Majalah Ilmiah Fisioterapi Indonesia
Indonesian Scientific Journal of Physiotherapy

Original Research Articles
ISSN (Print): 2303-1921
ISSN (Online): 2722-0443
Volume 14, Number 01, Pages 273-277 (2026)
DOI: https://doi.org/10.24843/mifi.000000913

Working Posture and Upper Trapezius Myofascial Pain Syndrome: A Cross-Sectional Study

Nuansa Cita Rudyana[1], M. Widnyana[2], Agung Wiwiek Indrayani[3]

[1]Undergraduate and Professional Physiotherapy Program, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia
[2]Department of Physiotherapy, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia
[3]Department of Pharmacology, Faculty of Medicine, Udayana University, Denpasar, Bali, Indonesia

Corresponding author:
Name: Nuansa Cita Rudyana
E-mail: nuansacita@gmail.com

Received 5 November 2025; Revised 10 November 2025; 3 December 2026; Published 31 January 2026

Abstract

Introduction: Poor working posture is widely recognized as a potential risk factor for musculoskeletal disorders among office workers, particularly those engaged in prolonged computer use. One of the most commonly reported conditions is myofascial pain syndrome (MPS), especially affecting the upper trapezius muscle. Despite this, the relationship between working posture and MPS remains inconsistent across studies.

Objective: This study aimed to determine the relationship between working posture and the incidence of upper trapezius myofascial pain syndrome among office workers.

Methods: A cross-sectional analytical study was conducted among employees at the Faculty of Medicine, Udayana University, between October 28 and December 6, 2024. A total of 61 participants aged 30–50 years who met the inclusion and exclusion criteria were recruited using purposive sampling. Working posture was assessed using the Rapid Upper Limb Assessment (RULA). The diagnosis of MPS was confirmed through flat palpation performed by a physiotherapist, while pain intensity was measured using the Numeric Rating Scale (NRS). Data were analyzed using Spearman's rho correlation test.

Results: The findings showed no significant correlation between working posture and the incidence of MPS. On the right side, the correlation coefficient was r = –0.112 with a p-value of 0.392, while on the left side, r = –0.026 with a p-value of 0.842 (p > 0.05). These results suggest that working posture alone may not significantly influence the occurrence of upper trapezius MPS.

Conclusion: There was no significant association between working posture and upper trapezius myofascial pain syndrome among office workers.

Keywords
Posture; Myofascial Pain Syndromes; Trapezius Muscle; Ergonomics; Office Workers

Introduction

The advancement of technology and the transformation of work patterns in the digital era have led many individuals to spend extended periods in static sitting positions, particularly while working with computers. This situation is highly relevant to staff at educational institutions such as the Faculty of Medicine, Udayana University, where administrative and academic duties often require prolonged sedentary activity. Poor ergonomic posture, such as slouching or forward head positions, may progressively contribute to musculoskeletal disorders, especially involving the upper trapezius muscle.[1] This muscle plays an essential role in neck and shoulder stabilization and functions as a postural muscle that remains active over prolonged periods. Sustained static load can impair microcirculation, leading to tissue ischemia, local inflammation, and the release of algogenic substances such as bradykinin and prostaglandins, all of which contribute to pain.[2]

One of the most common causes of musculoskeletal pain is myofascial pain syndrome (MPS), a condition marked by the presence of active trigger points within muscle fibers. Pressure applied to these trigger points can cause localized or referred pain. Muthiah et al. reported that approximately 93.75% of MPS cases affect the upper trapezius muscle, emphasizing the high prevalence and clinical importance of addressing this issue.[3,4] The condition is often exacerbated by low awareness of proper posture in the workplace. Hari et al. found that more than 50% of neck and head pain complaints were associated with MPS triggered by poor posture.[5] Risk factors include prolonged sitting, typing without elbow support, and misaligned monitors that contribute to excessive strain on the neck and shoulder muscles. Over time, this can result in the formation of taut bands within the muscle tissue, which may develop into active trigger points if not properly managed.[6]

Other contributing factors to MPS include age, sex, and work duration. Individuals aged 30 to 50 years, considered to be in their most productive years, are particularly vulnerable due to heavy workloads combined with poor ergonomic habits.[7] Women are reported to experience a higher incidence (54%) compared to men (45%), likely due to physiological and hormonal differences that affect muscle elasticity and strength.[8] Epidemiological data from Tsabita et al. suggest that the prevalence of MPS among the working population in Indonesia ranges between 6% and 67%, and globally, the condition contributes to disability in over 33.6 million individuals.[9]

Although previous studies, including that by Hari et al., have identified a significant association between poor working posture and the occurrence of MPS in the upper trapezius, research focusing specifically on academic staff, such as those at the Faculty of Medicine, Udayana University, remains limited.[5] Given that this population is often engaged in sedentary work and prolonged computer use, further investigation is necessary.

This study is important not only from a clinical standpoint but also from an institutional perspective. Employees suffering from chronic MPS-related pain may experience reduced productivity, increased absenteeism, and rising healthcare costs. Over time, these outcomes can negatively impact institutional efficiency and place a financial burden on health services. From a physiotherapy standpoint, this research serves as a foundation for developing evidence-based preventive interventions, such as ergonomic

education, postural muscle strengthening exercises, and manual therapy. The findings may also guide policy development for workplace ergonomics in academic and office settings and support future research in this area.

The objectives of this study are to describe the working posture and the incidence of upper trapezius myofascial pain syndrome among employees at the Faculty of Medicine, Udayana University, and to analyze the relationship between working posture and the occurrence of upper trapezius MPS in this population.

Methods

This study employed a cross-sectional design to evaluate the relationship between working posture and the incidence of myofascial pain syndrome (MPS). Participant recruitment was conducted from October 2024 to July 2025, with data collection taking place in Denpasar during October and December 2024. Each participant underwent a one-time assessment session lasting approximately 30 minutes.

The study sample comprised administrative and academic staff from the Faculty of Medicine, Udayana University, who routinely worked with computers and met the predefined inclusion and exclusion criteria. A purposive sampling technique was used, resulting in 61 eligible participants. The inclusion criteria were as follows: willingness to participate (with signed informed consent), age between 30 and 50 years, and current employment at the Faculty of Medicine with regular computer use. Exclusion criteria included neuromuscular disorders of the upper extremities and the presence of neurological signs, including a history of trauma, neck or shoulder injuries, or cervical herniated nucleus pulposus (HNP).

The independent variable in this study was working posture, assessed using the Rapid Upper Limb Assessment (RULA). The dependent variable was the presence of upper trapezius MPS, evaluated through manual flat palpation performed by a physiotherapist. Pain intensity was measured using the Numeric Rating Scale (NRS), and cervical lateral flexion range of motion was also recorded.

Prior to data collection, ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine, Udayana University, with approval number B/8722/UN14.2.2 V.7/PT.01.04/2024. Administrative permission was also secured from the faculty office. Each participant received a detailed explanation of the study and provided informed consent before participation. Individuals who met the inclusion criteria and did not fall under the exclusion criteria were enrolled.

Instruments were prepared before each session. Participants first performed the PFGD (Posture-Fatigue-General Discomfort) movement test. If no discomfort or pain was reported, further tests were conducted to rule out cervical HNP using two specific assessments: the Spurling test and the distraction test. A positive Spurling test indicated radiating pain in the neck or shoulder when compression was applied, whereas a positive distraction test was indicated by pain relief or comfort during distraction.

The final stage involved assessing MPS in the upper trapezius. This stage was conducted only if participants passed the previous screening. The physiotherapist palpated the upper trapezius area and asked participants to rate their pain intensity using the NRS from 0 to 10. These scores were then recorded for analysis.

Data were analyzed using SPSS version 25.0. Univariate analysis was conducted to describe participant characteristics, including age, sex, MPS occurrence, pain intensity, and RULA scores. RULA results were categorized into four risk levels: low (score 1–2), moderate (score 3–4), high (score 5–6), and very high (score 7). NRS scores were treated as ordinal data and classified as follows: no pain (score 0), mild pain (score 1–3), moderate pain (score 4–6), and severe pain (score 7–10) (16). Bivariate analysis using the Spearman's rho test was employed to determine the correlation between RULA scores and the incidence of upper trapezius MPS.

Results

A total of 61 participants were selected based on the inclusion and exclusion criteria. None of the eligible participants declined or withdrew from the study. Participant characteristics related to age distribution can be seen in Table 1.

Table 1. Descriptive Distribution by Age

Age Range (years)	Frequency (n)	Percentage (%)
30–50	61	100.0

The average age of participants was 40.20 years (SD = 6.595), indicating that all individuals were in the productive age group. Sex distribution among participants is presented in Table 2.

Table 2. Frequency Distribution by Sex

Sex	Frequency (n)	Percentage (%)
Male	26	42.6
Female	35	57.4
Total	61	100.0

As shown in Table 2, female participants constituted the majority (57.4%) compared to male participants (42.6%). The level of risk related to working posture based on RULA scores is shown in Table 3.

Table 3. Risk Category of Working Posture Based on RULA Scores

RULA Risk Category	Frequency (n)	Percentage (%)
Moderate (3–4)	22	36.1
High (5–6)	30	49.2
Very High (7)	9	14.8
Total	61	100.0

Table 3 indicates that all participants were at risk of developing upper extremity musculoskeletal disorders. A total of 22 participants (36.1%) were categorized as moderate risk, 30 participants (49.2%) as high risk, and 9 participants (14.8%) as very high risk, all of whom required further ergonomic evaluation and intervention. Pain intensity related to MPS on the right upper trapezius is detailed in Table 4.

Table 4. Pain Intensity of Upper Trapezius MPS (Right Side)

Pain Level	Frequency (n)	Percentage (%)
No pain (0)	5	8.2
Mild (1–3)	25	41.0
Moderate (4–6)	21	34.4
Severe (7–10)	10	16.4
Total	61	100.0

As shown in Table 4, 56 out of 61 participants reported pain due to MPS on the right side. Most experienced mild pain (41.0%), followed by moderate pain (34.4%), and severe pain (16.4%). Pain intensity associated with MPS on the left upper trapezius is summarized in Table 5.

Table 5. Pain Intensity of Upper Trapezius MPS (Left Side)

Pain Level	Frequency (n)	Percentage (%)
No pain (0)	17	27.9
Mild (1–3)	19	31.1
Moderate (4–6)	17	27.9
Severe (7–10)	8	13.1
Total	61	100.0

According to Table 5, 44 participants experienced MPS-related pain on the left side, with 31.1% reporting mild pain, 27.9% moderate pain, and 13.1% severe pain. The statistical relationship between working posture and MPS is shown in Table 6.

Table 6. Correlation Between Working Posture and MPS Using Spearman's Rho Test

Variable	Correlation Coefficient (r)	p-value (2-tailed)	N
MPS Right	–0.112	0.392	61
MPS Left	–0.026	0.842	61

Table 6 indicates no significant correlation between working posture and MPS in either the right or left upper trapezius muscles. For the right side, the correlation coefficient was –0.112 with a p-value of 0.392 ($p > 0.05$). For the left side, the correlation coefficient was –0.026 with a p-value of 0.842 ($p > 0.05$).

Further subgroup analysis based on sex revealed no significant differences in MPS occurrence between male and female participants ($p = 0.625$). Spearman's rho correlation test consistently showed no significant association between working posture and MPS ($p > 0.05$).

Discussion

This study aimed to examine the relationship between working posture and the incidence of upper trapezius myofascial pain syndrome (MPS) among office workers. The findings revealed that although all participants were categorized as having moderate to very high ergonomic risk based on RULA scores, there was no statistically significant correlation between working posture and MPS occurrence. These results indicate that working posture alone may not be a sufficient determinant of MPS in this population, supporting the growing body of evidence that musculoskeletal disorders are multifactorial in nature.

The absence of a significant association between posture and MPS is consistent with recent studies reporting weak or non-significant correlations between ergonomic factors and musculoskeletal outcomes in office settings. A recent cross-sectional study among office-based workers demonstrated a high prevalence of MPS but found no statistically significant relationship between work-related variables and clinical outcomes ($r = 0.069$, $p = 0.179$), suggesting that other factors may play a more dominant role.[10] This supports the interpretation that posture, although relevant, may not independently explain the occurrence of MPS without considering additional contributing variables.

One important explanation for this finding lies in the multifactorial etiology of MPS. Contemporary literature highlights that myofascial trigger points are strongly associated with prolonged low-level muscle activity, repetitive strain, and inadequate recovery rather than posture alone. According to the "Cinderella hypothesis," continuous recruitment of low-threshold motor units during sustained activities such as typing or desk work may lead to localized muscle overload and trigger point formation.[11,12] Therefore, even individuals with relatively acceptable posture may still develop MPS if exposed to prolonged static muscle activation without sufficient rest.

Despite the lack of statistical significance, it is important to note that the majority of participants in this study were classified as having high or very high ergonomic risk. This indicates that exposure to non-ideal postures remains prevalent and may contribute to subclinical musculoskeletal strain. Sustained non-neutral postures, such as forward head position and rounded shoulders, have been associated with increased upper trapezius muscle activity and mechanical load. Over time, this can result in decreased microcirculation, accumulation of metabolic by-products, and muscle fatigue, all of which are known contributors to trigger point formation.[13,14]

However, the discrepancy between high ergonomic risk and non-significant clinical outcomes observed in this study may be explained by protective or compensatory factors. One possible explanation is the level of physical activity among participants. Regular exercise has been shown to improve muscle perfusion, enhance oxygenation, and facilitate the clearance of metabolic waste products, thereby reducing the likelihood of MPS development.[15] Additionally, workplace environments with structured routines, such as scheduled breaks or ergonomic awareness, may mitigate the negative effects of prolonged sitting.[16]

Another important factor to consider is individual variability in pain perception and physiological adaptation. Not all individuals exposed to similar ergonomic risks will develop MPS, as susceptibility may depend on intrinsic factors such as muscle endurance, neuromuscular control, and pain threshold. Some individuals may also develop adaptive movement strategies that redistribute mechanical load and reduce strain on specific muscle groups. This variability may explain why a proportion of participants in this study did not report MPS despite being categorized as high-risk based on RULA scores.[17]

Furthermore, psychosocial factors are increasingly recognized as significant contributors to musculoskeletal disorders. Evidence suggests that job stress, mental workload, and emotional strain can increase muscle tension, particularly in the neck and shoulder region, thereby contributing to pain and trigger point development. These factors were not assessed in the present study and may have influenced the results. Previous literature has emphasized that psychosocial stressors can act synergistically with physical risk factors, amplifying the overall risk of musculoskeletal disorders.[18,19]

The findings of this study differ from those of previous research that reported a significant association between poor posture and MPS. Such discrepancies may be attributed to differences in study populations, occupational demands, and methodological approaches. Studies involving manual laborers or individuals exposed to repetitive high-load tasks often demonstrate stronger associations between posture and musculoskeletal disorders due to higher biomechanical stress. In contrast, office-based populations are typically exposed to lower-intensity but more prolonged static loads, where additional factors such as sedentary behavior and lifestyle play a more prominent role.[20]

From a physiological perspective, the upper trapezius muscle is a postural muscle composed predominantly of type I (slow-twitch) fibers, which are designed for endurance but are also susceptible to fatigue under prolonged low-intensity contraction. Sustained contraction can lead to capillary compression, reduced oxygen supply, and local ischemia. This environment promotes the release of nociceptive substances such as bradykinin, serotonin, and prostaglandins, which contribute to pain and trigger point formation. However, the development of clinically significant MPS likely requires the interaction of multiple factors, including mechanical load, metabolic stress, and insufficient recovery.[21]

The high prevalence of MPS symptoms observed in this study, particularly on the right side, may also be explained by task-related asymmetry. Office workers often use a dominant hand for mouse operation and repetitive tasks, leading to increased load on one side of the upper trapezius. This asymmetrical loading pattern has been associated with increased muscle stiffness and trigger point formation in previous studies.[22]

Several limitations should be considered when interpreting these findings. First, the cross-sectional design does not allow for causal inference. Second, the sample size was relatively small and limited to a single institution, which may restrict the generalizability of the results. Third, MPS assessment was conducted at a single time point, which may not reflect the fluctuating nature of musculoskeletal pain. Fourth, important confounding variables such as physical activity, stress levels, work duration, and ergonomic workstation setup were not quantitatively measured.

Despite these limitations, this study provides important insights into the complexity of MPS among office workers. The findings highlight that posture alone should not be considered an isolated risk factor, and that a more comprehensive approach is needed to understand and manage musculoskeletal disorders.

From a clinical and occupational health perspective, these findings suggest that preventive strategies should adopt a multifactorial approach. Interventions should include ergonomic adjustments, promotion of regular movement and stretching, strengthening exercises, and stress management strategies. Encouraging active work patterns, such as taking breaks every 30–60 minutes and alternating between sitting and standing, may help reduce muscle fatigue and improve overall musculoskeletal health.

Future research should employ longitudinal designs and include a broader range of variables, including psychosocial factors and objective measures of physical activity. Such approaches will provide a more comprehensive understanding of the mechanisms underlying MPS and support the development of effective, evidence-based interventions for office workers.

Conclusion

This study demonstrated that there was no statistically significant association between working posture and the incidence of upper trapezius myofascial pain syndrome among office workers. Although a high proportion of participants were classified as having moderate to high ergonomic risk, posture alone did not appear to be a determining factor for MPS.

These findings reinforce the concept that MPS is a multifactorial condition influenced by a combination of biomechanical, physiological, and psychosocial factors. Therefore, prevention strategies should extend beyond posture correction and incorporate regular physical activity, ergonomic interventions, adequate rest, and stress management. Future studies are recommended to explore these factors using larger sample sizes and longitudinal designs to better understand causal relationships and improve preventive strategies in occupational health settings.

Author Contribution

Nuansa Cita Rudyana: Conceptualization, Data curation, Formal analysis, Investigation, Writing – original draft.
M. Widnyana: Methodology, Supervision, Validation, Writing – review & editing.
Agung Wiwiek Indrayani: Data interpretation, Validation, Writing – review & editing, Final approval of manuscript.

Acknowledgments

The authors would like to express their sincere gratitude to all participants and staff of the Faculty of Medicine, Udayana University, who contributed to this study. Appreciation is also extended to the Research Ethics Committee and the administrative team for their support in facilitating the research process.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this article.

Funding Sources

This research received no external funding.

Ethics Statement

This study was approved by the Research Ethics Committee of the Faculty of Medicine, Udayana University with approval number B/8722/UN14.2.2 V.7/PT.01.04/2024. Written informed consent was obtained from all participants prior to data collection.

References

1. Kamijantono H, Sebayang MM, Lesmana A. Risk factors and ergonomic influence on musculoskeletal disorders in the work environment. J La Medihealtico. 2024;5(3):660–70.
2. Bau JG, Wu SK, Huang BW, Lin TT, Huang SC. Myofascial treatment for microcirculation in patients with postural neck and shoulder pain. Diagnostics (Basel). 2021;11(12):2226.
3. Cerezo-Téllez E, Torres-Lacomba M, Mayoral-del Moral O, Sánchez-Sánchez B, Dommerholt J, Gutiérrez-Ortega C. Prevalence of myofascial pain syndrome in chronic non-specific neck pain: a population-based cross-sectional descriptive study. Pain Med. 2016;17(12):2369–77.

4. Barbero M, Schneebeli A, Koetsier E, Maino P. Myofascial pain syndrome and trigger points: evaluation and treatment in patients with musculoskeletal pain. Curr Opin Support Palliat Care. 2019;13(3):270–6.
5. Hari KED, Putri Thanaya SA, Juhanna IV, Utama AAGES. Hubungan postur kerja dengan risiko myofascial pain syndrome otot upper trapezius pada pengrajin gerabah di Desa Pejaten, Tabanan, Bali. Maj Ilm Fisioter Indones. 2022;10(1):11–6.
6. Bhongade DK, Sakharwade A. Comparison of development of upper trapezius trigger point in computer operators with or without forearm support. Indian J Physiother Occup Ther. 2024;18(1):29–34.
7. Surya H, Handayani S. Individual and ergonomic risk factors for musculoskeletal disorders among health workers in Indonesia: a literature review. Hearty. 2025;13(2):409–19.
8. Toledo R, Dias MR, Souza D, Soares R, Lácio M, et al. Joint and muscle injuries in men and women CrossFit training participants. Phys Sportsmed. 2022;50(3):205–11.
9. Tsabita R, Aktifah N, Sunyiwara AS. Pengaruh kombinasi ischemic compression dan stretching pada myofascial pain syndrome otot upper trapezius. Fisio MU. 2021;2(1):47–53.
10. Sattar H, Zainab A, Naveed A, Mehvish F, Afzal M, Rajput R. Prevalence of myofascial pain syndrome and its association with work productivity among bankers. Healer J Physiother Rehabil Sci. 2026;6(1):23–9.
11. Gerwin RD. A new unified theory of trigger point formation: failure of pre- and post-synaptic feedback control mechanisms. Int J Mol Sci. 2023;24(9):8142.
12. Steen JP, Jaiswal KS, Kumbhare D. Myofascial pain syndrome: an update on clinical characteristics, etiopathogenesis, diagnosis, and treatment. Muscle Nerve. 2025;71(5):889–910.
13. Nishikawa Y, Watanabe K, Chihara T, Sakamoto J, Komatsuzaki T, Kawano K, et al. Influence of forward head posture on muscle activation pattern of the trapezius pars descendens muscle in young adults. Sci Rep. 2022;12(1):19484.
14. Andersen LL, Vinstrup J, Sundstrup E, Skovlund SV, Villadsen E, Thorsen SV. Combined ergonomic exposures and development of musculoskeletal pain in the general working population: a prospective cohort study. Scand J Work Environ Health. 2021;47(4):287–95.
15. Adebiyi AR, Sekhon-Atwal A, Davis E, Hansen BR, Baker DJ, D'Aoust RF. Combined ergonomic and physical activity interventions for preventing work-related musculoskeletal disorders: an integrated review. Workplace Health Saf. 2026;74(4):176–88.
16. Kallings LV, Blom V, Ekblom B, Holmlund T, Eriksson JS, Andersson G, et al. Workplace sitting is associated with self-reported general health and back/neck pain: a cross-sectional analysis in 44,978 employees. BMC Public Health. 2021;21(1):875.
17. Nygaard NPB, Thomsen GF, Rasmussen J, Skadhauge LR, Gram B. Ergonomic and individual risk factors for musculoskeletal pain in the ageing workforce. BMC Public Health. 2022;22(1):1975.
18. Liu HC, Cheng Y, Ho JJ. Associations of ergonomic and psychosocial work hazards with musculoskeletal disorders of specific body parts: a study of general employees in Taiwan. Int J Ind Ergon. 2020;76:102935.
19. Bezzina A, Austin E, Nguyen H, James C. Workplace psychosocial factors and their association with musculoskeletal disorders: a systematic review of longitudinal studies. Workplace Health Saf. 2023;71(12):578–88.
20. Dong Y, Jiang P, Jin X, Jiang N, Huang W, Peng Y, et al. Association between long-term static postures exposure and musculoskeletal disorders among university employees: a viewpoint of inflammatory pathways. Front Public Health. 2022;10:1055374.
21. Aurangzeb A, Tan CQ, Ang JF, Sirisena D. Trapezius myalgia: a review of clinical diagnosis, risk factors, and evidence-based management. J Orthop Rep. 2026;5(2):100739.
22. Lee YJ, Jung SH, Kim JH, Yoo HI, Kwon OY. Comparison of upper trapezius muscle stiffness between female assembly workers with and without myofascial trigger points. Work. 2025;82(3):915–21.