (1 - C1/C0), while data on the degree of pruritus were collected using a Numerical Rating Scale (NRS) questionnaire and sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Data analysis was performed using the Spearman Rank test to determine the relationship between variables. The results of the study showed that there was a significant relationship between URR and the degree of uremic pruritus p value 0.001 ($p < 0.05$) with a Correlation Coefficient value of 0.628 meaning a strong level of relationship, and there was a significant relationship between URR and the sleep quality of respondents undergoing hemodialysis p value 0.001 ($p < 0.05$) with a Correlation Coefficient value of 0.656 meaning a strong level of correlation. Dialysis adequacy measured by URR has an important role in reducing uremic pruritus symptoms and improving sleep quality in CKD patients.

Keywords: chronic kidney disease (CKD); hemodialysis; sleep quality; urea reduction rate (URR); uremic pruritus

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INTRODUCTION

Chronic kidney disease (CKD) is a condition of progressive and irreversible decline in kidney function, characterized by a decrease in the glomerular filtration rate (GFR) to <60 mL/min/1.73 m² for at least three months, or evidence of kidney damage such as albuminuria, urinary sediment abnormalities, or persistent structural abnormalities of the kidney (Kidney Disease: Improving Global Outcomes , 2020). CKD causes the accumulation of nitrogen waste such as urea and creatinine in the body which cannot be excreted optimally, thus having a systemic impact and disrupting various body functions (Dąbrowska-Bender et al., 2021). One of the main therapies for patients with terminal CKD is hemodialysis, which is a kidney replacement therapy process that uses a dialyzer machine to remove metabolic waste, excess electrolytes, and fluids from the body (Buoncristiani, Locatelli, Canaud, et al., 2021).

Hemodialysis effectiveness is measured through adequacy parameters, one of which is the Urea Reduction Ratio (URR), which is the percentage reduction in urea levels before and after hemodialysis. An adequate URR indicates that hemodialysis therapy has been optimally performed in removing urea from the blood (Yoon & Kim, 2022). According to the 2019 Global Burden of Disease report, it is estimated that more than 850 million people worldwide suffer from kidney disorders, with CKD being the leading cause. According to the 2022 Indonesian Renal Registry (IRR) report, the number of active hemodialysis patients in Indonesia reached more than 132,000 people, with a significant increase every year Indonesian Renal Registry, 2023). Meanwhile, WHO reported that CKD was the 10th leading cause of death globally in 2020 and will continue to increase due to risk factors such as diabetes and hypertension WHO, 2020). This figure indicates that chronic kidney disease (CKD) and its complications are a health issue that requires serious attention. In Kalimantan, the number of sufferers includes West Kalimantan (12,637), Central Kalimantan (6,286), South Kalimantan (9,352), East Kalimantan (8,929), and North Kalimantan (1,654). At Sultan Imanuddin Hospital in Pangkalan Bun, 108 patients were undergoing outpatient hemodialysis therapy in February 2025.

Uremic pruritus is a common complication in chronic kidney disease (CKD) patients undergoing hemodialysis, characterized by widespread and persistent itching, not always associated with skin lesions. Its prevalence is estimated to reach 40–90% in dialysis patients and can impair quality of life. Research shows that uremic pruritus is related to the ineffectiveness of hemodialysis in eliminating uremic toxins, which means it can be influenced by the adequacy of URR (Malekmakan et al., 2021). Patients with a low Urea Reduction Ratio (URR) tend to experience a buildup of nitrogenous waste substances that trigger inflammation and skin irritation, thereby increasing the degree of pruritus (Lin et al., 2022). In addition to pruritus, hemodialysis patients often experience sleep disturbances. Poor sleep quality can affect hormonal balance, reduce immunity, and increase the risk of cardiovascular complications. One cause of sleep disturbances in dialysis patients is high levels of toxic metabolites that have not been effectively eliminated due to inadequate dialysis (Lin et al., 2021). Previous research has found that low Urea Reduction Ratio (URR) levels are correlated with sleep disturbances because toxins remaining in the body can affect the central nervous system and cause sleep disturbances. Therefore, increasing hemodialysis adequacy, indicated by an optimal Urea Reduction Ratio (URR), is expected to reduce pruritus symptoms and improve patient sleep quality (Mohamed, Omran, & Kamel, 2023).

In Indonesia, Susanti et al. (2021) conducted a study at Semarang City Hospital on 60 hemodialysis patients and found a significant relationship between URR and sleep quality. Patients with URR <65% experienced more sleep disturbances than those with URR ≥65% (p=0.03) (Susanti, Nurwahyuni, & Maulani, 2021). Research by Yuliani & Lestari (2020) at Dr. Moewardi Regional Hospital in Surakarta also found that inadequate URR increases the risk of uremic pruritus. Patients with URR <65% had a 2.5 times greater risk of developing pruritus compared to patients with adequate URR Yuliani & Lestari, 2020). A longitudinal study by Mohamed et al. (2023) examined the relationship between URR and sleep quality using the Pittsburgh Sleep Quality Index (PSQI). The results showed that patients with URR ≥65% had better (lower) PSQI scores, indicating significantly better sleep quality (p=0.01). This suggests that adequate dialysis contributes to a reduction in toxins that can disrupt the central nervous system and improves sleep patterns (Mohamed, Omran, & Kamel, 2023). A preliminary study of 10 patients in the Hemodialysis Unit at Sultan Imanuddin Hospital in Pangkalan Bun found that 6 patients experienced moderate pruritus and 4 patients experienced mild pruritus. Laboratory tests showed that all patients had a Urea Reduction Ratio (URR) below 80%, indicating inadequate dialysis. This finding supports the hypothesis that hemodialysis ineffectiveness, particularly in terms of URR, contributes to uremic

pruritus. Given the critical role of URR in influencing the clinical condition of hemodialysis patients, it is crucial to conduct research to determine the relationship between the adequacy of the urea reduction ratio (URR) and the degree of uremic pruritus and sleep quality in patients with chronic kidney disease (CKD) undergoing hemodialysis. The results of this study are expected to contribute to efforts to improve the quality of hemodialysis services and the quality of life of patients with CKD.

METHOD

This study used a correlational analytical design with a cross-sectional approach. The aim of this study was to identify the relationship between the Urea Reduction Ratio (URR) and uremic pruritus and sleep quality in patients with chronic kidney disease undergoing hemodialysis. The population in this study was all 108 patients diagnosed with chronic kidney failure undergoing hemodialysis therapy during February 2025, located in the Hemodialysis Room of Sultan Imanuddin Hospital, Pangkalan Bun. The sampling technique used purposive sampling, with a sample size of 50 respondents. URR data was obtained from laboratory records and using the URR calculation formula using the formula URR = 100 × (1 - C1/C0), while data on the degree of pruritus was collected using a Numerical Rating Scale (NRS) questionnaire with a scale consisting of numbers 0 to 10, with categories: 0 (No itching), 1–3 (Mild itching), 4–6 (Moderate itching), 7–8 (Severe itching), 9–10 (Very severe itching). Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), which consists of seven main components ranging from 0 to 21. A PQSI score >5 indicates poor sleep quality, and a PSQI score ≤5 indicates good sleep quality. Based on the validity test results, all PSQI items have a correlation value (r count) greater than r table (0.361) and have high reliability with a Cronbach's Alpha value of 0.812. Therefore, the Indonesian version of the Pittsburgh Sleep Quality Index (PSQI) instrument used in this study can be stated to have good content validity and reliability for measuring sleep quality in the hemodialysis patient population. Data analysis was performed using the Spearman Rank test to determine the correlation between variables. The researcher has submitted a research permit in the Hemodialysis Room of Sultan Imanuddin Hospital. Respondents were given information about the objectives and procedures of the research to be carried out, then asked to become research respondents by signing the informed consent sheet.

RESULT

Table 1.
Respondent characteristics (n= 50)

Variable	f	%
Age		
Minimum	32	
Maximum	59	
Mean	48.19	
Gender		
Male	26	52
Female	24	48
Education		
Elementary school	10	20
Junior high school	18	36
Senior high school	14	28
College	8	16
Length of Hemodialysis		
3-11 month	10	20
12-24 month	22	44
≥ 24 month	18	36
Dylisis duration		
4,5 hours	49	98
4 hours	1	2

Based on table 1, it shows that the youngest age in the study was 32 years old and the oldest age was 59 years old with an average age of 48 years. Characteristics of gender: Most respondents were male, 26 people (52%). Characteristics of education show that almost half of the respondents had junior high school education, 18 respondents (36%). Characteristics of respondents based on dialysis duration: Almost all respondents had dialysis duration of 4.5 hours (98%). And characteristics of respondents based on the length of hemodialysis therapy, almost half, 22 respondents (42.3%) had undergone it within a period of 12-24 months.

Table 2.
Respondent characteristics based on Urea Reduction Rate (URR)

URR	f	%
Inadequate	40	80
Adequate	10	20

Based on the table above, it shows that almost all respondents' Urea Reduction Ratio is inadequate, namely 40 people (80%).

Table 3.
Correlation of Urea Reduction Ratio with Uremic Pruritus in Kidney Disease Patients Undergoing Hemodialysis

Uremic Pruritus	*Urea Reduction Ratio*		Total	*P Value*	Correlation Cofficient
	Adequate	Inadequate			
Not itchy	5	0	5	0,001	0,628**
Mild itching	5	9	15		
Moderate itching	0	19	20		
Severe itching	0	9	9		
Very itchy	0	3	3		

Based on table 3, the results of the Spearman's rank test show that the p value (0.001) is smaller than the α value (0.05) so that it is decided that H1 is accepted, meaning that there is a significant relationship between the Urea Reduction Ratio (URR) and uremic pruritus in chronic kidney disease patients undergoing hemodialysis with a Correlation Coefficient value of 0.628, meaning the level of relationship is strong.

Table 4.
Correlation of Urea Reduction Ratio with Sleep quality in Kidney Disease Patients Undergoing Hemodialysis

Sleep Quality	*Urea Reduction Ratio*		Total	*P Value*	Correlation Cofficient
	Adequate	Inadequate			
Good	7	3	10	0,001	0,656 **
Bad	3	37	40		

Based on table 4, the results of the Spearman rank test show that the p value (0.001) is smaller than the α value (0.05) so that it is decided that H1 is accepted, meaning that there is a significant relationship between the Urea Reduction Ratio (URR) and sleep quality in chronic kidney failure patients undergoing hemodialysis with a Correlation Coefficient value of 0.656, meaning the level of relationship is strong.

DISCUSSION

Identification of Adequate Urea Reduction Rate (URR) in Chronic Kidney Disease Patients Undergoing Hemodialysis

From table 2, it is known that almost all respondents who achieved adequate hemodialysis Urea Reduction Ratio (URR) in the inadequate category were 40 respondents (80%), and only a small portion, namely 10 respondents (20%) were included in the adequate category. The intensity of URR can be measured using the formula URR = 100 × (1- C1/C0). Researchers also calculated the average value of Urea Reduction Ratio (URR) and obtained a result of 75%. Hemodialysis adequacy is an important indicator in assessing the effectiveness of

dialysis therapy in patients with chronic kidney failure. One parameter widely used to assess hemodialysis adequacy is the Urea Reduction Rate (URR), which measures the percentage reduction in blood urea levels before and after dialysis. An optimal URR indicates that the patient is receiving effective dialysis therapy to remove toxic substances from the body. The results of this study indicate that most patients undergoing routine hemodialysis have varying levels of URR, with some not reaching the recommended minimum target of ≥80% according to the National Kidney Foundation (NKF) (National Kidney Foundation, 2015). This variability in URR can be influenced by several factors, including the duration and frequency of dialysis, as well as the type of vascular access used.

Adequate dialysis duration is an important factor in achieving optimal URR. Previous studies have shown that longer dialysis times contribute to increased efficiency of urea clearance from the body (Mojtahedzadeh, Eshraghi, & Gholipour, 2019). In addition, the frequency of hemodialysis, generally three times per week, significantly affects the URR value. A frequency lower than the standard can cause urea accumulation and reduce the effectiveness of dialysis (Kim, & Lim, 2020). Research by Yusuf et al. (2020) showed that patients undergoing hemodialysis three times per week for at least four hours per session tended to have a URR above 65%, compared to those who dialyzed only twice per week. This underscores the importance of adherence to the recommended dialysis schedule (Yusuf, Harahap, & Lubis, 2020).

The type of vascular access also plays a crucial role in achieving URR. The three main types of vascular access in hemodialysis are arteriovenous fistulas (AV fistulas), grafts, and central venous catheters. AV fistulas are considered the best access because they offer high blood flow rates and a lower risk of infection (Lok et al., 2020). Several studies have reported that patients with AV fistula tend to have a higher URR compared to patients using catheters (Kumbar & Yee, 2019) According to a study by Suhendar et al. (2021), the use of central venous catheters is often associated with low URR due to limited blood flow and an increased risk of thrombosis or catheter dysfunction (Suhendar, Prasetya, & Amin, 2021). In contrast, patients with AV fistulas show more adequate URR values because this access allows for a more stable and efficient blood flow rate during the dialysis process (Al-Saran et al., 2019).

An inadequate URR reflects a suboptimal hemodialysis process, which carries the risk of accumulating toxic substances, including urea and other metabolites, in the patient's body. This condition can contribute to various clinical complications such as uremic pruritus, decreased sleep quality, chronic fatigue, uncorrected anemia, and even increased mortality (Daugirdas et al., 2020). Furthermore, inadequate dialysis can also worsen patients' quality of life due to persistent uremic symptoms. Therefore, achieving an adequate URR is an important goal in the care of chronic hemodialysis patients (Flythe et al., 2020).

The fact that URR is significantly influenced by the duration and frequency of dialysis, as well as the type of vascular access, has important implications for nurses and medical personnel in the management of hemodialysis patients. Education regarding the importance of regular and optimal dialysis, as well as selecting the appropriate vascular access, should be an integral part of nursing care. Interventions to improve adherence to dialysis schedules and efforts to encourage the use of AV fistulas can contribute to improving the quality of hemodialysis therapy and, ultimately, patients' quality of life.

The Correlation between Adequate Urea Reduction Rate (URR) and the Degree of Uremic Pruritus in Chronic Kidney Disease Patients Undergoing Hemodialysis

Based on the research results in table 3, the results of the spearman rank test show that the p value (0.001) is smaller than the α value (0.05) so that it is decided that H1 is accepted,

meaning that there is a significant relationship between the Urea Reduction Ratio (URR) and uremic pruritus in chronic kidney failure patients undergoing hemodialysis with a Correlation Coefficient value of 0.628, meaning the level of relationship is strong. This study found a relationship between the adequacy of the urea reduction rate (URR) and the degree of uremic pruritus. These results align with several previous studies that found that patients with inadequate URR values tend to experience higher levels of uremic pruritus (Sukrisno, Nurhayati, & Ramadhani, 2020). Uremic pruritus is a common complication in patients with chronic kidney disease (CKD) undergoing hemodialysis and significantly reduces their quality of life. This complaint is often chronic, symmetrical, and without primary lesions. It occurs at night, thus impairing sleep quality and mental health (Narita et al., 2020).

Uremic pruritus in patients with chronic renal failure undergoing hemodialysis is a multifactorial condition that is not fully understood, but several mechanisms have been identified. Accumulation of uremic toxins, such as urea and β2-microglobulin, is a major cause because they are not effectively eliminated during inadequate URR (Ko et al.,2018). In addition, chronic systemic inflammation also plays a role, where increased pro-inflammatory cytokines such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α) cause irritation of the skin's nerve endings, which causes itching (Simonsen et al.,2017). Calcium-phosphorus imbalance, secondary hyperparathyroidism, and hyperphosphatemia are also associated with the occurrence of pruritus because they can cause calcium deposits in the skin (Verduzco & Shirazian, 2020). Dysfunction of the endogenous opioid system, particularly the imbalance between μ-opioid and κ-opioid receptors, contributes to the itching sensation in hemodialysis patients (Momose et al., 2021). In addition, dry skin (xerosis) which is common in dialysis patients due to sebaceous gland disorders also worsens the symptoms of pruritus (Ko et al.,2018).

A study by Sukrisno et al. (2020) found that patients with URR <80% had a higher risk of pruritus ($p<0.05$) (Sukrisno, Nurhayati, & Ramadhani, 2020). Another study by Hanafiah et al. (2021) showed that each increase in URR value was associated with a decrease in the incidence and severity of uremic pruritus in chronic hemodialysis patients (Hanafiah et al., 2021). This suggests that hemodialysis adequacy plays a crucial role in reducing the accumulation of uremic substances, which is one of the causes of pruritus. In addition to URR, individual factors such as age, gender, and duration of hemodialysis also influence the degree of pruritus. The study found that the youngest patient in the study was 32 years old and the oldest was 59 years old, with an average age of 48 years old experiencing uremic pruritus. Advanced age is often associated with an increased risk of uremic pruritus. This can be explained by several factors, including decreased skin barrier function, reduced skin hydration (xerosis), and decreased immune system function with age (Yosipovitch, Reaney, & Mastey, 2018). A study by Lin et al. (2020) showed that the prevalence of pruritus increased significantly in hemodialysis patients aged ≥60 years compared to younger age groups ($p<0.05$) (Lin et al., 2020). However, several studies also show that age is not always directly related to the severity of pruritus, but can act as a predisposing factor (Ko et al.,2018). Gender has also been reported as a factor influencing the incidence of uremic pruritus. Several studies have suggested that men tend to experience more severe pruritus than women, possibly related to hormonal differences, the number of sebaceous glands, and susceptibility to skin inflammation (Chen et al., 2019). A multicenter study by Shirazian et al. (2019) stated that men have a higher likelihood of experiencing severe chronic pruritus (Shirazian et al., 2019).

The duration of hemodialysis is an important factor associated with uremic pruritus. Patients who have been on dialysis for more than 24 months tend to experience long-term accumulation of uremic toxins and more severe metabolic complications, which can increase

the intensity of pruritus (Narita et al., 2020). A study by Rahmawati et al. (2022) found that patients with hemodialysis duration >36 months had higher pruritus scores compared to patients with duration <12 months (p<0,01). This demonstrates the importance of continuous strict control of dialysis adequacy (Rahmawati, Prasetya, & Utami, 2022). This study concluded that patients undergoing regular hemodialysis may not necessarily receive adequate dialysis, particularly if technical and clinical factors such as blood flow rate (BFR), duration and frequency of therapy, and the type of vascular access used do not meet recommended guidelines. This condition results in an increase in complaints of uremic pruritus, a chronic itching often experienced by patients with chronic kidney disease. These symptoms were found in nearly all study participants, with varying degrees of severity, influenced by factors such as age, gender, and duration of hemodialysis therapy. Therefore, the success of hemodialysis therapy should be assessed not only by the regularity of its implementation, but also by the optimal dialysis adequacy achieved, as indicated by a standard URR value and the management of symptoms such as pruritus.

The Correlation between Adequate Urea Reduction Rate (URR) and the Sleep Qualitye of Uremic Pruritus in Chronic Kidney Disease Patients Undergoing Hemodialysis

Based on table 4, the results of the Spearman rank test show that the p value (0.001) is smaller than the α value (0.05) so that it is decided that H1 is accepted, meaning that there is a significant relationship between the Urea Reduction Ratio (URR) and sleep quality in chronic kidney failure patients undergoing hemodialysis with a Correlation Coefficient value of 0.656, meaning the level of correlation is strong. This is in line with research by Pradita et al. (2019) which found a positive relationship between URR and sleep quality, where patients with URR >70% had lower PSQI scores (indicating better sleep quality) compared to patients with URR <65% (Pradita et al., 2019). Similar results were reported by Rosdiana and Wahyuni (2021), who stated that patients with inadequate dialysis had twice the risk of experiencing severe sleep disorders compared to patients who achieved the recommended URR value (Rosdiana & Wahyuni, 2021).

Patients with inadequate URR tend to have poor sleep quality, characterized by disturbances such as difficulty falling asleep, frequent nighttime awakenings, and feeling unrefreshed upon waking. These findings support the hypothesis that hemodialysis adequacy plays a crucial role in maintaining patient sleep quality. URR is an important indicator in assessing the extent to which hemodialysis therapy is able to eliminate urea, a metabolic waste product, from the body. A URR value <65% according to KDOQI recommendations indicates that dialysis is not adequately removing toxic substances from the patient's body. Inadequate dialysis leads to the accumulation of uremic toxins, such as urea, creatinine, and other nitrogenous compounds, which trigger various clinical complaints including fatigue, nausea, pruritus, and sleep disturbances (Siregar, Nasution, & Lubis, 2020). Itching due to uremic pruritus is a major contributing factor to sleep disturbances in patients with chronic kidney disease (CKD). Persistent and severe itching, especially at night, can cause difficulty sleeping, frequent awakenings, and decreased sleep duration. Pruritus can also lead to irritability, psychological stress, and fatigue, all of which worsen overall sleep quality. (Shariati et al., 2021). Thus, low URR not only reflects hemodialysis inadequacy, but also plays an indirect role in reducing sleep quality through increasing pruritus complaints.

Furthermore, sleep quality disorders in hemodialysis patients are also related to hormonal dysregulation resulting from chronic kidney disease. In patients with chronic kidney disease (CKD), there is a decrease in melatonin production, a hormone that regulates the sleep-wake cycle (circadian rhythm). This decrease in melatonin causes difficulty initiating sleep and maintaining sleep throughout the night (Elsharif, Elhadi, & Osman, 2019). Kidney dysfunction also causes disturbances in cortisol metabolism, which, if its levels increase at

night, can inhibit sleepiness and trigger insomnia (Zhang, Li, & Wang, 2020). Not only that, thyroid hormone imbalance, anemia due to erythropoietin deficiency, and chronic increases in pro-inflammatory cytokine levels (such as IL-6 and TNF-α) in HD patients are also known to play a role in reducing sleep quality by affecting the sleep center in the brain (Chen, Kuo, & Tsai, 2018). Chronic oxidative stress can also trigger chronic fatigue and depression, which are closely correlated with poor sleep quality in patients.

In addition to URR, this study also considered several other factors that influence sleep quality, namely age, gender, and duration of hemodialysis. Advanced age is often associated with decreased sleep efficiency due to physiological changes and an increased risk of comorbidities (Haryanto et al., 2018) [8]. In hemodialysis patients, older age groups are reported to experience sleep disturbances more frequently than younger age groups. Gender also contributes to sleep quality. In several studies, women have been reported to be more susceptible to sleep disturbances, thought to be influenced by hormonal differences, higher levels of anxiety, and sensitivity to uncomfortable symptoms (Kusumawati et al., 2023). However, this data still varies across populations. The length of hemodialysis treatment is also an important factor. The longer the duration of therapy, the greater the likelihood of sleep disturbances. This can be caused by accumulated emotional stress, chronic fatigue, and the long-term effects of the hemodialysis procedure itself, such as cardiovascular disorders, hypocalcemia, and peripheral neuropathy (Wijaya & Handayani, 2022).

Based on research results and literature review, it can be concluded that hemodialysis adequacy, as reflected by optimal URR values, is closely related to sleep quality in chronic kidney disease patients undergoing hemodialysis. Low URR contributes to the accumulation of uremic toxins that trigger various symptoms, including uremic pruritus and hormonal imbalance, which directly and indirectly disrupt sleep patterns and quality. However, sleep quality in hemodialysis patients is influenced not only by URR values but also by other factors such as age, gender, and duration of hemodialysis therapy, which also influence the patient's physiological and psychological responses to therapy.

Therefore, interventions aimed at improving dialysis adequacy, such as managing the timing and frequency of hemodialysis, selecting appropriate vascular access, and optimizing blood flow (QB), are crucial. In this regard, the role of nurses is crucial, not only as dialysis practitioners but also as patient educators and companions in managing emerging symptoms, monitoring clinical parameters such as URR, and providing education and non-pharmacological interventions to improve sleep quality. A holistic nursing approach that considers biological, psychological, social, and spiritual aspects is essential to improve patient comfort and quality of life overall.

CONCLUSION

This study shows a significant correlation between hemodialysis adequacy, as measured by the Urea Reduction Rate (URR), and the degree of uremic pruritus and sleep quality in patients with chronic kidney disease (CKD) undergoing routine hemodialysis therapy. Inadequate URR values tend to be associated with higher levels of pruritus and poor sleep quality. This suggests that ineffective uremic toxin elimination contributes to the emergence of clinical complications that affect patient comfort and quality of life. In addition to URR, this study also identified that age, gender, and duration of hemodialysis also influence this. Nurses play a crucial role in monitoring URR, providing patient education, and implementing holistic interventions to support patient comfort, quality rest, and overall improvement in quality of life.

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