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The Application of Intradialytic Stretching Exercise On Restless Legs Syndrome (RLS) Scale in Hemodialysis Patients: Literature Review

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ABSTRACT
The complaint that often makes hemodialysis patients is Restless Legs Syndrome (RLS). because the implementation of dialysis which takes 3-5 hours a day. To overcome this, intradialytic stretching exercises can be done while hemodialysis is taking place. The literature review aims to review the literature related to truth values in intradialytic gymnastics using the RLS scale. Methods: This study is a quantitative evidence published in an electronic database, Pubmed and Google Scholar. Using a search strategy, identified 12 articles relevant to the research objectives, and 3 articles were included in the final analysis. Results: Significant effect was seen on the scale reduction of restless leg syndrome in the group given the intervention compared to the control group. Conclusion: The results of the study in this literature review show that Intradialysis Stretching Exercise has been shown to be effective in lowering the RLS scale in patients undergoing hemodialysis.

Keywords: Hemodialysis, Restless Legs Syndrome, Intradialytic Stretching Exercise

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BACKGROUND

Chronic kidney disease (CKD) is a global health problem with an increasing prevalence worldwide (Rebholz et al., 2016). Chronic kidney disease (CKD) limits the functional capacity that leads to complication of cardiovascular and endocrine metabolic, musculoskeletal and other disorders that can affect one's quality of life (AL.Rashedi & Ghaleb, 2017).

Kidney failure is experienced by ± 50 million people each year worldwide (Utomo & Rochmawati, 2018). In the United States, kidney failure rates reach up to 14% of the population (Nivetha et al., 2017). In Indonesia, the prevalence of chronic kidney failure based on doctor's diagnosis in the population aged ≥ 15 years in 2018 was 713,783 cases, whereas in the Southern Province, 23,069 cases were found (RI, 2019).

One of the conventional therapies that are used in patients with chronic kidney disease is hemodialysis (Mary & Chiranjeevi, 2019). Hemodialysis is carried out through the use of artificial kidney machines to replace the kidney function and takes 3-5 hours a day or 2 to 3 times every week [7, 8].

Hemodialysis can eliminate the excess fluid and product waste (uremic toxins) from the blood through the dialyzer and restore the blood function to prolong the patients' survival (AL.Rashedi & Ghaleb, 2017). However, during the dialysis process, complications and heavy loads can occur due to the disease symptoms and also from the hemodialysis treatment. One of these is Restless Legs Syndrome (Song et al., 2018).

RLS's cause has not been clearly identified, but it is most common in people who suffer from chronic kidney disease, diabetes, anemia, Parkinson's disease, neuropathy, pregnancy, caffeine use, and calcium channel blockers, lithium, and sedatives. RLS is characterized by symptoms such as anxiety, which leads to an irresistible desire to move several parts of the body. There are 10% of adults worldwide experiences this condition, but in general, 20% to 70% are experienced by dialysis patients with chronic kidney failure. This syndrome has a significant impact on hemodialysis patients' quality of life, mainly due to poor sleep quality and lack of rest (Widianti et al., 2017).

RLS can be overcome with pharmacological therapy, namely the administration of drugs such as dopamine agonists, opioids or benzodiazepines. However, the continuous use of drugs can cause side effects that can be harmful to patients (Aliasgharpour et al., 2016). Therefore, the National Kidney Foundation (NKF) and Kidney Disease: Improving Global Outcomes (KDIGO) recommend the exercise therapy as a non-pharmacological alternative therapy with a minimum time of 30 minutes to overcome the severity of RLS in chronic kidney failure patients who undergo dialysis. One of them is Intradialytic Stretching Exercise (AL.Rashedi & Ghaleb, 2017).

Intradialytic Stretching Exercise therapy is a progressive muscle relaxation technique that can help hemodialysis patients calm the body and reduce heart rate, stress, and tension while undergoing hemodialysis. Physiologically, Intradialytic Stretching Exercise enables the blood circulation to the muscles and increases the volume of the capillary area to create the urea and toxins flow from the vascular area that will be removed in the dialyzer (Nivetha et al., 2017). The literature review aims to review some literature related on how the value of leg strength in the application of intradialytic exercise using the Restless Legs Syndrome (RLS) scale in hemodialysis patients

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METHODS

A literature review was carried out by searching for the results of scientific publications in the range year of 2015-2020 using the PubMed database and Google scholar. In the PubMed database from keyword 1 "intradialytic stretching exercise" the writer found 6 articles. From keyword 2 "restless legs syndrome", the writer found 4,895 articles. From keyword 3 "hemodialysis", the writer found 154,425 articles. Then the combination of the keywords 1, 2, and 3 "((intradialytic stretching exercise) AND restless legs syndrome) AND hemodialysis," the writer found 13 articles. After searching the articles, the writer then limiting the number of articles using LIMIT publication dates (2015-2020) and obtained 8 articles.

Meanwhile, the search through Google Scholar database, from keyword 1 "intradialytic stretching exercise," the writer found 625 articles. From keyword 2, "restless legs syndrome," the writer obtained 90,100 articles. From keyword 3 "hemodialysis," the writer obtained 900,000 articles. Then the combination of keywords 1, 2, and 3 "intradialytic stretching exercise AND restless legs syndrome AND hemodialysis," the writer found 118 articles. Furthermore, from limiting the number of articles using LIMIT to date (2015-2020), the writer obtained 76 articles. From all databases and other sources, there are 84 abstracts and titles suitable to the search method. Then the writer deleted some duplicate articles to be 62 articles remain. The title is then filtered to see the relevance and the citations based on the remaining 32 article titles. Of the number of articles, the writer found 12 articles that were considered to be directly related to the research question and had the full text for review. Then from abstract review and complete study based on the research objectives, there were 3 articles remain.

RESULTS

Hemodialysis

Hemodialysis is a medical procedure to remove fluids and waste products from the blood and correct the electrolyte imbalances that are carried out using machines and dialyzers, also referred to as "artificial kidney." Hemodialysis is used to treat both acute and chronic kidney failure (Parker, 2016).

Hemodialysis aims to take over the function of the kidneys in its function, namely removing excess fluid in the body such as creatinine, urea, and other excess body fluids, taking over the kidney function in the process of secreting fluids from the body that are usually released into urine if the kidney is healthy, and taking over the kidney function while waiting for the next treatment method (Nuari & Widayati, 2017).

In hemodialysis, the blood is removed from the body and filtered through an artificial membrane called a dialyzer or artificial kidney, and then the filtered blood is returned to the body. There are two parts in the dialyzer, namely the part for dialysate and the part for blood. In the blood of hemodialysis patients, there is a high concentration of waste, while dialysate has a low concentration of waste. Due to differences in concentration, the waste will move through a semipermeable membrane to make the same amount on both sides. The principle of hemodialysis is similar to the other dialysis method involving solute diffusion through the semipermeable membrane. Hemodialysis uses reverse flow, where the dialysate flows in the opposite direction from the blood flow on the extracorporeal track. The flow of opposite current maintains a maximum concentration gradient across the membrane and increases dialysis efficiency. The fluid removal (ultrafiltration), which achieved by changing hydrostatic pressure of the dialysate compartment, causes free water and some solutes to move across the membrane along the created pressure gradient (Birdee et al., 2013).

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***Restless Legs Syndrome* (RLS)**

Restless Legs Syndrome (RLS), or Willis-Ekbom's disease, is a common sensorimotor neurological disorder characterized by a desire to move the foot, which is often associated with discomfort or dysesthesia (Bertisch, 2015).

RLS can cause severe sleep disorders and damage the quality of life to the same extent as other chronic diseases. RLS affects about 2.5-15% of the American population. A small proportion (about 2.7% of the population) experience daily or severe symptoms. RLS is twice more common in women than men, and Caucasians are more susceptible to RLS than people of African descent. RLS occurs in 3% of people from the Mediterranean or the Middle East, and in 1-5% of people in East Asia. It shows that different genetic or environmental factors, including food, can play a role in the prevalence of this disease. RLS diagnosed at an older age is more severe. RLS is even more common in individuals with iron deficiency, pregnancy, or end-stage kidney disease (Trotti, 2017).

The prevalence of RLS tends to increase with age, as well as the severity and duration of symptoms. People with uremia who receive kidney dialysis have prevalence from 20% to 57%, while those who have kidney transplants show improvement compared to those treated with dialysis. Studies have revealed an estimated prevalence of 20-30% of RLS in hemodialysis compared to a prevalence of 3.9-15% among the general population. A study including 166 patients in Serbia showed that 22.7% of hemodialysis patients were under RLS conditions. Another study showed 14.8% of 176 hemodialysis patients in Brazil and 37.4% of 163 hemodialysis patients in Iran (Guo et al., 2017).

RLS sensations range from pain or aches in the muscles to "itching that cannot be scratched," "buzzing sensations," "unpleasant tickling that will not stop," feelings of "crawling," or limb jerks when awake. Sensations usually begin or increase while calmly awake, such as when relaxing, reading, studying, or trying to sleep. The sensation and the need to move can return immediately after stopping moving or at a later time. RLS can begin at any age, including childhood, and is a progressive disease for some people, while the symptoms can occur in others. A survey found that up to 45% of patients had their first symptoms before the age of 20 years (Becker & Sharon, 2014).

The treatment depends on whether symptoms occur frequently and interfere with activity, sleep, and quality of life. Doctors recommend iron supplements if laboratory test results show low iron levels. Mild symptoms can be managed with lifestyle changes, including avoiding substances that can trigger symptoms, such as alcohol, tobacco, and some prescription and over-the-counter medications, limiting your intake of caffeine. Furthermore, doing activities that can reduce symptoms including walking, stretching the body, stretching muscles or massaging the affected area, taking a warm or cold shower, applying hot or cold packs, doing relaxation techniques, or doing activities that interfere with mental disorders, such as crossword puzzles, crochet, or talk to someone. Moderate to severe symptoms may require medication other than lifestyle changes. Many different drugs have been used to treat RLS, and there is no single drug or drug dose that works for everyone (Bertisch, 2015).

The two most commonly prescribed drugs are dopamine agonists (such as ropinirole and pramipexole) and alpha-2-delta ligands (such as gabapentin and pregabalin). Possible side effects of dopamine agonists are daytime sleepiness, nausea, dizziness, and impulse control disorders. The use of dopamine agonists can also cause a problem called augmentation (Society, 2019).

Therefore, the National Kidney Foundation (NKF) and Kidney Disease: Improving Global Outcomes (KDIGO) recommend exercise therapy as a non-pharmacological

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alternative therapy with a minimum time of 30 minutes to overcome the severity of RLS in patients with chronic kidney failure who undergo dialysis. One of them is intradialytic stretching exercise therapy (AL.Rashedi & Ghaleb, 2017).

Intradialysis Stretching Exercise

Intradialytic Stretching Exercise is one of the therapeutic exercises used in hemodialysis patients. This therapy is one of the physical activity therapies that are carried out as guidance to restore and improve body health. Also, this therapy can improve the quality of life of hemodialysis patients (Segura-Ortí, 2010).

Stretch therapy is carried out as hemodialysis will increase the blood circulation in the muscles and expand the volume of capillaries, which will later increase the movement of urea and toxins from the tissues to the vascular and then flow into the machine or dialyzer. Stretching therapy will increase body fitness, physiological functions, and muscle work. This exercise can be done for at least 1 hour at the beginning of hemodialysis (Mohamed & Soliman, 2015).

The implementation of this therapy will improve bodily functions through optimization of venous strength and also increase the mobilization of fluids in the body through the main muscle pumps of the legs/calves, so that it will improve and increase the activity of fluid swelling in the lower extremities and reduce swelling during intradialytic ultrafiltration (Mortazavi et al., 2013).

Stretching exercise therapy is believed to improve physical and mental health and improve the quality of life of hemodialysis patients by reducing sympathetic nerve activity and increasing parasympathetic nerves that cause arterial diameter vasodilatation. Stretching exercise therapy can reduce muscle tension and arterial stiffness. Sympathetic fibers cause vasoconstriction in blood vessels, leading to decreases in activity in the vasomotor fibers, which will later cause vascular muscle relaxation and increase the arterial diameter to lower the patients' blood pressure (Nishiwaki et al., 2015).

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DISCUSSION

No	Title	Author	Year	Method	Sample	Result
1.	The Effect of Stretching Exercises on Severity of Restless Legs Syndrome in Patients on Hemodialysis	Aliasgharpour, M., Abbasi, Z., Razi, S. P., & Kazemnezhad, A.	2016	randomized controlled trial using a quasi-experimental design (pretest-posttest with the control group)	33 respondents (17 intervention groups and 16 control groups).	The research results showed that most patients in the intervention group showed a decrease in the RLS scale after being given therapy for eight weeks compared to the control group (P <0.001). It was concluded that the Intradialytic stretching exercise could reduce RLS in hemodialysis patients.
2	effect of intradialytic stretching exercise on the RLS scale in HD patients in the Hemodialysis Unit at MargonoSoekardjo Hospital and Banyumas Regional Hospital in Central Java	Widianti, A. T., Hermayanti, Y., & Kurniawan, T.	2017	quantitative research using a quasi-experimental design (pretest-posttest with the control group).	total sample of 32 HD patients (15 intervention groups and 17 control groups).	The results showed that the RLS scale in the intervention group showed an improvement with a difference of mean -1 indicating a decrease in the RLS scale, whereas, in the control group, it was actually seen an increase in the RLS scale with a mean difference of 1.29. The analysis between groups showed different significance (p = 0.035), which showed an intradialytic stretching exercise effect on the RLS scale.
3	The Effect Of Intradialysis Stretching Exercise On The Scale Of	Nur, A., Erika, K. A., & Sinrang, A. W.	2018	quantitative research using a Quasi-experimental	20 respondents (10 intervention groups, 10	The results showed that patients who were given stretching exercises decreased the

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	Restless Leg Syndrome, in hemodialysis units at Hasanuddin University Hospital Makassar,	design, with a non-equivalent control group design and with Pre-Post test design.	control groups). Restless Legs Syndrome (RLS) scale more significantly than patients who were not given the therapy ρ = 0.001 (ρ <0.05). So it can be concluded that Intradialytic Stretching Exercise can reduce the scale of Restless Legs Syndrome (RLS) effectively.

CONCLUSION

Based on the results of several studies in this literature review, it can be seen that the Intradialytic Stretching Exercise is proven to be effective in reducing the Restless Legs Syndrome (RLS) scale in hemodialysis patients.

It is expected that healthcare institutions need to facilitate nurses to increase their knowledge and experience regarding the implementation of intradialytic stretching exercises. It is expected that the nurses, especially those who work in the hemodialysis room, should conduct more training related to Intradialysis Stretching Exercise to increase their ability to provide complementary therapy

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