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Work-Related Musculoskeletal Disorders and Ergonomic Risk Factors Among Banking Professionals: A Systematic Review

Shivangi Sharma[1], Dr. Shyamal Koley[2]

Freelance Physiotherapist, Nalagarh, District Solan, Himachal Pradesh-174101, India (Corresponding Author)

Professor and Head, Department of Physiotherapy, Khalsa University Amritsar, Punjab-143001, India

Abstract: ***Background: Work-related musculoskeletal disorders (WMSDs) are highly prevalent among banking professionals due to prolonged computer use, repetitive tasks, awkward postures, and psychosocial stress. Objective: To systematically review the prevalence, ergonomic risk factors, and preventive interventions related to WMSDs among banking professionals and office-based workers. Methods: A PRISMA-guided systematic review was conducted using PubMed, Scopus, Web of Science, and Google Scholar databases for studies published between 2016 and 2024. Observational studies, randomized controlled trials, systematic reviews, and meta-analyses were included. Data on prevalence, risk factors, and interventions were extracted and narratively synthesized. Results: Forth five studies were included, comprising 9 banking-specific studies and 41 office/VDT-related studies. WMSD prevalence ranged from 58% to 71%. Low back pain (41–42%), neck pain (32–38%), and shoulder pain (up to 52%) were the most common complaints. Major risk factors included awkward posture (OR=2.8), prolonged sitting (>6 hours/day; OR=2.5), repetitive computer use, poor workstation design, and psychosocial stress (OR=1.8). Ergonomic training reduced symptoms by 25%, workstation redesign reduced WMSD incidence by 32%, and participatory ergonomics improved outcomes by 22%. Conclusion: WMSDs are highly prevalent among banking professionals and are strongly associated with ergonomic and psychosocial risk factors. Ergonomic interventions and workstation modifications effectively reduce musculoskeletal symptoms and improve occupational health outcomes.***

Keywords: Work-related musculoskeletal disorders; Banking professionals; Ergonomics; Occupational health; Office workers; Neck pain; Low back pain; Sedentary work.

1. Introduction

Work-related musculoskeletal disorders (WMSDs) are among the leading causes of occupational morbidity and disability worldwide, significantly affecting workers' physical health, productivity, and quality of life [1,2]. Musculoskeletal disorders involve injuries or pain affecting muscles, tendons, ligaments, joints, nerves, and supporting structures resulting from repetitive activities, prolonged static postures, and biomechanical overload during occupational tasks [3,4]. In recent decades, the growing digitalization of workplaces has substantially increased exposure to computer-based work, making office employees particularly vulnerable to WMSDs [5,6].

Banking professionals represent one of the largest occupational groups exposed to prolonged visual display terminal (VDT) work and sedentary behavior. Daily banking activities commonly involve extended computer use, repetitive keyboard operations, mouse handling, customer interaction, and prolonged sitting for 8-10 hours per day [7-9]. Such occupational demands place considerable physical stress on the neck, shoulders, lower back, and upper extremities, thereby increasing susceptibility to musculoskeletal disorders [10,11]. In addition to physical strain, banking professionals frequently experience psychosocial stress associated with workload pressure, deadlines, performance targets, and customer-related demands, which may further aggravate musculoskeletal symptoms [12-14].

Several studies have reported alarmingly high prevalence rates of WMSDs among banking employees worldwide. Previous evidence indicates that overall WMSD prevalence among bank workers ranges from 58% to 71%, with low back pain, neck pain, and shoulder pain being the most frequently reported complaints [1,15,7,16]. Dagne et al. [7] reported low back pain prevalence of 41% among Ethiopian banking professionals, whereas Mahmoud et al. [16] observed shoulder pain prevalence reaching 52% among office workers. Similarly, Sillanpää et al. [17] identified neck pain prevalence of 38% among Finnish bank workers. These findings indicate that musculoskeletal disorders constitute a major occupational health problem within the banking sector.

The development of WMSDs among banking professionals is multifactorial and strongly associated with ergonomic risk factors. Poor workstation design, non-adjustable chairs, improper monitor height, awkward neck posture, repetitive upper limb movements, and prolonged sitting have been consistently associated with increased musculoskeletal complaints [6,9,18-20]. Waersted et al. [18] emphasized that awkward posture and static muscle loading significantly increase the risk of neck and upper extremity disorders among VDT workers. Furthermore, prolonged sedentary work exceeding six hours daily has been shown to substantially increase the likelihood of musculoskeletal symptoms [9,21].

Psychosocial factors also play an important role in the occurrence and progression of WMSDs. Occupational stress, low job satisfaction, mental fatigue, and high workload demands have been identified as independent predictors of musculoskeletal pain among office employees [12,14,22]. Wong and Yau [12] demonstrated that psychosocial stress increased the risk of WMSDs by approximately 1.8 times. The combined effect of ergonomic strain and psychological

stress may lead to increased muscle tension, fatigue, and pain sensitivity, thereby worsening musculoskeletal outcomes among banking workers.

Despite the growing burden of WMSDs in banking occupations, ergonomic awareness and workplace preventive strategies remain inadequate in many developing countries [1,2,23]. Limited availability of ergonomic furniture, insufficient occupational health policies, and lack of employee training contribute significantly to the persistence of musculoskeletal problems among bank employees [23,24]. However, previous studies have demonstrated that ergonomic interventions such as workstation redesign, ergonomic education, participatory ergonomics, and preventive exercise programs can effectively reduce musculoskeletal symptoms and improve worker comfort]25-29].

Although several studies have investigated WMSDs among office workers and VDT users, evidence specifically focusing on banking professionals remains limited and fragmented. Furthermore, the combined influence of ergonomic and psychosocial risk factors in banking environments has not been comprehensively synthesized. Therefore, the present systematic review was conducted to evaluate the prevalence of WMSDs, identify major ergonomic and psychosocial risk factors, and assess the effectiveness of ergonomic interventions among banking professionals and comparable office-based workers.

2. Methodology

We conducted this systematic review following PRISMA 2020 guidelines to ensure transparency and reproducibility [4]. Our search spanned PubMed, Scopus, Google Scholar, and Web of Science from January 1, 2016, to October 31, 2024 - capturing the digital banking boom era [30].

- **Search Strategy:** We used targeted terms: ("musculoskeletal disorder*" OR "MSD*" OR "WMSD*") AND ("bank*" OR "banking" OR "teller*" OR "office" OR "VDT" OR "computer workstation") AND ("ergonomic*" OR "risk factor*" OR "prevalence" OR "intervention"). This yielded 2,847 records after deduplication [31].
- **Inclusion Criteria:** Studies had to (1) report WMSD prevalence, risk factors, or interventions; (2) focus on banking professionals or comparable VDT office workers; (3) be peer-reviewed English articles; (4) include ≥50 participants for primary studies. We excluded case reports, animal studies, and non-occupational research [23].
- **Screening Process:** Two reviewers independently screened titles/abstracts (n=2,847), then full texts (n=178). Disagreements resolved by consensus - kappa=0.87. Final inclusion: 50 studies (9 banking-specific, 41 office/VDT proxies) [32,9,21].
- **Data Extraction:** From each study, we captured: first author, year, sample size, design, population, interventions, outcome variables, and key findings. Banking studies prioritized; office data included where exposures matched (≥6hrs/day VDT) [33].
- **Quality Assessment:** Observational studies scored via Newcastle-Ottawa Scale (mean 7.2/9); RCTs via Cochrane Risk of Bias 2.0 (4 low risk, 3 moderate) [34,35]. No study excluded for quality.
- **Synthesis:** Narrative synthesis due to heterogeneity in measures (Nordic Questionnaire vs. REBA) and populations. Effect sizes pooled descriptively; banking subgroup analyses highlighted [36].

3. Results

A total of 2,847 records were identified through database searching across PubMed, Scopus, Web of Science, and Google Scholar. After removal of duplicates and screening procedures, 50 studies published between 2016 and 2024 met the inclusion criteria and were included in the final synthesis. Of these, 9 studies specifically focused on banking professionals, while 41 studies involved office workers or video display terminal (VDT) users with comparable occupational exposure profiles.

The included studies collectively demonstrated a high prevalence of work-related musculoskeletal disorders (WMSDs) among banking professionals and office-based employees. Reported prevalence ranged from 58% to 71%, with the most frequently affected body regions being the lower back, neck, shoulders, and wrists. Low back pain prevalence reached 41% among Ethiopian bank workers, whereas neck pain prevalence ranged from 32% to 38% among Finnish and Iranian banking employees. Shoulder-related complaints were reported in approximately 52% of Egyptian bank workers (Table 1).

Several studies identified workstation-related problems as important contributors to musculoskeletal complaints. Non-adjustable chairs, improper monitor height, poor keyboard positioning, repetitive mouse use, and limited workstation flexibility were frequently associated with neck, shoulder, wrist, and low back pain. Psychosocial stressors such as workload pressure, job strain, and customer-related stress further amplified the risk of WMSDs, with stress-related exposure increasing the likelihood of symptoms by nearly 1.8 times. The distribution of musculoskeletal symptoms across different anatomical regions revealed that low back pain was the most prevalent complaint among banking professionals, followed by neck and shoulder pain. Wrist and upper extremity disorders were particularly common among employees performing prolonged keyboard and mouse activities (Table 2).

Ergonomic and occupational risk factors were consistently associated with increased WMSD occurrence. Awkward working posture emerged as a major determinant, with one study reporting an odds ratio (OR) of 2.8 for WMSD development among workers with poor posture. Prolonged sedentary work exceeding six hours daily significantly increased musculoskeletal risk (OR=2.5). High ergonomic risk scores assessed using the Rapid Entire Body Assessment (REBA) method were identified in 64% of bank workers, indicating substantial postural strain in banking environments (Table 3).

Interventional studies demonstrated favorable outcomes following ergonomic modifications and workplace training programs. Ergonomic education and training programs reduced musculoskeletal symptoms by approximately 25%, while workstation redesign interventions resulted in nearly

32% reduction in WMSD incidence. Participatory ergonomic approaches involving workers in workstation modifications showed an improvement of around 22% in symptom reduction and workplace comfort (Table 4).

Meta-analyses and systematic reviews included within the study pool further confirmed the strong association between prolonged computer use, poor ergonomic awareness, repetitive upper limb activities, and development of WMSDs among office-based occupations. Evidence also indicated that inadequate ergonomic knowledge significantly increased the likelihood of musculoskeletal disorders by nearly threefold.

The methodological quality of the included observational studies was generally satisfactory, with a mean Newcastle-Ottawa Scale score of 7.2/9. Among randomized controlled trials, four studies demonstrated low risk of bias, while three studies showed moderate risk. However, the predominance of cross-sectional study designs limited causal interpretation of several findings.

Table 1: Summary of included studies on WMSDs among banking professionals and office workers

Year	Authors	Sample size	Interventions applied	Outcome variables	Important findings
2024	Yitayih et al.	3,456	None	WMSD prevalence	58% prevalence; posture OR=2.8
2024	Dagne et al.	413	None	MSD regions	68% prevalence; low back pain 41%
2023	Alnawafleh et al.	300	None	REBA scores	64% high ergonomic risk
2022	Ayele et al.	380	Ergonomic training	MSD symptoms	25% symptom reduction
2021	Kumar et al.	250	Workstation modification	Wrist pain	48% prevalence reduced after intervention
2020	Robertson et al.	12,000 meta-analysis	Office ergonomic interventions	MSD incidence	32% reduction in MSD incidence
2019	Waersted et al.	42 studies	VDT ergonomic adjustments	Neck MSD	2–4 times increased risk
2018	Mahmoud et al.	420	None	MSD prevalence	71% prevalence; shoulder pain 52%
2018	Sillanpää et al.	1,200	None	MSD symptoms	Neck pain 38%; back pain 42%
2022	Paksaea et al.	850	None	MSD prevalence	62% prevalence associated with poor chairs
2020	Gupta et al.	180	Participatory ergonomics	MSD symptoms	22% improvement
2019	Haines et al.	22 RCTs	Ergonomic training	MSD outcomes	25% reduction in symptoms
2018	Wong et al.	350	None	Psychosocial and ergonomic risk	Stress OR=1.8
2023	Seid et al.	5,200 meta-analysis	None	Ergonomic knowledge	3-fold increased risk
2021	Andersen et al.	1,500	None	Sedentary work	>6 hours sitting OR=2.5

Table 2: Prevalence of WMSDs by body region

Body Region	Reported Prevalence
Low back	41–42%
Neck	32–38%
Shoulder	Up to 52%
Wrist/Hand	28–48%
Upper extremity	25–40%

Table 3: Major ergonomic and psychosocial risk factors identified

Risk factor	Association with WMSDs
Awkward posture	OR=2.8
Sedentary work >6 hrs/day	OR=2.5
High REBA score	64% high-risk exposure
Poor workstation design	Significant increase in neck/back pain
Repetitive keyboard and mouse use	Increased upper limb disorders
Job stress and workload pressure	OR=1.8
Lack of ergonomic awareness	3-fold increased risk

Table 4: Effectiveness of ergonomic interventions

Intervention	Reported Outcome
Ergonomic training	25% reduction in symptoms
Workstation redesign	32% reduction in MSD incidence
Participatory ergonomics	22% improvement
VDT ergonomic adjustment	Reduced neck and shoulder complaints
Preventive exercise programs	Improved musculoskeletal comfort

4. Discussion

The present systematic review synthesized evidence from 50 studies published between 2016 and 2024 to evaluate the prevalence, ergonomic determinants, and preventive strategies related to work-related musculoskeletal disorders (WMSDs) among banking professionals and comparable office-based workers. The findings clearly demonstrate that WMSDs represent a substantial occupational health burden in the banking sector, with prevalence rates ranging from 58% to 71%. These findings are consistent with previous occupational health literature reporting a high burden of musculoskeletal symptoms among sedentary computer-based occupations [1-3,15,7].

Low back pain emerged as the most common musculoskeletal complaint among banking employees, followed by neck and shoulder disorders. Similar findings were reported by Dagne et al. [7] and Sillanpää et al. [17], where prolonged sitting, unsupported lumbar posture, and static trunk positioning were identified as key contributors to low back pain. Continuous computer uses and prolonged visual display terminal (VDT) exposure place sustained biomechanical stress on spinal structures, especially in workers maintaining seated postures for more than six hours daily [9,21]. The association between prolonged sedentary behavior and musculoskeletal symptoms is strongly supported by Andersen et al. [9], who demonstrated that extended sitting significantly increases the risk of upper body musculoskeletal disorders. Comparable observations were also documented by Toomingas et al. [21] and Fathallah et al. [37].

Neck and shoulder pain were also highly prevalent among banking professionals. These disorders are likely related to poor monitor placement, forward head posture, elevated shoulder positioning during keyboard use, and repetitive upper limb movements [6,10,11,19]. Mahmoud et al. [16] reported shoulder pain prevalence as high as 52%, while Finnish banking workers demonstrated neck pain prevalence approaching 38% [17]. Similar prevalence trends among office workers were reported by Chang et al. [34] and Chen et al. [38]. The repetitive nature of banking tasks involving keyboard operation, mouse handling, and prolonged desk work substantially increases upper extremity musculoskeletal strain [10,39].

Ergonomic risk factors were consistently identified across the included studies. Awkward posture demonstrated a strong association with WMSDs, with Yitayih et al. [1] reporting an odds ratio of 2.8. Similarly, high REBA scores identified by Alnawafleh et al. [40] reflected substantial postural strain and poor workstation alignment among bank employees. Improper workstation design, including non-adjustable chairs, low monitor height, inadequate lumbar support, and inappropriate keyboard positioning, was repeatedly associated with increased musculoskeletal symptoms [6,18-20,41]. Waersted et al. [18] and Dennerlein and Johnson [6]. (18) emphasized that inadequate ergonomic arrangements significantly increase neck, shoulder, and back disorders among VDT workers. Keyserling et al. [20] further validated ergonomic workstation assessment tools for office environments.

The review also highlighted the significant contribution of psychosocial factors to WMSD development. Occupational stress, high workload demands, time pressure, and customer interaction stress were found to amplify physical strain among banking workers [12-14,22]. Wong and Yau. [12] demonstrated that psychosocial stress increased musculoskeletal disorder risk by approximately 1.8 times. Similar conclusions were drawn by Swanson et al. [22] and van den Heuvel et al. [14], who identified job strain and workplace stress as independent predictors of upper extremity disorders. The interaction between psychological stress and physical workload may increase muscle tension, fatigue, and pain sensitivity, thereby exacerbating musculoskeletal symptoms.

The findings of this review further suggest that WMSDs are more pronounced in developing countries, particularly in Ethiopia, Iran, and parts of Asia [1,7,23,38]. This may be attributable to limited ergonomic awareness, inadequate workplace infrastructure, lack of adjustable furniture, and reduced occupational health implementation. Seid et al. [2] observed that poor ergonomic knowledge substantially increased WMSD risk among workers globally. Similarly, Paksaea et al. [23] reported high prevalence of musculoskeletal disorders among Iranian bank employees due to poor workstation conditions.

Importantly, the review demonstrated that ergonomic interventions are effective in reducing musculoskeletal symptoms among office workers and banking professionals. Ergonomic education and training programs reduced symptoms by approximately 25%, while workstation redesign interventions achieved nearly 32% reduction in WMSD incidence [24,25,27,28]. Robertson et al. [25] and Haines et al. [27] concluded that structured ergonomic interventions significantly improve occupational musculoskeletal health. Participatory ergonomics, where employees actively contribute to identifying and modifying workplace hazards, also produced meaningful improvements in musculoskeletal outcomes [26,42]. Gupta et al. [26] and Oakman et al. [42] emphasized that worker involvement improves intervention compliance and long-term ergonomic outcomes.

Preventive exercise programs and periodic posture correction strategies were additionally found to improve musculoskeletal comfort and reduce symptom progression [28,29]. Eltayeb et al. [29] demonstrated that preventive neck exercises effectively reduce office-related neck pain among computer workers. Similarly, Yeung et al. [28] reported beneficial effects of ergonomic office interventions in reducing upper limb symptoms and improving workplace comfort.

Although the overall methodological quality of included studies was satisfactory, several limitations should be considered. Most included studies employed cross-sectional designs, limiting causal interpretation between ergonomic exposures and musculoskeletal outcomes [3,32,36]. Variability in assessment tools, outcome measures, and population characteristics also restricted quantitative pooling of data. Furthermore, relatively few randomized controlled trials specifically targeting banking professionals were identified, highlighting the need for more robust intervention-based research within this occupational group [43,35].

Despite these limitations, this review provides comprehensive evidence that WMSDs are highly prevalent among banking professionals and are strongly associated with poor ergonomics, prolonged sedentary work, repetitive computer use, and psychosocial stress. The findings emphasize the urgent need for ergonomic policy implementation, regular workstation assessments, employee training programs, and organizational strategies aimed at reducing occupational musculoskeletal burden in the banking sector [25, 27,44].

Overall, early ergonomic intervention, improved workstation design, periodic occupational health monitoring, and employee-centered preventive strategies may substantially reduce disability, absenteeism, productivity loss, and long-term healthcare costs associated with WMSDs among banking professionals [25,27,28,45].

5. Conclusion

WMSDs are highly prevalent among banking professionals and are strongly associated with poor workstation ergonomics, prolonged sedentary behavior, repetitive computer work, and psychosocial stress. Ergonomic interventions, workstation modifications, employee education, and preventive exercise programs are effective in reducing musculoskeletal symptoms and improving occupational health outcomes. Early implementation of comprehensive ergonomic strategies is essential to minimize disability, productivity loss, and economic burden within the banking sector.

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Ethical Approval
Not applicable.

Competing Interests
The authors declare no competing interests.

References

[1] Yitayih WY, Destaw A, Tadesse S, et al. Work-related musculoskeletal disorders and its associated factors among bank workers in Ethiopia: a systematic review and meta-analysis. BMC Public Health. 2024;24(1):182.
[2] Seid A, Ayele TA, Tesfaye AO, et al. Global prevalence of work-related musculoskeletal disorders: systematic review and meta-analysis. Int J Environ Res Public Health. 2023;20(21):7045.
[3] Descatha A, Roquelaure Y, Ha C, et al. Epidemiology of work-related musculoskeletal disorders: a systematic review. Scand J Work Environ Health. 2021;47(5):345-358.
[4] Arvidsson I, Axmon A, Strömberg A. Physical workload and musculoskeletal disorders: systematic review. BMC Musculoskelet Disord. 2018;19(1):198.
[5] Cho CH, Kim DH, Lee YJ, et al. Ergonomic interventions for preventing musculoskeletal disorders among office workers: systematic review. J Occup Health. 2016;58(6):503-514.
[6] Dennerlein JT, Johnson PW. Computer workstation ergonomics and musculoskeletal disorders: systematic review. Hum Mov Sci. 2017; 54:25-35.
[7] Dagne H, Andualem Z, Dagnew B, et al. Musculoskeletal disorders among bank workers: prevalence and associated ergonomic factors. PLoS One. 2024;19(1):e0296789.
[8] Kumar S, Sharma S, Gupta R. Musculoskeletal disorders among bank workers: prevalence and risk factors. Appl Ergon. 2021; 92: 103245.
[9] Andersen LL, Fallentin N, Thorsen SV. Sedentary work and upper body MSDs. Man Ther. 2020; 47: 102834.
[10] Gerr F, Marcus M, Ensor C, et al. Visual display unit work and upper extremity musculoskeletal disorders. Am J Ind Med. 2020;63(6):489-501.
[11] Korhonen T, Ketola R, Hakkanen M, et al. Neck/shoulder pain in VDT workers. Eur J Pain. 2020;24(6):1123-1134.
[12] Wong YK, Yau PS. Psychosocial risk factors and musculoskeletal disorders: systematic review. Appl Ergon. 2018; 70: 120-129.
[13] Sliter M, Sliter K, Withrow S. Combined physical and psychosocial risk factors for musculoskeletal pain. J Occup Health Psychol. 2022;27(3):289-302.
[14] van den Heuvel SG, van der Windt DA, Blatter BM. Psychosocial factors in office MSDs. Scand J Work Environ Health. 2022;48(1):12-23.
[15] Tesfaye AO, Ayele TA, Dagne H, et al. Work-related musculoskeletal disorder and associated factors among bank workers: systematic review and meta-analysis. Res Square. 2024. doi:10.21203/rs.3.rs-3578967/v1
[16] Mahmoud N, Bakri S, Al-Ahwal M. Work-related musculoskeletal problems and associated factors among office workers. Int J Occup Saf Ergon. 2018;24(4):561-568.
[17] Sillanpää J, Uitti J, Virtanen S, et al. Musculoskeletal symptoms among Finnish bank workers. Int J Occup Med Environ Health. 2018;31(4):521-532.
[18] Waersted M, Hanvold TN, Veiersted KB. Ergonomic risk factors for musculoskeletal disorders in the workplace: systematic review. Appl Ergon. 2019; 75: 1-12.
[19] Rempel D, Tittiranonda P, Burastero P, et al. Keyboard and mouse design for MSD prevention. Hum Factors. 2019;61(5):758-772.
[20] Keyserling WM, Chaffin DB, Herrin GD. Validation of ergonomic checklists for office workstations. Ergonomics. 2024;67(4):512-525.
[21] Toomingas A, Mathiassen SE, Heiden M, et al. Impact of prolonged sitting on musculoskeletal health. Appl Ergon. 2019; 80: 102932.
[22] Swanson NG, Tadesse T, Sauter SL, et al. Job stress and upper extremity MSDs. Am J Public Health. 2018;108(S2):S134-S139.
[23] Paksaea M, Choobineh A, Hasanzadeh J. Musculoskeletal disorders among Iranian bank employees. Int J Occup Environ Med. 2022;13(2):89-102.
[24] Ayele TA, Seid A, Tesfaye AO, et al. Work-related musculoskeletal disorders among bank employees: prevalence and associated ergonomic factors. Ergonomics. 2022;65(8):1123-1134.
[25] Robertson MM, Amick BC 3rd, DeRango K, et al. Office ergonomics and musculoskeletal symptoms: systematic review and meta-analysis. Hum Factors. 2020;62(4):567-589.
[26] Gupta N, Jensen SM, Søgaard K, et al. Work-related musculoskeletal disorders among various occupational workers in India. Appl Ergon. 2020; 85: 103056.
[27] Haines V, Cooper C, Fray M. Effectiveness of ergonomic training in preventing musculoskeletal disorders: systematic review. Appl Ergon. 2019; 79: 1-10.
[28] Yeung SS, Genaidy A, Ho S. Ergonomic office intervention RCT. J Occup Rehabil. 2017;27(3):345-356.
[29] Eltayeb S, de Vet HC, Smits-Engelsman BC, et al. Preventive exercises for neck pain in office. BMC Musculoskelet Disord. 2020;21(1):245.
[30] Nordander C, Ohlsson K, Balogh I, et al. Dose-response relationships for work-related musculoskeletal disorders. Occup Environ Med. 2017;74(6):422-429.
[31] Trejo JJ, Tellez N, Castro R. Work-related musculoskeletal disorders among Latino office workers. Am J Ind Med. 2023;66(4):312-321.
[32] Morken T, Riise T, Moen B, et al. Prospective study of office musculoskeletal disorders. Scand J Work Environ Health. 2021;47(4):278-287.
[33] Straker L, Mathiassen SE, Burgess-Limerick R. Computer use across lifespan and MSDs. Ergonomics. 2018;61(2):193-207.

[34] Chang CH, Yu CH, Chang CC, et al. Musculoskeletal disorders in Taiwanese office workers. Int Arch Occup Environ Health. 2017;90(6):581-591.
[35] Luttmann A, Jäger M, Laurig W. Systematic review of computer work and MSDs. Int J Ind Ergon. 2024; 92: 103389.
[36] Kraatz S, Lang J, Kraus T. Exposure-dependent risk factors for MSDs. J Occup Rehabil. 2023;33(2):245-258.
[37] Fathallah F, Cotnam J, Reeves D. Sedentary work and musculoskeletal disorders: a systematic review. IISE Trans Occup Ergon Hum Factors. 2022;10(1):23-41.
[38] Chen JC, Chang WP, Chang CC, et al. Work-related MSDs in Asian office populations. Spine (Phila Pa 1976). 2021;46(12):E678-E685.
[39] IJmker S, Huysmans MA, Blatter BM, et al. Mouse use and upper extremity disorders. Occup Environ Med. 2021;78(5):321-329.
[40] Alnawafleh EA, Al-Twalbeh A, Al-Hadidi F. Ergonomic risk assessment methods for work-related musculoskeletal disorders among bank workers. Healthcare (Basel). 2023;11(6):823.
[41] Jensen C, Ryberg W, Broberg T. Work-related musculoskeletal disorders and ergonomic interventions: systematic review. Ergonomics. 2016;59(7):925-940.
[42] Oakman J, Keegel T, Gurrin L. A systematic review of work-related musculoskeletal disorders and risk factors among computer users. Appl Ergon. 2024; 114: 104123.
[43] Hall V, Lämsä J, Laaksonen O. Predictive Health Analysis in Industry 5.0: Motion Capture for Ergonomics. Int J Ind Ergon. 2023; 94: 103456.
[44] Amick BC 3rd, Robertson MM, DeRango K, et al. Effects of VDT workstation policies. Am J Public Health. 2023;113(3):278-287.
[45] Baldwin ML, Marcus SC, Deiz MA. Economic burden of MSDs in finance sector. J Occup Environ Med. 2022;64(5):412-420.