

Original Research Article

A cross-sectional study to assess the pattern of work-related musculoskeletal disorder among class-IV workers of tertiary care centres in central India

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) are typically characterized by persistent pain and limitations in mobility and dexterity. They are highly prevalent and are the leading cause of severe long-term pain and physical disability. Providing stress-management training, encouraging regular breaks, and offering physical therapy and other treatments can alleviate the physical symptoms of work-related MSDs (WMSDs). Objectives were to assess the prevalence and patterns of WMSDs among class-IV workers and to identify the key factors contributing to WMSDs.

Methods: The study was conducted at the Hamidia Hospital and Gandhi Medical College Bhopal. 350 class IV workers were selected using random sampling, and data were collected by direct interview.

Results: Among all housekeeping staff, 82% showed symptoms of MSDs. Pain was predominantly reported in the lower back (49.3%), followed by the lower leg (32.9%). Among the 350 participants, 72 experienced mental stress manifested as difficulty falling asleep, restlessness, and anxiety. Gutkha, followed by smoking, was the most common substance abused by Class IV workers, which correlated with musculoskeletal pain. Participants with a BMI <18.5 and 25-29.99 reported more MSD pain compared to those with a normal BMI (18.5-24.99). Additionally, workers who did not exercise or exercised only 1-2 times a month experienced higher levels of pain.

Conclusions: Class IV workers face physically demanding tasks, so regular breaks should be advised. Promoting literacy can aid in the prevention and early detection of MSDs. Basic interventions and counselling are essential to prevent chronic pain, mental stress, and the development of MSDs.

Keywords: Class IV workers, Musculoskeletal disorder, Visual analogue scale

INTRODUCTION

Musculoskeletal disorders (MSDs) are typically characterised by pain (often persistent) and limitations in mobility and dexterity, which reduces an individual's ability to work and participate in society. MSDs are prevalent and their impact is pervasive and they are the most common cause of severe long-term pain and physical disability.¹

A recent global burden of disease (GBD) 2019 data analysis showed that approximately 1.71 billion people globally live with musculoskeletal conditions.² Among all MSDs, low back and neck pain is the leading cause of both chronic pain and disability worldwide.³ The prevalence of MSDs among the Indian adult population is 6.92-76.8%.⁴ Musculoskeletal impairments comprise more than 150 different diseases/conditions that affect the system and are characterized by impairments in the muscles, bones, joints and adjacent connective tissues, leading to temporary or lifelong limitations in functioning

and participation.^{5,6} Work-related musculoskeletal disorders (WMSDs) can be caused by a variety of physical and psychosocial factors, including mental stress.⁷⁻¹⁰ Mental stress can contribute to WMSDs in several ways, including increased muscle tension, poor posture, reduced ability to cope, reduced focus etc. To address mental stress in WMSD patients, it is important to identify and address the root causes of the stress. This may involve changing the work environment, providing stress-management training, and encouraging employees to take breaks and practice self-care. Physical therapy and other treatments may also address the physical symptoms of WMSDs.¹¹ MSDs negatively impact employees' health, leading to decreased productivity, and increased healthcare disability and worker's compensation costs. Musculoskeletal conditions are also the highest contributor to the global need for rehabilitation.^{2,12}

Due to the rising pattern of MSDs, WHO launched the Rehabilitation 2030 initiative in 2017 to draw attention to the profound unmet need for rehabilitation worldwide, and to highlight the importance of strengthening rehabilitation in the health systems.¹³ Providing stress-management training, and encouraging employees to take breaks and practice self-care. Physical therapy and other treatments may also address the physical symptoms of WMSDs. In addition to pharmacological strategies, modifications in lifestyle behaviours may play an important role in the prevention of the progression of MSDs and the reduction of important associated comorbidities.^{14,15} There should also be a focus on certain lifestyle factors, including tobacco, smoking, alcohol, cannabis, opioids etc. Consumption of these has shown significant importance in the development of MSDs.¹⁴

This study presents an innovative approach focusing on the early detection of MSDs and mental stress (using ERI), identifying the contributing factors and implementing timely preventive measures, consequently leading to improvements in productivity.

Operational definition

Effort-reward imbalance (ERI)

It is defined as “to identify unfavourable psychosocial work characteristics that focus on a mismatch between “costs” and “gains” in costly social transactions”.¹⁶ “Effort” means extrinsic work demands. “Reward” is thought to come from three sources: salary or wage (financial reward), career promotion or job security (status-related reward), and esteem or recognition (socioemotional reward).

Class IV worker

Class IV worker means daftries, jamadars, peons, chowkidars and sweepers appointed under section 8 (2) (d) of the Act.¹⁷

Objectives

To assess the prevalence and patterns of work-related musculoskeletal disorders (WMSDs) among class-IV workers. To identify the key factors contributing to WMSDs.

METHODS

Study design and period

It was a cross-sectional study that took place for a period of 3 months (January 2023 to March 2023).

Settings and sample

The study was conducted at the Hamidia Hospital and Gandhi Medical College Bhopal. 350 class IV workers were selected using random sampling. Both males and females, aged between 18 and 60 years were considered to be part of the sampling unit. Workers with documented musculoskeletal disease and taking treatment were excluded from the study.

Data collection tool

The interview had three parts: a sociodemographic profile of the workers, questions to assess body location and grading of musculoskeletal pain and questions to assess mental stress (work-related mental stress). The questionnaire was self-derived using previous studies.^{9,18}

Ethical approval

The study received approval from the Institutional Ethics Committee (IEC-141/2023) at Gandhi Medical College Bhopal.

Data collection method

Data were collected by direct interviews with those who fulfilled the selection criteria. The interviews were conducted without disrupting their regular work routines. The objectives of the study were explained to the respondents before the participants agreed to participate. To avoid any comprehension issues, the questions were read to the subjects, and their answers were recorded individually. The visual analogue pain scale was used to identify their pain grade.¹⁹ The average time of one interview was calculated to be about 20 minutes.

Data analysis

The filled questionnaires were checked for completeness and consistency and findings were coded for analysis. Data were entered using Microsoft Excel 2019 and analysed using Jamovi version 2.3.²⁰ The chi-square test was applied for inferential purposes a p value of ≤ 0.05 has been considered for declaring the difference statistically significant.

RESULTS

Sociodemographic information of the class IV workers is presented in Table 1. About 55.7% of the workers were male and 44.3% were female. Among them, 58.3% were

in the age group 19-35 years. 32.9% were in the 36-49 and 8.8% were in the 50-60 years. The majority of the participants (60.3%) were found to follow the Hindu religion.

Table 1: Demographic characteristics of the study participants (n=350).

Demographic characteristics	Pain		Total no. of participants (350)	P value
	Present- 211 (60.3)	Absent- 139 (39.7)		
	N (%)	N (%)		
Age (years)				
19-35	85 (40.3)	119 (85.6)	204	p<0.001
36-49	102 (48.3)	13 (9.4)	115	
50-60	24 (11.4)	7 (5)	31	
Gender				
Male	102 (48.3)	93 (67)	195	p<0.001
Female	109 (51.7)	46 (33)	155	
Education				
Illiterate	0 (0)	0 (0)	0	p<0.001
Primary	48 (22.7)	11 (8)	59	
High school	93 (44)	23 (16.5)	116	
Higher Secondary	56 (26.5)	90 (64.7)	146	
College	14 (6.8)	15 (10.8)	29	
Religion				
Hindu	143 (67.8)	68 (48.9)	211	p<0.001
Muslim	61 (28.9)	69 (49.6)	130	
Christian	7 (3.3)	2 (1.5)	9	
Marital status				
Unmarried	2 (0.9)	9 (6.5)	11	p<0.001
Married	186 (88.2)	130 (93.5)	316	
Widowed/divorced	23 (10.9)	0 (0)	23	

Table 2: Work-related information of the study participants (n=350).

Variables	Category	Pain (n)		Test of significance	Total no of participants (350)
		Present- 211 (60.3%)	Absent- 139 (39.7%)		
Type of work	Housekeeping	110 (52.1)	24 (17.3)	p<0.001	134
	Ward boys	0 (0)	34 (24.5)		34
	Ward girls	7 (3.3)	11 (8)		18
	Security guards	21 (10)	30 (21.5)		51
	Sanitary workers	73 (34.6)	40 (28.7)		113
Work hours per day	≤7	48 (22.7)	47 (33.8)	p=0.002	95
	8	126 (59.8)	84 (60.4)		120
	≥9	37 (17.5)	8 (5.8)		45
Break during work	Break	42 (20)	72 (51.8)	p<0.001	114
	No break	169 (80)	67 (48.2)		236

Work-related information about the workers is shown in Table 2. Among all housekeeping staff, 82% showed the symptoms of MSD. All participants have working hours of 6-9 hours/day. Almost 2/3rd (60%) had 8 hours of work in a day while a small proportion (12.9%) had ≥9 hours of work every day, 32.6% of the workers take a break during work and the remaining 67.4% did not take a break during work. The duration of each break was 10-60

minutes. Out of which most of the workers took a break of 30 minutes.

Figure 1 demonstrates the location and grading of musculoskeletal pain of the 211 workers. The participants mostly suffered from pain in the lower back (49.3%) followed by the lower leg (32.9%), and shoulders (28%).

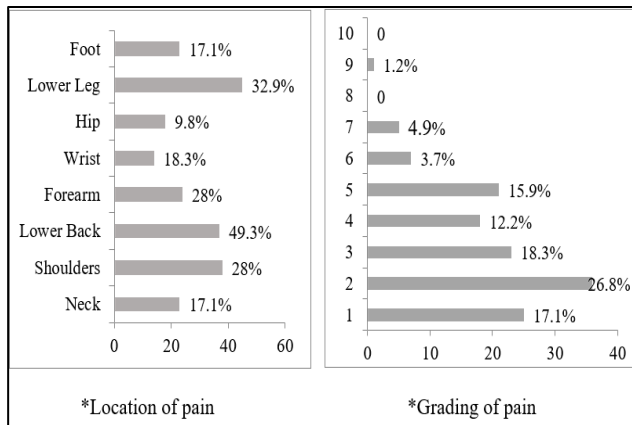


Figure 1: Number of participants showing location and grading of pain (as per visual analogue scale).

Among 211 participants having pain, 157 (74.5%) had aching followed by cramping 50 (23.7%) and 4 (1.8%) had a burning sensation.

Table 3 demonstrates the level of mental stress. Among 350 participants, 72 had mental stress in the form of difficulty falling asleep, restlessness, anxiety and work-related stress. 34.7% present with severe difficulty in sleeping. 41.7% have low work-related stress and 9.8% have high work-related stress.

Table 5 demonstrates a different type of substance abused by class IV workers, gutkha was the most common

substance abused by class IV workers, which shows musculoskeletal pain.

Table 3: Prevalence of mental stress [sleeping difficulty, general stress (restlessness, anxiety) and work-related stress] among 72 study participants.

Mental stress	Frequency (n=72)	Percentage
Difficulties in falling asleep		
1-A little	47	65.3
2-Severe	25	34.7
General stress		
1- Minimal	15	20.8
2- Moderate	38	52.8
(3-4)- Strong to very strong	19	26.4
Work-related stress (ERI- effort-reward imbalance)		
Very low (ERI- ≤ 0.8)	8	11
Low (ERI- $>0.8-1$)	30	41.7
Moderate (ERI- $>1-1.5$)	27	37.5
High (ERI- >1.5)	7	9.8

Table 4: Frequency of substance abuse by the study participants (n=350).

Substance abused	Frequency	Percentage
Yes	110 (male-89, female-21)	31.43
No	240	68.57

Table 5: Association of substance abuse and musculoskeletal pain among the study participants (n=110).

Substance abused	No. of workers (n=110)	No. of workers showing musculoskeletal pain (among 110)	Test of significance (χ^2 tests)
Smoking	20	10	p<0.001
Tobacco chewing	15	2	p<0.001
Alcohol	31	15	p<0.001
Gutkha	44	32	p<0.001
Cannabis	0	0	-
Opioids	0	0	-

Table 6: Modifiable factors associated with musculoskeletal pain among the study participants (n=350).

Factors	Pain (N)		Test of Significance	Total no of participants (350)
	Present -211 (60.3%)	Absent -139 (39.7%)		
BMI				
<18.5	30 (14.2)	6 (4.3)	p=0.002	36
18.5-24.99	73 (34.6)	89 (64)		162
25-29.99	108 (51.2)	44 (31.7)		152
Exercise				
No exercise	73(34.6)	35(25.2)	p<0.001	108
1-2 times a month	82(38.9)	41((29.5)		123
3-5 times a month	45(21.3)	38(27.3)		83
≥6 times a month	11(5.2)	25(18)		36

Modifiable factors associated with the musculoskeletal pain of the workers are presented in Table 6. Showing, Workers who did not exercise or only exercise 1-2 times a month experience higher levels of pain, with 34.6% and 38.9% respectively reporting pain. In contrast, workers who exercise more frequently have a lower incidence of pain.

DISCUSSION

Musculoskeletal pain is a pervasive health problem among class IV workers. The number of incident cases and disability-adjusted life years (DALYs) of MSDs increased by 59.86% to 77.39%, respectively, from 1990 to 2019. Similarly, an increasing trend has been demonstrated in previous reports analysing the GBD 2017.^{2,21-24} Analysis study showed that 48.3% of males and 51.7% of females participated, and a slightly high prevalence was noticed in females (70.32%) compared to all males (52.30) which were statistically significant $p < 0.001$, similar results were shown in a previous study as well.²⁵

Among all participants, most participants showing musculoskeletal pain belong to the middle age group 36-49, and it was found statistically significant. In contrast, a previous study by Thamrin et al did not show any significant correlation between age group and MSD pain.²⁶

Most participants belonging to primary education and High school groups showed more presence of MSD pain in comparison to higher secondary and college groups which shows a significant correlation ($p < 0.001$) between literacy and MSD pain, similar results were observed in a previous study by Hansen et al which showed that a high educational level was associated with reduced odds of pain compared with low educational level.²⁷

Among all participants, the majority were married and reported musculoskeletal pain, while all widowed or divorced participants experienced musculoskeletal pain. No previous studies have shown a significant correlation between marital status and musculoskeletal pain. The study showed that most of the participants with BMI < 18.5 and 25-29.99 had MSD pain concerning normal BMI (18.5-24.9), similar results were seen in a study by Rosa et al.^{28,29} Observation showed the positive effect of exercise on MSD pain, participants performing ≥ 6 times a month showed less MSD pain compared to participants who are not performing the exercise/1-2 times in a month/3-5 times in a month. Similar results were observed in a previous study by Bullo et al.³⁰

Housekeeping staff showed the maximum musculoskeletal symptoms among all participants ($p < 0.001$), similar results were seen in a previous study as well.³¹ Analysis showed that the longer the working hours, the more the musculoskeletal pain, similar results were observed in a prior study by Amiri et al.³²

Participants who were not taking any breaks showed more musculoskeletal symptoms in comparison to those who were taking breaks, and similar results were seen in previous studies by Park et al.³³

Participants were found mostly suffering from pain in the lower back (49.3%) followed by the lower leg (32.9%), Similar results were shown in previous studies where lower back pain was more prevalent in females along with pain in other sites and most likely due to muscular strain in a similar research Yang et al 36, found the prevalence of shoulder disorder was 72% and 53% in females and males respectively.^{34,35} There was a slightly higher prevalence of lower back problems (30%) in females as compared to males.

Many studies have focused on the risk factors and the prevalence of WRMDs using a cross-sectional study, but cross-sectional studies cannot determine the association among different variables.³⁷ As demonstrated in a previous study, the proportion of prolonged standing hours increases the presence of lower extremity muscle pain.³⁵ There is extensive literature explaining that musculoskeletal pain is multifactorial.³⁸ In the present study, physical factors, directly and indirectly, affected WRMDs through the risk perception by class IV, similar results were demonstrated in previous studies as well.³⁹ In the present study, 110 participants were found as substance users, 32 (among 44 gutkha consumers), and 15 (among 31 alcoholics) showed MSD. Similarly, as per previous studies, addiction decreases bone mineral density ultimately leading to the development of MSD.^{14,40}

CONCLUSION

From this study, we can conclude that class IV workers are often working in very physically demanding situations, they have to work for a longer period in their duty hours and this leads to fatigue, pain etc, hence a break should be advised at regular interval. Current scientific evidence suggests that individuals with MSDs should be encouraged to quit addiction habits and informed about the impact on several disease-specific outcomes such as symptoms and physical function. Literacy should be promoted to prevent and early detection of MSD. Chronic pain leads to the development of MSDs. Thus, basic intervention and counselling need to be given which can help in the prevention of the development of mental stress and MSDs.

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REFERENCES

1. Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. *Bull World Health Organ*. 2000;81(9):646-56.
2. Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396(10267):2006-17.
3. Murillo C, Vo TT, Vansteelandt S, Harrison LE, Cagnie B, Coppieters I, et al. How do psychologically based interventions for chronic musculoskeletal pain work? A systematic review and meta-analysis of specific moderators and mediators of treatment. *Clin Psychol Rev*. 2022;94:102160.
4. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012;380(9859):2163-96.
5. Punnett L, Wegman DH. Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *J Electromyogr Kinesiol*. 2004;14(1):13-23.
6. Da Costa BR, Vieira ER. Risk factors for work-related musculoskeletal disorders: a systematic review of recent longitudinal studies. *Am J Ind Med*. 2010;53(3):285-323.
7. Mehta RK, Parijat P. Associations between psychosocial risk factors and musculoskeletal disorders: application to the IT profession in India. *Work*. 2012;41:2438-44.
8. Robertson J, Jayne C, Oakman J. Work-related musculoskeletal and mental health disorders: Are workplace policies and practices based on contemporary evidence? *Saf Sci*. 2021;138:105098.
9. Li X, Yang X, Sun X, Xue Q, Ma X, Liu J. Associations of musculoskeletal disorders with occupational stress and mental health among coal miners in Xinjiang, China: a cross-sectional study. *BMC Public Health*. 2021;21(1):1327.
10. Cho YS, Park JB, Kim S, Lee K. Repeated measures study of the association between musculoskeletal symptoms and mental health in subway workers. *Ind Health*. 2019;57(6):721-31.
11. Prall J, Ross M. The management of work-related musculoskeletal injuries in an occupational health setting: the role of the physical therapist. *J Exerc Rehabil*. 2019;15(2):193-9.
12. WHO. Musculoskeletal health. Available from: <https://www.who.int/news-room/fact-sheets/detail/musculoskeletal-conditions>. Accessed on 11 June 2024.
13. WHO. Rehabilitation 2030 initiative. Available from: <https://www.who.int/initiatives/rehabilitation-2030>. Accessed on 11 June 2024.
14. Wiecezorek M, Gwinnutt JM, Ransay-Colle M, Balanescu A, Bischoff-Ferrari H, Boonen A, et al. Smoking, alcohol consumption and disease-specific outcomes in rheumatic and musculoskeletal diseases (RMDs): systematic reviews informing the 2021 EULAR recommendations for lifestyle improvements in people with RMDs. *RMD Open*. 2022;8(1):e002170.
15. Dean E, Söderlund A. What is the role of lifestyle behaviour change associated with non-communicable disease risk in managing musculoskeletal health conditions with special reference to chronic pain? *BMC Musculoskelet Disord*. 2015;16(1):87.
16. Ren C, Li X, Yao X, Pi Z, Qi S. Psychometric Properties of the effort-reward imbalance questionnaire for teachers (teacher ERIQ). *Front Psychol*. 2019;10:2047.
17. Law Insider. Class IV staff definition. Available from: <https://www.lawinsider.com/dictionary/class-iv-staff>. Accessed on 11 June 2024.
18. Hendi OM, Alturkistani LH, Bajaber AS, Alhamoud MA, Mahfouz ME. Prevalence of musculoskeletal disorder and its relation to stress among medical student at Taif University, Saudi Arabia. *Int J Prevent Med*. 2021;12(1).
19. Physiopedia. Visual Analogue Scale. Available from: https://www.physio-pedia.com/Visual_Analogue_Scale. Accessed on 11 June 2024.
20. The jamovi project (2022). jamovi. (Version 2.3). Available from: <https://www.jamovi.org>. Accessed on 11 June 2024.
21. Safiri S, Kolahi A, Cross M, Hill C, Smith E, Carson-Chahhoud K, et al. Prevalence, deaths, and disability-adjusted life years due to musculoskeletal disorders for 195 countries and territories 1990-2017. *Arth Rheumat*. 2021;73(4):702-14.
22. Lewis R, Gómez Álvarez CB, Rayman M, Lanham-New S, Woolf A, Mobasheri A. Strategies for optimising musculoskeletal health in the 21st century. *BMC Musculoskelet Disord*. 2019;20(1):164.
23. Williams A, Kamper SJ, Wiggers JH, O'Brien KM, Lee H, Wolfenden L, et al. Musculoskeletal conditions may increase the risk of chronic disease: a systematic review and meta-analysis of cohort studies. *BMC Med*. 2018;16(1):167.
24. Jin Z, Wang D, Zhang H, Liang J, Feng X, Zhao J, et al. Incidence trend of five common musculoskeletal disorders from 1990 to 2017 at the global, regional and national level: results from the global burden of disease study 2017. *Ann Rheum Dis*. 2020;79(8):1014-22.
25. Wijnhoven HAH, De Vet HCW, Picavet HSJ. Prevalence of musculoskeletal disorders is systematically higher in women than in men. *Clin J Pain*. 2006;22(8):717-24.
26. Thamrin Y, Pasinringi S, Darwis AM, Putra IS. Musculoskeletal disorders problems and its relation

- to age, working periods, and smoking habit among fishermen. *Gac Sanit*. 2021;35:S417-20.
27. Hansen J, Hansen H, Nilsson C, Ekholm O, Molsted S. Association between educational level and self-reported musculoskeletal pain and physical functioning in Danes 60-70 years old from 2010 to 2017: a longitudinal analysis of trends over time on data from the Danish Health and Morbidity Survey. *BMJ Open*. 2023;13(11):e073523.
 28. Rosa S, Martins D, Martins M, Guimarães B, Cabral L, Horta L. Body mass index and musculoskeletal pain: a cross-sectional study. *Cureus*. 2021;13(2).
 29. Bihari V, Kesavachandran C, Pangtey BS, Srivastava AK, Mathur N. Musculoskeletal pain and its associated risk factors in residents of National Capital Region. *Indian J Occup Environ Med*. 2011;15(2):59-63.
 30. Bullo V, Favro F, Pavan D, Bortoletto A, Gobbo S, Palma GD, et al. The role of physical exercise in the prevention of musculoskeletal disorders in manual workers: a systematic review and meta-analysis. *La Med del Lavoro*. 2024;115(1).
 31. Sánchez-Rodríguez C, Bulilete O, Chela-Alvarez X, Velasco-Roldán O, Llobera-Canaves J. Chronic pain and work conditions of hotel housekeepers: a descriptive study. *Int J Env Res Public Health*. 2022;19(6):3383.
 32. Amiri S. Longer working hours and musculoskeletal pain: a meta-analysis. *Int J Occup Saf Ergon*. 2023;29(1):1-16.
 33. Park S, Lee J, Lee JH. Insufficient rest breaks at workplace and musculoskeletal disorders among Korean kitchen workers. *Saf Health Work*. 2021;12(2):225-9.
 34. Overstreet DS, Strath LJ, Jordan M, Jordan IA, Hobson JM, Owens MA, et al. A brief overview: sex differences in prevalent chronic musculoskeletal conditions. *Int J Environ Res Public Health*. 2023;20(5):4521.
 35. Jo H, Lim O bin, Ahn YS, Chang S jin, Koh SB. Negative impacts of prolonged standing at work on musculoskeletal symptoms and physical fatigue: the fifth Korean working conditions survey. *Yonsei Med J*. 2021;62(6):510.
 36. Yang CL, Huang WP, Lin WY, Tseng PC, Kuo HW. Job-related stress associated with work-related upper extremity musculoskeletal disorders (UEMDs) in municipal waste collectors: the moderation and mediation effect of job support. *BMC Musculoskelet Disord*. 2022;23(1):762.
 37. Baker R, Coenen P, Howie E, Lee J, Williamson A, Straker L. A detailed description of the short-term musculoskeletal and cognitive effects of prolonged standing for office computer work. *Ergonomics*. 2018;61(7):877-90.
 38. Moom RK, Sing LP, Moom N. Prevalence of musculoskeletal disorder among computer bank office employees in Punjab (India): a case study. *Procedia Manuf*. 2015;3:6624-31.
 39. Danquah IH, Kloster S, Holtermann A, Aadahl M, Tolstrup JS. Effects on musculoskeletal pain from “take a stand!” - a cluster-randomized controlled trial reducing sitting time among office workers. *Scand J Work Environ Health*. 2017;43(4):350-7.
 40. Gao Y, Nevala N, Cronin NJ, Finni T. Effects of environmental intervention on sedentary time, musculoskeletal comfort and work ability in office workers. *Eur J Sport Sci*. 2016;16(6):747-54.

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