



Prevalence of Kinesiophobia in Patients on Maintenance Hemodialysis and Its Correlation with Risk of Fall

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ABSTRACT

Chronic kidney disease is a long-standing disease associated with complications which affect the musculoskeletal system and has an effect on postural control mechanism, which is an intrinsic factor that influences the risk of fall. Literature suggesting additional factors such as aging and a psychological basis affecting the individual's risk of fall is inadequate. This study was conducted to determine the correlation between kinesiophobia which is a psychological factor associated with risk of fall. This analytical cross-sectional study was conducted at the dialysis centre of Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pune. Patients undergoing maintenance hemodialysis aged 30-60 years were assessed for kinesiophobia using The TAMPA Scale. Risk of fall was determined using Timed-Up and Go Test. The prevalence of kinesiophobia was found to be 90.5% in the study population. A positive correlation was seen between Tampa SK and TUG. There is a low correlation of Kinesiophobia and risk of fall in patients undergoing maintenance hemodialysis. Age-wise correlation of data suggests an increase in values with an increase in age.

Keywords: Hemodialysis, Kinesiophobia, Risk of Fall, Tampa scale, Time up and go test

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INTRODUCTION

Chronic kidney disease (CKD) is a long-standing disease of the kidneys which progressively leads to kidney failure. As the kidneys fail to function efficiently, there is an accumulation of waste and toxin in the body. CKD is a global public health problem, a meta-analysis of prevalence studies conducted in 44 countries, estimated that the worldwide prevalence of CKD is 13.4%. CKD can be defined based on kidney damage or reduced glomerular filtration rate (GFR), which is considered to be the best overall index to check functions of the kidney [1]. End-stage renal disease (eGFR less than mL/min/1.73 m²) is defined as loss of kidney function such that life is unsustainable in the absence of renal replacement therapy (RRT) [2]. Maintenance hemodialysis is a type of renal replacement therapy used to filter out waste and excess water from the blood. It helps contribute by controlling blood pressure and balancing essential minerals, such as potassium, sodium, and calcium levels in your blood [3]. Alterations occur in the maintenance of nutrient homeostasis as the function of the kidneys decline in CKD patients. This results in the accumulation of body fluids due to a reduction in excretion of solutes as the disease progresses. This reduces the adaptive capability of the body towards the dietary intake [4]. In such cases, protein-energy wasting (PEW) occurs due to energy intake deficiencies and protein depletion. PEW causes a decline in muscular function as well. Dialysis solution and chronic inflammation are the causes of this protein depletion. This further results in physiological dysfunction such as low muscle strength, muscle mass and exercise capacity [5]. Muscle atrophy is one among all other comorbidities that occur such as mineral bone disorder, electrolyte imbalance, under nourishment and fatigue which contribute to an increase in the likelihood of falls in patients with CKD [6]. Postural control mechanisms are an intrinsic factor increasing risk of fall⁷. Timed-Up and Go Test (TUG) is one of the most-evidence supported functional measure to determine an individual's risk of fall [8]. This test is used to determine fall risk and measure the progress of balance in the desired population. It is a simple screening test, that is a sensitive and specific measure of probability for falls. This test was initially designed for elderly persons but is now also used for other populations. TUG is a sensitive and specific measure for assessing fall probability⁹. Chronic kidney disease negatively affects the physical and biopsychosocial aspects of the lives of individuals with the disease¹⁰. Also, psychiatric

evaluation revealed presence of moderate reactive depression in this population [11]. Kinesiophobia or fear of movement is a type of specific phobia that can be defined as an irrational, weakening and devastating fear of movement originating from the belief of fragility and susceptibility towards injury [12]. TAMPA Scale of Kinesiophobia is a Likert type self-reporting questionnaire based on evaluation of fear of movement, fear of physical activity, and fear avoidance. TAMPA Scale for Kinesiophobia (TSK-17) is a valid and reliable tool used to assess kinesiophobia¹³. As per the article published by the American Pain Association, the fear-avoidance model helps understand the influence of pain-related fear in chronic pain-related disability. This fear of movement also called as Kinesiophobia, is measured using the TAMPA Scale for Kinesiophobia, which is a strong predictor of physical function and disability [14]. The basis of loss of balance pertaining to muscle affection is well established^{5,6}. However, the literature suggesting additional components such as ageing and psychological factors is still inadequate. This study was conducted to determine the prevalence of kinesiophobia in patients on maintenance hemodialysis and its correlation towards an individual's risk of fall. In CKD patients there is a loss of balance and decrease in overall activity level due to physical factors [5, 6]. These factors result in high incidences of falls in patients on maintenance hemodialysis [6]. This being the physical basis, an influence of psychological factors such as anxiety, depression which are also among common problems associated with long term dialysis is still unknown among this population [10, 11]. The psychological influence of dialysis on an increase in the risk of falls in the form of kinesiophobia is explored.

The relation between kinesiophobia and increased risk of fall has been established in a study conducted on the patients undergone renal transplant [15]. This population includes patients with chronic kidney disease but, due to the lack of evidence suggesting the occurrence of kinesiophobia in maintenance hemodialysis patients, this is an area worth exploring. If kinesiophobia is found to be a significant factor affecting the risk of fall and overall functional activities, physiotherapeutic treatment including cognitive behavioural therapy and counseling could be added to the preexisting treatment protocol being followed. Thus, maintaining the overall functional abilities of the patients to the best possible extent.

MATERIAL AND METHODS

This analytical cross-sectional study was conducted in the hemodialysis unit of Dr. D. Y. Patil Medical College, Hospital and Research Center, Pimpri, Pune. After institutional ethical ethics approval, 80 patients were screened on decided inclusion and exclusion criteria. 63 participants were included in the study. Patients were briefed about the procedure and need for study. Written consent was taken from all participants. After addressing all queries from the patients, a brief assessment was taken by interviewing the patient. They were asked to fill out the Tampa Scale for Kinesiophobia and the scores for TUG score for balance were noted. After dialysis, the patient was asked to sit comfortably in a chair with an arm rest. A point was marked 3 meters away from the chair. The Timed-Up and Go Test was explained to the patients and they were then asked to perform it. Therapist recorded the time taken by the participant to complete a lap using a stopwatch. The data was documented and appropriate statistical analysis was done.

Statistical Analysis

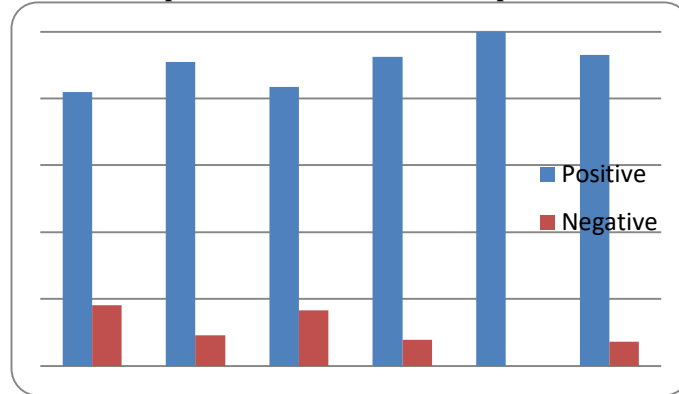
Exploratory statistical analysis using tables and graphs for the prevalence of Kinesiophobia and linear regression correlation test was conducted using primer software.

RESULTS

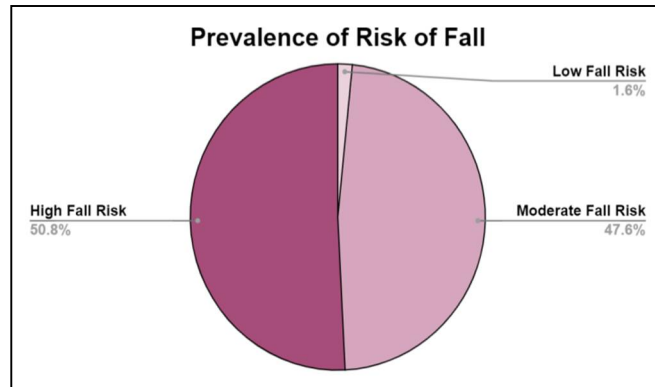
From graph 1 it is observed that 90.5 % of patients with maintenance haemodialysis (n=63) were affected by kinesiophobia. Figure 2 shows age wise classification. Kinesiophobia was found positive in all age groups, maximum from 51 to 55 years. Graph 3 shows prevalence of risk of fall, 50.8% had high risk, 47.6% had moderate risk and 1.6% had low risk of fall. Graph 4 shows age wise risk of fall in the patients with Maintenance Hemodialysis. This was highest (92.85%) in the age group of 56 to 60 years; and in the age group 31-35 years. Graph 5 shows linear regression and correlation of TAMPA score with Time up and Go test (TUG), $r=0.39$.



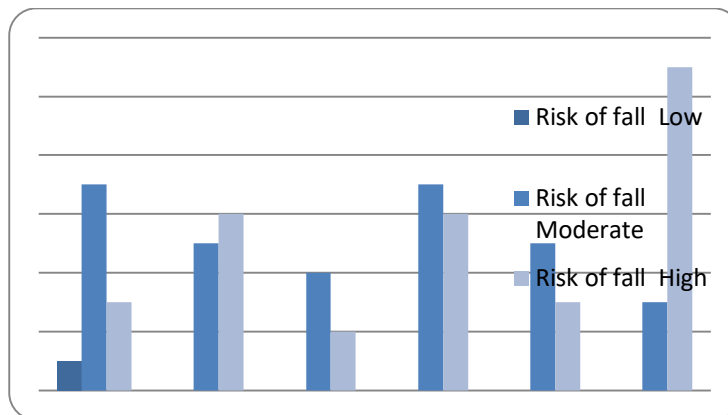
Graph 1: Prevalence of Kinesiophobia



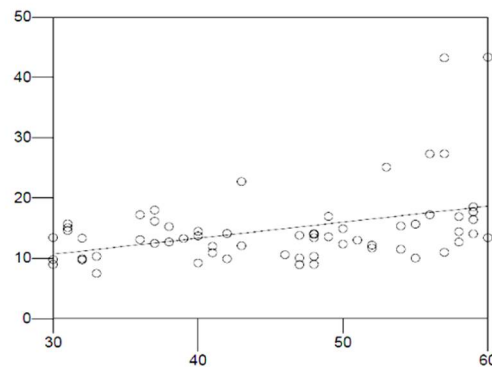
Graph 2: Age wise classification of Prevalence of Kinesiophobia



Graph 3: Prevalence of Risk of fall in the patients with Maintenance Hemodialysis



Graph 4 : Age wise Risk of fall in the patients with Maintenance Hemodialysis



Graph 1.5: Linear regression and Correlation of TAMPA score and Time up and Go test (TUG)

DISCUSSION

Kinesiophobia or fear of movement is a type of specific phobia defined as an irrational, weakening and devastating fear of movement from the belief of fragility and susceptibility of injury [12]. Chronic kidney disease has a negative effect on the physical and biopsychosocial aspects of the lives of individuals affected with the disease [10]. Previous research has shown that patients with CKD show moderate depression leading to functional limitation [11]. Through study we explored the prevalence of kinesiophobia in patients with CKD on maintenance hemodialysis. A similar study was conducted in the same population i.e. patients with CKD that underwent Renal Transplant treatment concluded that fear of movement influenced the levels of physical activity¹⁵. In order to avoid injury or pain, Kinesiophobia alters the movement patterns which affects related actions by adjusting the motor behavior patterns [16]. Therefore subjects included in the study were assessed for risk of fall as well, using the Timed-Up and Go test. An article titled “Development and validation of a Fall Risk Assessment Index for dialysis patients” by Kenichi Kono stated that while comparing the non-fallers and fallers population, older individuals were more likely to be fallers⁵, which also supports our study with results of risk of fall in the age group of 56 to 60 years. Another study conducted by Pinar Doruk Analan and Rüya Özelsancak titled, “Balance and fall risk in peritoneal dialysis patients,” concluded that serum glucose level, BMI (body mass index) and age appear to affect balance and fall risk. However, duration of dialysis, blood pressure, and urea do not affect balance system in peritoneal dialysis patients [19]. Findings of the current study are similar to the above study. Numerous physical attributes influence the degree of fall risk in patients with CKD as discussed previously [5-7]. This establishes the physical basis of increasing fall risk in the concerned population. The value of TAMPA showed an increase with scores of TUG suggesting an positive correlation between the two. Also, both values show an increase with an increase in age. This establishes the influence of age on both components. In chronic kidney disease, exercises are beneficial for a range of health-related outcomes in chronic kidney disease, and may be considered as an adjunct treatment to help improve the patients’ functional capacity. Patients should be encouraged to increase their physical activity and to exercise more often. Simple activities like walking can be included into their treatment protocols to maintain their overall well-being²¹. When we compare the TAMPA score and the TUG score using linear regression co-relation co-efficient, $r = 0.39$ which showed poor co relation between two scores. The direct correlation between the two could be based on the chronicity of CKD, the type, frequency and duration of maintenance hemodialysis, age and present comorbidities. Presence of kinesiophobia in CKD patients and its relevance in physiotherapy practices is an unexplored area of research. The present study explored this dimension, and the findings can be incorporated in physiotherapy rehabilitation for CKD patients.

CONCLUSION

The values of TAMPA showed an increase with that of TUG scores suggesting an existing positive correlation between the two scales, although weak. Both values show an increase in risk of fall (low, moderate and high) with an increase in age. This establishes the influence of age on both components.

Declaration by Authors

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