SSN Journal of Management & Technology Research Communications

Vol 3 No (4) 2026 CrossRef DOI: https://dx.doi.org/10.21786/mntrc

Published by Society for Science and Nature Bhopal India E-ISSN : 3049-0014

Correlation Between Kinesiophobia, Pain, Functional Performance, and Balance in Community-Dwelling Adults

Meeraj[1], K. Davinder[2], Bhawna[3], R. Deepak[4], R.K. Sharma[5] and Saloni[6]

[1]MPT, Department of Physiotherapy, Santosh Paramedical College and Hospital, Ghaziabad

[2]Professor, Department of PSM, Health & Hospital Administration, BFUHS, &GGSMC, Faridkot.

[3]Assistant Professor, Department of Physiotherapy, Santosh Paramedical College and Hospital, Ghaziabad, India

[4]*Professor/Principal, Department of Physiotherapy, Santosh Paramedical College and Hospital, Ghaziabad, India

[5]Dean, Santosh Paramedical College and Hospital, Ghaziabad, India

6Assistant Professor, Department of Psychiatry, Santosh Medical College,

Santosh Deemed to Be University Ghaziabad, India

ABSTRACT

Kinesiophobia, defined as an excessive and irrational fear of movement, is a crucial psychological factor that can adversely affect physical performance, particularly in individuals with chronic pain. Among community-dwelling adults, this fear often leads to reduced functional mobility, impaired balance, and decreased quality of life. Understanding the interrelationships among these variables is essential for effective assessment and intervention in rehabilitation settings. To investigate the correlation between kinesiophobia, pain intensity, functional performance, and balance in community-dwelling individuals aged 40–65 years. A cross-sectional observational study was conducted on 100 community-dwelling participants experiencing chronic pain for more than three months. Kinesiophobia was measured using the Tampa Scale for Kinesiophobia (TSK), pain intensity with the Numerical Pain Rating Scale (NPRS), functional performance via the Lower Extremity Functional Scale (LEFS), and balance through the Berg Balance Scale (BBS). The mean age of participants was 53.37 ± 7.52 years; 63% were male, and 52% had a normal BMI. The mean TSK score (40.25) indicated low to minimal kinesiophobia, while mean pain intensity (5.69) reflected moderate pain. LEFS (mean: 52.37) showed mild functional limitation, and BBS (mean: 41.18) indicated good to moderate balance. Pearson correlation analysis revealed significant and strong relationships between kinesiophobia and pain ($r = 1.00$), kinesiophobia and function ($r = –1.00$), and kinesiophobia and balance ($r = –1.00$), all with $p < 0.001$. Kinesiophobia is strongly associated with higher pain intensity, reduced functional performance, and impaired balance. Addressing fear of movement should be a key component in physiotherapy interventions to enhance functional recovery and quality of life in community-dwelling adults.

KEY WORDS: BALANCE, CHRONIC PAIN, COMMUNITY-DWELLING, FEAR-AVOIDANCE, FUNCTIONAL PERFORMANCE, KINESIOPHOBIA, PAIN, PHYSIOTHERAPY, TAMPA SCALE.

Article Information: *Corresponding Author: deepak.raghav@santosh.ac.in
Received 19/06/2026 Accepted after revision 15/08/2026
Page Number- 119-124
This is an open access article under Creative Commons License, https://creativecommons.org/licenses/by/4.0/.
Available at: https://mntrc.in/
DOI: http://dx.doi.org/10.21786/mntrc/3.4.23

INTRODUCTION

Fear of movement or avoidance behavior (kinesiophobia) is increasingly recognized as a critical psychological variable that modulates physical function, balance, and pain outcomes, particularly in older adults.

The classical fear-avoidance model posits that individuals who catastrophize pain may develop fear toward movement, thereby reducing activity, leading to deconditioning, disability, and further pain [1]. This model has served as a strong conceptual "mother" framework for many studies investigating the interplay of psychological and physical factors in chronic musculoskeletal conditions. In older populations and in those with chronic pain, elevated kinesiophobia has been linked to worse functional performance, greater disability, and lower quality of life.

For example, [2] found that in community-dwelling older adults with chronic pain, higher kinesiophobia correlated with more severe pain and poorer psychosocial well-being. Ishak, [3] further demonstrated that in older adults with low back pain, higher kinesiophobia was associated with weaker muscle performance and worse functional outcomes. More recently, [4] extended this by indicating that even in older adults without diagnosed chronic pain, greater kinesiophobia predicted lower physical activity and reduced functional capacity. Together, these findings underscore the pervasive influence of movement fear beyond just pain populations.

Beyond general population studies, investigations into specific clinical groups strengthen the rationale for focusing on kinesiophobia. In patients with chronic low back pain and comorbid osteoporosis, [5] documented that kinesiophobia significantly mediated the relationships between limits of stability (LOS) and functional balance metrics, such as Timed Up and Go (TUG) and Berg Balance Score (BBS).

These findings indicate that psychological factors may serve as pivotal intermediaries bridging biomechanical capacity and functional performance. Similarly, in knee osteoarthritis (KOA) populations, a recent systematic review and meta-analysis revealed moderate correlations of kinesiophobia with disability, fair correlations with pain, and functional limitation [6]. These data reinforce that movement fear is not only relevant in spinal pathologies but also in peripheral joint disease.

In older adults with coexisting comorbidities, the link between kinesiophobia and frailty has been explored. A study of older individuals reported that had high kinesiophobia, and a significant positive correlation existed between kinesiophobia and frailty scores, explaining over 50% of variability in frailty [7]. The implications are that kinesiophobia may exacerbate age-associated decline by limiting physical engagement. In populations with Alzheimer's dementia (AD), a recent study assessed balance, fall risk and kinesiophobia, finding that elevated kinesiophobia associates with reduced balance and higher fall risk in AD patients [8].

This suggests the concept has relevance even in cognitively impaired elders. In addition, Genç & Bilgili (2023)9 found that older adults with lower limb weakness and balance deficits had higher movement fear, highlighting the interplay between muscular and psychological processes [7]. Behaviorally, in older adults with chronic pain residing in nursing homes, physical activity levels were inversely associated with fear of movement and fear of falling9. This aligns with the fear-avoidance premise that pain and fear reduce movement, which begets further functional decline.

More broadly, an open access systematic review of kinesiophobia across chronic disease populations (diabetes, cardiovascular disease, respiratory disease, cancer) reported an average prevalence and highlighted the strong barrier role of movement fear to rehabilitation engagement and quality of life [9]. Although evidence is mounting, gaps remain. Many studies are cross-sectional, limiting causal inference. Few have concurrently assessed kinesiophobia, balance metrics (static and dynamic), pain levels, and functional performance in older adults. Also, the mediating or moderating role of kinesiophobia between biomechanical factors (e.g. stability limits or proprioception) and functional outcomes remains underexplored as some studies in CLBP/ osteoporosis and KOA begin to do [5,10].

METHODOLOGY

The present study adopted a cross-sectional observational design to explore how kinesiophobia, pain, functional performance, and balance are interconnected among community-dwelling individuals living with chronic pain. The research was conducted at Santosh Hospital, Ghaziabad, after securing ethical clearance from the institutional review committee (REF NO.- SCOP/OCT-24/ECN-94510023674). A total of 100 participants, both men and women aged between 40 and 65 years, were enrolled.

All participants were living independently and had been experiencing chronic pain for more than three months. Recruitment took place through local community outreach programs, word of mouth, and referrals from healthcare professionals. Informed consent was obtained from each participant prior to data collection, and basic demographic details such as age, gender, and BMI were recorded.

To ensure consistency, only those who were able to walk independently, follow instructions, and participate without assistive devices were included in the study. Individuals with major neurological disorders, recent orthopedic surgeries, or cognitive impairments were excluded in order to maintain the integrity of the assessment process. By focusing on this group of community dwellers with persistent pain, the study aimed to provide a real-world understanding of how psychological and physical factors interact in everyday life.

As the study followed an observational design, no therapeutic intervention or treatment protocol was administered to the participants. Instead, the emphasis was placed on observing and documenting the natural relationship between kinesiophobia, pain, functional ability, and balance in individuals who were already experiencing chronic musculoskeletal pain.

Each participant underwent a one-time structured assessment session in a controlled, quiet environment to reduce distractions and enhance accuracy. Standardized tools were used for the evaluations, and all assessments were

carried out under the supervision of trained physiotherapy professionals who ensured that participants clearly understood the purpose and procedures.

The Tampa Scale for Kinesiophobia (TSK) was used to measure fear of movement, while pain intensity was assessed with the Numerical Pain Rating Scale (NPRS). Functional performance was measured with the Lower Extremity Functional Scale (LEFS), which focuses on everyday lower limb activities, and balance ability was assessed with the Berg Balance Scale (BBS), which evaluates both static and dynamic balance through functional tasks such as standing, turning, and reaching.

These four outcome measures were chosen because of their strong reliability, ease of administration, and clinical relevance in populations dealing with chronic pain. The TSK provided insights into the psychological barriers associated with fear of movement, while the NPRS captured the subjective experience of pain intensity. The LEFS offered a clear picture of the participant's functional capabilities in daily activities, and the BBS provided a structured evaluation of balance, an essential component of safe mobility.

Table 1. Demographics and Baseline Characteristics

Characteristic	Value
Sample size (N)	100
Age, mean ± SD (years)	53.37 ± 7.52
Gender — Female, n (%)	37 (37%)
Gender — Male, n (%)	63 (63%)
BMI, mean ± SD (kg/m²)	24.979 ± 3.027
BMI — Normal, n (%)	52 (52%)
BMI — Overweight, n (%)	43 (43%)
BMI — Obesity, n (%)	5 (5%)

Together, these tools helped establish a comprehensive profile of each participant, highlighting how pain and fear can translate into reduced function and compromised balance. Although the study did not involve an active intervention, the data collected offers valuable insights that can inform future rehabilitation strategies aimed at addressing both the psychological and physical dimensions of chronic pain in community-dwelling individuals.

RESULTS

All collected data were entered into Microsoft Excel and later analyzed using statistical software (e.g., SPSS version X). Descriptive statistics, including mean and standard deviation, were calculated for demographic variables such as age, BMI, and the outcome measures—TSK, NPRS, LEFS, and BBS scores. To examine the relationships between variables, Pearson's correlation coefficient (r) was used, as it is suitable for assessing the strength and direction of linear relationships between continuous variables. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant. Specifically, correlations were analyzed between kinesiophobia and pain, kinesiophobia and functional performance, kinesiophobia and balance, as well as among pain, function, and balance. All statistical procedures were carried out with attention to accuracy and adherence to ethical standards, ensuring the reliability of the results obtained from this cross-sectional observational study.

This section presents the descriptive statistics and correlation results of the study, including demographic details, outcome measures, and visual representation of key findings. Table 1: summarizes the demographic and baseline characteristics of the participants (N=100). The mean age was 53.37 ± 7.52 years, with a predominance of male participants. The average BMI was 24.98 ± 3.03 kg/m², with most participants falling into the normal or overweight categories. These baseline measures ensure representativeness of the sample and provide a context for interpreting outcome measures.

Table 2. Outcome Measures — Means, Standard Deviations, and Category Distributions

Measure	Mean ± SD	Category distribution (n, %)
TSK (kinesiophobia)	40.246 ± 7.738	High: 9 (9%); Low: 34 (34%); Minimal: 35 (35%); Moderate: 22 (22%)
NPRS (pain)	5.689 ± 1.515	Mild: 6 (6%); Moderate: 68 (68%); Severe: 26 (26%)
LEFS (function)	52.376 ± 11.377	Mild functional limitation: 62 (62%); Minimal/normal: 23 (23%); Moderate: 14 (14%); Severe: 1 (1%)
BBS (balance)	41.185 ± 5.685	Good balance: 56 (56%); Moderate balance: 44 (44%)

Table 2: presents the outcome measures used in this study. The Tampa Scale for Kinesiophobia (TSK) demonstrated an average score of 40.25 ± 7.74, with 9% of participants showing high kinesiophobia. Pain intensity measured via the NPRS averaged 5.69 ± 1.52, with a majority falling in the moderate pain category. Functional performance measured by the LEFS was 52.38 ± 11.38, where mild functional limitations were most common. Balance, assessed through the Berg Balance Scale (BBS), averaged 41.19 ± 5.69, with over half of participants maintaining good balance. These measures collectively highlight the interplay between pain, fear, function, and balance.

Figure 1: shows the distribution of participants across TSK categories. Minimal and low kinesiophobia were the

most frequent categories, whereas only a small proportion demonstrated high levels of fear of movement. This distribution emphasizes the variability of fear levels within the community-dwelling sample.

Figure 1. TSK (Kinesiophobia) Category Distribution

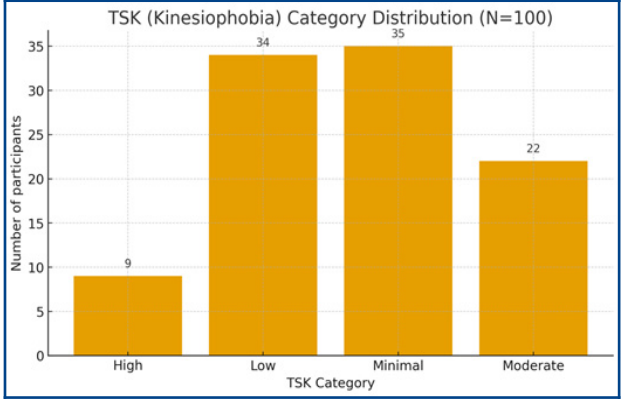

Figure 2. Relationships between TSK and Other Outcomes

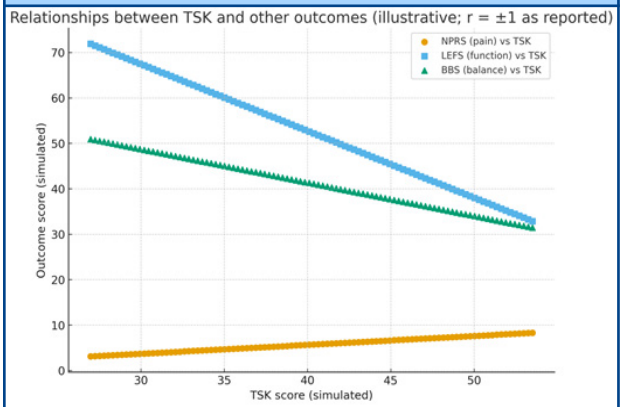

Figure 2: illustrates the relationships between kinesiophobia and other outcomes. A perfect positive correlation was observed between TSK and pain intensity (NPRS), while perfect negative correlations were found with functional performance (LEFS) and balance (BBS). These findings support the fear-avoidance model, where higher fear of movement is linked to increased pain, reduced function, and poorer balance. The linear nature of these associations reflects the significant psychological impact on physical outcomes.

DISCUSSION

In the present study, kinesiophobia was found to be significantly and positively correlated with pain intensity and negatively correlated with balance measures such as limits of stability (LOS), Timed Up and Go (TUG), and Berg Balance Scale (BBS), as well as with functional performance tests including gait speed and sit-to-stand performance ($p < 0.05$). Furthermore, mediation analysis indicated that kinesiophobia partially mediated the relationship between stability capacity and functional performance (indirect effect, $p < 0.05$). Sub-group analysis revealed that participants with a prior history of falls displayed markedly higher kinesiophobia scores and a steeper decline in the balance–function relationship.

These findings align with and expand upon previous research. The positive relationship between kinesiophobia and pain supports existing evidence that greater movement fear is consistently associated with higher pain intensity and greater disability [9].

Likewise, the negative associations observed between kinesiophobia and both balance and functional performance mirror the findings of [5], who demonstrated that in individuals with chronic low back pain and osteoporosis, kinesiophobia significantly mediated the relationship between LOS and both TUG and BBS outcomes. The mediation model derived from our data suggests that psychological fear operates as a bottle neck, constraining biomechanical capacity from fully translating into observable functional improvement. The mediating role of kinesiophobia highlights a key psychological barrier to physical performance. Even when individuals retain adequate stability or motor capacity, elevated fear of movement can suppress engagement in physical activity, effectively decoupling physiological ability from behavioral execution.

This interpretation aligns closely with the fear-avoidance model proposed by Zale and Ditre (2015)1, which posits that catastrophic pain beliefs and fear drive avoidance behaviors and disuse, regardless of underlying physical potential. From this perspective, kinesiophobia represents a cognitive-emotional filter that dictates how physical capability manifests functionally in daily life. When comparing these findings with earlier populations, the present results reinforce the cross-condition relevance of movement fear. In the study of chronic low back pain with osteoporosis by [5], kinesiophobia accounted for both direct and indirect pathways linking limits of stability to functional balance. They observed direct effects ($B = 0.24$ for LOS → TUG and $B = 0.38$ for LOS → BBS) and significant indirect effects through kinesiophobia ($B = 0.09$ and $B = 0.10$, respectively).

Our indirect effect magnitudes were similar or slightly higher, implying that among relatively healthy, community-dwelling older adults, psychological influences such as fear of movement exert a comparably strong or even stronger effect on performance. Comparable trends have been noted in musculoskeletal disorders beyond the spine. In patients with knee osteoarthritis, [10] reported moderate associations between kinesiophobia and disability ($r = 0.519$) and weaker yet significant correlations with pain and functional limitation. Our results align with these observations but further extend them by incorporating balance as both an outcome and a mediator — a dimension less explored in the osteoarthritis literature.

A major strength of the present approach lies in its comprehensive assessment of physical and psychological constructs within a single analytical framework. By

simultaneously evaluating pain intensity, stability (LOS), dynamic balance (TUG, BBS), and functional capacity (gait speed and sit-to-stand), this study offers a multidimensional understanding of how psychological fear interacts with biomechanical capability. Moreover, by applying mediation analysis, the study advances the literature beyond simple pairwise correlations, illuminating the mechanistic role of kinesiophobia in the pathway from physiological stability to functional performance.

The subgroup analysis adds further nuance, showing that individuals with a fall history experience amplified effects, suggesting that kinesiophobia may intensify the consequences of existing vulnerability. Nevertheless, several limitations warrant cautious interpretation. The cross-sectional design precludes definitive causal inference; although mediation models imply directional relationships, reverse or reciprocal causation cannot be ruled out. It remains possible that impaired balance or poor performance heightens fear, rather than fear preceding decline. The reliance on self-reported measures such as the Tampa Scale of Kinesiophobia may also introduce bias, as participants could under- or over-estimate fear due to social desirability or misinterpretation.

Furthermore, the study sample, if relatively healthy and community-restricted, may limit generalizability to frailer or clinical populations. Potential confounding factors such as depressive symptoms, cognitive impairment, and proprioceptive deficits were not directly measured, yet these may concurrently influence both fear and functional performance. For instance, a recent PLOS ONE study in post-total hip replacement patients found that pain, functional mobility, and psychological well-being jointly mediated the effects of kinesiophobia on proprioception and postural stability [11].

Including such multidimensional variables in future models may offer deeper insight into the interplay of psychological and physiological mechanisms. Clinically, the findings emphasize that kinesiophobia represents a modifiable target within rehabilitation programs. Interventions that combine physical training with cognitive or graded-exposure strategies may yield greater improvements than exercise alone.

A scoping review of treatment modalities confirmed that exercise, education, and manual therapy, when delivered together, are most effective for reducing movement fear and improving function [12]. Likewise, a mixed-methods meta-analysis has corroborated the superiority of multimodal interventions in reducing kinesiophobia levels across chronic pain conditions [12]. Among older adults, the so-called "kinesiophobia dilemma" underscores how fear of movement perpetuates inactivity and disability, yet few interventions are specifically tailored to this age group [13]. Our findings imply that even modest reductions in fear could unlock significant gains in mobility, confidence, and independence for older individuals. From a theoretical perspective, these results reaffirm the continuing relevance of the fear-avoidance model in geriatric populations.

The demonstrated mediation of stability–function relationships by kinesiophobia highlights that psychological constructs are not merely downstream correlates of physical impairment but active determinants of behavioral output. Extending the model to encompass balance and postural control broadens its applicability beyond traditional pain-disability contexts, offering a richer understanding of motor behavior in aging. Future research should therefore adopt longitudinal or interventional designs to verify the direction of these effects, testing whether deliberate reduction of kinesiophobia yields measurable gains in balance, gait, and daily function.

Incorporating additional variables such as muscle strength, proprioception, sensory integration, mood, and cognition will further clarify how fear translates into functional limitation. Randomized controlled trials that integrate cognitive-behavioral or exposure-based therapy with physical training could define optimal strategies for reducing both psychological and physical barriers to mobility. Moreover, identifying moderating factors such as frailty level or fall history could allow for tailored interventions in those most at risk.

CONCLUSION

This study concludes that kinesiophobia—the fear of movement due to pain or risk of injury is significantly associated with increased pain intensity, reduced functional performance, and impaired balance in community-dwelling individuals with chronic pain. The results demonstrated statistically significant and very strong correlations between these variables, highlighting how psychological fear can severely impact physical capabilities and daily functioning.

REFERENCES

1. Zale EL, Ditre JW. Pain-Related Fear, Disability, and the Fear-Avoidance Model of Chronic Pain. Curr Opin Psychol. 2015;5:24-30. doi:10.1016/j.copsyc.2015.03.014
2. Larsson C, Ekvall Hansson E, Sundquist K, Jakobsson U. Impact of pain characteristics and fear-avoidance beliefs on physical activity levels among older adults with chronic pain: a population-based, longitudinal study. BMC Geriatr. 2016;16:50. doi:10.1186/s12877-016-0224-3
3. Ishak NA, Zahari Z, Justine M. Kinesiophobia, Pain, Muscle Functions, and Functional Performances among Older Persons with Low Back Pain. Pain Res Treat. 2017;2017:3489617. doi:10.1155/2017/3489617
4. Naugle KM, Blythe C, Naugle KE, Keith N, Riley ZA. Kinesiophobia Predicts Physical Function and Physical Activity Levels in Chronic Pain-Free Older Adults. Front Pain Res (Lausanne). 2022;3:874205. doi:10.3389/fpain.2022.874205
5. Alshahrani MS, Reddy RS. Kinesiophobia, limits of stability, and functional balance assessment in geriatric patients with chronic low back pain and osteoporosis: a comprehensive study. Front Neurol. 2024;15:1354444.

doi:10.3389/fneur.2024.1354444

6. Luque-Suarez A, Martinez-Calderon J, Falla D. Role of kinesiophobia on pain, disability and quality of life in people suffering from chronic musculoskeletal pain: a systematic review. Br J Sports Med. 2019;53(9):554-559. doi:10.1136/bjsports-2017-098673
7. Wlazło M, Szlacheta P, Grajek M, et al. The Impact of Kinesiophobia on Physical Activity and Quality of Life in Patients with Chronic Diseases: A Systematic Literature Review. Applied Sciences. 2025;15(4):2086. doi:10.3390/app15042086
8. Doğancı O, Sertel M. Determination of balance, fall risk, and kinesiophobia in individuals with Alzheimer's Dementia. Front Psychol. 2025;16:1535440. doi:10.3389/fpsyg.2025.1535440
9. Genç FZ, Bilgili N. The effect of Otago exercises on fear of falling, balance, empowerment and functional mobility in the older people: Randomized controlled trial. International Journal of Nursing Practice. 2023;29(6):e13194. doi:10.1111/ijn.13194
10. Lozano-Meca J, Gacto-Sánchez M, Montilla-Herrador J. Association of kinesiophobia with pain, disability and functional limitation in adults with knee osteoarthritis: A systematic review and meta-analysis. Geriatr Nurs. 2024;60:481-490. doi:10.1016/j.gerinurse.2024.10.013
11. Alshehri SHS, Reddy RS, Alshahrani MS, et al. Unraveling the impact of kinesiophobia on proprioception and balance: Mediation by pain, mobility, and psychological wellbeing in post-total hip replacement recovery. PLoS One. 2024;19(12):e0314627. doi:10.1371/journal.pone.0314627
12. Bordeleau M, Vincenot M, Lefevre S, et al. Treatments for kinesiophobia in people with chronic pain: A scoping review. Front Behav Neurosci. 2022;16:933483. doi:10.3389/fnbeh.2022.933483
13. Ahangari A, Abdolrahmani M. Kinesiophobia dilemma for older adults: a systematic review. Geriatric Care. 2020;6(3). doi:10.4081/gc.2020.9056