



Interventions for treatment of muscle cramps in hemodialysis patients: A systematic review

Joey Anung Aninditya Widodo¹, Azizah Khoiriyati^{2*})

¹ Master Of Nursing Universitas Muhammadiyah Yogyakarta

² Universitas Muhammadiyah Yogyakarta

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ABSTRACT

Background: Physical disorders in patients undergoing hemodialysis therapy are problems that often occur in intradialysis, which if not handled properly will cause discomfort to the patient. Patients suffering from Chronic Renal Failure (CKD) often experience physical suffering and anxiety. Muscle cramps are often associated with hemodialysis side effects. **Objective:** This systematic review aims to determine interventions that can be used to treat muscle cramps in hemodialysis patients. **Method:** The research method uses PRISMA with a systematic approach and selection process. Library sources were traced from the ProQuest, Pubmed and Scient Direct databases. **Result:** Based on the analysis through systematic review, several interventions can be used to treat muscle cramps in hemodialysis patients, namely isotonic exercise, range of motion, statin therapy. **Conclusion:** In conclusion, these interventions have an influence on the incidence of muscle cramps experienced by patients with chronic kidney failure during the process of hemodialysis therapy.

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*) corresponding author

Dr. Azizah Khoiriyati, Ns., M.Kep

Universitas Muhammadiyah Yogyakarta
Jalan Brawijaya, Geblagan, Tamantirto,
Kecamatan Kasihan, Kabupaten Bantul,
Daerah Istimewa Yogyakarta, Indonesia
(55183)

Email: azizah.khoiriyati@umy.ac.id

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ABSTRAK

Latar Belakang: Gangguan fisik pada pasien yang menjalani terapi hemodialisa merupakan masalah yang sering terjadi pada intradialisis, yang jika tidak segera ditangani dengan baik akan menimbulkan rasa tidak nyaman pada pasien. Pasien yang menderita Gagal Ginjal Kronik (GGK) sering merasakan penderitaan fisik dan kecemasan. Kram otot sering dikaitkan dengan efek samping hemodialisa. **Tujuan:** Systematic review ini bertujuan untuk mengetahui intervensi yang dapat digunakan untuk menangani kram otot pada pasien hemodialisa. **Metode :** Metode penelitian menggunakan PRISMA dengan pendekatan dan proses seleksi yang sistematis. Sumber pustaka ditelusur dari database ProQuest, Pubmed dan Scient Direct. **Hasil:** Berdasarkan analisis melalui systematic review didapatkan beberapa intervensi yang dapat digunakan untuk menangani kram otot pada pasien hemodialisa yaitu isotonic exercise, range of motion, statin therapy. **Kesimpulan:** Kesimpulan intervensi-intervensi tersebut memiliki pengaruh terhadap kejadian kram otot yang dialami pasien gagal ginjal kronik selama proses terapi hemodialisa.

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INTRODUCTION

Kidneys have a vital role in maintaining the body's overall health because the kidneys are one of the essential organs in the body. If the kidneys don't work correctly, health problems related to chronic kidney disease will arise (abdurakhman & yuniar, 2021).

Chronic kidney disease (CKD) is a disease that is a big problem in the world. Chronic kidney failure is a disease that causes the function of the kidneys to decrease until they are unable to perform their functions properly (masi & kundre, 2018). Impaired kidney function occurs when the body fails to maintain metabolism and fluid balance electrolytes, thereby causing the retention of urea and other nitrogenous wastes in the blood (wati et al., 2021). Chronic kidney failure is kidney damage that occurs for three months or more with a glomerular filtration rate of less than 60 ml/min/1.73m² (fadlilah, 2019). Crf sufferers are faced with managing crf with various drug therapies, fluid restrictions, and diet management to hemodialysis (wulandari & widayati, 2020).

Hemodialysis is a significant health problem, which means it requires pretty expensive treatment and therapy costs. Usually, patients undergoing long-term hemodialysis face various issues, such as obstacles to work and the drive of sexual problems that are decreasing (pardede et al., 2021). There are side effects during hemodialysis, such as hypotension, nausea, vomiting, and pruritus. The change in physical condition will impact functional status, which can be seen in their well-being which includes physical, social/family, emotional, practical, and spiritual (amalina et al., 2018).

Hemodialysis is a therapy to replace kidney function, a process carried out approximately 4-5 hours to remove the rest of the body's metabolism that cannot be done because the kidney function has decreased. This process of hemodialysis activities will cause patients to become tired both due to dialysis, and the disease caused. One of the problems that may appear during hemodialysis is hypotension. Hypotension with hemodialysis results in headaches (nurfitriani et al., 2020), cold sweats, fatigue (safruddin & asnaniar, 2019), malaise, and muscle cramps (rahmawati, 2017). Hemodialysis can prevent death but cannot cure the disease or restore the patient's condition to its original state, causing the patient to comply with hemodialysis therapy. (puspasari & nggobe, 2018).

According to the united states renal data system, in 2018, 132,000 Americans out of 390 per million residents experienced end-stage kidney disease end-stage kidney disease, of which 113,000 started with hemodialysis in health centres, and about 15,000 started with peritoneal dialysis. At the end of 2018, 485,052 patients underwent hemodialysis in health centres, an increase of 2.3% from 2017 in the united states, and who underwent hemodialysis of more than 10,000 people with a rise of 8.8% (johansen et al., 2021).

Patients who experience symptoms that appear during hemodialysis therapy include chills, headache, muscle tension, pain, dilated pulse, reduced pulse, hypothermia, and chest pain. In addition, several signs of symptoms appear, namely fatigue (sajidah et al., 2021). This follows the theory that crf patients will feel discomfort, tightness, oedema, chest pain, nausea or even vomiting, and muscle cramps resulting in severe pain (rustandi et al., 2018).

During the hemodialysis process, it is not uncommon for various complications, including muscle cramps (nekada & judha, 2019). Muscle cramps are contractions often continuously experienced by a group of muscles and cause

pain (ekarini et al., 2019). Complaints of muscle cramps during the hemodialysis (intradialytic) process are described by various conditions, namely tension in the legs or hands and sensations of feeling inadequate and stiff around the abdomen and back. This condition certainly feels like something disconcerting for patients. Therefore, this condition requires special attention from the beginning of the patient's arrival or will start the process of hemodialysis (predialysis) (allegretti et al., 2015).

Muscle cramps generally occur halfway through hemodialysis until near the end of hemodialysis. Muscle cramps often occur in rapid ultrafiltration (fluid withdrawal) with a high volume. If left untreated, muscle cramps will interfere with emotional and sleep quality and affect the quality of life of people with kidney failure in daily activities (juwita & kartika, 2019).

One of the acute complications during hemodialysis is muscle cramps. Muscle cramps are painful contractions that occur in one muscle or group of muscles in patients without myopathy or neuropathy. These cramps are usually confined to the calf muscles but can also involve other skeletal muscles (rohmawati et al., 2020). Furthermore, this symptom of muscle cramps is a complication of hemodialysis in the form of restless leg syndrome (desnita et al., 2022).

The purpose of writing this article is to find out effective interventions in the treatment of muscle cramps in patients who are undergoing hemodialysis therapy.

METHODS

The research method uses PRISMA. This literature review uses a systematic approach and selection process. Library sources searched for national and international databases include ProQuest, Pubmed and Scient Direct. The keywords that will be used in the search are prevention, Dialysis, Intervention, Muscle Cramps.

This research uses a systematic approach and selection process through four stages: identification, screening, feasibility, and results received. The inclusion criteria used to determine that an article is worthy of inclusion in the review are as follows: patients who experience muscle cramps, kidney failure patients, journal articles published in 2017 - 2022, and research designs, namely quasi-experimental, randomized controlled trial, true experimental and intervention studies. The exclusion criterion is muscle cramps that do not appear during the hemodialysis therapy process.

RESULTS

Results of literature search with systematic literature review through international databases, namely Proquest, Pubmed and Science Direct, which show high relevance to the topics reviewed 227 articles were found with keywords "*intervention*" OR "*methods*" AND "*cramps muscle*" OR "*muscle cramp*" AND "*dialysis*" OR "*renal dialysis*". Then use the exclusion criteria by looking at the time of publication 2017 - 2022 and research suitability obtained from 148 literature. After duplication of articles was issued and screening of titles and abstracts was carried out, 17 pieces of literature were entered into the next stage, namely full text and eligibility studies based on the inclusion and exclusion

criteria set by the researcher. The author obtained three pieces of research literature with the full text according to the specified criteria, then reviewed them for quality and synthesized them in the final report of this literature review (Chart 1). All relevant articles were screened and analyzed for inclusion or exclusion from review reviews, assessing the quality of the articles using a rating tool Joanna Briggs Institute (JBI). Literature based on quality and relevance to the review topics, questions and objectives of the systematic review. To organize the article findings, researchers use bibliographic software, namely Mendeley to help organize search results articles. Researchers create special folders in Mendeley which are named based on the name of the database used to store the articles obtained. The researcher then screened whether there were duplicate articles obtained from the five databases. After duplicate articles were removed and stored in separate folders, the researcher screened the titles and abstracts of the articles to determine whether the articles were appropriate or relevant for inclusion in the next stage. The next stage is the researcher reads the full text of the article and examines whether the articles meet the inclusion and exclusion criteria from this literature review. Research articles that meet the inclusion criteria are included in a separate folder and will be reviewed further regarding the quality of the research.

After the researcher selected and extracted the data for each article obtained, a detailed description regarding the name of the researcher, title, place of research, research design, research sample, and type of intervention carried out, the research results are summarized in.

DISCUSSIONS

The results of the literature review of the four articles show that in the research results of Kandukuri et al., it was found that this Isotonic study exercise is an effective strategy to relieve leg muscle cramps in hemodialysis patients. More research is needed to fully understand the effectiveness of isotonic exercise on leg muscle cramps in hemodialysis patients in various healthcare settings. Isotonic exercise effectively relieves leg muscle cramps in hemodialysis patients (Poornzaari et al., 2019). Regular sports exercises in dialysis centers can be considered a care intervention assisting dialysis patients to avoid an in-active life and get closer to the status before their illness. It is important to note that many patients may not have the possibility of doing exercise and physical activity at home. In this regard, providing necessary facilities at treatment centers will enable these individuals to take advantage of this adjuvant therapy prior to undergoing hemodialysis. There was a significant difference in the reduction of muscle cramps in individuals who received isotonic exercise intervention versus those who did not. To fully understand the effect of isotonic exercise sessions on leg muscle cramps in hemodialysis patients in various healthcare settings, more research is needed (Srinubabu et al., 2022).

In line with Semmalar research, et al., Intradialytic Range of motion exercise has some effects in reducing Severity of Muscle spasm ,Range of motion exercise might be done in a strutured setting will be having the more effects in reducing the severity of muscle spasm.. The findings were In pretest as well as in post test, there is no significant difference between experiment and control group except severity. the Relationship between severity scores and selected demographic variables among experimental groups.

Significant results were found when compared with the control group's values as moderate as much as 33.% and 66.6%; the results remained the same as in the pre-test. The calculated post-test value for severity was $c^2=4.19$ $p=0.05$ which was found to be significant. The association between demographic variables and the experimental group shows that monthly income and support systems are related to muscle spasms and the selected demographic variables (Semmalar & Hemavathy, 2022).

Meanwhile, according to Cholesterol Treatment Trialists' Collaboration (CTTC), Previous randomized trials and meta-analyses of trials, as well as N-of-1 trials of statin therapy, have not been able to resolve whether statin therapy causes a slight increase in the risk of muscle pain. Based on individual participant data on all muscle events recorded in large-scale, long-term statin trials, this study improves understanding of the nature and risk of muscle symptoms caused by statin therapy. (Reith et al., 2022)

CONCLUSIONS

From all the articles that have been reviewed, it can be concluded that several interventions affect treating muscle cramps in hemodialysis patients. There was a significant difference in the reduction of muscle cramps in individuals who received the isotonic exercise intervention compared to those who did not. These data highlight the usefulness of isotonic exercise in treating muscle cramps. These exercises have the advantage that they are safe and inexpensive nursing procedures.

Intradialytic range of motion exercises can reduce the severity of muscle spasms. Range of motion exercises, perhaps performed in a structured setting, will have a more impact in reducing the severity of muscle spasms. The study concluded that Intradialytic ROM Exercise reduced the severity of muscle cramps.

The review and content should only serve as an introduction. We look forward to conducting well-designed and methodologically rigorous studies to confirm the efficacy and safety of TCM for complications of HD and thereby benefit more HD patients.

These findings have suggested that symptoms may differ from those observed in patients with myopathy (patients may report myalgias, cramps, leg pain, fatigue or weakness, or other musculoskeletal pain) without good evidence that the proportional risk increase varies between different types of patients or statins with equivalent LDL-lowering ability, but some evidence that the risk of proportional increase is higher for more intensive statin regimens than for moderate-intensity statin regimens.

Several intervention to reduce muscle cramps in hemodialysis patients are Isotonic exercise intervention, Intradialytic range of motion exercise. Statin therapy caused a slight excess of mostly mild muscle pain.

LIMITATION

This article uses only search sources from three databases and some of the literary sources obtained in this search in Indonesian and English.

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This research is not sponsored or endorsed by any institution or organization.

Conflict of Interest Statement

There is no conflict of interest.

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