



Prevalence Of Various Musculoskeletal Problems In CKD Patients

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Abstract:

Introduction – CKD is a leading cause of morbidity and mortality worldwide. It has multi factorial etiology and equally widespread complications. But affection of the musculoskeletal (MSK) system, in terms of pain and reduced mobility is a major concern for the health care providers. Hence this study was planned to focus on the gravity of situation by assessing the prevalence of pain and mobility affection in this population.

Aim of the study - To assess the prevalence of various musculoskeletal problems in CKD patients. Objectives – 1) To assess the incidence of MSK problems in CKD patients. 2) To analyze the prevalence of MSK problems with other disease specific and demographic factors.

Methodology & study tool – It's a survey based cross sectional study. The Nordic questionnaire was used as the study tool.

Results – 72% of the CKD patients involved in the study had MSK pain, while 52% had the affection of mobility. Ankle (56%) was the most affected body part, followed by lower back (52%) and knee (50%). MSK pain was experienced by greater proportion of patients (85%), in those having CKD for more than 10 years. The study also showed that the affection of the mobility increases exponentially, as the disease process progresses, with majority of the CKD patients (85%) showing both existence of pain and reduced mobility to equal extent, in those having the disease for more than 10 years.

Conclusion - The study concludes that the majority of the CKD patients (72%) experience MSK pain, which can have multi factorial etiology. The most common sites for the pain, in this study were ankle, knee and lower back. In this study, the mobility is found to affected in more than half the population (52%) with CKD. Pain affection is more in those who have the disease from more than 10 years, and this pain is invariably accompanied by reduced mobility.

INTRODUCTION:-

Chronic kidney disease (CKD) is a condition characterized by a gradual loss of kidney function over a period of time. CKD is defined as the structural or functional

abnormalities of the kidneys for more than three months, as manifested by kidney damage, with or without decreased GFR (i.e. $GFR < 60\text{ml/min/1.73m}^2$)

The prevalence of CKD in different Indian regions ranges from < 1% to 13%. There is a rising incidence of CKD that is likely to cause major problems for both health care and economy in future years. In India it has been recently estimated that the age – adjusted incidence rate of ESRD is 229 per million population and > 100,000 new patients per year. This rising numbers are specially of concern, due to the chronic, irreversible and progressive nature of the disease.

Stages of CKD

There are various risk factors, which play role in the disease process. Some of the important risk factors are diabetes mellitus, hypertension, cardiovascular disease, obesity, age and race, acute kidney injury, malignancy, family history of CKD, recurrent kidney stones, infection like HIV, autoimmune diseases, nephrotoxic drugs like NSAIDS. CKD is a chronic progressive disease that gradually affects the other organ systems eventually, leading to complications like, fluid retention, Hyperkalemia, cardiovascular disease, weak bones and increased risk of bone fractures, anemia, damage to CNS, decreased immune response.

Patients with uncontrolled diabetes and malignantly high blood pressure are particularly vulnerable for developing CKD. The reason for this can be that certain medications can cause kidney damage. Ibuprofen and NSAIDs are particularly related to CKD. The prevalence of CKD due to diabetes is 28 -30% and due to high blood pressure is 21%.

The progression of the disease depends on the cause and stages. As it progresses over a period of time, complications mentioned above start affecting the general health of the person by affecting the functional status of the person and the quality of life. One of the major reasons for decline in the functional status in this population is the pain during the physical activities. Reduced functional status affects the basic activities of daily living and instrumental activities of daily living.

Need of the study:

Being a long term, life altering disease, there has been a lot of research in CKD patients and their quality of life. But, the specific MSK related problems and their prevalence is not been studied in this population, which is the ultimate impairment affecting their daily activities and functional independence. Hence, we planned this study to assess the prevalence of MSK problems in CKD patients.

AIM OF THE STUDY :- To assess the prevalence of various musculoskeletal problems in CKD patients.

OBJECTIVES OF THE STUDY:-

1. To assess the incidence of MSK problems in CKD patients

2. To analyze the prevalence of MSK problems with other disease specific and demographic factors.

REVIEW OF LITERATURE

CKD is a major health care challenge, as it affects all the other organ systems increasing the morbidity level. Hence, there have been many researches in this population. Some of them have specifically focused on the pain problem faced by this population.

Sara n Davison , in her study of Pain in hemodialysis patients concluded that Pain is a significant problem in more than 50% of HD patients and is not being effectively managed. The development of effective pain management strategies, underpinned by appropriate training and education, is necessary to improve the quality of life for dialysis patients. Another study by Davison SN, Rathwell S, Ghosh S, et al. focused on the Prevalence and Severity of Chronic Pain in Patients With Chronic Kidney Disease. This multicentric global study involving 16 558 patients from 26 countries found the mean prevalence of chronic pain in hemo dialysis patients to be 60.5%, and the mean prevalence of moderate or severe pain was 43.6%. Although limited, pain prevalence data for peritoneal dialysis patients (35.9%), those managed conservatively without dialysis (59.8%), those following withdrawal of dialysis (39.2%), and patients with earlier GFR category of CKD (61.2%) suggest similarly high prevalence rates. The study concluded that the chronic pain is common and often severe across diverse CKD populations providing a strong imperative to establish chronic pain management as a clinical and research priority. Stig Molsted, and Inge Eidemak , in their study of Musculoskeletal pain reported by mobile patients with chronic kidney disease, found that musculoskeletal pain was not more frequently reported by patients with CKD and no mobility problems compared with the general population. However, as musculoskeletal pain was reported by up to two-thirds of the patient sample, hence healthcare professionals should remember to focus on this issue. The patients' pain was associated with negative impacts on QOL, level of physical activity and physical function. Francisco, Caravaca Boris, Gonzales Miguel, Ángel Bayo, Enrique Lunain their study of Musculoskeletal pain in patients with advanced CKD not on dialysis, analyzed and compared the musculoskeletal pain in CKD patients with other uremic symptoms and their prognosis significance. They found that the chronic muscle pain is highly prevalent in patients with advanced CKD and is associated with other common symptoms of chronicuraemia. The study also emphasized that as with the general population, elderly age, the female gender, obesity and some comorbid conditions are the best determinants of CMP. Increased inflammatory markers commonly observed in patients with CMP may have a relevant role in its pathogenesis.

In their study of frequency and severity of pain and symptoms distress among the patients with chronic kidney disease receiving dialysis, Claudia Gamondia, Nadia Galli, Carlo Schönholzer, et al. found that the significant proportion of CKD patients suffered from pain symptoms, along with asthenia and fatigue as concomitant symptoms. The

study also pointed out that the majority of the patients reported that their pain limited their daily life activities. They concluded that pain severity and symptom distress in dialysis patients are important, but underestimated and undertreated. They interfere with sleep quality and daily living. Similar results were found by Domenico Santoro, Ersilia Satta, and Salvatore Messina in their study of pain in end-stage renal disease, which concluded that Pain is a major health problem in end-stage renal disease (ESRD) affecting half of the dialysis patients. Most of these patients experience a moderate to severe degree of pain. Consequently the health related-quality of life (HRQOL) is diminished, associated with a higher morbidity and mortality.

MATERIAL/METHODOLOGY OF THE STUDY :-

STUDY DESIGN : Survey based Cross – sectional study.

STUDY TOOLS &TECHNIQUES : Nordic questionnaire.

The questionnaire is a commonly used survey tool for determining the prevalence of musculoskeletal pain symptoms. It includes

DURATION OF THE STUDY :- 6 Months.

STUDY SUBJECTS :- Chronic kidney disease patients.

SAMPLE SIZE :-52

INCLUSION CRITERIA :-

1. Patients suffering from kidney disease more than 5 years.
2. Those not on dialysis as well as on dialysis.
3. Age group – more than 20 years.
4. Those willing to participate.

EXCLUSION CRITERIA :-

1. Those not willing to participate.
2. Age – less than 20 years.
3. CKD patients having concomitant distinct musculoskeletal diagnosis, which can attribute to the pain

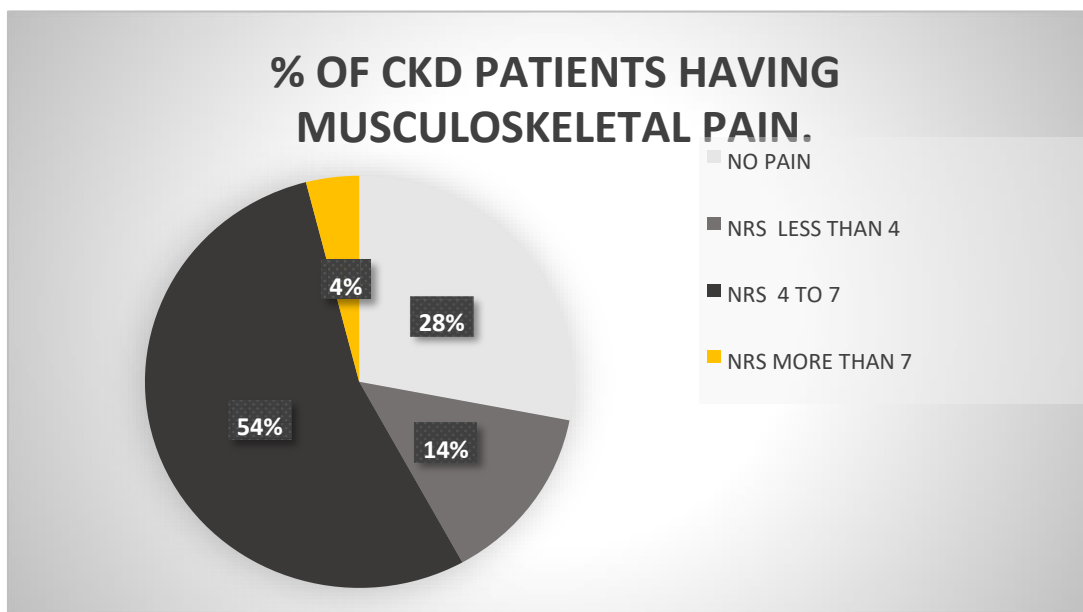
METHODOLOGY& PLAN OF STUDY:-

The study design was prepared and was approved by the institutional ethics committee. The study subjects were selected according to the inclusion and exclusion criteria. The study purpose and procedure was explained to the subjects and their informed written consent was taken. The study subjects were interviewed individually to collect the data.

The data received from the questionnaire was analyzed statistically with respect to our objectives.

DATA INTERPRETATION:

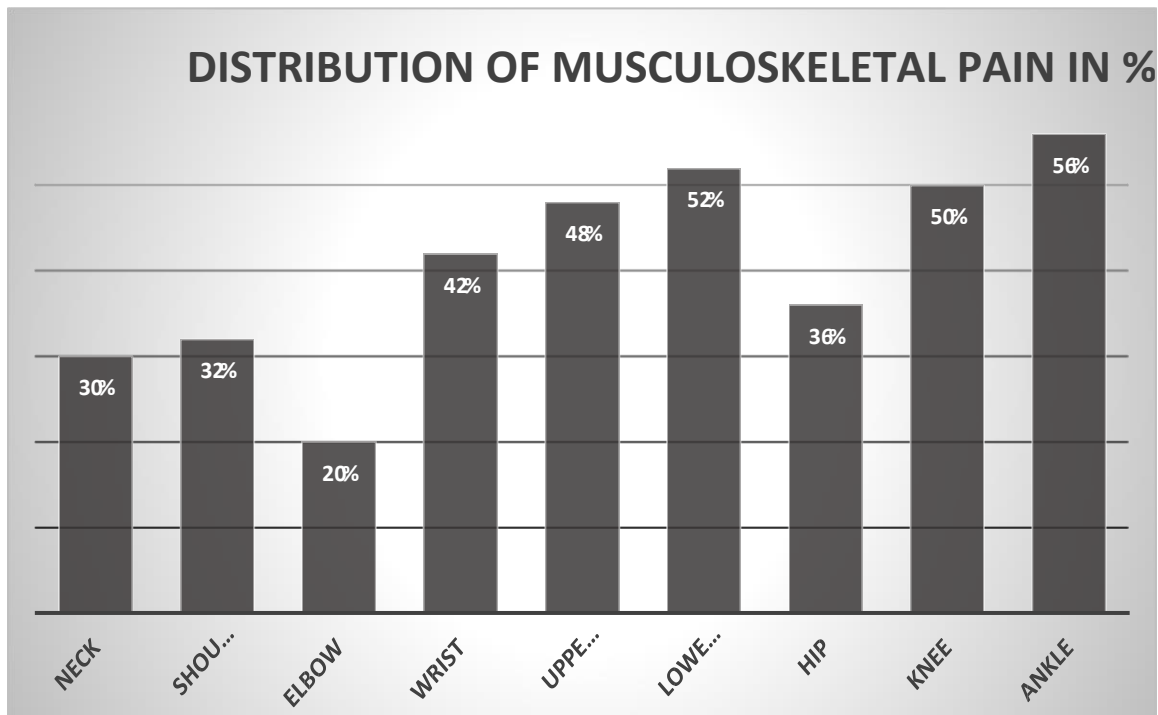
Graph 1: Distribution of MSK pain as per the numerical rating scale (NRS)



NO PAIN	NRS LESS THAN 4	NRS 4 TO 7	NRS MORE THAN 7
28%	14%	54%	4%

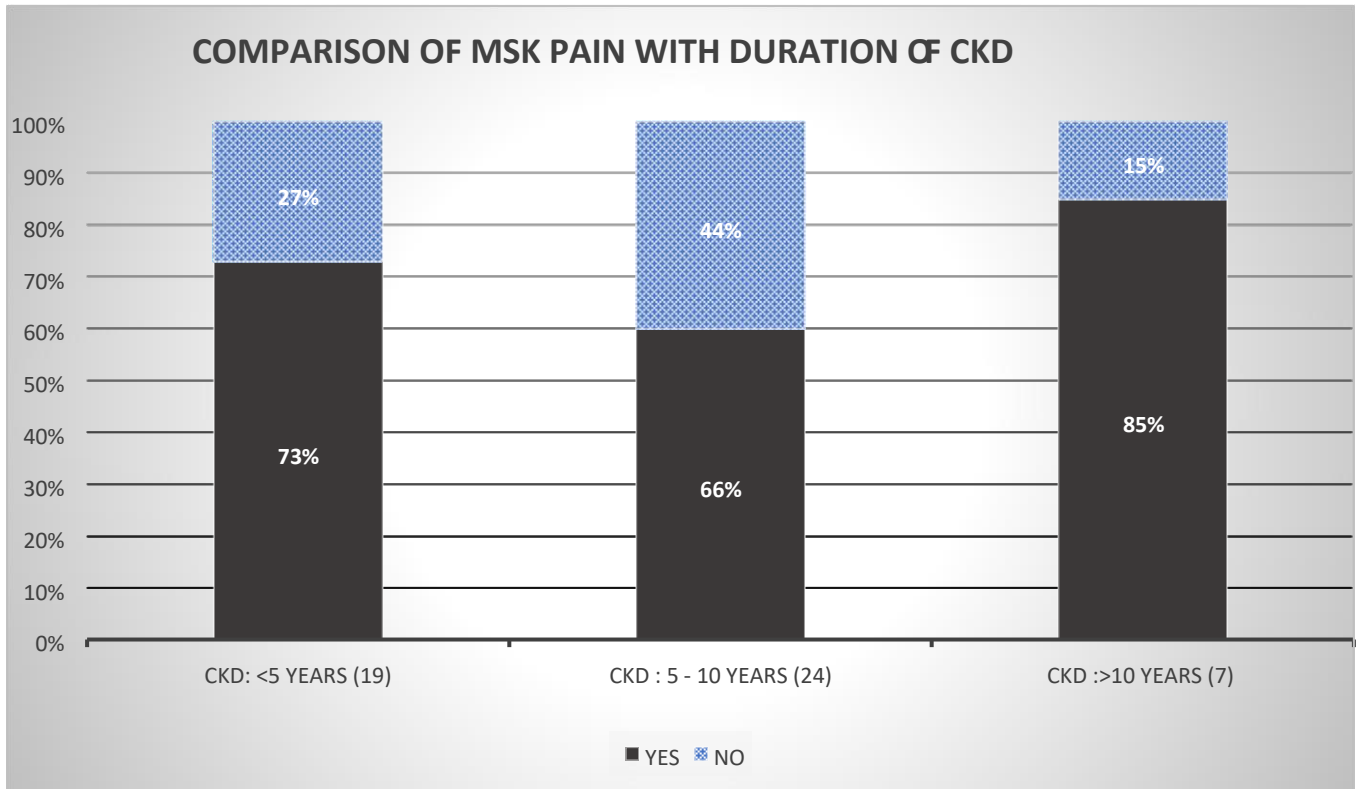
Interpretation: It was observed that 72% of the CKD patients had MSK pain and 28% patients denied having any pain. According to NRS – 14% patients had mild pain (i.e. NRS less than 4), 54% patients had moderate pain (i.e. NRS 4 – 7), and 4% patients complained of severe pain (NRS more than 7)

Graph 2: Distribution of MSK pain based on location of pain



NECK	SHOULDER	ELBOW	WRIST	UPPERBACK	LOWERBACK	HIP	KNEE	ANKLE
30%	32%	20%	42%	48%	52%	36%	50%	56%

Inter pretation: It was observed that maximum proportion of CKD patients, i.e. 56% had ankle pain, followed by 52% patients having lower back pain.50% patients complained of knee pain, while 48%patients had upper back pain. 42% of CKD patients had pain in wrists and hands.36% had pain in hip and 32% shoulder pain. The least pain was observed in elbow (20%).

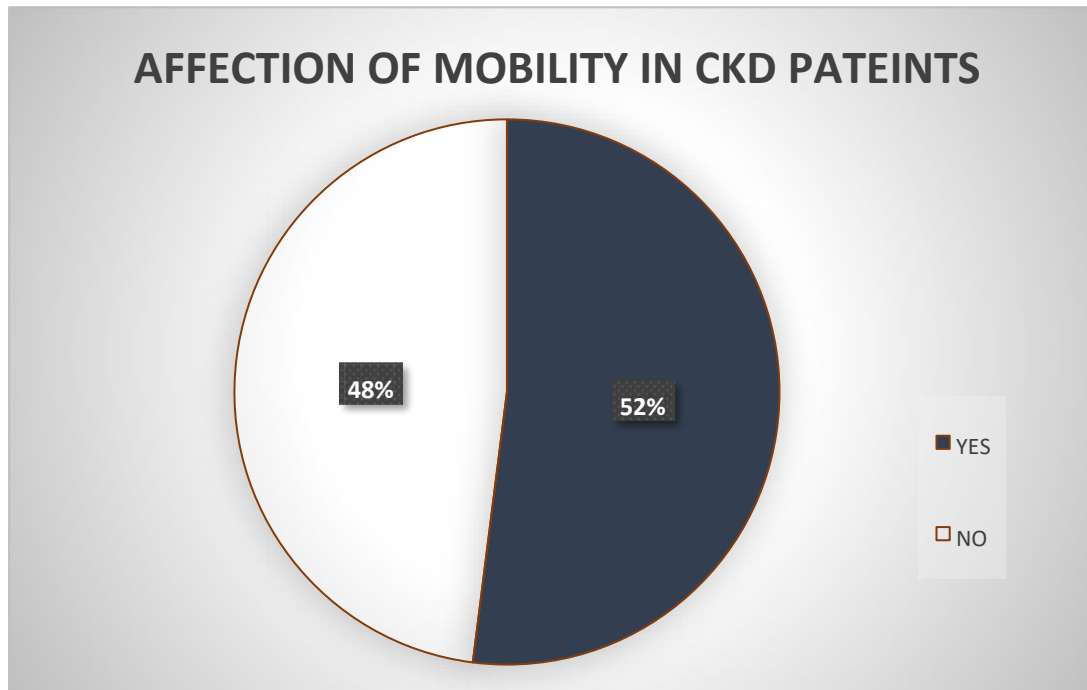


Graph 3: Comparison of MSK pain with duration of CKD

PAIN	CKD: <5 YEARS (19)	CKD : 5 - 10 YEARS (24)	CKD : >10 YEARS (7)
YES	73%	66%	85%
NO	27%	44%	15%

Inter pretation: On comparing their duration of disease, it was found that in those having CKD for less than 5 years, 73% patients had pain and 27% had no symptoms of pain. In patients suffering from CKD for 5 to 10 years, relatively lesser proportion of patients (66%) had pain, while in those suffering from more than 10 years, 85% patients had pain. The prominent observation was that majority of the patients suffering from CKD had pain irrespective of the duration of the disease.

Graph 4: Affection of mobility in CKD patients

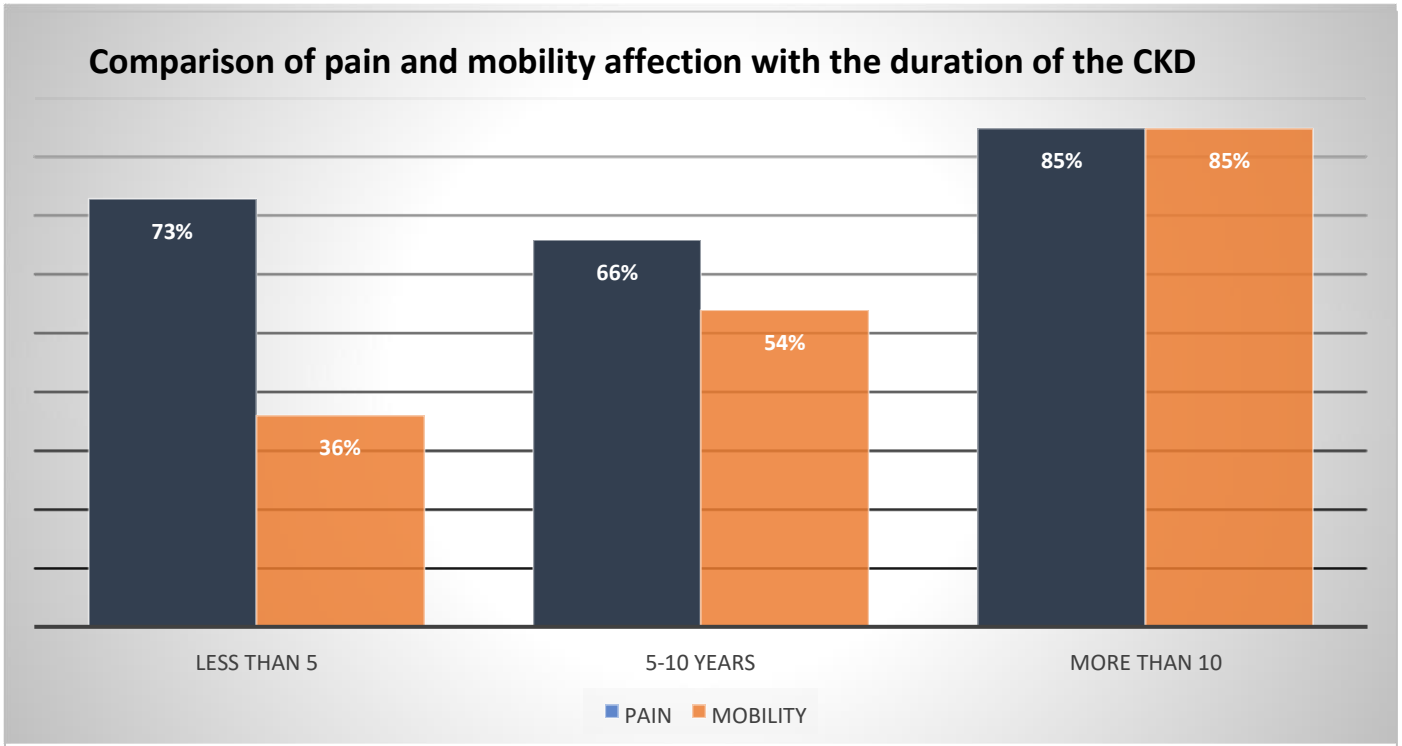


MOBILITY AFFECTED	52%
MOBILITY NOT AFFECTED	48%

Interpretation: It was found that more than half the patients (52%) complained of the mobility being affected due to pain.

Graph 5: Comparison of pain and mobility affection with the duration of the CKD

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CKD (YEARS)	LESS THAN 5	5-10 YEARS	MORE THAN 10 YEARS
PAIN	73%	66%	85%
MOBILITY	36%	54%	85%

Inter pretation: It was observed that in recently diagnosed CKD patients (less than 5 years), 73% patients had pain and 36% had mobility affection. In those suffering from CKD for 5-10 years, 66% patients had pain and 54% had mobility affection, while 85% of the long term (more than 10 years) CKD patients had pain and mobility affection. It shows that as the duration of the disease increases, the MSK pain experienced by these patients starts to interfere with the mobility of the patient more and more.

DISCUSSION:

The research included 50 participants who had end stage chronic kidney disease and are undergoing hemo dialysis.

The study found that the frequency of the musculoskeletal pain in the patients with CKD was reported by a more than 70% of the participants. The reported MSK pain was associated with reduced mobility, which ultimately affects the quality of life (QOL) of the patient.

The majority of the participants in this study had a comorbid factor, 62% participants had high blood pressure and 24% participants had diabetes.

The outcome parameters of the study were pain intensity as per the numerical rating scale (NRS) and the affection of the mobility.

The study showed that 72% participants had MSK pain, with 54% having moderate pain intensity and 4% severe pain. As we have already mentioned in the literature review, the association between the CKD and MSK pain has been identified by various researchers. This association of the end stage renal disease and myalgia may be multifactorial. One of the major cause for this pain can be the altered vitamin D and abnormal calcium and phosphorus metabolism, which are common in these patients. Vitamin D reduction directly affects the bone health and the musculoskeletal functioning, while abnormal calcium and phosphorus metabolism causes calcification of the vessels ,both in the artery and arterioles ,with subsequent arteriole narrowing and increased vascular stiffness. As a result the vascular flexibility and perfusion of the target tissue can get affected. In most cases the target tissue is the skeletal muscles and the result is decrease exercise tolerance.

As Francisco, Caravaca Boris, Gonzales Miguel, et al. showed in their study, accumulation of the uremic toxins such as phosphate, creatinine, para-cresol and also parathyroid hormone can have a cusative effect in increasing the risk of MSK pain.

Amyloid protein rises in the blood in kidney failure, they clump together forming amyloid deposits into a variety of tissue and organs including joints and tendons which can result in symptoms such as joint pain and stiffness.

Also, hypertension which was present in significant proportion of patients, is proposed as a major risk factor leading to vascular stiffness and muscular pain secondary to vascular insufficiency.

Further this study investigated the distribution of pain according to the location or the body area and it was found that the most common body parts to be affected due to pain was ankle (56%) , lower back(52%) , and knees(50%). The least affected was the elbow(20%). Other body parts affected were upperback(48%), wrists and hands(42%), hip(36%), shoulder(32%) and neck(30%).

Swelling is one of the most common symptom of end stage renal disease. The excess fluid is pulled down towards the feet by the gravity. Patients with ESRD who are receiving dialysis treatment, are known to have more frequent cramps in the feet and legs. Muscle cramps occurs when muscles do not receive oxygen, electrolytes and nutrients.

Back pain can be attributed to the sedentary lifestyle, low physical performance , altered metabolic activity and muscle weakness.

Shoulder pain and finger/hand rigidity are reported to cause upper limb disability. They are associated with skeletal muscle dysfunction and atrophy that cause an overall decrease in muscle strength and endurance with reduced physical functioning and ability to work.

The study found that those participants who had chronic kidney disease from more than last 10 years had more pain than patients with the disease for less than 10 years . Chronic kidney disease is a gradual and progressive disease. As the number of year increases, the symptoms caused by the disease are also increased. There is deterioration in the bodily functions. Hence, those patients who have loss of kidney function since more than 10 years have more serious and extensive MSK pain.

The study also found that more than half the participants (52%) had affected mobility. This can be associated with the reduced physical activity, due to pain and weakness.

Patients with chronic kidney disease (CKD) experience substantial loss of muscle mass, and strength, which attributes to the poor physical performance. As kidney disease progresses, skeletal muscle dysfunction forms a common pathway for mobility limitation, loss of functional independence, and vulnerability to disease complications secondary to immobility.

In this study, the comparison of pain and mobility affection with the duration of the disease, clearly showed that, as the disease progresses, the changes in the musculoskeletal system along with the vascular system, consolidate and become more and more permanent. As a result, the gap in the proportion of the patients having pain and restriction of mobility, decreases as the disease progresses temporally. This is evident in the findings that all the patients who had MSK pain in the more than 10 years of CKD group, showed affection of mobility, which consequently affects the functional independence and the quality of life.

CONCLUSION

- The study concludes that the majority of the CKD patients (72%)experience MSK pain, which can have multi factorial etiology.
- The most common sites for the pain, in this study were ankle, knee and lower back.

- In this study, the mobility is found to be affected in more than half the population (52%) with CKD
- Pain affection is more in those who have the disease for more than 10 years, and this pain is invariably accompanied by reduced mobility.

CLINICAL IMPLICATION

As the study shows that most of the CKD patients eventually have MSK problems which impair their mobility and functional independence, this population should be made aware of these complications and a physiotherapy intervention should be started at the earliest to minimize the pain and mobility impairment and maximize their functional independence.

LIMITATIONS

The study only focuses on the subjective parameters like pain and mobility, as we are trying to address the gravity of the situation. But for a more thorough analysis, objective parameters like bone density and MSK assessment should also be part of the study, along with functional measures.

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