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Prevalence of musculoskeletal disorders in patients undergoing haemodialysis in a tertiary care hospital: A cross-sectional study

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Abstract

Background: Chronic kidney disease (CKD) is a significant public health problem. Dialysis is the mainstream method of treatment in these patients. This causes the patients to have a monotonous and restricted daily life, joint pain, limiting their activities after treatment onset, hence the study was undertaken to find out the prevalence of common musculoskeletal disorders in patients undergoing haemodialysis. **Method:** 50 participants undergoing dialysis in a tertiary care hospital under the age group of 18-70 years diagnosed with stage V CKD were included using convenient sampling. They were assessed using the Nordic Questionnaire to locate the different areas of pain. Result: The first group consisted of 41 participants who underwent dialysis from 2- 41 months. Body regions commonly affected in the last 7 days were low back 25 (60.97%); neck 21 (51.21%); shoulder 15 (36.58%); elbow 14 (34.14%) in the extremity with arteriovenous fistula; upper back 14 (34.14%); hips/thighs, knees 9 (21.95); wrist/hands 7 (17.07%) in the extremity with arteriovenous fistula; ankle/feet 6 (14.63%). The second group consisted of 9 participants who underwent dialysis from 42-84 months. Body regions commonly affected in the last 7 days were low back 8(88.88%); upper back 7 (77.8%); hip/thigh 6 (66.7%); neck, knee 5 (55.6%); elbow 4 (44.4%) in the extremity with arteriovenous fistula; shoulder, ankle/feet, wrist/hands 3(33.3%). **Conclusion:** The study concluded that the highest prevalence of musculoskeletal disorders in the participants undergoing haemodialysis was low back pain followed by neck, upper back, shoulder, elbow, hips/thighs, knees, wrist/hands and ankle/feet pain.

KEYWORDS: Chronic kidney disease; Musculoskeletal disorders; haemodialysis.

Introduction

Chronic kidney disease (CKD) is a significant public health problem [1]. CKD is defined as a slowly progressive and irreversible loss of renal functions, a condition in which the kidneys fail to function due to nephron destruction, resulting in the body's inability to maintain renal metabolic and electrolyte balance. As of 2017, in India, there are over 1,30,000 patients receiving dialysis and it is increasing by about 232 per million population [2].

Kidney failure is considered when the glomerular filtration rate (GFR) is less than 60mL/min/1.73 m^2, for a period exceeding three months, and when it reaches GFR levels below 15 mL/min./1.73m^2 - it is known as terminal CKD. In such a stage, the most frequently used kidney replacement strategy is haemodialysis (HD) [3].

Haemodialysis treatment utilizes the patient's blood to remove waste, toxins and excess water from the patient. Catheters are inserted into the patient's arterio-venous fistula, and the blood passes through a dialyzer of the machine, which removes waste, toxins and excess water from the blood and cleaned blood is returned to the patient [4].

Literature suggests that 37 to 50 % of haemodialysis patients experience musculo-

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skeletal pain with moderate to severe in intensity [5]. Even in the last day of life, pain is present in 42% of patients withdrawing from dialysis. Pain may be a result of the primary kidney disease itself (e.g., polycystic kidney disease) or the result of the treatment of CKD [6]. Painful chronic infections such as osteomyelitis and discitis are complications from central lines, and arteriovenous fistulas can lead to painful ischemic neuropathies. Recurrent pain caused by needle insertion and muscle cramps during dialysis treatments is perceived as chronic pain by patients. Unlike the general population, musculoskeletal pain in CKD is, on average, equal in severity to neuropathic and ischemic pain [6].

In tertiary care hospitals, some patients undergo dialysis for months or years, and each session of dialysis takes around 4 hours to complete. This causes the patient to live a more sedentary lifestyle and associated physical inactivity. Even due to pain, patients avoid physical activities, which, in turn, leads to further musculoskeletal disorders. This indirectly affects the quality of life of the patients.

There is insufficient literature on the prevalence of musculoskeletal pain in patients undergoing haemodialysis in the Indian population. If the actual number of patients with musculoskeletal pain undergoing haemodialysis is identified, then that data can be used to plan physiotherapy treatment and manage the symptoms related to it. Hence this study was undertaken to find out the prevalence of musculoskeletal pain in patients undergoing haemodialysis in a tertiary care hospital.

Material And Methodology

This cross-sectional study was conducted in the dialysis unit of Dr Vithalrao Vikhe Patil Memorial Hospital, Ahmednagar, Maharashtra. The study population was the patients diagnosed with stage V chronic kidney disease undergoing haemodialysis. The sample size was 50, which was calculated based on patients visiting the dialysis unit and a convenient sampling method was used for including the subjects.

The participants who were included in the study were assessed using the Nordic questionnaire for locating the musculoskeletal symptoms [7]. The demographic data were evaluated, which included, since how many months the participant is undergoing dialysis and body mass index of the participants. The study was approved by the Institutional ethical committee, and informed consent was obtained from the participants.

Results

A total of 50 participants were assessed using the Nordic questionnaire. Out of the 50 participants, 21 were females, and 29 were males. The mean age was 45.34 ± 13.61 years, and the mean Body Mass Index was 21.81 ± 1.67 kg/m^2.

The participants were divided into two groups based on the duration of dialysis. The first group consisted of 41 participants who underwent dialysis from 2- 41 months (Table 1). Body regions commonly affected in the last 7 days were low back 25 (60.97%); neck 21 (51.21%); shoulder 15 (36.58%); elbow 14(34.14%) in the extremity with arteriovenous fistula; upper back 14(34.14%); hips/thighs, knees 9(21.95); wrist/hands 7 (17.07%) in the extremity with arteriovenous fistula; ankle/feet 6 (14.63%).

The second group consisted of 9 participants who underwent dialysis from 42-84 months (Table 2). Body regions commonly affected in the last 7 days were low back 8 (88.88%); upper back 7 (77.8%); hip/thigh 6 (66.7%); neck, knee 5 (55.6%); elbow 4 (44.4%) in the extremity with arteriovenous fistula; shoulder, ankle/feet, wrist/hands 3 (33.3%).

Table 1. Prevalence of pain according to the Nordic Questionnaire and Months under haemodialysis

Body region	Months under dialysis			
	2-41 (n=41)	42-84 (n=9)	2-41 (n=41)	42-84 (n=9)
	Trouble during last12 months		Trouble during the last 7 days	
Neck	51.21	55.55	51.21	55.55
Shoulder	29.26	33.33	36.58	33.33
Elbow	31.7	44.44	34.14	44.44
Wrist/hand	17.07	22.22	17.07	33.33
Upper back	26.82	77.77	34.14	77.77
Lower back	53.65	88.88	60.97	88.88
Hips/thighs	17.07	66.66	21.95	66.66
Knees	19.51	55.55	21.95	55.55
Ankle/feet	12.19	33.33	14.63	33.33

Fig 1. Prevalence of musculoskeletal disorders in the last 12 months according to areas of the body in participants who are under haemodialysis for 2-41 months.

Figure (1-4) shows the percentage distribution of the participants affected with musculoskeletal disorders according to the areas of the body, which was assessed using the Nordic questionnaire and the participants were divided into two groups according to the months they underwent haemodialysis.

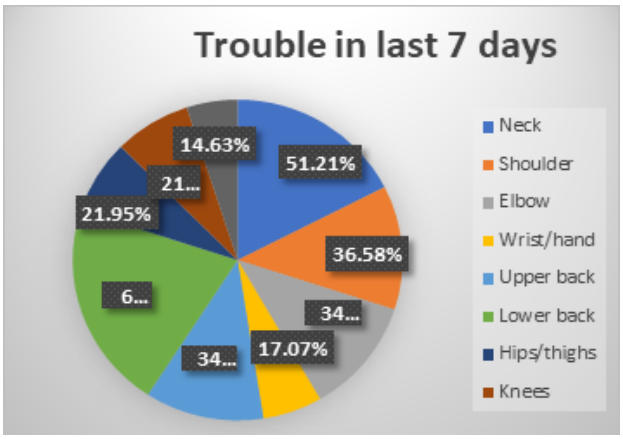

Fig 2. Prevalence of musculoskeletal disorders in the last 7 days according to areas of the body in participants who are under haemodialysis for 2-41 months

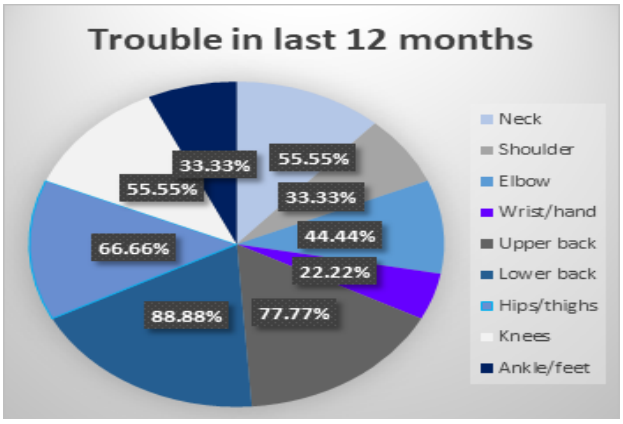

Fig 3. Prevalence of musculoskeletal disorders in the last 12 months according to areas of the body in participants who are under haemodialysis for 42-84 months.

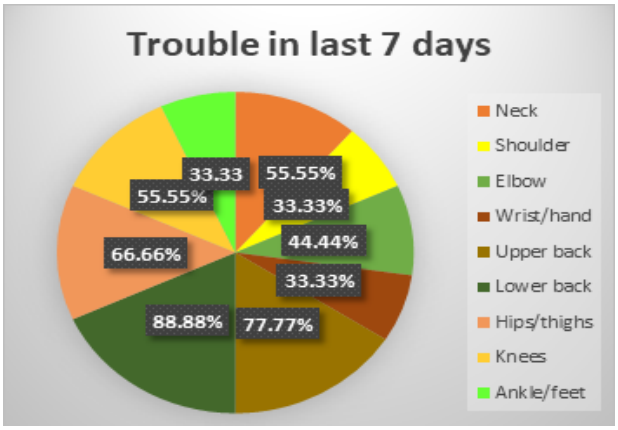

Fig 4. Prevalence of musculoskeletal disorders in the last 7 days according to areas of the body in participants who are under haemodialysis for 42-84 months.

Discussion

To the author's knowledge, this is the first study conducted in a tertiary care hospital of rural Maharashtra with the purpose to find out the prevalence of musculoskeletal pain in patients undergoing haemodialysis. It was our observation that all patients undergoing haemodialysis suffer from different types of musculoskeletal pain. Our study showed that the most common site of these symptoms was low back, upper back and neck. The other sites of pain include shoulder, elbow, wrist/ hands of the extremity with an arteriovenous fistula, hips/ thighs, knees, ankle/feet. These findings are supported by the study conducted by Caravaca et al., which showed that 38% of patients suffered from chronic musculoskeletal pain [10].

The reason for this can be that these participants need to be in a supine position or semi-fowlers position during dialysis for a continuous 4 hours and this needs to be repeated for at least twice per week. This may cause prolonged static contraction of specific muscles, decreased tissue flexibility, weakened paravertebral muscles. Another cause for the musculoskeletal pain can be hyperuricemia [8]. Studies suggest that hyperuricemia could be a consequence of impaired kidney function, diuretic therapy, or oxidative stress [9]. Therefore, it is not surprising that the co-morbidity of hyperuricemia is associated with musculoskeletal pain.

The other possible reason for musculoskeletal pain can be the high levels of inflammatory markers in patients with chronic kidney disease. The study done by Caravaca et al. showed that chronic inflammatory states are capable of sensitizing peripheral nociceptors (pain receptors) due to several inflammatory mediator substances. The sensitizations of nociceptors can sometimes be so intense that they end up being activated without the presence of any injury [9].

These same inflammatory mediators and perhaps certain uremic toxins may also play an essential role in the sensitization of pain perception in the central nervous system and the balance of endogenous pain inhibitors.

Conclusion

The prevalence of musculoskeletal disorders is more common in the areas of the low back, neck, upper back followed by shoulder, elbow, wrist/hands, hips/thighs, knees, ankle/foot in undergoing haemodialysis. It was also noted that areas of affection changes with the duration of dialysis.

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REFERENCES

1. F1. El-Najjar AR, Amar HA, El Wahab Selim HA, Ibrahim M, Fouad M. Musculoskeletal disorders in hemodialysis patients and its impact on physical function (Zagazig University Nephrology Unit, Egypt). Egyptian Rheumatology and Rehabilitation. 2014;41(4):152.
2. Abraham G, Varughese S, Thandavan T, Iyengar A, Fernando E, Naqvi SA, Sheriff R, Ur-Rashid H, Gopalakrishnan N, Kafle RK. Chronic kidney disease hotspots in developing countries in South Asia. Clinical kidney journal. 2016;9(1):135-41.
3. Silva SF, Pereira AA, Silva WA, Simões R, Neto B, de Resende J. Physical therapy during haemodialysis in patients with chronic kidney disease. Jornal Brasileiro de Nefrologia. 2013;35(3):170-6.
4. Ding YS, Lo YC, inventors; Baxter Healthcare SA, Baxter International Inc, assignee. Dialysis treatment devices for removing urea. United States patent US 8,404,091. 2013 Mar 26.
5. Davison SN. Pain in hemodialysis patients: prevalence, cause, severity, and management. American Journal of Kidney Diseases. 2003;42(6):1239-47.
6. Fainsinger RL, Davison SN, Brenneis C. A supportive care model for dialysis patients. Palliative medicine. 2003;17(1):81.
7. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, Andersson G, Jørgensen K. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. Applied ergonomics. 1987;18(3):233-7.
8. Badve SV, Brown F, Hawley CM, Johnson DW, Kanellis J, Rangan GK, Perkovic V. Challenges of conducting a trial of uric-acid-lowering therapy in CKD. Nature Reviews Nephrology. 2011;7(5):295.
9. Hsu HJ, Yen CH, Hsu KH, Wu IW, Lee CC, Hung MJ, Sun CY, Chou CC, Chen YC, Hsieh MF, Chen CY. Factors associated with chronic musculoskeletal pain in patients with chronic kidney disease. BMC nephrology. 2014;15(1):6.
10. Caravaca F, Gonzales B, Bayo MÁ, Luna E. Musculoskeletal pain in patients with chronic kidney disease. Nefrología (English Edition). 2016;36(4):433-40.