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ORIGINAL ARTICLE

Frequency of Pain, Its Severity and Interference in Patients Receiving Hemodialysis

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Author`s Contribution

[1-7] Substantial contributions to the conception or design of the work for the acquisition, analysis or interpretation of data for the work, [1-7] Drafting the work or reviewing it critically for important intellectual content, [1-7] Final approval of the version to be published.

Article Info.

Received: February 27, 2024
Acceptance: July 29, 2024

Conflict of Interest: None
Funding Sources: None

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Cite this article as: Javed N, Afsar A, Junaid D, Mazhar S, Fatima M, Jaffry SHBM, Ahmad K. Frequency of Pain, Its Severity and Interference in Patients Receiving Hemodialysis. JRCRS. 2024;12(3):144-148 https://dx.doi.org/10.53389/JRCRS.2024120307

ABSTRACT

Background: Hemodialysis is the treatment of choice for end-stage renal disease but there is increasing evidence that dialysis patients have a high burden of problems including pain which may affect their quality of life.

Objectives: The objective of this study was to find out the frequency of pain, its severity, and interference in patients receiving hemodialysis.

Methodology: A cross-sectional survey on 218 patients was conducted on Institute of Kidney Diseases, Rehman Medical Institute, and Northwest General Hospital, Hayatabad, Peshawar. A brief pain inventory questionnaire (BPI) was used to find out the frequency, severity, and interference of pain.

Results: The frequency of pain was 70.2%. The mean time period of treatment was 22.42 months (standard deviation (SD) 28.56). The pain was most commonly present in the lower limb. The calculated mean severity was 4.3 (SD 1.70) which showed most of the patients had mild pain. The mean interference of pain in general performance was calculated to be 5.6 (SD 2.10) which presented moderate interference. There was a significant correlation between mean pain severity and mean pain interference (P=0.000). Out of those 153 patients who reported pain, 119(77.78%) were taking medications for pain relief.

Conclusion: Pain is a frequent problem reported by these patients. Out of those who had pain, greater than two third were taking medications for pain. Pain in these patients is the main cause of interference in the performance of general activities. So, it is important to manage the pain, and strategies other than medications should also be considered.

Keywords: Dialysis, End Stage Renal Disease, Hemodialysis, Interference, Pain

Introduction

Chronic kidney disease (CKD) is a major global health issue projected to rise. CKD progresses through five stages, with end-stage renal disease (ESRD) being the final stage where kidney function severely declines (GFR <15ml/min/1.73m²) that leads to toxins and water accumulation in the body.[1-3] In developing Asian countries like Pakistan, ESRD prevalence is notably high (about 1.5 million peoples), largely about 40% to 50% due to diabetic neuropathy and hypertensive nephrosclerosis.[4,5] Treatment options include peritoneal dialysis (PD), hemodialysis (HD), and kidney

transplant, with HD being the most common worldwide (90%), in which the natural diffusion and filtration function of kidney is replaced by dialysis machine.[6] Despite extending life expectancy, HD increases risks of cardiovascular, mineral metabolic, blood, endocrine and musculoskeletal disorders, these are often asymptomatic but with the passage of time symptoms appear.[1, 3, 6-8.]

Pain and fatigue are significant issues for patients undergoing hemodialysis (HD), about 82% experience acute pain, and 92% deal with chronic pain, with 80% reporting severe pain on the visual analogue scale.[9] A systematic review of 52 studies shows 50% to 60% of HD patients suffer from severe pain, while another study in Poland shows 63.4% of patients have chronic pain, often related to reduced renal function, inactivity, fatigue, and depression.[2, 10-12] Musculoskeletal symptoms like bone pain, fractures, and joint pains are common, particularly in the lower limbs.[8] Other symptoms include muscle cramps, headaches, and hypotension, affecting more than 70% of patients with increase in dialysis years.[13] Risk factors for pain include older age, higher BMI, and smoking.[14] The prevalence of severe headaches is 88%. [15]

Pain significantly impacts the daily life and social interactions of hemodialysis (HD) patients, leading to sleep disturbances and reduced quality of life.[7, 11] High-intensity pain limits physical activity like walking and also influences activities of leisure and socializing.[16, 17] Effective pain management is crucial for improving sleep, quality of life, and overall health outcomes in HD patients.[18] However, many patients report inadequate pain control .[3, 12, 19, 20] due to barriers such as adverse effects, fear of addiction, language and lack of time or training(5). Both pharmacological and non-pharmacological approaches are used for pain management, with non-pharmacological like low intensity exercise methods preferred for good impact on physical performance.[11, 14, 21]

Despite the common occurrence of pain among HD patients and its significant impact on their overall performance and quality of life, there is a notable absence of studies focusing on this issue in Hayatabad, Peshawar. This lack of research has led to a gap in understanding among healthcare providers, resulting in inadequate treatment and limited access to care services for these patients. Therefore, there is an urgent need to gather reliable and current data to inform better planning and improve the management of pain in HD patients. This study aims to assess the prevalence, severity, and impact of pain among HD patients in order to address these critical gaps in knowledge and healthcare delivery.

Methodology

We conducted a cross-sectional survey on hemodialysis (HD) patients. Our study setting includes dialysis units of the Institute of Kidney Diseases, Rehman Medical Institute, and Northwest General Hospital, Hayatabad, Peshawar. Ethical Approval was taken from ethical committee of Khyber Medical University prior to commencement. The approval number/reference is KMU(IPM&R)/DPT/48.

The Sample size was calculated by using the EPI info calculator which turned out to be 218. Stratified sampling was done according to the population in government and private hospitals. In stratified sampling population is classified into exclusive groups or strata. Therefore, the target population was split into two strata (government and private hospitals) based on hospital population size in government and private setting, where there were two third (2/3rd) of population from government hospital and one third (1/3rd) from private hospitals. Data were collected from 148 patients in government hospitals and from 70 patients in private hospitals by employing convenience sampling-a non-probability sampling method in which data was collected by convenient accessibility and proximity to the researcher. Data was collected by using a brief pain inventory questionnaire (BPI). It scores pain and interference on a 0 to 10 scale, in which 0 indicates no pain/interference while 10 indicates severe pain/ interference.

The inclusion criterion was patients aged from 18 to 65 years, both male and female patients, patients willing to participate in the study, and patients receiving HD > 1 month. We excluded the patients with diagnosed hepatitis B & C, patients with any other chronic condition that causes pain and interference in general performance, and patients with poor cognition or non-oriented. Data were analyzed by using SPSS version 20.

Results

We conducted a study on 218 hemodialysis patients. The mean age of patients was 41.3(standard deviation (SD) 14.06). The age of the patients ranged from a minimum of 18 to a maximum of 65 years. The mean time period of patients receiving hemodialysis was 22.42 (SD28.56). The time period ranged from a minimum of 2 months to a maximum of 240 months. The mean body mass index (BMI) of patients was 23.27 (SD 4.96). Out of the total of 218 patients, nearly half of the patients 52.3 %(n=114) had normal BMI.

Out of the total, 56 % (n=122) were males and 44% (n=96) were females. These patients received one, two, and three sessions of treatment in a week. A maximum number of

patients 86.2% (n=188) received two sessions in a week. Out of the total (n=153) reported pain showed the frequency of pain is 70.2%. There is a statistically significant relationship between pain and hospitals (P=0.004). The strength of relationship is low, as presented by (r=0.196).

Table I: Association between pain and hospitals

Hospitals	Pain		Total	
	Yes	No		P
Government	113 (76.4%)	35(23.6%)	148(100%)	0.004

Table II: Aassociation between areas and pain severity.

Areas	Pain severity category			Total	
	Mild	Moderate	Severe		
Head	18	7	5	30	P=0.502
UL	5	1	0	6	$\chi 2$=5.329
LL	71	32	7	110	
Back	5	2	0	7	
Total	99	42	12	153	

Table III: Association between areas and interference.

Areas	Interference category			Total	
	Mild	Moderate	Severe		
Head	14	8	8	30	P=0.108
UL	3	2	1	6	$\chi 2$ =10.409
LL	33	47	30	110	
Back	1	6	0	7	
Total	51	63	39	153	

Table IV: Correlation between pain severity and interference.

	Mean	SD		
Severity	4.3	1.70	P=0.000	r=0.456
Interference	5.6	2.10		
Private	40(57.1%)	30(42.9%)	70(100%)	
Total	153	62	218(100%)	

The majority of patients (n=110) reported pain in the lower limb (LL) and the least number of patients (n=6) had pain in the upper limb. The maximum number of patients who reported pain in the LL and back had moderate interference of pain.

There is a significant positive correlation between pain severity and interference (p=0.000). The strength of the correlation is low. Greater numbers of patients (77.7%) were taking medication for their pain relief as shown in the figure below.

Discussion

End Stage Renal Disease (ESRD) is one of the most frequent health-related problems in developed as well as developing countries.[1, 2] Hemodialysis (HD) is the treatment of choice for ESRD(6). Various complications are associated with HD among them pain is one of the most prevalent.[9] We conducted a study on patients receiving HD. The main focus of our study was the frequency of pain; its severity and interference of pain in the general performance of HD patients. Areas of pain and treatment received were also documented in our study. A total of 218 patients are recruited in the study.

In our study majority of patients, 86.2 %(n=188) were taking two sessions of HD per week. According to a study conducted in 2015, three sessions per week is the standard protocol for HD treatment.[5] In underdeveloped countries due to a limited number of dialysis units, inaccessibility of patients to dialysis units, and financial problems, only two sessions per week are given.[5] As Pakistan is an underdeveloped country, that may be the reason for a greater number of patients receiving two sessions per week.

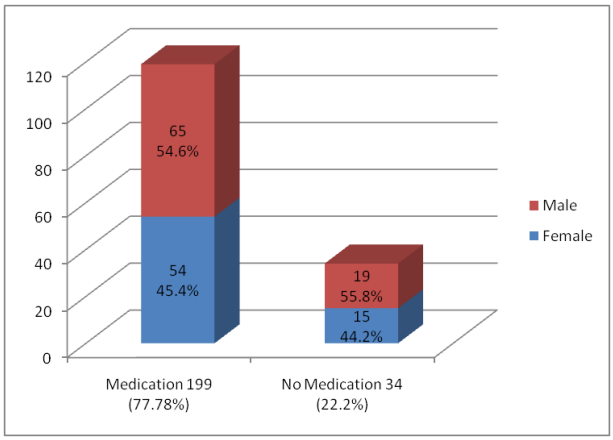

Figure 1. Treatment received. n(%)

The frequency of pain in HD was 70.2 % according to our study. Similarly, a study conducted in Switzerland shows the frequency of pain is 66% in HD patients. The reason for almost the same prevalence may be the usage of the same questionnaire and age.[9] While another study in Canada shows the frequency of pain at 50% as compared to our study.[19] Administration of additional questionnaires and difference in mean age may be the reason for the contradiction in results.[19]

The frequency of pain was greater in males 55% as compared to females 45%. According to a study conducted in 2018 frequency of pain reported in men was greater showing similarity with our results.[16] In contrast, a study conducted in Turkey (2016), Japan (2018), and Egypt (2018) show frequency of pain reported by women is greater.[3, 7, 13] There is an increased tendency of Myalgia, arthritis, CTS, ectopic calcification, and amyloidosis in males which may be the reason for increased pain frequency in males.[13] Additionally, the ratio of males was greater in our study which may be the reason for the increased pain frequency in males.

Maximum number of participants 71.9% had pain in the lower limb. Similar to our results, a study in Iran shows the most common area of pain in such patients is the lower limb.[14] Ischemia due to atherosclerosis is the reason for the increased frequency of lower limb pain.[22]

The second most common area of pain was the head reported by 19.6% of patients. A study conducted in Israel reports the increased frequency of headaches in HD patients.[15] Blood pressure alteration, fluid, and electrolyte imbalances are the major causes of headaches.[15]

The least number of patients reported pain in the upper limb 3.9% and back 4.6% in our study. In contrast to our study results, there is an increased frequency of LBP in HD patients.[12] Advanced age and increased BMI are significantly related to LBP.[12] In our study, the mean age was found to be 41.3±14.06 and most of the patients had normal BMI which may be the reason for decreased frequency of LBP.

The severity of pain reported by the maximum number of patients 64.7% was mild in our study. In contrast, studies in 2016 and 2013 show a greater number of HD patients have moderate to severe pain.[2, 9] Different pain assessment tools other than BPI, greater mean age (71±12.5), and increased BMI (27±5.5) may be the reason for the difference in results.[9] Availability of over-the-counter drugs and the fear of having severe pain results in early intake of medications for pain relief. This may be the factor that a greater number of patients reported mild pain.

In our study Interference in general performance including general activities, mood, walking ability, normal work, relations with others, sleep, and enjoyment of life were also analyzed. Increased pain severity is directly related to increased interference in performance. [23] Similar results are found in our study that there is a positive significant correlation between pain severity and interference in general performance.

Most of the patients having lower limb and back pain reported moderate interference in physical performance depicted by our study. A study in Boston also shows LL and back pain results in reduced physical performance in HD patients. [23]

Data was collected from private and government hospitals in Hayatabad, Peshawar. Pain was reported by 76.3 % of patients in government hospitals while in private hospitals 57.1% of patients had pain. There is a significant correlation between pain frequency and hospitals. In the HD procedure, electrolytes essential for the body along with fluid are also removed so it is important to maintain their optimal level in the body. It is not properly managed in government hospitals which may be the reason for the increased frequency of pain in patients in government hospitals.

The recommended time period for HD is a four-hour session.[5] In private hospitals, four-hour sessions are given to each patient while in government hospital only three-hour session is given. This may be the reason for increased pain frequency in HD patients of government hospitals.

Medications for pain relief were taken by 77.78% of patients and no medications were taken by 23.32% of patients who had reported pain. A study in Canada reports that 54% of patients are not taking pain medication while 15.5% are taking non-pharmacological treatment and it is recommended to use non-pharmacological treatment before pharmacological treatment.[11, 19] Lack of awareness of non-pharmacological treatment methods and easy access to pharmacological treatment may be the reason for the increased intake of medications for pain relief in our population.

Conclusion

Based on our findings, it is evident that pain is a prevalent issue among more than two-thirds of hemodialysis (HD) patients. While the pain severity tends to be mild, it significantly interferes with general activities like walking, normal work and sleep for a majority of patients. Currently, pain management primarily relies only on pharmacological treatments within our clinical setting. Given the high prevalence of pain and its interference in hemodialysis patients, it is imperative that this issue is acknowledged as a significant health concern requiring effective interventions that also including non-pharmacological treatments and holistic care strategies.

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