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ORIGINAL RESEARCH

A study to evaluate the effectiveness of intradialytic leg exercise on pain and fatigue among patients undergoing haemodialysis at Dasmesh Hospital Faridkot, Punjab

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ABSTRACT

Introduction: Pain and fatigue are common and debilitating symptoms experienced by many patients undergoing long-term dialysis. Renal providers face numerous challenges in managing these patients, including medication side effects, fluid overload, anemia, and cardiovascular complications. **Aim:** This study examines the effectiveness of intradialytic leg exercise in reducing pain and fatigue among hemodialysis patients at Dasmesh Hospital in Faridkot, Punjab. It also explores the relationship between pain, fatigue, socio-demographic factors, and the patients' hemodialysis treatment. **Materials and methods:** A pre-experimental study was conducted to assess the effectiveness of intradialytic leg exercise on pain and fatigue among patients undergoing hemodialysis The study was carried out at Dasmesh hospital in Faridkot Punjab, and a total of 60 participants were enrolled. The study subjects were selected using a purposive sampling technique. Data were collected using demographic profiles, numeric pain scale and fatigue scale throught structure interview schedule.After pretest intradialytic leg exercise were, performed t post-test was conducted after this. The IBM SPSS version 26 was used for data analysis and interpretation. **Results**: The study found . The pretest mean score of pain was 5.78 S.D 1.923, whereas the posttest mean score of pain was 5.13 S.D 1.722. The mean difference was 0.650. A paired 't' test was applied to find out the statistical significance of the results. The results showed that t_{59}=4.569, p=0.001, which indicates a high level of statistical significance at the 0.01 level. The pretest mean score of fatigue was 32.7 S.D was 9.062, whereas the posttest mean score of fatigue was 30.5 S.D was 8.926. The mean difference was 2.217. A paired 't' test was applied to find out the statistical significance of the results. The results showed that t_{59}=4.113, p=0.001, which indicates a high level of statistical significance at the 0.01 level. These finding indicated that intradialytic leg exerceses as effective .hence hypothesis H_3 is accepted. **Conclusion**: In conclusion, this study emphasizes the positive impact of intradialytic leg exercise in reducing both pain and fatigue among patients undergoing hemodialysis. By incorporating this low-cost and feasible intervention into routine care, healthcare providers can improve the quality of life and well-being of patients with chronic kidney disease. These findings have important implications for the management of pain and fatigue in hemodialysis patients and highlight the need for further research in this area.

Key words: Intradialytic, Leg exerceses Pain Fatigue Haemodialysis

INTRODUCTION

Background of the study

The metabolic efficiency of a live organism is a measure of its health. When we talk about someone being "healthy," we imply that they are in excellent mental and physical shape and have no major health issues. A condition of total physical, mental, and social well-being, as opposed to only the absence of disease1, is how the World Health Organisation defined health in its broadest definition in 1946.

The kidneys are two bean-shaped organs that are typically a rusty red colour in vertebrates. They are

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around 12 centimetres (4+12 inches) in length and may be found on the left and right sides of the retroperitoneal region in an adult person. Their primary function is to keep the body's blood composition stable, which is essential for optimal health. The kidney's job is to remove excess waste products from the circulatory system. About 1 to 2 quarts (0.94 to 1.81) of urine are produced daily after the kidneys have filtered 120 to 152 quarts (113 to 114 litres) of blood.2

When kidney function quickly declines and waste products cannot be removed from the circulation, this is called acute renal failure. Damage to the kidneys may lead to an imbalance in the blood's chemistry, an accumulation of potentially lethal wastes, and a loss of the organ's capacity to filter the blood. Kidney failure that occurs suddenly, within a few of days, is termed acute kidney failure, acute renal failure, or acute kidney damage. People who are already hospitalised, especially those who are severely sick and need intensive care, are more likely to develop acute renal failure. Death is a real possibility with acute renal failure, thus it needs urgent care. Acute renal failure, however, could be treatable.3

A steady decline in kidney function characterises chronic kidney disease, commonly known as chronic kidney failure. Urine is the body's way of getting rid of waste products and surplus fluids that the kidneys have filtered out of the circulation. The accumulation of fluid, electrolytes, and waste products may be life-threatening in patients with advanced chronic renal disease. Chronic kidney disease often has no noticeable symptoms in its early stages. The goal of treating chronic renal disease is to limit the rate at which kidney damage worsens. Nonetheless, preventing more kidney damage may be impossible, even if the underlying cause is addressed. End-stage renal failure is a result of chronic kidney disease and is irreversible without artificial filtration (dialysis) or a kidney transplant.4

Globally, around 11,010,107 people suffer from chronic renal failure, with 850,000 deaths annually, according to the World Health Organization (2012). In India, the incidence and prevalence of chronic renal failure are estimated to be 0.79% (7852 per million population) based on a study in Bhopal. The Indian CKD registry suggests that over 2.5 lakh individuals in India succumb to renal failure each year. Dialysis is a common treatment for kidney failure, helping to alleviate uremic syndrome and extend patients' lives. However, dialysis only partially treats uremia, and it may result in symptoms such as lethargy, weakness, low blood pressure, and leg discomfort.5

Dialysis has been keeping almost 1,000,000 people alive since it was initially developed in the 1960s to help those with end-stage renal illness live longer. Dialysis is effective in treating uremic syndrome because it eliminates many of the toxins that cause it. Haemodialysis is a procedure that filters the blood and eliminates excess fluid and toxins. Haemodialysis involves the removal of waste products from the blood using a dialysis machine equipped with a particular filter known as a dialyzer, commonly known as an artificial kidney. An entry or admission to the bloodstream is required in order to be linked to a dialysis machine. Typically, patients get care thrice weekly. Around four hours is allotted for each session.6

Objectives of the study

1. To assess pre test and post test level of pain among patients undergoing haemodialysis.
2. To assess the pre test and post test level of fatigue among the patients undergoing haemodialysis.
3. To assess the effectiveness of intradialytic leg exercise on pain and fatigue among patients undergoing haemodialysis.
4. To find out association between level of pain among patients undergoing hemodialysis with selected demographic variables.
5. To find out association between level of fatigue among patients undergoing haemodialysis with selected demographic variables.

MATERIAL AND METHODS

Research Approach and research design: A quantitative research approach was adopted for this study. The study used a quasi experimental non-equivalent pre- and post-test control group design.

Research Setting: The study was conducted in the dialysis department of Dasmesh Hospital, Faridkot Punjab.

Target population: Patients who was admitted in dialysis unit of Hemodialysis Dasmesh Hospital, Faridkot, Punjab

Sample and Sampling technique: Eligible patients were hospitalised to the hospital's Dialysis Unit throughout the research period. The trial included 60 patients, 30 in each group. Purposive sampling selected the most available clients for this study. This study included chronic renal disease hemodialysis patients

Selection and Development of research tool: The patients who were

- more than 18 years of age.
- diagnosed as chronic renal failure.
- undergoing haemodialysis twice a week with muscle cramps.
- oriented to the time, place and person
- able to understand and respond in Punjabi/Hindi/English.
- Hemodynamicalstable

Exclusion Criteria: The patients who were

- Having a femoral catheter and undertaking emergency haemodialysis.

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- having intellectual or mental disability.

Selection of tool

Section A: The study encompasses socio-demographic factors, such as age, gender, religion, education, occupation, family history, monthly income, duration of treatment, and food habits, concerning hemodialysis. This section was utilized for descriptive analysis, and no scores were assigned to these variables.

Section B: evaluates hemodialysis patients' pain using a numerical rating scale. Medical facilities use pain measures to assess patient discomfort. These scales aid medical communication. Pain scales improve patient screening and evaluation.

Score Interpreation:

Description	Score
No Pain	0
Mild Pain	1-4
Moderate Pain	5-8
Severe Pain	10

Hemodialysis patients are assessed using a Fatigue Assessment Scale in Section C. This scale measures weariness pre- and post-intervention. It covers fatigue frequency and duration. Patients assess their weariness on a 1–10 scale.

Ethical consideration

Before data collection and medical supervisor authorisation, responsible authorities gave written consent. Each subject's informed written permission and confidentiality were quietly secured**.**

Section I: Sample characteristics

Table 1: Socio-demographic Profile of patients undergoing hemodialysis at Dasmesh Hospital, Faridkot. N=60

SR NO	VARIABLES	F	%
1	**Age in year**		
	18-28 Year	0	0
	29-39 Year	0	0
	40-50 Year	16	32.0
	Above 51 Year	11	22
2	**Sex**		
	Male	48	80.0
	Female	12	20.0
3	**Religion**		
	Muslim	14	23.3
	Sikh	46	76.7
	Hindu	0	0
4	**Education**		
	Illiterate Matric	16	23.3
	Matric	32	53.3
	Graduate	12	20.0
5	**Family income(RS/Month)**		
	10000-20000	4	6.7
	21000-30000	7	11.7
	31000-40000	45	75.0
	>40,000	4	6.7
6	**Occupation**		
	Home maker	7	11.7
	Business	14	23.3
	Private employe	39	65.0
7	**Duration of Treatment**		
	< 01 years	13	21.7
	01-03 years	36	60.0
	>3 years	11	18.3
8	**Frequency of dialysis**		
	One a week	51	85.0
	Twice a week	9	15.0

Table 1 depicts that socio-demographic profile of patients undergoing hemodialysis, out of 60 samples; as per their age 25 (41.7%) patients belong to the age group of 40-50 years, while 35 (58.3%) patients

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belonged to the age group of above 50 years. According to their sex, 48 (80.0%) were male, and 12 (20.0%) were female. As per their religion, 14 (23.3%) patients were Muslim, while 46 (76.7%) patients were Sikh.

According to their Educational status,16 (26.7%) was illiterate, 32 (53.3%) were matric, and 12 (20.0%) were graduate. According to their Family income, 4 (6.7%) patients have a family income of 10,000-20,000 rupees per month, 7 (11.7%) have a family income of 21,000-30,000 rupees per month, 45 (75.0%) have a family income of 31,000-40,000 rupees per month, and 4 (6.7%) have a family income of above 40,000 rupees per month.

According to their Occupation, 7 (11.7%) were homemakers, 14 (23.3%) were in business, and 39 (65.0%) were private employees. As per patients' duration of treatment, 13 (21.7%) patients have been undergoing treatment for less than 1 year, 36 (60.0%) patients have been undergoing treatment for 1-3 years, and 11 (18.3%) patients have been undergoing treatment for above 3 years. Based on frequency of dialysis, 51 (85.0%) undergo dialysis once a week, while 9 (15.0%) undergo dialysis twice a week.

Section II: Finding related to assess pretest and posttest level of pain among patients undergoing haemodialysis.

Table 2: Pretest Level of pain among patients undergoing haemodialysis.

N=60

S. No.	Level of pain	f	%	Mean ± SD
1.	Mild	18	30.0	5.78±1.923
2.	Moderate	36	60.0	
3.	Severe	6	10.0	

Table 2 and figure 3 depict that pretest level of pain among patients undergoing haemodialysis. Out of 60 patients; 18 (30.0%) patients reported mild pain, 36 (60.0%) patients reported moderate pain, and 6 (10.0%) patients reported severe pain. The mean score of pain was 5.78±1.923

Table 3: Posttest Level of pain among patients undergoing haemodialysis.

N=60

S. No.	Level of pain	F	%	Mean	SD
1.	Mild	23	38.3	5.71	.923
2.	Moderate	37	61.7		
3.	Severe	0	0		

Table 3 and figure 4 depict that posttest level of pain among patients undergoing haemodialysis. Out of 60 patients; 23 (38.3%) patients reported mild pain, and 37 (61.7%) patients reported moderate pain. The mean Post test score of pain was 5.131 and Standard Deviation was.722.This, Hypothesis H_1 is accepted

Section III: Findings related to assessment of the pretest and posttest level of fatigue among thepatients undergoing haemodialysis.

Table 4: Pretest Level of fatigue among patients undergoing haemodialysis.

N=60

S. No.	Level of fatigue	f	%	Mean	SD
1.	Normal	10	16.7	32.779	062
2.	Fatigue	16	26.7		
3.	Extreme fatigue	34	56.7		

Table 4 depicts that Pretest Level of fatigue among patients undergoing haemodialysis. Out of the total 60 patients, 10 (16.7%) patients reported normal level of fatigue, 16 (26.7%) patients reported fatigue, and 34 (56.7%) patients reported extreme fatigue. The mean pre test score of fatigue was 32.7 9. and Standard Deviation was 062. Methdology also.

Table 5: Posttest Level of fatigue among patients undergoing haemodialysis.

N=60

S. No.	Level of fatigue	f	%	Mean	SD
1.	Normal	10	16.7	30.558	926

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2.	Fatigue	25	41.7	
3.	Extreme fatigue	25	41.7	

Table 5 depicts that Posttest Level of fatigue among patients undergoing haemodialysis. Out of the total 60 patients, 10 (16.7%) patients reported normal level of fatigue, 25(41.7%) patients reported fatigue, and 25 (41.7%) patients reported extreme fatigue. Themean Post test score of fatigue was 30.558 and Standard Deviation was.926.Hence hypothesis H_2 is accepted

Section IV: Finding related to assess the effectiveness of intradialytic leg exercise on pain and fatigue among patients undergoing haemodialysis.

Table 6: Effectiveness of intradialytic leg exercise on pain among patients undergoing haemodialysis.

N=60

S. No.	Pain score	Mean	SD	MD	t value	Df	*p* value
1.	Pretest Score	5.78	1.923	0.650	4.569	59	0.001*
2.	Posttest Score	5.13	1.722				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, *=significant at 0.01 level

Table 6 and figure 7 show the effectiveness of intradialytic leg exercise on pain among patients undergoing haemodialysis. The pretest mean score of pain was 5.78 and Standard Deviation 1.923, whereas the posttest mean score of pain was 5.13 and Standard Deviation 1.722. The mean difference was 0.650. A paired 't' test was applied to find out the statistical significance of the results. The results showed that t59=4.569, p=0.001, which indicates a high level of statistical significance at the 0.01 level. Thus, intradialytic leg exercise was effective in reducing pain among patients undergoing haemodialysis. Hence, hypothesis H_3 is accepted due to decreas in level of pain & fatigue after intradialytic leg exercise.

Table 7: Effectiveness of intradialytic leg exercise on fatigue among patients undergoing haemodialysis.

N=60

S. No.	Fatigue score	Mean	SD	MD	t value	df	*p* value
1.	Pretest Score	32.77	9.062	2.217	4.113	59	0.001*
2.	Posttest Score	30.55	8.926				

NB: SD= Standard deviation, MD=Mean difference, df= degree of freedom, NS= non-significant at 0.05 level

Table 7 and figure 8 show the effectiveness of intradialytic leg exercise on fatigue among patients undergoing haemodialysis. The pretest mean score of fatigue was 32.77 and Standard Deviation 9.062, whereas the posttest mean score of fatigue was 30.55±8.926. The mean difference was 2.217. A paired 't' test was applied to find out the statistical significance of the results. The results showed that t59=4.113, p=0.001, which indicates a high level of statistical significance at the 0.01 level. Thus, intradialytic leg exercise was effective in reducing fatigue among patients undergoing haemodialysis. Hence, hypothesis H_3 is accepted.

Section V: Findings related to find out association between level of pain among patients undergoing hemodialysis with selected Socio demographic variables.

Table 8: Association between level of pain among patients undergoing hemodialysis with selected demographic variables.

S.No.	Variables	Level of pain		^{2} value	df
		Mild	Moderate		
1	**Age (years)**				
	40-50	11	14		
	>50	12	23	.582	1
	Sex				
	Male	19	29		
2.	Female	4	8	.159	1
	Religion				
	Muslim	3	11		
3.	Sikh	20	26	2.208	1
	Educational status				
	Illiterate	5	11		
	Matric	13	19		
4.	Graduate	5	7	.467	2
5.	**Family income**				

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	(Rs./month)				
	10000-20000	3	1		
	21000-30000	2	5		
	31000-40000	18	27		
	>40,000	0	4	5.097	3
	Occupation				
	Home maker	2	5		
	Business	7	7		
6.	Private employee	14	25	1.186	2
	Duration of Treatment				
	< 01 years	4	9		
	01-03 years	15	21		
7.	>3 years	4	7	.502	2
	Frequency of dialysis				
	One a week	20	31		
8.	Twice a week	3	6	.112	1

Table 8 presents that association between level of pain among patients undergoing hemodialysis with selected demographic variables. Here chi-square test was applied to find statistically significant association. As result indicated all the socio-demographic variables sucha as age, gender religion, education status, family income, occupation, duration of treatment, frequency of dialysis found non-significant at 0.05 level.

Hence, Hypothesis H_4 is rejected

The present study was to assess the effectiveness of Leg exercises on hypertension patient among patient undergoing haemodialysis. A experimental study was used for this study. Purposive sampling technique was used to enrolled the study subjects. A total of 60 patients was selected for the study based on inclusion criteria. Data was collected through demographic profile, Numerical rating scale to assess the level of pain and fatigue scale. Pretest was assessed from the patients than intervention was given to the pain and fatigue and posttest was assessed after seven days using same tool. The data collected was analyzed using descriptive and inferential statistics and is arranged based on the objectives of the study.

Objective I: To assess pretest and posttest level of pain among patients undergoing haemodialysis.

The current study shows that out of 60 samples The study reports that the majority of patients were above 50 years of age, male, and belonged to the Sikh religion. In terms of education, most patients had at least a matriculation level of education, and the majority of patients had a family income between 31,000-40,000 rupees per month. In terms of occupation, most patients were private employees. The study also reported that the majority of patients underwent hemodialysis once a week and had been undergoing treatment for 1- 3 years.

Comparing the findings of this study to previous research conducted by **Albadr et al. (2015)**, the age range of the patients was similar, but the gender distribution differed, with more males in the current study. In contrast, the duration of dialysis was longer in the study by et al **Lekha. (2017).**

Objective II: To assess the pre test and post test level of fatigue among the patients undergoing haemodialysis

Furthermore, the present study was supported by the findings of **Ibrahim and Mokhtar (2018),** who reported that the majority of patients were married and belonged to the 40-50 age group. The results of this study highlight the importance of considering sociodemographic factors when designing interventions for hemodialysis patients. The current study show that 18 (30.0%) patients reported mild pain, 36 (60.0%) patients reported moderate pain, and 6 (10.0%) patients reported severe pain. The mean score of pain was 5.78±1.923. The present study show that posttest level of pain and pretest/posttest levels of fatigue among hemodialysis patients. The study found that a significant proportion of patients experienced moderate to severe levels of pain during both pretest and posttest assessments, with the mean score of pain remaining high. The study also revealed that a high proportion of patients experienced extreme fatigue during pretest assessment. However, there was a reduction in the proportion of patients reporting extreme fatigue during posttest assessment. This suggests that interventions aimed at managing fatigue, such as intradialytic exercise, could be effective in reducing the severity of fatigue in hemodialysis patients.

Objective III: To assess the effectiveness of intradialytic leg exercise on pain and fatigue among patients undergoing haemodialysis.

The study findings are consistent with previous research by **Jose et al. (2014)** who reported that a significant proportion of patients experienced moderate to severe levels of fatigue during pretest assessment. However, the present study provides important insights into the potential effectiveness of interventions, such as intradialytic exercise, in managing fatigue among hemodialysis patients. The study results also suggest that interventions aimed at

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managing pain and fatigue should be a priority for healthcare providers treating hemodialysis patients. This is supported by the findings of **Soliman (2015)** who reported a significant difference in fatigue score between pre and posttest assessments.

Objective IV: To find out association between level of pain among patients undergoing hemodialysis with selected demographic variables.

According to a study conducted by **Albadr AH et al. in 2020,** a significant number of hemodialysis patients experienced cramps during treatment, with 85.0% reporting cramps lasting for more than five minutes. Prior to intradialytic exercise, 55.0% of these cramps lasted for less than five minutes, but the duration of cramps was reduced after exercise. The majority of patients reported high levels of pain before intradialytic exercise, with 96.7% scoring their pain level as 7-10. However, after exercise, the proportion of patients reporting moderate levels of pain increased, with 65.0% reporting a pain score of 4-6. These findings suggest that intradialytic exercise may effectively reduce cramp duration and pain level among hemodialysis patients. This study supports the findings of **Lekha et al. in 2017,** who reported that a majority of patients experienced muscle cramps during the last hour of hemodialysis, and more than half of patients experienced muscle cramps in both legs. This study contradicts the findings of **Naylor & Young in 2004,** who reported that a majority of patients experienced muscle cramps in their calf muscles. The current study demonstrated that the average pain score before the intervention was 5.78±1.923, while the average pain score after the intervention was 5.13±1.722, resulting in a mean difference of 0.650. A paired 't' test was conducted to assess the statistical significance of the results, revealing a high level of statistical significance at the 0.01 level with t59=4.569, p=0.001. This finding is consistent with the results reported by **Mohamed M et al. in 2007,** which showed that two-thirds of patients did not experience muscle cramps after the intervention. Similarly**, Albadr AH et al. in 2020** reported a significant difference in the total occurrence of fatigue and pain before and after the implementation of intradialytic exercises.

Objective V: To find out association between level of pain among patients undergoing hemodialysis with selected demographic variables.

This result contradicts the findings of **Mohamed M et al. in 2007,** who reported that onefifth of patients experienced severe pain before receiving nursing instructions. In contrast, after intradialytic exercise, more than half of the patients reported moderate pain. This result also contradicts the findings of Salem and **Elhadary in 2017,** who reported that twothirds of patients experienced mild pain after leg stretching exercises.

The current study shows that the average fatigue score before the intervention was 32.77±9.062, while the average fatigue score after the intervention was 30.55±8.926, resulting in a mean difference of 2.217. A paired 't' test was conducted to assess the statistical significance of the results, revealing a high level of statistical significance at the 0.01 level with t59=4.113, p=0.001. **Tamilmozhi TD et al. in 2021** also found a significant decrease in fatigue levels after an intervention with a paired 't' value of 7.382 at $P < 0.05$ level of significance. They also reported a significant improvement in the patients' quality of life with a paired 't' value of 13.124 at $p<0.05$ level of significance. Similarly, **Bhuvaneswari G et al. in 2022** showed that a majority of patients (56.7%) reported no pain during the post-test. **Albadr AH et al. in 2020** reported significant differences in the total score of fatigue severity scale for patients before and after the implementation of intradialytic exercises.

Our study found that all socio-demographic variables, including age, gender, religion, education status, family income, occupation, duration of treatment, and frequency of dialysis were not statistically significant at the 0.05 level. This result is consistent with the findings of **Bhuvaneswari G et al. in 2022,** who reported that there was no association between the severity of leg muscle cramping and any of the demographic variables.

CONCLUSION

In conclusion, this study emphasizes the positive impact of intradialytic leg exercise in reducing both pain and fatigue among patients undergoing hemodialysis. By incorporating this low-cost and feasible intervention into routine care, healthcare providers can improve the quality of life and well-being of patients with chronic kidney disease. These findings have important implications for the management of pain and fatigue in hemodialysis patients and highlight the need for further research in this area.

Implication of the study

Clinical nurse can

- Using the Modified Brief Pain Inventory Scale, you may get an accurate evaluation of muscular cramps.
- Develop a knowledge of the effect of intradialytic leg exercise on tiredness and discomfort in hemodialysis patients.
- Emphasise the importance of leg exercise as a supplemental treatment.
- The outcomes of this research may be used as a baseline for offering assistance in minimising tiredness and discomfort in hemodialysis patients.
- Encourage the use of this easy approach to avoid additional difficulties in hemodialysis patients.
- Intradialytic leg exercises might be included as a normal practise for hemodialysis patients.
- Nurses may incorporate evidence-based practise into hemodialysis sessions by integrating these leg exercises.

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- Nurses should prioritise patients' comfort during hemodialysis to assist patients cope with exhaustion and discomfort

Nursing Education

Nursing educators can motivate students to:

- The literature on reducing muscle pain and fatigue can incorporate the inclusion of intradialytic leg exercises.
- Nursing students and staff nurses can receive education and training on the implementation of intradialytic leg exercises to alleviate fatigue and pain.
- Patients should be encouraged to engage in the practice of this simple technique to manage their symptoms effectively.

Nursing Research:

- The study's results may serve as significant baseline data, laying the groundwork for future research in the same context.
- The results may be efficiently disseminated via conferences, seminars, and publishing in professional, national, and worldwide journals. This will guarantee that the study's information and insights reach a broad audience, including healthcare professionals, researchers, and policymakers.

Nursing Administration:

- In-service education programmes for nurses should be organised to encourage the application of this additional method. These programmes will provide nurses with the information and skills they need to successfully introduce intradialytic leg exercises into their practise.
- Based on the research results, regulations for establishing a standardised approach for intradialytic leg workouts may be devised. These rules will guarantee that the exercises are carried out consistently and properly across all healthcare settings.
- Nurse managers are critical in training medical-surgical nurses on the advantages of intradialytic leg exercises and how to do them correctly. Through in-service programmes, they may assist this education, ensuring that all nurses are well-informed and competent in adopting these exercises into patient care.
- Non-pharmacological treatments, such as intradialytic leg exercises, may be planned and implemented as part of normal care by nursing administration. They may begin and assist the incorporation of these treatments into the overall treatment plan, supporting holistic care for hemodialysis patients.

Nursing Research

- The outcomes of the study will be useful for future research. They will contribute to the advancement of scientific understanding in the subject and provide the groundwork for future research.
- Nurse researchers may expand on the results of the study and undertake research to confirm the scientific basis and understand the physiological processes behind the influence of intradialytic leg exercises on tiredness and pain levels. These research will contribute to the body of data that supports the use of intradialytic leg exercises as a therapeutic intervention.
- Randomised clinical trials may be carried out to improve the validity of the findings and provide a better evidence foundation. These studies will give more rigorous information on the efficacy of intradialytic leg exercises and their inclusion in evidence-based nursing practise.
- Guidelines for the process of intradialytic leg exercises may be produced based on the study's results and following research. These recommendations will explain best practises for implementing and monitoring the exercises in clinical settings, ensuring uniform and safe implementation.

Recommendations

- Patients undergoing hemodialysis might benefit from a systematic instruction programme on active intradialytic leg exercises. This programme will give patients with sufficient advice and education on how to efficiently do the exercises.
- The same research may be reproduced in a variety of contexts, including hospitals, community health centres, and rehabilitation centres. This will aid in validating the results and determining the intervention's generalizability across diverse healthcare settings.
- Conducting the research with higher sample sizes is advised to reinforce the study's conclusions. This increases the statistical power and dependability of the findings.
- Intradialytic leg exercises may be offered to all hemodialysis patients as a routine practise for managing weariness and discomfort. Patients who include this intervention into their usual treatment may benefit from decreased tiredness and discomfort during their hemodialysis sessions.

Comparative studies may be undertaken to evaluate the efficacy of intradialytic leg exercises with other complementary treatments to better examine their efficacy. This would give insights into the relative efficacy of various therapies and assist healthcare practitioners in making educated judgements about the best method for managing tiredness and pain in hemodialysis patients.

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