Effectiveness of Allen Exercise in reduction of Muscle cramps among Hemodialysis Patients in Dialysis Unit

Tejpal Singh, Ruban David P*, Kala Barathi S
Department of Medical Surgical Nursing, Saveetha College of Nursing, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India

Article History:
Received on: 06 Oct 2020
Revised on: 14 Nov 2020
Accepted on: 17 Nov 2020

Keywords:
Muscle Cramp, Hemodialysis patients, Effectiveness of Allen Exercise

ABSTRACT
A muscle spasm can be clarified as an automatically and persuasively contracted muscle that doesn't relax. Muscle squeezing of the feet, and legs is genuinely basic on hemodialysis. The reason for muscle squeezing is not known. Nonetheless, three conditions that appear to increment squeezing are hypotension, the patient being underneath dry weight and utilization of low sodium dialysate arrangement. Allen exercises for the confined muscle is the best treatment, May help in on the other hand crushing and delivering the confined muscle. This mechanical plying reestablishes blood stream and for the most part assists with loosening up the fit and snugness. Hence the study aimed to assess the effectiveness of Allen exercise in reduction of muscle cramps among hemodialysis patients. Quasi Experimental research design was employed with 80 samples which matched the inclusion criteria were selected by convenience sampling technique. Demographic variables data were collected by using a structured interview questionnaire followed by assessing the muscle cramps by using the Ashworth muscle cramps scale. The findings of the study clearly infers that the Allen Exercise administered to hemodialysis patients was found to be effective in reducing the level of muscle cramps among hemodialysis patients in the post test of experimental group than the hemodialysis patients in the control group.

INTRODUCTION
Hemodialysis is a procedure done to oversee patient with an end stage renal failure by utilizing an artificial kidney machine to supplant the excretory capacity of the failed kidneys. (Chang et al., 2015) Different kidney pathogenesis challenges the functions of human body and puts human life danger. (Smart and Steele, 2011) Two such important pathogenesis is acute and chronic renal failure. Acute kidney injury is normal among hospitalized patients. (Dashtidehkordi et al., 2019) It influences some 3-7% of patients admitted to the hospital and roughly 25-30% of patients in the Intensive care unit. (Kaur et al., 2016) Depending on the reason, an extent of patients will never recapture full renal capacity, along these lines having end-stage renal failure requiring lifelong hemodialysis or a kidney transplant. (Thenmozhi, 2018) An automatically and coercively contracted muscle that doesn't loosen up it is known as muscle cramps. A muscle squeezing of the feet, and legs is genuinely basic on hemodialysis.
Table 1: Frequency and percentage distribution of demographic variables of hemodialysis patients. N = 80 (40 + 40)

| Demographic Variables | Experimental Group | Control Group |
|-----------------------|--------------------|---------------|
|                       | No     | %    | No     | %    |
| **Age in years**      |        |      |        |      |
| 21 – 30 years         | 3      | 7.5  | 2      | 5.0  |
| 31 – 40 years         | 21     | 52.5 | 17     | 42.5 |
| 41 – 50 years         | 16     | 40.0 | 20     | 50.0 |
| 51 – 60 years         | 0      | 0    | 1      | 2.5  |
| **Gender**            |        |      |        |      |
| Male                  | 21     | 52.5 | 22     | 55.0 |
| Female                | 19     | 47.5 | 18     | 45.0 |
| **Previous experience of muscle cramps** |        |      |        |      |
| Yes                   | 25     | 62.5 | 31     | 77.5 |
| No                    | 15     | 37.5 | 9      | 22.5 |
| **Co-morbid condition** |      |      |        |      |
| Diabetes              | 28     | 70.0 | 21     | 52.5 |
| Hypertension          | 12     | 30.0 | 19     | 47.5 |
| Diabetes & hypertension | -     | -    | -      | -    |
| Any other             | -      | -    | -      | -    |
| **Duration of disease** |      |      |        |      |
| Less than or equal to 6 months | 3     | 7.5  | 2      | 5.0  |
| 7 – 12 months         | 21     | 52.5 | 17     | 42.5 |
| 13 – 36 months        | 16     | 40.0 | 20     | 50.0 |
| 37 – 60 months        | 0      | 0    | 1      | 2.5  |
| **Duration of hemodialysis** |      |      |        |      |
| 2 hours               | 1      | 2.5  | 1      | 2.5  |
| 3 hours               | 21     | 52.5 | 19     | 47.5 |
| 4 hours               | 17     | 42.5 | 20     | 50.0 |
| 5 hours               | 1      | 2.5  | 0      | 0    |
| **Amount of fluid during Hemodialysis** |      |      |        |      |
| 1 litre               | -      | -    | -      | -    |
| 2 litres              | -      | -    | -      | -    |
| 3 litres              | 21     | 52.5 | 18     | 45.0 |
| 4 litres              | 19     | 47.5 | 22     | 55.0 |

Table 2: Frequency and percentage distribution of pretest and posttest level of muscle cramps among hemodialysis patients in the experimental group. n = 40

| Muscle Cramps | No Cramps | % | Mild Cramps | No | % | Moderate Cramps | No | % | Severe Cramps | No | % |
|---------------|-----------|---|-------------|----|---|-----------------|----|---|---------------|----|---|
| Pretest       | 0         | 0 | 15          | 37.5 |     | 25              | 62.5 |    | 0             | 0   |   |
| Post Test     | 5         | 12.5 | 34         | 85.0 |     | 1               | 2.5  |    | 0             | 0   |   |
Table 3: Comparison of pretest and post test level of muscle cramps among hemodialysis patients between the experimental and control group. N = 80(40+40)

| Test  | Group           | Mean | S.D  | Mean Difference Score | Student Independent ‘t’ Test |
|-------|-----------------|------|------|------------------------|-----------------------------|
| Pretest | Experimental Group | 5.20 | 1.86 | 0.02 (0.12%)           | t = 0.057                   |
|        | Control Group   | 5.18 | 2.05 |                        | P = 0.955 N.S               |
| Post Test | Experimental Group | 1.83 | 1.13 | 4.72 (29.5%)           | t = 11.811                  |
|        | Control Group   | 6.55 | 2.26 |                        | P = 0.0001 S***             |

***p<0.001, S — Significant, N.S — Not Significant.

(Jancy and Parimala, 2020) The reason for muscle squeezing is obscure. Notwithstanding, three conditions that appear to increment squeezing are hypotension, the patient being underneath dry weight and utilization of low sodium dialysate solution. (Thenmozhi, 2020) Buerger exercises are enlarged by dynamic activities of the feet. These activities comprise in flexion, augmentation, and circumduction of the lower legs and are finished during the period of reliance of the legs, as proposed in 1931 by Arthur W. Allen (1887-1958). Allen practices for the confined muscle is the best treatment, May help in then again pressing and delivering the confined muscle. (Takhreem, 2008)

This mechanical manipulating reestablishes blood stream and by and large assists with loosening up the fit and snugness, Allen practices for the confined muscle is the best treatment, May help in on the other hand crushing and delivering the confined muscle. This mechanical working reestablishes blood stream and for the most part assists with loosening up the fit and tightness (Poornzaari et al., 2019). Persistent renal disappointment (CRF) as a dangerous occasion is presently on the ascent. The worldwide frequency of end-stage renal ailment (ESRD) is every year 260 for each million, and it is developing by roughly 6% every year According to the Kidney Foundation of Iran (Parsons et al., 2006).

Study from India by Modi and Jha regarding the incidence of end-stage renal disease (ESRD) in India concluded the adjusted incidence of ESRD is 229 per million and >100,000 new patients enter renal replacement therapy annually (Jung and Park, 2011). People with chronic renal failure on hemodialysis often suffer from muscle cramps, up to 50%, especially involving the lower limbs. Many studies proved that Allen exercise increases peripheral circulation, and maintain, and prevent of muscles cramps. Hence, the study aimed to assess the effectiveness of Allen exercise in reduction of muscle cramps among hemodialysis patients (Danasu, 2016).

MATERIALS AND METHODS

This study was a quantitative approach with Quasi experimental design was selected. A total of 80 samples who met the inclusion criteria were selected by using Non Probability Convenience sampling method. After selecting the sample, the investigator introduced himself and explained the purpose of the study to the patients. Informed consent was obtained after assuring confidence. Each patient was assessed on the bed side. The patient was placed in a comfortable position. The demographic variables and clinical variables were collected by using structured interview questionnaire. Pretest was conducted by using muscle cramp assessment tool for both experimental group and control group. Allen exercise was given 10 to 15 minutes at one session for experimental group Post test was conducted by using muscle cramps assessment tool and observation of Allen exercise tool for both experimental group and control group. The data were tabulated and analyzed by descriptive and inferential statistics.

RESULTS AND DISCUSSION

The Sample characteristics are in the experimental group, most of them 21 (52.5%) were in the age group of 31-40 years, 21 (52.5%) were male, 25 (62.5%) had previous experience of muscle cramps, 28 (70%) had diabetes as co-morbid condition, 21 (52.5%) had the disease for 7-12 months, 21 (52.5%) had dialysis for 3 hours and 21 (52.5%) had 3 liters of fluid during hemodialysis. In the control group, most of them 17 (42.5%) were in the age group of 31-40 years, 22 (55%) were male, 31 (77.5%) had previous experience of muscle cramps, 21 (52.5%) had diabetes as co-morbid condition, 20 (50%) had the disease for 13 – 36 months, 20 (50%) had dialysis for 4 hours and 22 (55%) had 4 liters of fluid during hemodialysis.

The Table 2 depicts that in the experimental group, 25 (62.5%) had moderate cramps and 15 (37.5%)
had mild cramps in the pretest. Whereas in the post test after the administration of Allen Exercise, 34 (85%) had mild cramps, 5 (12.5%) had no cramps and only one had moderate cramps. The study finding supported by the study of Mahdi Poornzaari (2019) conducted a study to decide the effect of isotonic exercise on the recurrence of muscle cramps. The outcomes uncovered that isotonic exercise of consistent cycling considerably affects diminishing the quantity of muscle cramps in hemodialysis patients (Poornzaari et al., 2019).

The Table 3 shows that the pretest mean score of muscle cramps in the experimental group was 5.20±1.86 and the pretest mean score in the control group was 5.18±2.05. The mean difference score was 0.02 (0.12%). The calculated student independent ‘t’ test value of t=0.057 was not found to be statistically significant. This clearly infers that there was no significant difference in the level of muscle cramps in the pretest between the two groups. The Table 3 also shows that the post test mean score of muscle cramps in the experimental group was 1.83±1.13 and the post test mean score in the control group was 6.55±2.26. The mean difference score was 4.72 (29.5%). The calculated student independent ‘t’ test value of t=-11.811 was found to be statistically highly significant at p<0.001 level. The above finding clearly infers that the Allen Exercise administered to hemodialysis patients was found to be effective in reducing the level of muscle cramps among hemodialysis patients in the post test of experimental group than the hemodialysis patients in the control group. The study finding supported by the study of Diane Mastnardo (2016) conducted a study to Allen exercise for leg cramps among hemodialysis patients. The intervention group got a 20-minute exercise of the lower limits during every treatment (three times each week) for about fourteen days. The benchmark group got normal consideration by dialysis focus staff. The outcomes uncovered that Allen practice has all the earmarks of being a powerful method to address muscle cramping (Mastnardo et al., 2016).

CONCLUSIONS

The results show that the Allen exercise among hemodialysis patients can significantly reduce the muscle cramps. In order to comply with treatment modality, muscle cramps reduction and thereby physical and psychological comfort to the patients is considered the most important factor. It is incumbent upon health care professionals to be knowledgeable and sensitive towards adverse outcomes result from hemodialysis and promote safety and comfort to patients and to relieve physical discomfort.

Funding Support

The authors declare that they have no funding support for this study.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

REFERENCES

Chang, C. F., Chang, C. C., Huang, S. L., et al. 2015. Effects of Buergers Exercise Combined Health Promoting Program on Peripheral Neurovasculopathy Among Community Residents at High Risk for Diabetic Foot Ulceration. Worldviews on Evidence Based Nursing, 12(3):145–153.

Danasu, R. 2016. Effectiveness of intra-dialytic stretching exercise on reducing muscle cramps among hemodialysis patients at Sri ManakulaVinayagar Medical College and Hospital Puducherry. International Journal of Information Research and Review, 3(6):2443–2445.

Dashtidehkordi, A., Shahgholian, N., Attari, F. 2019. Exercise during hemodialysis and health promoting behaviors: a clinical trial. BMC Nephrology, 20(1):96.

Jancy, P. O., Parimala, S. 2020. Assess the Effect of Intradialytic Stretching Exercises to Reduce Leg Muscle Cramps among Patients Undergoing Hemodialysis in Selected Dialysis Unit of Erinakulum District. International Journal of Nephrology and Kidney Failure, 6(3):1–6.

Jung, T. D., Park, S. H. 2011. Intradialytic Exercise Programs for Hemodialysis Patients. Chonnam Medical Journal, 47(2):61–66.

Kaur, L., Kaur, R., Monisha, N. K. 2016. A Quasi Experimental Study to assess the Effect of Intra-dialytic Stretching Exercises on Muscle Cramps among Patients undergoing hemodialysis in selected Hospitals of Jalandhar. International Journal of Advances in Nursing Management, 7(2):97–102.

Mastnardo, D., Lewis, J. M., Hall, K., et al. 2016. Intradialytic Massage for Leg Cramps Among Hemodialysis Patients: a Pilot Randomized Controlled Trial. International Journal of Therapeutic Massage & Bodywork, 9(2):3–8.

Parsons, T. L., Toffelmire, E. B., King-VanVlack, C. E. 2006. Exercise Training During Hemodialysis Improves Dialysis Efficacy and Physical Performance. Archives of Physical Medicine and Rehabilitation, 87(5):680–687.
Poornzaari, M., Roshanzadeh, M., et al. 2019. Effect of Isotonic Exercise on the Frequency of Muscle Cramps in Hemodialysis Patients: A Clinical Trial. Medical - Surgical Nursing Journal, 8(1):85770–85775.

Smart, N., Steele, M. 2011. Exercise Training in Hemodialysis Patients: A Systematic Review and Meta-Analysis. Nephrology, 16(7):626–632.

Takhreem, M. 2008. The effectiveness of intradialytic exercise prescription on quality of life in patients with chronic kidney disease. Medscape Journal of Medicine, 10(10):226–226.

Thenmozhi, P. 2018. Quality of life of patients undergoing Hemodialysis. Asian Journal of Pharmaceutical and Clinical Research, 11(4):219–219.

Thenmozhi, P. 2020. Intradialytic Exercise and Biochemical Markers: An Experimental Study. International Journal of Research in Pharmaceutical Sciences, 11(2):2278–2282.