JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

https://doi.org/10.61919/78tyzy70

Original Article

Relationship of Sleep Disturbance and Kinesiophobia with Trigger Points of Gastrocnemius

Sania Naz[1], Nida Ilhai[2], Zainab Batool[3], Summan Zahra[3], Syeda Khizra Zaidi[3], Hadia Sohail[3], Amna Anser[3], Aleesha Fayyaz[3], Mahnoor Fatima[3], Maria Razzaq[3]

[1] Senior Lecturer, DPT Department, GCUF Layyah Campus, Layyah, Pakistan
[2] HOD, DPT Department, GCUF Layyah Campus, Layyah, Pakistan
[3] DPT Department, GCUF Layyah Campus, Layyah, Pakistan

*Corresponding author: Sania Naz, saaniaanaz@gmail.com

"Cite this Article" **Received**: 26 April 2026; **Accepted**: 11 May 2026; **Published**: 13 June 2026
Author Contributions: Concept: SN and NI; Design: SN, NI, and ZB; Data Collection: SZ, SKZ, HS, AA, AF, MF, and MR; Analysis: SN and NI; Drafting: SN, ZB, and SZ; Critical Review: NI. **Ethical Approval**: GCUF Layyah Campus, Layyah, Pakistan. **Informed Consent**: Written informed consent was obtained from all participants; **Conflict of Interest**: The authors declare no conflict of interest. **Funding**: No external funding; **Data Availability**: Available from the corresponding author on reasonable request; **Acknowledgments**: N/A.

ABSTRACT

Background: Gastrocnemius myofascial trigger points may contribute to calf pain, nocturnal discomfort, functional limitation, and altered movement behavior. Sleep disturbance and kinesiophobia are clinically relevant in musculoskeletal pain, but their relationship among individuals with gastrocnemius trigger points remains insufficiently explored. Objective: To determine the association between sleep disturbance and kinesiophobia among individuals with gastrocnemius trigger points. Methods: This cross-sectional observational study was conducted in Layyah and included 109 participants aged 20–50 years with clinically identified gastrocnemius trigger points. Participants were selected using non-probability purposive sampling. Trigger points were identified using Travell and Simons' diagnostic criteria and a positive jump sign. Sleep disturbance was assessed using the Insomnia Severity Index, and kinesiophobia was assessed using the Tampa Scale of Kinesiophobia. Data were analyzed using SPSS version 27. Categorical variables were summarized as frequencies and percentages, age was summarized using median and interquartile range, and the association between insomnia severity and kinesiophobia was assessed using Spearman's rank correlation. Results: The median age was 34 years (IQR: 28–42), and 57 participants (52.3%) were female. Left-sided involvement was reported by 56 participants (51.4%). Sleep-related functional interference was the most prominent insomnia-related domain, while pain-related protective beliefs were commonly endorsed across kinesiophobia items. Spearman's correlation showed a statistically significant positive association between insomnia severity and kinesiophobia (r_s = 0.977, p = 0.001). Conclusion: Higher insomnia severity was strongly associated with higher kinesiophobia among individuals with gastrocnemius trigger points. These findings support integrated assessment of sleep disturbance and fear-avoidance beliefs during rehabilitation planning, although causal direction cannot be inferred from the cross-sectional design. Keywords: Gastrocnemius; Insomnia; Kinesiophobia; Myofascial Trigger Points; Sleep Disturbance; Tampa Scale of Kinesiophobia.

INTRODUCTION

Myofascial trigger points are hyperirritable localized areas within taut bands of skeletal muscle that may produce local tenderness, referred pain, restricted muscle flexibility, altered neuromuscular activation, and functional limitation when compressed or mechanically stressed (1). In the lower limb, the gastrocnemius is clinically important because it contributes to ankle plantar flexion, knee flexion, postural control, gait propulsion, and weight-bearing stability; therefore, repetitive loading, prolonged standing, postural strain, and occupational overuse may predispose this muscle to myofascial dysfunction (2). Trigger points in the gastrocnemius may present with localized calf tenderness, referred pain toward the foot, reduced tolerance for standing or walking, nocturnal calf discomfort, and

ISSN 3007-0570 | © 2026 The Authors | CC BY 4.0

symptoms that may overlap with other regional disorders such as plantar fasciitis or Achilles tendinopathy (3). Because the gastrocnemius is repeatedly engaged during routine mobility and sustained upright activity, trigger-point-related pain in this muscle may have functional implications beyond local discomfort, particularly in individuals whose daily work requires prolonged standing or repetitive lower-limb loading.

The pathophysiological basis of myofascial trigger points is commonly explained through abnormal motor endplate activity, excessive acetylcholine release, sustained sarcomere contraction, localized ischemia, sensitization of nociceptors, and the development of a palpable taut band that can generate pain and protective movement responses (4). In clinical examination, Travell and Simons' diagnostic criteria and the jump sign remain commonly used approaches for identifying trigger points, although these procedures require careful palpation and standardized examiner technique to reduce diagnostic variability (5). Active trigger points may also contribute to altered movement behavior because persistent pain can increase protective guarding, reduce muscle efficiency, and reinforce avoidance of painful activity. In this context, gastrocnemius trigger points may be particularly relevant because even routine activities such as walking, stair climbing, standing, or stretching can provoke calf discomfort and may gradually influence an individual's confidence in movement.

Kinesiophobia refers to an excessive and maladaptive fear of physical movement or activity arising from the belief that movement may cause pain, worsen symptoms, or lead to re-injury (6). The fear-avoidance model suggests that individuals who interpret pain as threatening may avoid activity, which can contribute to physical deconditioning, increased disability, persistent pain behavior, and reduced participation in daily activities (6). Previous evidence has shown that individuals with musculoskeletal pain frequently report kinesiophobia, and factors such as pain severity, psychological distress, physical inactivity, and overweight status may further increase fear of movement (7). In gastrocnemius-related myofascial pain, fear-avoidance beliefs may be especially relevant because calf pain directly affects walking, balance, and weight-bearing tasks. Evidence from athletes with gastrocnemius chronic myofascial pain indicates that fear-avoidance beliefs and kinesiophobia are more prominent in affected individuals than in healthy controls, supporting the view that trigger-point-related calf pain may influence both physical performance and pain-related cognition (8).

Sleep disturbance is another important clinical dimension in individuals with musculoskeletal pain. Insomnia is characterized by difficulty initiating sleep, difficulty maintaining sleep, early morning awakening, dissatisfaction with sleep quality, and daytime impairment despite adequate opportunity for sleep (9). Pain arising from active myofascial trigger points may interfere with sleep by increasing nocturnal discomfort, limiting comfortable sleeping positions, producing muscle stiffness, or contributing to night-time calf cramps and awakenings (10). Poor sleep may also reduce pain tolerance, amplify pain perception, increase emotional distress, and reduce physical recovery, thereby creating a clinically important interaction between pain, sleep, and movement behavior (11). In individuals with lower-limb myofascial symptoms, disturbed sleep may therefore coexist with kinesiophobia, as the combined burden of pain, fatigue, and anticipatory fear may reduce willingness to move or exercise.

Although previous studies have examined gastrocnemius trigger points, kinesiophobia, sleep disturbance, and musculoskeletal pain as separate or partially related constructs, direct evidence on the association between insomnia severity and kinesiophobia among individuals with gastrocnemius trigger points remains limited. Existing work has reported gastrocnemius trigger points in occupational groups exposed to prolonged standing, fear-avoidance beliefs in athletes with gastrocnemius myofascial pain, and sleep disturbance in musculoskeletal conditions, but few studies have assessed sleep disturbance and kinesiophobia together in a non-athlete clinical or occupational sample with confirmed gastrocnemius trigger points (7,8,12). This gap is clinically important because rehabilitation strategies for gastrocnemius trigger points often focus on local pain, stretching, manual therapy, or ergonomic

correction, while sleep-related impairment and fear of movement may remain under-recognized contributors to persistent symptoms and reduced functional recovery.

The present cross-sectional study was therefore conducted to determine the association between sleep disturbance and kinesiophobia among individuals with gastrocnemius trigger points. The study was guided by the hypothesis that higher insomnia severity would be significantly associated with higher kinesiophobia in individuals with clinically identified gastrocnemius trigger points.

MATERIALS AND METHODS

This cross-sectional observational study was conducted in Layyah over a six-month period after synopsis approval to examine the association between sleep disturbance and kinesiophobia among individuals with gastrocnemius trigger points. The cross-sectional design was appropriate because the objective was to assess the relationship between insomnia severity and fear of movement at a single point in time rather than to determine causality or treatment effect. The study population included male and female participants aged 20–50 years who had a history of prolonged standing for approximately 3–4 hours per day and met the clinical criteria for at least one gastrocnemius trigger point. Participants were selected through non-probability purposive sampling based on predefined eligibility criteria. Individuals were included if they had a positive jump sign and fulfilled Travell and Simons' diagnostic criteria for gastrocnemius trigger points. Individuals were excluded if they had recent lower-limb surgery, any condition contraindicating palpation of the calf muscles, a history of Alzheimer's disease or Parkinson's disease, vestibular problems, or acute traumatic injury.

The final analyzed sample consisted of 109 participants. The sample size was calculated using Epitools based on the study objective and expected association between the study variables. Eligible participants were approached after initial screening, and the purpose and procedures of the study were explained before enrolment. Written informed consent was obtained from each participant before data collection. Participants were informed about voluntary participation, confidentiality of collected information, anonymity of responses, and their right to withdraw from the study at any stage without penalty. Ethical principles for human-subject research were followed, and the study procedures were conducted according to the ethical requirements of the GCUF Layyah ethical committee.

Clinical screening for gastrocnemius trigger points was performed before administration of the questionnaires. The gastrocnemius muscle was examined through palpation to identify a taut band, localized tenderness, and reproduction of symptoms consistent with Travell and Simons' diagnostic criteria. The jump sign was used as a behavioral response indicating marked tenderness on compression of the suspected trigger point. Participants who fulfilled the diagnostic criteria and met all eligibility conditions were included in the study. This approach ensured that sleep disturbance and kinesiophobia were assessed specifically among individuals with clinically identified gastrocnemius trigger points rather than among a general asymptomatic population.

Sleep disturbance was assessed using the Insomnia Severity Index, a seven-item self-report questionnaire designed to measure the perceived severity and impact of insomnia over the preceding month. The instrument evaluates difficulty falling asleep, difficulty staying asleep, early morning awakening, satisfaction with current sleep pattern, interference of sleep problems with daily functioning, noticeability of sleep-related impairment to others, and distress or worry related to sleep problems. Each item is scored on a five-point Likert scale from 0 to 4, yielding a total score ranging from 0 to 28. The total score is interpreted as absence of clinically significant insomnia from 0–7, subthreshold insomnia from 8–14, moderate insomnia from 15–21, and severe insomnia from 22–28 (13). For analysis, insomnia severity was treated as both a continuous total score and a categorical severity variable.

Kinesiophobia was assessed using the Tampa Scale of Kinesiophobia-17, a 17-item questionnaire developed to measure fear of movement and pain-related fear in individuals with musculoskeletal

conditions. Each item is scored on a four-point Likert scale ranging from 1, indicating strongly disagree, to 4, indicating strongly agree. Total scores range from 17 to 68, with higher scores indicating greater fear of movement or re-injury. Participants scoring above 37 were classified as having kinesiophobia according to the threshold used in the manuscript. Reverse-scored items were handled according to the scoring requirements of the Tampa Scale before calculating the total score. The total TSK-17 score was used as the primary kinesiophobia variable for correlation analysis, while the categorical classification was used to describe the frequency of kinesiophobia in the sample.

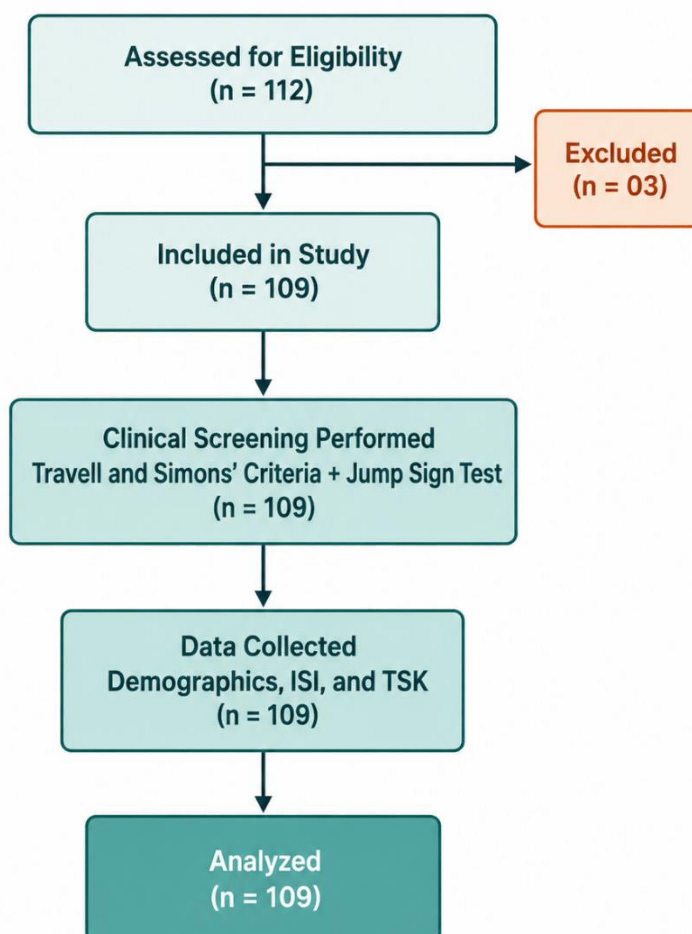

Figure 1 The participant flow diagram shows that 112 individuals were assessed for eligibility, of whom 3 were excluded, leaving 109 participants included in the study. All 109 participants underwent clinical screening using Travell and Simons' criteria with the jump sign test, completed demographic, Insomnia Severity Index, and Tampa Scale of Kinesiophobia assessments, and were included in the final analysis.

The main exposure variable was insomnia severity measured by the total Insomnia Severity Index score, and the main outcome variable was kinesiophobia measured by the total Tampa Scale of Kinesiophobia-17 score. Additional variables included age, gender, affected side, and occupation. Age was treated as a continuous variable, while gender, affected side, and occupation were treated as categorical variables. To improve data quality and reduce measurement error, all participants were assessed using the same eligibility criteria, standardized self-report instruments, and uniform data collection procedures. Questionnaire responses were checked for completeness before data entry. Data were entered and coded for analysis, and categorical variables were verified against the original response categories to reduce coding errors.

Data were analyzed using IBM SPSS Statistics version 27. Continuous variables were summarized using mean and standard deviation when approximately normally distributed and median with interquartile range when distributional assumptions were not met. Categorical variables were summarized as frequencies and percentages. Normality of continuous scale scores was assessed before inferential analysis. Because the Insomnia Severity Index score showed evidence of non-normal distribution and both ISI and TSK scores were derived from ordinal questionnaire items, Spearman's rank correlation coefficient was used to evaluate the association between insomnia severity and kinesiophobia. Statistical significance was set at $p < 0.05$. The correlation coefficient was interpreted according to its direction, magnitude, and clinical relevance. The analysis was limited to association and was not interpreted as evidence of causality because of the cross-sectional study design.

RESULTS

A total of 109 participants with clinically identified gastrocnemius trigger points were included in the final analysis. The median age of the participants was 34 years, with an interquartile range of 28–42 years and an observed age range of 20–49 years. Females constituted a slightly larger proportion of the sample than males, with 57 participants (52.3%) being female and 52 (47.7%) being male. The affected side was almost evenly distributed; left-sided involvement was reported by 56 participants (51.4%), while right-sided involvement was reported by 53 participants (48.6%). Healthcare professionals represented the largest occupational subgroup, accounting for 34 participants (31.2%), followed by students with 28 participants (25.7%), office workers with 25 participants (22.9%), and teachers with 22 participants (20.2%), as shown in Table 1.

Table 1. Demographic and Occupational Characteristics of Participants

Variable	Category	Frequency (n)	Percentage (%)
Age, years	Median (IQR)	34 (28–42)	—
Age, years	Range	20–49	—
Gender	Male	52	47.7
	Female	57	52.3
Affected side	Right	53	48.6
	Left	56	51.4
Occupation	Student	28	25.7
	Teacher	22	20.2
	Office worker	25	22.9
	Healthcare professional	34	31.2

The age distribution showed broad representation across young and middle-aged adults. The middle 50% of participants were between 28 and 42 years of age, indicating that the sample was not dominated by either the youngest or oldest eligible participants. Although the inclusion criteria allowed participants up to 50 years of age, the available frequency distribution showed an observed maximum age of 49 years. Because age was not the primary exposure or outcome variable, and because the frequency distribution was sufficient to describe the sample, detailed single-year age frequencies were not retained in the main results table.

Insomnia-related responses are presented in Table 2 using item-level frequencies and percentages. Difficulty staying asleep was one of the most frequently reported sleep complaints, with 91 participants (83.5%) reporting this symptom at moderate, severe, or very severe levels. Difficulty falling asleep was reported at moderate, severe, or very severe levels by 82 participants (75.3%), while early morning awakening was reported at these levels by 80 participants (73.4%). Sleep dissatisfaction was also prominent, as 64 participants (58.7%) reported being dissatisfied or very dissatisfied with their current sleep pattern. Sleep-related interference with daily functioning was particularly notable, with 72 participants (66.0%) reporting that their sleep problem interfered very or very much with daily functioning. In contrast, worry or distress about sleep was less severe than the functional impact, as 66 participants (60.4%) reported no or only a little worry or distress about their current sleep problem.

Table 2. Item-Level Response Distribution for the Insomnia Severity Index

ISI Item	Response 0	Response 1	Response 2	Response 3	Response 4
Difficulty falling asleep	1 (0.9%)	26 (23.9%)	33 (30.3%)	26 (23.9%)	23 (21.1%)
Difficulty staying asleep	1 (0.9%)	17 (15.6%)	35 (32.1%)	30 (27.5%)	26 (23.9%)
Waking up too early	2 (1.8%)	27 (24.8%)	31 (28.4%)	27 (24.8%)	22 (20.2%)
Satisfaction with current sleep pattern	5 (4.6%)	14 (12.8%)	26 (23.9%)	28 (25.7%)	36 (33.0%)
Interference with daily functioning	1 (0.9%)	16 (14.7%)	20 (18.3%)	25 (22.9%)	47 (43.1%)
Noticeability to others	6 (5.5%)	42 (38.5%)	28 (25.7%)	16 (14.7%)	17 (15.6%)
Worry or distress about sleep	14 (12.8%)	52 (47.6%)	21 (19.3%)	15 (13.8%)	7 (6.4%)

Note: For the first three ISI items, responses range from no difficulty to very severe difficulty. For satisfaction, responses range from very satisfied to very dissatisfied. For interference, noticeability, and distress items, responses range from not at all to very much.

Movement-related fear responses on the Tampa Scale of Kinesiophobia are presented in Table 3 as frequencies and percentages rather than mean scores, because the individual items are ordinal Likert-type responses. For the item "I am afraid that I might injure myself if I exercise," 55 participants (50.5%) agreed or strongly agreed, while 54 participants (49.6%) disagreed or strongly disagreed. A similar pattern was observed for the statement "If I were to try to overcome it, my pain would increase," where 55 participants (50.5%) agreed or strongly agreed. The highest agreement was observed for the statement "Pain lets me know when to stop exercising so that I do not injure myself," where 59 participants (54.2%) agreed or strongly agreed. These findings suggest that movement-related fear and pain-related protective beliefs were present in approximately half of the sample at the item level.

Table 3. Item-Level Response Distribution for the Tampa Scale of Kinesiophobia

TSK Item	Strongly Disagree	Disagree	Agree	Strongly Agree
I am afraid that I might injure myself if I exercise	26 (23.9%)	28 (25.7%)	27 (24.8%)	28 (25.7%)
If I were to try to overcome it, my pain would increase	27 (24.8%)	27 (24.8%)	27 (24.8%)	28 (25.7%)
My body is telling me I have something dangerously wrong	32 (29.4%)	28 (25.7%)	25 (22.9%)	24 (22.0%)
My pain would probably be relieved if I were to exercise	28 (25.7%)	27 (24.8%)	27 (24.8%)	27 (24.8%)
People are not taking my medical condition seriously enough	30 (27.5%)	30 (27.5%)	25 (22.9%)	24 (22.0%)
My accident put my body at risk for the rest of my life	30 (27.5%)	30 (27.5%)	24 (22.0%)	25 (22.9%)
Pain always means I have injured my body	28 (25.7%)	28 (25.7%)	27 (24.8%)	26 (23.9%)
Just because something aggravates my pain does not mean it is dangerous	28 (25.7%)	27 (24.8%)	27 (24.8%)	27 (24.8%)
I am afraid that I might injure myself accidentally	28 (25.7%)	27 (24.8%)	27 (24.8%)	27 (24.8%)
Being careful not to make unnecessary movements is safest	26 (23.9%)	28 (25.7%)	28 (25.7%)	27 (24.8%)
I would not have this much pain if something dangerous were not going on	28 (25.7%)	28 (25.7%)	28 (25.7%)	25 (22.9%)
Although painful, I would be better off physically active	25 (22.9%)	28 (25.7%)	28 (25.7%)	28 (25.7%)
Pain lets me know when to stop exercising	24 (22.0%)	26 (23.9%)	26 (23.9%)	33 (30.3%)
It is not safe for a person with my condition to be active	30 (27.5%)	30 (27.5%)	25 (22.9%)	24 (22.0%)
I cannot do normal activities because I may get injured	30 (27.5%)	30 (27.5%)	24 (22.0%)	25 (22.9%)
Pain does not necessarily mean danger	24 (22.0%)	25 (22.9%)	30 (27.5%)	30 (27.5%)
No one should have to exercise when in pain	28 (25.7%)	27 (24.8%)	27 (24.8%)	27 (24.8%)

The normality assessment of the total questionnaire scores is presented in Table 4. The Insomnia Severity Index score showed evidence of non-normal distribution, with $p = 0.045$. In contrast, the Tampa Scale of Kinesiophobia score did not show statistically significant evidence of non-normality, with $p = 0.200$. Because one of the main variables was non-normally distributed and both total scores were derived from ordinal questionnaire items, Spearman's rank correlation was selected for the primary association analysis.

Table 4. Normality Assessment of Main Study Variables

Variable	Test Statistic	df	p-value
Insomnia Severity Index total score	0.086	109	0.045
Tampa Scale of Kinesiophobia total score	0.065	109	0.200

Spearman's rank correlation analysis showed a statistically significant positive association between insomnia severity and kinesiophobia among participants with gastrocnemius trigger points. The correlation coefficient was $r_s = 0.977$, with $p = 0.001$, indicating a very strong positive relationship between the two total scale scores. The approximate 95% confidence interval for the correlation coefficient was 0.966 to 0.984. This finding suggests that participants with higher insomnia severity also

tended to report higher levels of kinesiophobia. However, because the study design was cross-sectional, this result should be interpreted as an association rather than evidence of a causal or directional relationship.

Table 5. Association Between Insomnia Severity and Kinesiophobia

Variables	Statistical Test	n	Correlation Coefficient	p-value
Insomnia Severity Index total score and Tampa Scale of Kinesiophobia total score	Spearman's rank correlation	109	rs = 0.977	0.001

Overall, the results indicate that sleep disturbance and movement-related fear were both clinically relevant among individuals with gastrocnemius trigger points. The most prominent insomnia-related problem was interference of sleep difficulty with daily functioning, while the most frequently endorsed kinesiophobia-related belief was that pain signals when to stop exercising to avoid injury. The primary inferential finding demonstrated a very strong positive association between insomnia severity and kinesiophobia, supporting the need to assess both sleep-related impairment and fear of movement when evaluating individuals with gastrocnemius trigger points.

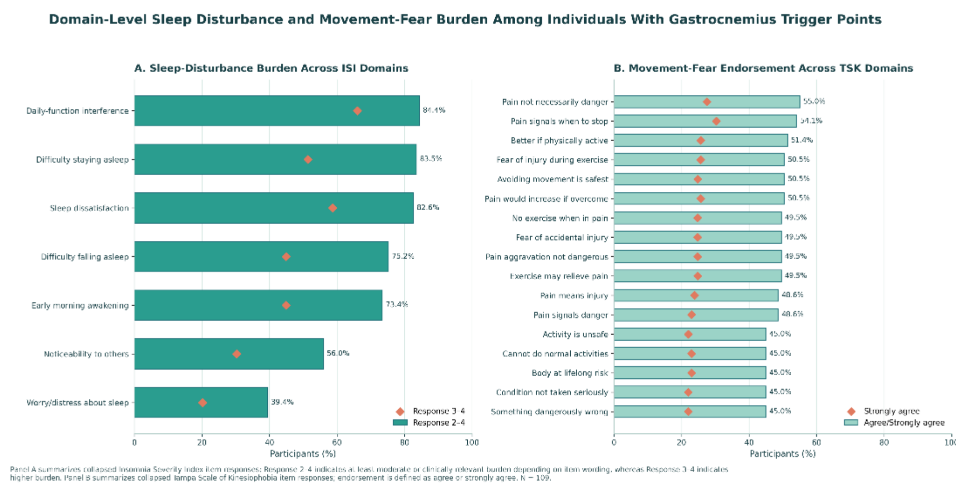

Figure 1. Domain-Level Sleep Disturbance and Movement-Fear Burden Among Individuals With Gastrocnemius Trigger Points

The panelled figure demonstrates that sleep-related functional interference, difficulty staying asleep, and sleep dissatisfaction were the most prominent insomnia-related domains, affecting 84.4%, 83.5%, and 82.6% of participants at response level 2–4, respectively. High-burden ISI responses were most evident for daily-function interference, where 66.0% of participants selected response categories 3–4, followed by sleep dissatisfaction at 58.7% and difficulty staying asleep at 51.4%. In the movement-fear panel, agreement or strong agreement was most frequent for the beliefs that pain is not necessarily dangerous despite severity (55.0%), pain signals when to stop exercising (54.1%), and physical activity may be beneficial despite pain (51.4%). Overall, the figure suggests that functional sleep impairment was more concentrated than movement-fear endorsement, while kinesiophobia-related responses were more evenly distributed across items, supporting the clinical need to assess both sleep-related disability and pain-related movement beliefs in individuals with gastrocnemius trigger points.

DISCUSSION

The present cross-sectional study examined the association between sleep disturbance and kinesiophobia among individuals with clinically identified gastrocnemius trigger points. The main finding was a statistically significant positive correlation between Insomnia Severity Index and Tampa Scale of Kinesiophobia scores, indicating that participants with greater insomnia severity also tended to report higher fear of movement or re-injury. This finding supports the clinical relevance of assessing sleep-related impairment and pain-related movement beliefs together in individuals with gastrocnemius trigger points. However, because the study was observational and cross-sectional, the association should

not be interpreted as evidence that sleep disturbance causes kinesiophobia or that kinesiophobia causes sleep disturbance.

The demographic profile showed that the sample included both males and females, with a slightly higher proportion of female participants, and the affected side was nearly balanced between right and left gastrocnemius involvement. Healthcare professionals, students, office workers, and teachers were represented in the sample, suggesting that the findings may be relevant to individuals exposed to prolonged standing, repetitive lower-limb loading, or sustained postural demands. Previous research has reported that lower-limb trigger points are common in populations exposed to repetitive activity or prolonged standing, and gastrocnemius involvement is clinically important because of its role in gait, postural control, weight bearing, and ankle plantar flexion (1,2). Trigger points in this muscle may therefore influence not only local calf symptoms but also confidence in movement and daily functional tolerance.

The observed insomnia-related response pattern showed that sleep-related functional interference, difficulty staying asleep, and dissatisfaction with sleep pattern were among the most prominent domains. This pattern is clinically plausible because gastrocnemius trigger points may be associated with localized tenderness, nocturnal calf discomfort, stiffness, referred pain, and cramps that can interrupt sleep continuity (3,4). Prior literature has also suggested that musculoskeletal pain and trigger-point-related symptoms may contribute to poor sleep quality by increasing nociceptive input and reducing comfort during rest (5). In the present study, the functional effect of sleep disturbance appeared more prominent than emotional distress about sleep, suggesting that participants may experience meaningful daytime impairment even when worry about sleep is not the dominant complaint. This distinction is important for rehabilitation assessment because sleep impairment may influence fatigue, activity tolerance, pain sensitivity, and participation in exercise-based management.

The kinesiophobia-related response pattern demonstrated that approximately half of the participants endorsed fear-related or pain-protective beliefs on several Tampa Scale items. The most frequently endorsed beliefs included interpreting pain as a signal to stop exercising, fear of injury during exercise, concern that pain would increase if activity was attempted, and reliance on movement avoidance as a protective strategy. These findings are consistent with the fear-avoidance model, which proposes that individuals who interpret pain as threatening may avoid activity, leading to reduced physical conditioning, persistent disability, and greater pain-related vigilance (6). Evidence from individuals with gastrocnemius chronic myofascial pain has also shown higher fear-avoidance beliefs and kinesiophobia compared with healthy controls, supporting the relevance of movement-related fear in this clinical context (7).

The very strong positive correlation between insomnia severity and kinesiophobia suggests that these two dimensions may coexist in individuals with gastrocnemius trigger points. A possible explanation is that persistent calf discomfort and disturbed sleep may reduce pain tolerance and increase perceived vulnerability during movement, while fear of movement may reduce physical activity and reinforce symptom monitoring. Psychological factors, including anxiety, depressive symptoms, and pain catastrophizing, may also contribute to both poor sleep and kinesiophobia in musculoskeletal conditions (8,9). Previous studies have reported associations between musculoskeletal pain, insomnia, anxiety, depression, physical inactivity, and kinesiophobia, which supports the interpretation that these variables are clinically interconnected rather than isolated symptoms (8,10). Nevertheless, the strength of the reported correlation in the present study is unusually high for clinical self-report data, and it should be verified against raw total ISI and TSK scores before final publication. In particular, scoring procedures should confirm that the correlation was calculated from true total scale scores, that reverse-scored Tampa Scale items were handled correctly, and that categorized or duplicated values were not inadvertently used.

The present findings have practical implications for physiotherapy and rehabilitation practice. Assessment of gastrocnemius trigger points should not be limited to palpation findings, local pain, or muscle flexibility. Screening for sleep disturbance and kinesiophobia may help clinicians identify patients who require a broader biopsychosocial approach. Patients with prominent insomnia-related functional impairment may benefit from education about sleep hygiene, pain positioning, pacing, and strategies to reduce nocturnal calf discomfort. Similarly, patients with fear of movement may benefit from reassurance, graded exposure, progressive loading, and carefully monitored exercise programs that challenge maladaptive beliefs while avoiding symptom exacerbation. Such integrated care is consistent with contemporary approaches to myofascial pain, which emphasize the interaction of biological, psychological, and functional contributors (5,6).

This study adds to the existing literature by focusing specifically on individuals with gastrocnemius trigger points and examining the relationship between sleep disturbance and kinesiophobia using standardized self-report tools. Previous studies have explored gastrocnemius trigger points in occupational or athletic populations, kinesiophobia in musculoskeletal disorders, and sleep problems in relation to pain, but fewer studies have examined insomnia severity and kinesiophobia together in this specific trigger-point population (2,7,10). By identifying a significant positive association, the current study highlights the need for rehabilitation assessments that include both sleep and movement-fear domains.

Several limitations should be considered when interpreting these findings. First, the cross-sectional design prevents causal or directional inference. Second, the use of non-probability purposive sampling and a single geographical setting may limit generalizability. Third, the study relied on self-reported measures for sleep disturbance and kinesiophobia, which may be influenced by recall bias, response tendency, or social desirability. Fourth, the diagnosis of gastrocnemius trigger points was based on clinical examination, and the manuscript does not report examiner blinding, inter-rater reliability, or standardized palpation pressure. Fifth, potential confounding variables such as pain intensity, duration of symptoms, physical activity level, body mass index, psychological distress, analgesic use, and occupational standing duration were not adjusted in the main analysis. Finally, the reported correlation coefficient is extremely high and should be rechecked using raw total scores before final interpretation.

Future studies should use larger and more representative samples, include pain intensity and symptom duration, assess physical activity and occupational exposure, and apply adjusted statistical models to determine whether insomnia severity remains independently associated with kinesiophobia after controlling for relevant confounders. Longitudinal studies are also needed to determine whether sleep disturbance predicts later fear of movement, whether kinesiophobia contributes to persistent sleep impairment, or whether both are driven by pain severity and psychological distress. Interventional studies may further clarify whether combined management of trigger points, sleep disturbance, and movement-related fear improves functional outcomes more effectively than local treatment alone.

CONCLUSION

In this cross-sectional sample of individuals with gastrocnemius trigger points, insomnia severity showed a statistically significant positive association with kinesiophobia, indicating that participants with greater sleep disturbance also tended to report greater fear of movement or re-injury. Sleep-related functional interference and difficulty maintaining sleep were prominent insomnia-related problems, while pain-related protective beliefs were common across several kinesiophobia items. These findings suggest that assessment and rehabilitation of gastrocnemius trigger points should include both sleep-related impairment and fear-avoidance beliefs, rather than focusing only on local muscle tenderness or pain. Because of the cross-sectional design, the findings should be interpreted as associative, and further longitudinal and controlled studies are needed to clarify directionality and clinical mechanisms.

REFERENCES

1. Akbar T, Mazher Y, Shahid H. Frequency of trigger points in lower extremity muscles among runners with plantar fasciitis. Journal Riphah College of Rehabilitation Sciences. 2024;12(3).
2. San-Antolín M, Rodríguez-Sanz D, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Casado-Hernández I, López-López D, et al. Central sensitization and catastrophism symptoms are associated with chronic myofascial pain in the gastrocnemius of athletes. Pain Med. 2020;21(8):1616-25.
3. Bordoni B, Varacallo MA. Anatomy, bony pelvis and lower limb, gastrocnemius muscle. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2023.
4. Zhai T, Jiang F, Chen Y, Wang J, Feng W. Advancing musculoskeletal diagnosis and therapy: a comprehensive review of trigger point theory and muscle pain patterns. Front Med (Lausanne). 2024;11:1433070.
5. Koukoulithras I, Plexousakis M, Kolokotsios S, Stamouli A, Mavrogiannopoulou C. A biopsychosocial model-based clinical approach in myofascial pain syndrome: a narrative review. Cureus. 2021;13(4):e14737.
6. Bordeleau M, Vincenot M, Lefevre S, Duport A, Seggio L, Breton T, et al. Treatments for kinesiophobia in people with chronic pain: a scoping review. Front Behav Neurosci. 2022;16:933483.
7. San-Antolín M, Rodríguez-Sanz D, Vicente-Campos D, Palomo-López P, Romero-Morales C, Benito-de-Pedro M, et al. Fear avoidance beliefs and kinesiophobia are presented in athletes who suffer from gastrocnemius chronic myofascial pain. Pain Med. 2020;21(8):1626-35.
8. Zarean E, Azadeh A, Pirali H, Doroushi B, Edrisi A, Ahmadi A, et al. Association between depression, anxiety, and insomnia with musculoskeletal pain source: a multi-center study. Middle East Curr Psychiatry. 2021;28(1):5.
9. Fábrega-Cuadros R, Aibar-Almazán A, Martínez-Amat A, Hita-Contreras F. Impact of psychological distress and sleep quality on balance confidence, muscle strength, and functional balance in community-dwelling middle-aged and older people. J Clin Med. 2020;9(9):3059.
10. Mekonnen Y, Gashaw M, Abich Y, Takele MD, Chanie ST, Wayessa DI, et al. Kinesiophobia and associated factors among people with musculoskeletal disorders in Ethiopia: a multicenter cross-sectional study. BMC Musculoskelet Disord. 2025;26(1):55.
11. Lam CSE, Zhang M, Lim I. Primary care approach to calf cramps. Singapore Med J. 2022;63(12):746-52.
12. Ahmad M, Sheikh SA, Noor M, Munir B, Khan MA, Noor M. Prevalence of musculoskeletal pain and trigger points due to prolonged standing and awkward posture among chefs. Journal of Health, Wellness and Community Research. 2025:e445-e.
13. You Y, Chen Y, Zhang Q, Yan N, Ning Y, Cao Q. Muscle quality index is associated with trouble sleeping: a cross-sectional population based study. BMC Public Health. 2023;23(1):489.
14. Núñez-Cortés R, Horment-Lara G, Tapia-Malebran C, Castro M, Barros S, Vera N, et al. Role of kinesiophobia in the selective motor control during gait in patients with low back-related leg pain. J Electromyogr Kinesiol. 2023;71:102793.
15. Das R, Jhajharia B. Correlation between latent myofascial trigger point and peak torque production of lower limb muscles on sports person. Age (Years). 2022;20(2.13):20.45-2.18.

16. Benli RK, Yasarer Ö, Mete E, Kilic BB. The relationship between comorbidities, physical inactivity, kinesiophobia and physical performance in hypertensive individuals: a cross-sectional study. BMC Cardiovasc Disord. 2025;25(1):279.

17. Mikkonen J, Kupari S, Tarvainen M, Neblett R, Airaksinen O, Luomajoki H, et al. To what degree patient-reported symptoms of central sensitization, kinesiophobia, disability, sleep, and life quality associated with 24-h heart rate variability and actigraphy measurements? Pain Pract. 2024;24(4):609-19.

18. Bulguroğlu M, Bulguroğlu Hİ. Investigation of sleep quality and kinesiophobia levels in individuals with fibromyalgia with different physical activity levels. Acıbadem Üniversitesi Sağlık Bilimleri Dergisi. 2024;15(4):418-23.

19. Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep. 2011;34(5):601-8.

20. Das R, Jhajharia B, Ciocan VC, Sharma A, Majumdar I. Myofascial trigger points and its influence on athletic performance. NeuroQuantology. 2022;20(19):467-83.