

The Effect of Pranayama Yoga and Education on Anxiety and Fatigue in Hemodialysis Patients at X Hospital in West Java

Liana Sriulina^{1*}, Ni Luh Widani², Sutanto Priyo Hastono³

¹STIK Sint Carolus, Jakarta, Indonesia

*Email: sriliana985@gmail.com

ARTICLE INFO	ABSTRACT
<p>Keywords: Hemodialysis, anxiety, fatigue, pranayama yoga, education</p>	<p><i>Chronic renal failure patients on hemodialysis have physical and psychological changes that cause worry and fatigue. The study examines how pranayama yoga and education affect anxiety and exhaustion at X Hospital in West Java hemodialysis patients. A single group pre-post-test was used in the quasi-experimental investigation. From June 12 to July 12, 2023, 35 hemodialysis patients participated. These patients had nine yoga pranayama and education sessions. The study found that 85.7% of participants experienced low-level anxiety before and 100% after the intervention. The t-dependent test showed a significant difference in anxiety ($p=0.001$) and exhaustion ($p=0.001$) before and after the session. Even after controlling for age, gender, and hemodialysis time, pranayama yoga and education therapies significantly reduced anxiety in multivariate linear regression. The P-value for this influence is 0.009. Age (p-value=0.989), gender (p-value=0.212), and protracted haemodialytic treatments (p-value=0.525) do not affect nervousness—the effects of the intervention on anxiety and fatigue. Even after controlling for age, gender, and hemodialysis duration, pranayama yoga and education did not affect anxiety and fatigue. Additional research on sleep quality and hemoglobin levels is recommended.</i></p>

INTRODUCTION

Chronic Kidney Disease (CKD) or terminal renal failure is a condition characterized by an irreversible and gradual decline in kidney function. This dysfunction leads to imbalances in fluids and electrolytes and metabolic abnormalities that result in the body's buildup of urea and nitrogenous waste products (Smeltzer & Bare, 2013). In 2018, the Indonesia Renal Registry (IRR) reported 132,142 active patients receiving hemodialysis. Out of these, 66,433 were new patients. Specifically, in the West Java Province, there were 14,796 new patients having hemodialysis (IRR, 2018). The medical records of hemodialysis patients at X Hospital in West Java show that 2020 there were 30 patients. In 2021, the number was reduced to 24 patients. However, in 2022, the number grew to 37 patients. By January 2023, there was a further increase to 34 haemodialyzed patients compared to the previous year (Rekam Medis. RS X Jabar, 2023).

Patients with chronic renal failure have multiple therapeutic choices, one of which is hemodialysis therapy. The primary objective of hemodialysis therapy is to eliminate accumulated toxins, specifically urea, from the body, resulting in purified blood. This treatment extends the patient's lifespan and enhances their overall quality of life (Setiati & MEpid, 2014). Uraemia in hemodialysis patients leads to diminished appetite, nausea, vomiting, exhaustion, and decreased creatinine production, reducing activity levels (Balouchi et al., 2018).

Elevated levels of urea in the body lead to a reduction in the production of the hormone erythropoietin, resulting in a drop in red blood cell count, a condition generally referred to as anemia. Anaemia induces symptoms of exhaustion, such as tiredness and weariness, in the patient (Lubkin, 2006). CKD patients undergoing hemodialysis therapy often exhibit psychological changes and declines, characterized by a sense of desperation to undergo treatment and feelings of shame, disappointment, sadness, and regret. These emotional states can give rise to anxiety and depression, which in turn can disrupt sleep patterns and contribute to fatigue. The study results

in CKD patients revealed that nine individuals (16.4%) experienced no anxiety, 12 individuals (21.8%) had mild anxiety, 16 individuals (29.1%) had moderate anxiety, and the highest level of severe anxiety was reported by 18 individuals (32.7%).

Additionally, the majority of respondents, 50 individuals (90.9%), reported feeling tired, while five individuals (9.1%) reported feeling non-exhausted. According to a study by Muna in 2022, 67.2% of chronic kidney disease (CKD) patients undergoing hemodialysis therapy had fatigue, with 72.1% reporting physical fatigue and 80.3% reporting mental fatigue. A study conducted by Su-Jeong Han Su in 2015 found that fatigue following hemodialysis is caused by factors such as hemoglobin levels, post-dialysis blood pressure, and weight loss. Research conducted a study that demonstrated a correlation between a 1 mg/dl rise in hemoglobin and a decrease in tiredness rate of around 0.44 (Sulistini et al., 2021).

CKD patients undergoing hemodialysis therapy can effectively manage their fatigue and anxiety using both non-pharmacological and pharmaceutical interventions. One well-known example of non-pharmacological therapy is Complementary and Alternative Medicine (CAM) (Rubiyanti, 2019). Non-pharmacological interventions encompass many techniques, such as massage, yoga, muscular relaxation, breathing exercises, contemplation, and cardiovascular exercise (Alhazmi et al., 2020). Respiratory exercises are an integral aspect of natural healing. They are incorporated into the treatment approach for problems such as exhaustion, sleep difficulties, stress, and anxiety. Respiratory exercises can activate the parasympathetic nervous system, leading to an increase in the production of endorphins. These activities also promote adequate lung expansion for proper development and induce muscle relaxation. During respiration exercises, oxygen is transported through the circulatory system and delivered to body tissues, eliminating waste substances the body does not utilize. This process enhances metabolism and generates energy (Djamaludin et al., 2021). An instance of a breathing exercise is pranayama, a kind of yoga focusing on controlled breathing.

Pranayama Yoga breathing involves deep and slow inhalation using the diaphragm muscle, causing it to rise gradually and the chest to expand fully. Yoga breathing techniques effectively regulate both the mind and the corresponding breath. Yoga breathing exercises employ gradual and internal mechanisms that can alter the body's physical state by inducing conscious relaxation and ultimately leading to deep relaxation.

Patients experiencing anxiety require tangible and constructive interventions, such as engaging in discussions and active participation, as well as receiving informative explanations regarding health education. (Soekidjo, 2011).

Health education is disseminating information to individuals, enabling them to understand their personal, familial, and collective health requirements to enhance overall well-being (Triwibowo & Pusphandani, 2015). The findings of the study conducted (Rahmatika, 2017) revealed that 8 participants had significant anxiety levels ranging from 28 to 41 prior to obtaining health certification. Similarly, ten respondents scored between 28 and 41 in the booklet group, indicating extreme distress. (severe anxiety). The health education intervention group exhibited a more significant reduction in the anxiety level related to chronic renal failure compared to the booklet group.

After conducting interviews with ten patients at Hospital X in West Java, it was found that 90% of them experienced anxiety, and 70% reported feeling tired due to complaints related to excessive weight gain, low hemoglobin levels, high blood pressure, low blood pressure, nausea, vomiting, cramps, and other symptoms. Nurses instruct patients on how to cope with the problems that patients are experiencing. Due to the lack of research conducted by nurses on the worry and fatigue experienced by hemodialysis patients, researchers were motivated to investigate this topic. Anxiety and fatigue in hemodialysis patients can be addressed through the practice of pranayama yoga, which involves sitting upright, bending both legs and breathing in and out slowly through the nose. In addition, patients are also educated to maintain a healthy lifestyle, including proper fluid intake and food choices. Therefore, this study aims to determine and analyze the effect of yoga pranayama and education on anxiety and fatigue in hemodialysis patients at Hospital X in West Java.

METHOD

The study employed a quasi-experimental design, specifically a one-group pre-post-test design, to assess the impact of pranayama yoga and education sessions on patients undergoing hemodialysis. Quantitative data were collected using the Functional Assessment of Chronic Illness Therapy (FACIT) to evaluate chronic illness therapy and the Hospital Anxiety and Depression Scale-Anxiety (HADS-Anxiety) to measure anxiety levels. These assessments were conducted before and after the intervention period, involving a total of 35 participants from

June 12 to July 12, 2023. Data analysis utilized descriptive statistics to summarize participant characteristics and scores on the FACIT and HADS-Anxiety scales. Inferential statistics, such as paired t-tests or Wilcoxon signed-rank tests, may have been employed to compare pre- and post-intervention outcomes. The study was conducted with ethical approval (No. 058/SPmP/S2Kep/STIK-SC/VI/2023) and authorization from X Hospital (No. 082/SHLC/DIR/VI/2023) in West Java, ensuring compliance with ethical standards and regulatory requirements.

RESULTS AND DISCUSSION

Univariate Analysis

Respondent Characteristics

Table 1. Frequency distribution of the mean age of patients receiving hemodialysis treatment at X Hospital in West Java

Variable	n	Mean	SD	min	max
Age	35	49,09	12,157	26	77

Table 1 displays the mean age of patients who underwent hemodialysis therapy at the Hospital. This study is backed by research conducted by (Insani et al., 2019) at RSUD Dr. H. Abdul Moeloek in Lampung Province. The study involved 92 participants, with an average age of 49.70. The youngest participant was 20 years old, while the oldest was 65 years old. Research conducted at Cilacap Regional Hospital (Prasetyo, 2018) found that the average age of the 112 respondents was 49.4 years, with the youngest participant being 15 years old and the oldest being 64 years old.

Table 2. The gender distribution frequency of respondents receiving hemodialysis treatment at X Hospital in West Java

Gender	Frequency	Percentage
Male	22	62,9
Female	13	37,1
Total	35	100

The data in Table 2 indicates that 62.9% of CKD patients receiving hemodialysis therapy are male, with 22 individuals. The study done by Sofia Zyga et al. in 2015 took place in two dialysis units at a hospital in the Region of Athens. It involved 129 haemodialyzed patients, 77 (59.7%) male.

Table 3. Frequency distribution of the mean duration of hemodialysis therapy among respondents at X Hospital in West Java

Variable	n	Mean	SD	min	max
Duration of Haemodialysis (mo)	35	41,51	45,005	3	204

Table 3 displays the mean duration of hemodialysis for 41.51 months. It includes data on the most recent patients who underwent haemodialytic therapy for three months and the longest-standing patients who received treatment for 204 months.

A summary of the anxiety outcomes observed in patients undergoing hemodialysis

Table 4. Distribution of mean anxiety levels in CKD patients undergoing hemodialysis prior to and following intervention

Variable	n	Mean	SD	min	max
Pre-intervention	35	11.40	6,545	2	10
Post-intervention	35	5,86	4,223	0	17

Table 4 displays the mean anxiety level before engaging in yoga as 11.40, which subsequently decreased to 5.86 after participating in yoga. The mean score for worries decreased by 5.5. This is corroborated by a study conducted by (Lukmanulhakim and Agustina, 2018) that examined the levels of significant familial distress in patients in the intensive care unit (ICU). The study found that the average anxiety level before breathing yoga (pranayama) was 42.80 and decreased to 32.48 after the intervention. There has been a decline in the mean anxiety score by 10.32.

Table 5. Frequency distribution of anxiety levels before and after intervention in CKD patients with hemodialysis

Anxiety Level	Pre-intervention		Post-intervention	
	n	%	n	%
Low	30	85,7	35	100
Moderate	4	11,4	0	0
High	1	2,9	0	0
Total	35	100	35	100

Table 5 indicates that the predominant anxiety levels before and after the intervention were low. Prior to the intervention, four respondents experienced moderate anxiety, and one individual reported feeling high levels of anxiety. However, following the intervention, all participants reported no anxiety.

Table 6. Assessing anxiety levels with a questionnaire administered to CKD patients undergoing hemodialysis, both before and after an intervention

Queries	Pre-intervention								Post-intervention							
	0	%	1	%	2	%	3	%	0	%	1	%	2	%	3	%
I am experiencing feelings of tension or pain	17	48,6	15	42,9	2	5,7	1	2,9	25	71,4	9	25,7	1	2,9	-	-
There are still some things I find enjoyable	13	37,1	4	11,4	17	48,6	1	2,9	27	77,1	3	8,6	5	14,3	-	-
I felt apprehensive, as if something catastrophic were about to occur	10	28,6	18	51,4	6	17,1	1	2,9	17	48,6	14	40,0	2	5,7	2	5,7
I can laugh and find humor in situations	25	71,4	3	34,3	6	17,1	1	2,9	28	80,0	3	8,6	4	11,4	-	-
I experienced a moment of trepidation	16	45,7	12	34,3	6	17,1	1	2,9	29	82,9	5	14,3	1	2,9	-	-
I feel cheerful	15	42,9	17	48,6	2	5,7	1	2,9	18	51,4	15	42,9	2	5,7	-	-
I can sit comfortably and feel relaxed	21	60,0	10	28,6	4	11,4	-	-	29	82,9	4	11,4	2	5,7	-	-
I felt like I was being slowed down	9	25,7	16	45,7	7	20,0	3	8,6	19	54,3	16	45,7	-	-	-	-
I had a kind of feeling of fear, like a feeling of disgust in my stomach	10	28,6	21	60,0	4	11,4	-	-	21	60,0	13	37,1	1	2,9	-	-
I have lost interest in my physical appearance	12	34,3	8	22,9	10	28,6	5	14,3	19	54,3	7	20,0	7	20,0	2	5,7
I am restless because I	12	34,3	13	37,1	9	25,7	1	2,9	18	51,4	14	40,0	3	8,6	-	-

Queries	Pre-intervention						Post-intervention									
	0	%	1	%	2	%	3	%	0	%	1	%	2	%	3	%
must be occupied																
I want to be happy with something	21	60,0	9	25,7	4	11,4	1	2,9	29	82,9	6	17,1	-	-	-	-
I suddenly felt a feeling of panic	9	25,7	18	51,4	6	17,1	2	5,7	17	48,6	16	45,7	2	5,7	-	-
I can enjoy a good book or radio or TV show	23	65,7	10	28,6	1	2,9	1	2,9	28	80,0	6	17,1	1	2,9	-	-

Information:

0: never

1: occasionally

2: Often

3: Always

The results of anxiety levels before engaging in yoga pranayama and education are displayed in Table 6. Patients consistently selected the same question. I experience a sense of tension or emotional distress towards one individual, accounting for 2.9% of my overall emotional state. However, I still derive satisfaction from the activities or items I previously enjoyed, accounting for 2.9% of my emotional state. Additionally, I am plagued by a sense of apprehension, as if something catastrophic is imminent. Out of the total number of people surveyed, 2.9% reported being able to find humor in situations and laugh.

Similarly, 2.9% of the respondents mentioned experiencing occasional feelings of anxiety. I represent a minority of 1 person (2.9%) with a sense of cheerfulness. However, I also belong to a larger group of 3 people (8.6%) who feel slowed down. Additionally, I have lost interest in my physical appearance. There are a total of five individuals, which accounts for 14.3% of the group. I am experiencing anxiety due to one person being occupied, representing 2.9% of the group. I desire to find contentment by engaging with one person, accounting for 2.9% of the group. Suddenly, I am overwhelmed with dread since two individuals are present, making up 5.7% of the group. Following the practice of pranayama yoga and providing patient education, the patient reported experiencing a sense of terror, as if something dreadful was imminent. This emotion was reported by two individuals, accounting for 5.7% of the total. Additionally, two individuals, representing 5.7% of the total, expressed a loss of interest in their physical appearance.

Overview of fatigue results in patients undergoing hemodialysis

Table 7. Distribution of mean fatigue levels in CKD patients undergoing hemodialysis prior to and following intervention

Variable	n	Mean	SD	min	max
Pre-intervention	35	34,83	6,780	19	47
Post-Intervention	35	40,14	5,652	24	48

According to Table 7, the average degree of fatigue before the intervention was 34.83. However, after the intervention, it increased to 40.14. The score increased by 5.31, indicating a decrease in fatigue. Before the intervention, the average fatigue level was mild, but the average fatigue level was none after the intervention. This finding is substantiated by a study conducted by (Liu et al., 2014) on a sample of 60 individuals diagnosed with breast cancer. The participants reported an initial average fatigue level of 3.31, significantly increasing to 7.30 after engaging in yoga practice for eight weeks.

Table 8. Frequency distribution of fatigue levels before and after intervention in CKD patients with hemodialysis

Fatigue Level	Pre-intervention		Post-intervention	
	n	%	n	%
No Fatigue	10	28,6	22	62,8
Mild Fatigue	20	57,0	12	34,3
Moderate Fatigue	5	14,4	1	2,9
Severe Fatigue	0	0,0	0	0,0

Fatigue Level	Pre-intervention				Post-intervention			
	n	%	n	%	n	%	n	%
Total	35	100	35	100				

Table 8 indicates that most participants reported experiencing minor weariness before the intervention. In contrast, after the intervention, fatigue was utterly absent. The hemodialysis patients at Hospital X in West Java are still in their working years and have a supportive social environment. Several patients arrived unaccompanied at the hemodialysis chamber after finishing their work, except the elderly, who were accompanied and picked up by their families. The mean hemoglobin concentration was 9.1 grams per decilitre (gr/dL), and the patients had been receiving long-term hemodialysis treatment. Research conducted by (Cabrera et al., 2017) indicates that dialysis patients typically start experiencing weariness within the first 6-8 months, gradually declining in subsequent months with no significance.

Table 9. Assessing fatigue levels using questionnaire responses before and after intervention in CKD patients on hemodialysis

Queries	Pre-intervention										Post-intervention											
	0	%	1	%	2	%	3	%	4	%	0	%	1	%	2	%	3	%	4	%		
I feel tired	5	14,3	1	42,9	1	40,4	-	-	1	2,9	12	4,3	1	7	4	8,6	5	14,3	-	-	1	2,9
My whole body feels weak	1	2,8	1	28,6	1	40,4	1	2,9	-	-	19	4,3	1	1	1	5,4	5	14,3	-	-	-	-
I feel lethargic	1	1,4	1	40,0	9	25,7	-	-	1	2,9	20	7,1	1	1	1	4,4	4	11,4	-	-	-	-
I feel fatigued	6	7,1	1	48,6	1	31,4	1	2,9	-	-	15	2,9	1	4	0	6	17,1	-	-	-	-	
I find it difficult to start anything because I am tired	1	4,5	1	40,0	5	14,3	-	-	1	2,9	23	5,7	9	5,7	3	8,6	-	-	-	-	-	
I find it difficult to get anything done because I am tired	1	4,0	8	22,9	9	25,7	3	8,6	1	2,9	23	5,7	7	0	5	14,3	-	-	-	-	-	
I have energy	-	-	9	25,7	2	65,7	2	5,7	1	2,9	1	2,9	9	2,5	2	71,5	-	-	-	-	-	
I can carry out my daily routine activities	6	7,1	3	8,6	2	71,5	-	-	1	2,9	2	5,7	7	0	2	74,3	-	-	-	-	-	
I need to sleep during the day	4	1,4	1	31,4	1	45,6	3	8,6	1	2,9	3	8,6	1	6	1	42,5	1	2,9	-	-	-	-
I could not eat because I was too tired	1	5,8	1	28,6	7	20,0	-	-	-	-	29	2,9	1	2,9	5	14,3	-	-	-	-	-	
I need help to carry out my routine activities	1	4,6	7	20,0	1	28,6	-	-	2	5,7	22	2,9	5	3	6	17,1	1	2,9	1	2,9	1	2,9
I was disappointed and annoyed because I was	1	4,6	9	25,7	7	20,0	1	2,9	2	5,7	24	6,6	8	2,9	3	8,6	-	-	-	-	-	

Queries	Pre-intervention								Post-intervention									
	0	%	1	%	2	%	3	%	0	%	1	%	2	%	3	%	4	%
too tired to do anything I wanted to do I had to limit my social activities because I was tired	1	2	1	31,	1	34,	1	2,	19	5	1	2	6	17	-	-	-	-
	0	8,	1	4	2	3	1	9	1	4,	0	8,	6	,1	-	-	-	-
		6								3		6						

Information:
 0: not fatigued
 1: fatigued
 2: rather fatigued
 3: very fatigued
 4: Extremely fatigued

Table 9 displays the level of weariness experienced by patients before engaging in yoga pranayama and education. The patients were asked to indicate their degree of tiredness. One person (2.9%) reported feeling tired. This person also mentioned needing help starting tasks and getting things done due to tiredness. However, another person (2.9%) reported having energy and being able to carry out daily activities.

Additionally, one person (2.9%) expressed the need to sleep during the day. Lastly, two people (5.7%) said they require assistance with their routine activities. I am experiencing a sense of disappointment and irritation due to my excessive fatigue, which hinders my ability to engage in desired activities with two individuals (5.7%).

Additionally, I am compelled to restrict my social interactions to only one person (2.9%). Some patients selected "very tired" to answer the question, "How does your whole body feel?" Out of the total sample, 2.9% reported feeling lethargic, while another 2.9% reported feeling tired.

Similarly, 2.9% of individuals expressed difficulty performing tasks due to fatigue.

On the other hand, 8.6% of individuals reported having sufficient energy.

Additionally, 5.7% of individuals needed to nap during the day.

Furthermore, 8.6% of individuals expressed disappointment and annoyance due to excessive tiredness, which hindered their desired activities. Lastly, 2.9% of individuals reported limiting their social engagements due to fatigue. Following the practice of pranayama yoga and receiving information, there was a significant decrease in the number of patients who reported feeling very tired (1 person, 2.9%) and needing assistance to carry out their daily tasks (1 person, 2.9%). Patients selected the response "exhausted" when asked about their ability to perform daily tasks. One individual represented 2.9% of the total.

The results above demonstrate that the practice of yoga pranayama, in conjunction with education, significantly aids in the reduction of fatigue levels among patients. The ratings ranged from 11 to 2 among individuals who had extreme fatigue. The number of patients experiencing significant fatigue decreased from 13 individuals to just one individual following the implementation of yoga pranayama and educational interventions.

Bivariate Analysis

Normality Test

Table 10. Normality Test

Variable	Skewness	Std Error	Result	Info
Pre-intervention (anxiety)	0,824	0,398	2,07	Normal
Post-intervention (anxiety)	0,605	0,398	1,52	Normal
Pre-intervention (anxiety)	-0,231	0,398	-0,58	Normal
Post-intervention (anxiety)	-1,084	0,398	-2,72	Abnormal

The results of the normality test are displayed in Table 10. Data is considered to have a normal distribution if the quotient of Skewness divided by the standard error falls between the range of -2 (1.96) to +2 (1.96).

Results of dependent T-test analysis on the implementation of pranayama yoga and education on anxiety

Table 11. Analysis of differences in anxiety levels before and after intervention in CKD patients with HD

Variable	Mean	SD	SE	P Value	N
Pre-intervention	11,40	6,545	1,106	0,001	35

Variable	Mean	SD	SE	P Value	N
Post-intervention	5,86	4,223	0,714		

The results of statistical tests in Table 11 indicate a p-value of 0.001. This value suggests that if the p-value is less than or equal to 0.05, it can be inferred that there is a notable disparity in anxiety levels before and after the intervention. Therefore, the practice of pranayama yoga and educational interventions can decrease levels of anxiety. According to a (Ratih, 2021) study, which involved 56 patients undergoing endoscopy at BaliMed Hospital, it was shown that practicing pranayama yoga significantly decreased anxiety levels ($p < 0.001$).

Results of dependent T-test analysis on implementing pranayama yoga and education on fatigue.

Table 12. Analysis of differences in fatigue levels before and after intervention in CKD patients with HD

Variable	Mean	SD	SE	P Value	N
Pre-intervention	38,43	6,780	1,146	0,001	35
Post-intervention	40,14	5,652	0,955		

Table 12 presents the statistical test findings, indicating a p-value of 0.001. This suggests that if the p-value is less than or equal to 0.05, it can be inferred that there is a substantial disparity in fatigue levels before and after the intervention or action. Pranayama yoga and education therapies increase the fatigue score, minimizing patient complaints. According to a study by Dhruva et al. in 2012, 16 cancer patients who underwent chemotherapy were examined. The results showed a significant finding, with a p-value of 0.04, less than the accepted threshold of 0.05.

Multivariate Analysis

Results of multivariate linear regression analysis of anxiety

Table 13. Multivariate linear regression analysis between pre-intervention anxiety, age, gender, duration of hemodialysis, and post-intervention anxiety

Variable	β Coefficients	P value
Constant	4.353	0,243
Pre-intervention	0,311	0,009
Age	0,001	0,989
Gender	-1.827	0,212
Duration of Hemodialysis	0,311	0,525

The multivariate linear regression analysis results, as displayed in Table 13, indicate a substantial impact of the yoga pranayama intervention and education (p value=0.009) on anxiety. This effect remains significant even after accounting for age, gender, and length of hemodialysis. The three covariate factors, age (p value=0.989), gender (p value=0.212), and duration of hemodialysis (p value=0.525) did not show statistical significance.

According to a study conducted by Tokala et al. in 2015, there is no correlation between the duration of hemodialysis treatment and the amount of anxiety experienced by patients. The Spearman test yielded a p-value of 0.462, indicating that it is more significant than 0.05. This suggests that there is no significant correlation between the duration of hemodialysis and the level of anxiety in patients with chronic renal failure. This study (Farida et al., 2018) found a significant association between the duration of hemodialysis and the anxiety level of patients with Chronic Kidney Failure. The statistical analysis yielded a p-value of 0.000, with a significance level (α) of 0.05. Similarly, a study (Astutik, 2021) found a significant correlation between the duration of hemodialysis treatment and the anxiety levels of patients receiving hemodialysis, with a p-value of 0.000.

Results of multivariate linear regression analysis of fatigue

Table 14. Multivariate linear regression analysis between pre-intervention fatigue, age, gender, duration of hemodialysis, and post-intervention fatigue

Variable	β Coefficients	P value
Constant	23.292	0,002
Pre-intervention	0,543	0,001
Age	-0,055	0,419
Gender	0,895	0,583
Duration of hemodialysis	0,014	0,465

The multivariate linear regression analysis results, as displayed in Table 14, indicate a substantial impact of the yoga pranayama intervention and education (p value=0.001) on fatigue. This effect remains significant even after accounting for gender and length of hemodialysis. The three covariate variables, age (p value=0.419), gender (p value=0.583), and duration of hemodialysis (p value=0.465), did not show any significant effects.

These findings align with the research conducted by (Suparti and Nurjanah, 2018), which concluded that there is no correlation between gender and the occurrence of fatigue ($P=0.89$). Nevertheless, contrary to the findings of (Sulistini et al., 2021), a significant association exists between fatigue and gender, as indicated by a P -value of 0.049. This elucidates that irrespective of gender; individuals have a similar outcome of fatigue when having dialysis therapy since their physical condition deteriorates.

CONCLUSION

Based on the results of the 4-week intervention study at X Hospital in West Java, which aimed to evaluate the effects of implementing pranayama yoga and educational programs on anxiety and exhaustion levels among hemodialysis patients, several key findings emerged. Firstly, the study involved 35 participants, with findings indicating a significant reduction in anxiety levels following the intervention. Prior to the intervention, the mean anxiety level was 11.40, which decreased to 5.86 after participation in yoga and education sessions. Similarly, fatigue levels were assessed, showing an increase from an average of 38.43 before the intervention to 40.14 afterward. Secondly, the study observed distinct changes in anxiety and fatigue levels before and after the implementation of yoga pranayama and educational interventions. These changes highlight the effectiveness of these interventions in reducing anxiety and potentially managing fatigue among hemodialysis patients. Thirdly, even after considering covariate variables such as gender and duration of hemodialysis, the impact of pranayama yoga and educational interventions on anxiety and exhaustion remained significant. These findings suggest that these interventions can be beneficial across different patient demographics and treatment durations. In conclusion, the study underscores the notable positive effects of pranayama yoga and educational interventions on anxiety and exhaustion levels in hemodialysis patients. Future research should continue to explore additional factors such as sleep quality and improvements in patient hemoglobin levels to further enhance the quality of care provided to hemodialysis patients. These findings contribute valuable insights into holistic approaches to managing psychological and physical well-being in this patient population.

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