



IMPLEMENTATION OF *STRETCHING EXERCISE INTRADIALYTICS* IN IMPROVING MUSCLE CRAM SYMPTOMS IN PATIENTS UNDERGOING HEMODIALYSIS

Asep Novi Taufiq Firdaus¹, Ari Yulistianingsih^{1*}, Rizki Nugraha Agung², Iyar Siswandi²

¹Faculty of Health Sciences, Universitas Muhammadiyah Cirebon, Jl. Tuparev No.70, Kedungjaya, Kedawung, Kabupaten Cirebon, West Java 45153, Indonesia

²Faculty of Nursing, Universitas Muhammadiyah Jakarta, Jl. Cemp. Putih Tengah No.27, Cemp. Putih Timur, Cemp. Putih, Jakarta Pusat, Jakarta 10510, Indonesia

*asepnovitaufiq@umc.ac.id

ABSTRACT

Hemodialysis is the most successful and most frequent therapy used as form therapy replacement kidney therapy hemodialysis own One of the impacts felt by patients is that is cramps muscle. Muscle cramps is one of the symptom the most common physical problems experienced patient dialysis. This is contraction muscle sudden that is not deliberate and marked with painful great thing happened repeatedly in patients hemodialysis. The purpose of study This analyze influence implementation implementation stretching exercise intradialytic in repair symptom cramps muscles in patients undergoing hemodialysis at Al Ihsan Regional Hospital Bandung. Data collection uses questionnaire, observation and interviews. Research sample as many as 15 patients shared into 2 groups. Research conducted at Al Ihsan Regional Hospital Bandung, room intermittent hemodialysis May -August 2025. results testing use one-way ANOVA test sig. value < 0.05 so that can concluded that there is influence significant before and after given stretching exercise intervention on cramps. Multivariate test on week first and second p value 1,000 or > 0.05 then No There is influence, on week to three $0.106 > 0.05$ no There is influence and on the week to four p values $0.015 < 0.05$ exist influence. Implementation Intradialytic exercise range of motion (ROM) intervention according to SOP shows success in a way practical. All participants who received intervention report feeling more comfortable, calm, relaxed, and not too focus to action will therapy hemodialysis.

Keywords: CKD; hemodialysis; muscle cramps; stretching exercise intradialytic

How to cite (in APA style)

Firdaus, A. N. T., Yulistianingsih, A., Agung, R. N., & Siswandi, I. (2025). Implementation of Stretching Exercise Intradialytics in Improving Muscle Cram Symptoms in Patients . Indonesian Journal of Global Health Research, 7(6), 269–276. <https://doi.org/10.37287/ijghr.v7i6.384>.

INTRODUCTION

Disease kidney stage End Stage Renal Disease (ESRD) is stage end from the CKD indicated with inability kidney in maintain body homeostasis (Ignatavicius & Workman, 2016) If the patient are in the ESRD stage, therapy replacement kidney become the only one choice For maintain function body (Lemone & Burke, 2018). Healthy kidneys functioning For filter blood and discharge remains fluid body through urine. Hormones that function important For body We also have some that are produced by the kidneys. According to Sherwood (2013), the kidneys have function For help sour language inside body to stay balanced, issuing remainder metabolism and compounds foreigners, also guard pressure blood still stable. When the kidneys experience decline function, generally will end with fail kidneys. Because of this That needed maintenance for function kidney the Can replaced. Maintenance For decline function kidney That There is various choice namely, hemodialysis, peritoneal dialysis, and transplantation kidney (National Kidney Foundation, 2018).

Hemodialysis is action treatment given to patients Disease Kidney Chronic (PGK) so that capable endure live. However Thus, the action the have effect side on condition physique as well as psychological PGK sufferers (Ministry of Health, 2018). Hemodialysis (HD) is one of the therapies replacement for P GK patients and the type of therapy most frequently given by the renal unit. Sufferer P GK does therapy hemodialysis 2-3 times a week, with an average duration of 4-5 hours (Rahman et al., 2016). The World Health Organization (2017) shows that there has been an increase

in the number of P GK patients by 50% from year Previously, based on Indonesian Renal Registry (IRR) data in 2017 PGK sufferers with Hemodialysis increase to 77,892 patients. In addition According to the 2018 Basic Health Research (Riskesdas), the prevalence PGK disease in Indonesia is 499,800 people (2%), prevalence the highest in Maluku with a total of 4351 people (0.47%) experienced PGK disease (Putri et al., 2020), in line with the government's health insurance policy, around 91% of patients funded by the National Health Insurance both Recipients of Financial Assistance (PBI) and non - recipients of financial assistance. If all the Indonesian population has become members of the National Health Insurance and can access all over service dialysis so patient new will reached 73935 people and patients active 147340 people (PERNEFRI, 2018).

Hemodialysis is the most successful and most frequent therapy used as form therapy replacement kidney. Success and worldwide use in wide prove benefits and safety. Complications intradialysis is abnormal conditions that occur at the time patient undergo Hemodialysis. Complications I hemodialysis defined as existence manifestation clinical related with hemodialysis that occurs during session dialysis or in the first 24 hours after dialysis. Complications I hemodialysis is complications that occur during hemodialysis ongoing. Frequent complications occurs in dialysis are ; Hypotension 25 - 60% Arrhythmia 5 – 25% Cramps 5 – 15% Nausea and vomiting 5 – 10% Headache 5 – 10% Back pain 2 – 5% Chest pain 2 – 5% Itching 1 – 5% Fever 1% (Levy et al., 2016).

Hemodialysis procedure is something action for emit remains metabolism that has been No required body consequence function kidneys that have No capable Work optimally. In addition to the remains metabolism, action hemodialysis this also filters fluids and vitamins, minerals, glucose, and others. During the hemodialysis process Can happen complications acute, defined as existence manifestation clinical related with hemodialysis that occurs during session dialysis or the first 24 hours after dialysis. Frequent complications happen is hypotension, cramps muscle, nausea, and disequilibrium syndrome. Withdrawal fluid excessive can be one of reason emergence cramps muscle.

Muscle cramps is one of the symptom the most common physical problems experienced patient dialysis. This is contraction muscle sudden that is not deliberate and marked with painful great thing happened repeatedly in patients hemodialysis. Leg cramps are the most common attack muscle calves, feet, toes, and thighs, but can also attack arms and hands, besides muscle stomach. In many case occurrence cramps muscle give sign that the hemodialysis process must ended more early. However matter That precisely causes hemodialysis become not optimal, where remains metabolism No wasted all, accumulation fluid excessive, and triggers emergence hypertension so that over time will increase risk death. (Mohmadi, 2016)

One of complications acute at the time hemodialysis is cramps muscle. Muscle cramps is something painful contractions that occur at one time muscle or a group muscles in patients without myopathy or neuropathy. These cramps usually limited to muscles calf, but also can involving muscle frame others (Stolze, Trautmann, Goebeler, & Stoevesandt, 2016). Prevalence from cramps muscle in HD patients is around 33% to 86% which starts with very painful muscles so that cause patient No move. This is Can happen during HD treatment. Usually cramps muscle can cause termination session dialysis before planned time, so that cause poor handling effective (Damasiewicz & Polkinghorne, 2011).

Although etiology Certain from cramps muscle Not yet fully understood, some trigger general has identified including ; hypovolemia, hypotension, composition dialysate, ultrafiltration fast (UF) (Mastnardo, 2016). Disturbance metabolism electrolytes and minerals, such as level high serum calcium and phosphorus and low sodium, potassium, and magnesium levels in HD patients. These

cramps, which are experienced by 33% to 86% of patients, can happen during maintenance hemodialysis or at home after dialysis (Ulu, 2015).

Many methods the treatment used For cramps during hemodialysis, however a number of have effect side and results not enough effective (Ulu & Ahsen, 2015). Intervention therapeutic For reduce cramps muscle covering giving fluid intravenous, oral medication, adjustments in arrangement dialysis, compress warm, and stretching (Holley, Bems, Sheridan, 2012; Daugirdas, Blake, Ing, 2007). Some study recommend stretching can lower effect cramps muscles (Ulu & Ahsen, 2015).

One of the important strategies for control a number of effect side This is physical exercise or sports. Arian and Mortazavi Dallam research show that 56% of patients hemodialysis lack of exercise from very a week, 75% have limitations heavy in do sports, and 42% have average limitations in activity everyday. This is Can caused by anemia, disorders circulation blood in the extremities, decreased performance heart, and decline activity physique everyday. Important factors other like anxiety, depression, spending more Lots time sleep, and inactivity the more limit capacity physique those who undergo hemodialysis.

During dialysis many training programs physical that can done patient with supported facilities and monitored by the team health. Physical exercise is done during dialysis can increase flow blood to the muscles and enlarge them amount capillary as well as enlarge wide surface capillary so that increase movement of urea and toxins from network to vascular Then streamed to dialyzer or machine hemodialysis (Parson et al, 2006). When the muscles stretched, occurs vasodilation local (widening) vessels blood), which increases perfusion (flow) blood) to network muscle matter This can reduce ischemia frequent muscles become originator cramps. In addition The benefits of stretching exercises are extraordinary normal can increase stamina, relax body and mind with method stimulate endorphin production and reduce perception pain, increase focus and concentration, as well as reduce risk injury (Elsedawy, 2023).

Another benefit of stretching exercises is the relief of leg muscle cramps during hemodialysis sessions. Therefore, to address leg muscle cramps in hemodialysis patients, we chose stretching exercises as an intervention to address intradialysis leg muscle cramps because they are more affordable and accessible than other interventions and carry a significantly lower risk of injury. Stretching exercises are much more suitable for exercise in hemodialysis patients, easily applicable to patients who are bedridden for 4-5 hours. Al Ihsan Regional General Hospital has a hemodialysis ward, one of its supporting medical services facilities. The ward currently has 27 HD machines, with 90 patients in January 2024. The total incidence of muscle cramps in patients undergoing hemodialysis at Al Ihsan Regional Hospital is 30%. The purpose of this study was to analyze the effect of intradialysis stretching exercises on improving muscle cramp symptoms in patients undergoing hemodialysis at Al Ihsan Regional Hospital, Bandung.

METHOD

This type of research is a randomized controlled clinical trial conducted at the hemodialysis unit of Kasr El-Einy Center for Urology Nephrology and Renal Transplantation affiliated with Cairo University, Egypt. Data collection used questionnaires, observations and interviews. The questionnaire used in this study was a cramp questionnaire chart instrument that had been adopted from previous research and had been tested for validity and reliability with an R value of 0.716. The population was all participants who would undergo intradialysis leg stretching exercises in patients undergoing hemodialysis regularly and the sample in this study amounted to 15 people divided into 2 groups, sample determination using simple random sampling. The study was conducted in the Hemodialysis Room of Al Ihsan Hospital, Bandung during May - August 2025. The questionnaire used to measure muscle cramps in hemodialysis patients was the Cramp Questionnaire Chart. Data analysis used in this study was one-way ANOVA test analysis and multivariate analysis using post

hoc Benforroni.

RESULT

Table 1
Characteristics Respondents

Variables	f	%
Gender		
Male	4	26.7
Female	11	73.3
Age		
Adulthood (36-45 years)	5	33.3
Early Elderly (46-55 years)	6	40
Middle Elderly (56-69)	4	26.7
Work		
Private	1	6.7
civil servant	1	6.7
Entrepreneur	13	86.7
HD Duration		
4 Hours	11	73.3
5 Hours	4	26.7
HD Time		
1 year	2	13.3
1.5 Years	1	6.7
15 Months	1	6.7
2 years	3	20.0
2.5 Years	1	6.7
3 years	2	13.3
3.5 Years	1	6.7
4 years	3	20.0
5 years	1	6.7

Based on table 1 above, it is known that most of participants (73.3%) were of the same type Female genitalia. Almost half from participants (40.0%) were in the Early Elderly age group. Almost all of it participants (86.7%) worked as self-employed. Most of them participants (73.3%) underwent HD duration for 4 hours. Most of the participants (20%) have undergo HD for 2 years and 4 years

Table 2.

Distribution Frequency Cramps before the incident given intervention (n=15)

Variables	f	%
No Cramps	1	6.7
Moderate Cramps	10	66.7
Severe Cramps	4	26.7

Based on table 2, it is known before given intervention Physical exercise stretching exercise partly big participants (66.7%) experienced cramps moderate, partial small participants (26.7%) experienced cramps weight and so on small participants others (6.7%) no experience cramps.

Table 3.

Distribution Frequency Cramps Occur After given intervention week 1 (n=15)

Variables	f	%
No Cramps	1	6.7
Mild cramps	4	26.7
Moderate Cramps	7	46.7
Severe Cramps	3	20.0

Based on table 3 above, it is known after given Physical exercise intervention stretching exercise week 1 part big participants (46.7%) experienced cramps moderate, partial small participants (26.7%) experienced cramps light, as small participants others (20.0%) experienced cramps heavy and as much as 6.7% not experience cramps.

Table 4.
Distribution Frequency Cramps Occur After given intervention week 2 (n=15)

Variables	f	%
No Cramps	1	6.7
Mild cramps	4	26.7
Moderate Cramps	7	46.7
Severe Cramps	3	20.0

Based on table 4 above, it is known after given Physical exercise intervention stretching exercise week 2 part big participants (46.7%) experienced cramps moderate, partial small participants (26.7%) experienced cramps light, as small participants others (20.0%) experienced cramps heavy and as much as 6.7% not experience cramps.

Table 5.
Distribution Frequency Cramps Occur After given intervention week 3 (n=15)

Variables	f	%
Mild cramps	10	66.7
Moderate Cramps	5	33.3

Based on table 5 above, it is known after given physical exercise intervention *stretching exercise* week 3 part big participants (66.7%) experienced cramps light, and some small participants (33.3%) experienced cramps currently.

Table 6.
Distribution Frequency Cramps Occur After given intervention week 4 (n=15)

Variables	f	%
Mild cramps	11	73.3
Moderate Cramps	4	26.7

Based on table 6 above, it is known after given physical exercise intervention *stretching exercise* week 3 part big participants (73.3%) experienced cramps light, and some small participants (26.7%) experienced cramps currently

Table 7.
ANOVA test

Levene Statistics	DF	Mean	F	P Value
Between groups	4	24,087	3,275	0.016
Within groups	70	7354		

Based on Table 7 above, the results data is known testing use *one-way ANOVA test* sig. value < 0.05 so that can concluded that there is influence significant before and after given stretching exercise intervention on cramps.

Table 8.
Benferroni Post Hoc Test Table

		Mean	P Value.
pre	Post 1	1.33333	1,000
	Post 2	1.33333	1,000
	Post 3	2.60000	0.106
	Post 4	3.26667	0.015

Based on Table 8 above, the results data is known testing multivariate use Benferroni mark significance pre-test and post-test the 1st week and 2nd week are 1,000 or > 0.05 so can concluded No there is influence significant before and after given stretching exercise intervention on cramps during the week first and week second, value significance pre-test and post-test Sunday third show mark significance of 0.106 or > 0.05 so can concluded No there is influence significant before and after given stretching exercise intervention on cramps during the week third. value significance pre-test and post-test Sunday fourth show mark significance equal to 0.015 or < 0.05 so can concluded there is influence significant before and after given stretching exercise intervention on cramps after four Sunday

DISCUSSION

Characteristics respondents based on type sex

Based on table 1 above, it is known that part big participants (73.3%) were of the same type female sex. In general direct Not yet There is research that explains connection direct cramps during dialysis with type gender, but thus a number of study connect between factor anxiety and hormonal in kind gender that makes somebody experience cramps muscles. Research conducted by Damanik (2020) on men more calm moment face problem Because they own better mental and physical condition stronger and more capable overcome stressors. On the other hand, women more sensitive and more difficult face stressors. As a result, they more easy experience anxiety and fear in Lots things, such as must Keep going undergo treatment For continuity his life. In line with with research by Sabbatini et al. (2002) shows that disturbance psychological like anxiety and depression are very common in HD patients, and are correlated with symptom physique like pain and discomfort moment dialysis. In addition, women often carry role double in family and society, such as as caregiver main at home stairs, which can increase stress psychological and worsening fatigue chronic (Weisbord et al., 2022).

Characteristics respondents based on age

Almost half from participants (40.0%) were in the Early Elderly age group. study by Daugirdas et al. (2022) states that age carry on is factor non- specific risks For various complications dialysis, including cramps muscles, especially If accompanied by hypotension or malnutrition. This matter in line with research conducted by Husna et al (2021) found majority with age elderly early (46-55 years) amounting to 40%. As it increases age, opportunity caught fail kidney chronic increase Because decline function kidney as well as decline rate glomerular filtration gradually (B. Simanjuntak et al., 2024)

Characteristic point Respondents based on Work

From the results research, almost all of it participants (86.7%) work as self-employed, workers active Possible experience fatigue addition consequence pressure work, even though a number of studies show No There is connection significant between work with cramps hemodialysis. Patients who are still Work influence condition physical, metabolic, and hydration status patients who are not direct can influence cramps during dialysis (Jumaiyah et al., 2020).

Characteristics participants based on dialysis duration

From the results study obtained that most of participants (73.3%) underwent HD duration for 4 hours. short duration cause withdrawal fluid (ultrafiltration) is performed more fast For achieve the target. Decrease electrolyte in a way slowly But progressive (especially sodium, calcium, magnesium) Daugirdas et al. (2022) Explains that level too much ultrafiltration tall consequence duration short dialysis is reason general hypotension and cramps.

Characteristics participants based on dialysis duration

Most of the participants (20%) have undergo HD for 2 years and 4 years. A study by Afshar et al. (2017) stated that duration longer hemodialysis correlates with improvement complications musculoskeletal, including cramps muscle, pain, and stiffness joints. The duration of undergoing Hemodialysis also has a big impact occurrence decline production erythropoietin consequence damage kidney so that reduce capacity transportation oxygen in blood throughout body so that cause fatigue. Anemia that occurs result in circulation to peripheral decrease so that reduce sensation sensory and motor. This will result in damage systemic like occurrence inflammation, dysfunction endocrine, musculoskeletal disorders. In addition to anemia conditions that cause fatigue in CKD patients on hemodialysis is improvement sour lactate and comorbidities (Xia et al., 2024).

Influence *stretching exercise* intradialytic in repair symptom cramps muscles in patients hemodialysis

The implementation of EBNP aim For evaluate eligibility application of stretching exercises to cramps muscles in patients hemodialysis. The application of EBNP can become alternative in overcome cramps muscle in a way non-pharmacological which can used by power health, in particular nurse. Muscle cramps is one of the symptom the most common physical problems experienced patient dialysis. This is contraction muscle sudden that is not deliberate and marked with painful great thing happened repeatedly in patients hemodialysis. Leg cramps are the most common attack muscle calves, feet, toes, and thighs, but can also attack arms and hands, besides muscle stomach. In many case occurrence cramps muscle give sign that the hemodialysis process must ended more early. However matter That precisely causes hemodialysis become not optimal, where remains metabolism No wasted all, accumulation fluid excessive, and triggers emergence hypertension so that over time will increase risk death. (Mohmadi, 2016). Based on results research, the results data is known testing use *one-way ANOVA test* sig. value < 0.05 so that can concluded that there is influence significant before and after given stretching exercise intervention on cramps muscle patient hemodialysis. Study This in line with research by *Segura- Ortí et al.* (2018) and *Kaya et al.* (2020), which showed that intervention exercise light during hemodialysis (including stretching and light resistance training) can repair complaint muscle like cramps, fatigue, and stiffness

CONCLUSION

Implementation Intradialytic exercise range of motion (ROM) intervention according to SOP shows success in a way practical. All participants who received intervention report feeling more comfortable, calm, relaxed, and not too focus to action will therapy hemodialysis.

REFERENCES

- Wahida AZ et al., (2022). The effectiveness of intradialytic exercise in ameliorating fatigue symptoms in patients with chronic kidney failure undergoing hemodialysis: A systematic literature review and meta-analysis, *Journal of Taibah University Medical Sciences*. <https://doi.org/10.1016/j.jtumed>.
- Chang Y, Cheng SY, Lin M, Gau FY, Chao YFC. (2020). The effectiveness of intradialytic leg ergometry exercise for improving sedentary lifestyle and fatigue among patients with chronic kidney disease: a randomized clinical trial. *Int J Nurs Stud* 2010; 47(11): 1383e1388. <https://doi.org/10.1016/j.ijnurstu>
- Maniam R, Subramanian P, Kaur S, Singh S. (2020). Preliminary study of an exercise program for reducing fatigue and improving sleep among long-term hemodialysis patients. *Singap Med J* 2020; 55(9): 476e482. <https://doi.org/10.11622/smedj.2014119>.
- Soliman HM. (2021). Effect of intradialytic exercise on fatigue, electrolytes levels and blood pressure in hemodialysis patients: a randomized controlled trial. *J Nurs Educ Pract*; 5(11): 16e28. <https://doi.org/10.5430/jnep.v5n11p16>
- Ministry of Health of the Republic of Indonesia. (2022). Basic Health Research; https://kesmas.kemkes.go.id/assets/upload/dir_519d41d8cd98f00/files/Hasil-risikesdas-2018_1274.pdf.
- Raja SM, Seyoum Y. (2020) Intradialytic complications among patients on twice-weekly maintenance hemodialysis: an experience from a hemodialysis center in Eritrea. *BMC Nephrol* 21(1): 1e7. <https://doi.org/10.1186/s12882-020-01806-9>.

- Urquhart-Secord R, Craig JC, Hemmelgarn B, Tam-Tham H, Manns B, Howell M, et al. (2021). Priorities patients and caregivers For results hemodialysis : study technique international nominal group. *Am J Kidney Dis.*;68(3): 444– 54..
- Shemy M, Elkazeh E, Elkuaily R. (2021). Efficacy of exercise program in intra hemodialysis on patients' quality of life. *IOSR J Nurs Health Sci*; 5(1): 17e30. <https://doi.org/10.9790/1959-05151730>.
- Ibrahim MM, Mokhtar IM. (2021). Leg exercise: effect on reducing fatigue and improving activities of daily living for hemodialysis patients. *J Nurs Health Sci*; 7(3): 11e19. <https://doi.org/10.9790/1959-0703041119>. <https://www.iosrjournals.org/iosrjnhs/papers/vol7-issue3/Version-4/B0703041119.pdf>
- Yuan Song Y, Jun Hu R, Shu Diao Y, Chen L, Lian Jiang X. (2020). Effects of exercise training on restless legs syndrome, depression, sleep quality, and fatigue among hemodialysis patients: a systematic review and meta-analysis. *J Pain Symptom Management*; 55(4): 1184e1195. <https://doi.org/10.1016/j.jpainsymman.2017.12.472>.
- Farhad L, Brazparandjani S, Latifi SM, Chahkhoei M, Khalili A, Paymard A, et al. (2019). The influence of the care model collaborative on fatigue in patients undergoing hemodialysis maintenance : clinical trials random. *Qom Univ Med Sci J.*;10(8):71–9.
- O'Sullivan D, McCarthy G. (2020) Exploration connection between fatigue and function physical condition of the patient with disease end- stage kidney transplant recipients Hemodialysis. *J Clin Nurs*;16(11c):276–84
- Riahi Z, Esfarjani F, Marandi M, Bayat A, Kalaly N. (2020) The influence of sports programs regular to efficacy dialysis, atrophy muscle and performance physical condition of the patient Hemodialysis. *J Shahrekord Univ Med Sci.*; 14(5):63–73.
- Salem SS, Elhadary SM. (2020) Effectiveness of intra-dialytic stretching exercises on leg muscle cramps among hemodialysis patients. *IOSR Journal of Nursing and Health Science.*;6(02):47-53.
- Crowther F, Sealey R, Crowe M, Edwards A, Halson S. (2020). Influence recovery strategy based on performance and perception after grueling exercise : trial controlled in a way randomized. *BMC Sports Sci Med Rehabil.*;9(1):25