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Psychosocial Workload and Multidimensional Fatigue in Computer-Intensive Office Work: An Integrative Review of Scientific Literature

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ABSTRACT

Computer-intensive office work is increasingly shaped by digitalization, hybrid work arrangements, and rising cognitive demands, which elevate psychosocial risks and may contribute to multidimensional fatigue. This study aimed to synthesize scientific evidence on psychosocial workload and multidimensional fatigue in computer-intensive office work through an integrative review. A PRISMA-guided search and selection process was applied across major databases (PubMed, Scopus, Web of Science, ScienceDirect, ProQuest, Wiley Online Library, Springer), using combinations of keywords related to workload, psychosocial factors, computer work, cognitive strain, and fatigue. Peer-reviewed English-language full-text studies from the last 15 years were included. The reviewed literature consistently links high job demands, time pressure, low job control, limited social support, role ambiguity, and technostress to increased work-related fatigue—most strongly to mental and emotional fatigue, with downstream effects on concentration, recovery (including sleep disturbances), productivity, presenteeism, and error likelihood. Evidence also indicates that psychosocial risks interact with ergonomic exposures (prolonged sitting, static postures, inadequate workstations, insufficient breaks), amplifying musculoskeletal complaints and reinforcing fatigue-related impairments. Overall, psychosocial workload in computer-intensive office settings is a robust correlate of multidimensional fatigue, while the predominance of cross-sectional designs highlights the need for more causal, confounder-controlled research and targeted intervention evaluation.

Keywords: Psychosocial risks, Office work, Fatigue, Workload, Ergonomics

INTRODUCTION

Over the last decade, the nature of work in modern offices has changed significantly due to digitalization, increased cognitive demands, hybrid working arrangements, and higher performance requirements. Work-related psychosocial risks has a significant role in today's and tomorrow's labour market across various sectors of the economy (Schulte et al., 2020). Office workers are increasingly exposed to psychosocial risks that can

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cause psychological and physical harm to workers if they are not properly controlled and managed (Bolis et al., 2024). These risks include cognitive demands, heavy physical and psychoemotional workload, time pressure, limited control over work, insufficient social support, role ambiguity, ethical conflicts, and an unfavourable organisational climate (Leka et al., 2015). Research shows that psychosocial risks are closely related to fatigue at work, which is perceived as a multidimensional framework, including physical fatigue (reduced physical energy), mental fatigue (impaired concentration and cognitive endurance), and emotional fatigue (emotional exhaustion and reduced motivation) (Frone et al., 2018; Moyano-Díaz et al., 2024). This multidimensional perspective is particularly relevant in computer-intensive office work, where prolonged attention, prolonged sitting, and frequent task changes, as well as insufficient support from management and colleagues, contribute to both cognitive strain and physical discomfort.

In recent years, there has been a growing trend toward remote working, especially among office workers. This has contributed to the negative impact of physical risks on employees' health, such as non-ergonomic workplaces that promote work-related musculoskeletal disorders (WRMSDs), as well as the negative impact of psychosocial risks. When working remotely, employees often lack support from management and colleagues, and frequently have to make difficult decisions alone, which can lead to psycho-emotional stress (Kanwal et al., 2024). Having studied Information technology (IT) workers, the authors concluded that long working hours on a computer, overtime and an indifferent attitude towards health are directly linked to work-related stress, fatigue and musculoskeletal disorders (Zheng et al., 2023). Empirical evidence shows that psychosocial risks rarely occur in isolation. They interact with physical and ergonomic factors, such as inadequate workstations, prolonged static postures, and insufficient breaks, exacerbating fatigue and complaints of musculoskeletal health problems. This interaction is particularly pronounced in office environments, which are characterised by prolonged work at a monitor and limited movement. As a result, fatigue manifests itself both as a health consequence and as an early warning sign of reduced performance and the likelihood of errors. Forced working postures, unhealthy habits, inappropriate workstation design, and psychosocial risks at work are just some of the main causes of health problems for office workers (Putsa et al., 2022; Prasetya et al., 2024). The most common health complaints are pain or discomfort in the neck and shoulder area, as well as in the arms and wrists, which often increase the risk of developing vision, musculoskeletal, and psychological problems (Medin-Ceylan et al., 2023; Dessie et al., 2023; Lee & Park, 2022). Mental and physical workload contribute to multidimensional fatigue encompassing cognitive, emotional, and physical components (Hopstaken et al., 2015; Meyer & Hünefeld, 2018). This is a complex condition that causes physiological and psychological exhaustion and a decline in functional capacity, which in turn negatively affects an individual's work efficiency and health (Li et al., 2024).

The aim of the study was to perform integrative review of scientific literature on psychosocial workload and multidimensional fatigue in computer-intensive office work.

METHODS AND MATERIALS

Source of Information

This study is an integrative scientific literature review with a PRISMA-guided search and study selection process (see. Fig. 1). An integrative scientific literature review was conducted using the following databases: PubMed, Scopus, Web of Science, ScienceDirect, ProQuest, Wiley Online Library, Springer. The following keywords were used in combination: 'workload', 'multidimensional', 'mental', 'fatigue', 'computer work', 'cognitive strain', 'work intensity', and 'musculoskeletal risk'. For example, the search string for the PubMed database looked like this: "computer work" or "computer-intensive work") and ("mental fatigue" or "multidimensional fatigue" or "cognitive strain") and ("psychosocial" or "job demands" or "social support" or "job control"). The following publications were included: peer-reviewed scientific articles in English over the last 15 years; the research context was work-related; the articles covered physical/mental workload and fatigue (including cognitive/mental fatigue) and/or health-related disorders in computer-intensive office work. Exclusion criteria: conference abstract collections, presentations, and articles not published in full text.

Entries were collected from the specified databases, duplicates were identified/removed, then titles and abstracts were screened, followed by full-text evaluation according to inclusion/exclusion criteria.

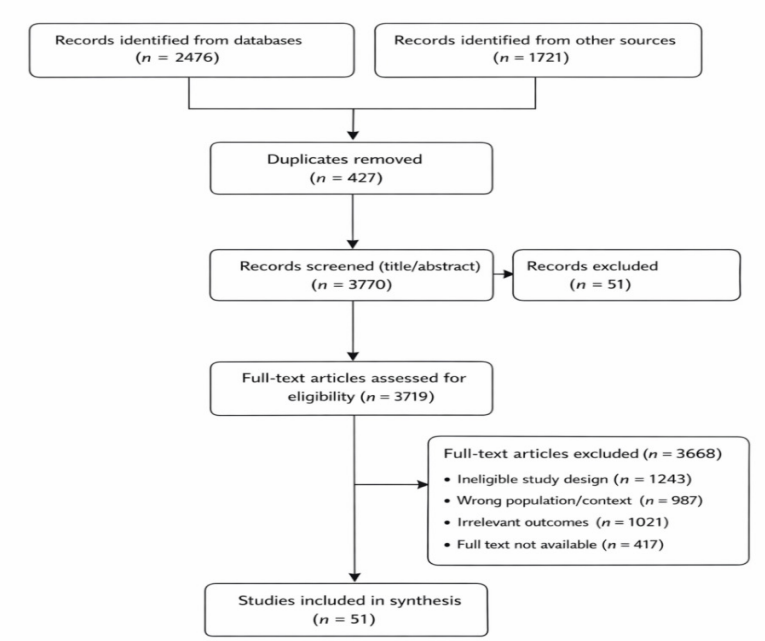

Figure 1: Prisma flow diagram of included studies.

RESULTS AND DISCUSSION

The reviewed literature indicates that psychosocial workload and multidimensional fatigue in computer-intensive office work are examined across several recurring thematic domains, most notably psychosocial risks at work, multidimensional fatigue outcomes, and psychosocial–ergonomic interactions (see Figure 2). The two principal domains identified are analysed separately to provide a more focused synthesis of the evidence: Psychosocial Risks at Work and Multidimensional Fatigue at Work.

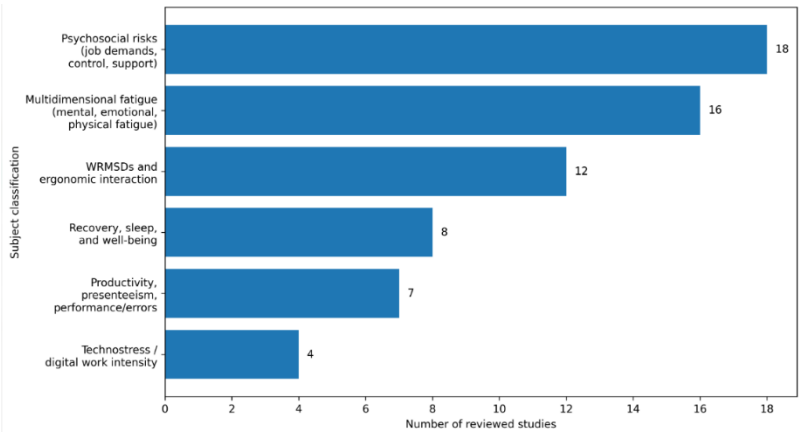

Figure 2: Subject classification and reviewed studies.

As shown in Figure 2, the reviewed literature was primarily focused on psychosocial risks, multidimensional fatigue, and psychosocial–ergonomic interactions, whereas fewer studies specifically addressed recovery-related outcomes, productivity consequences, and technostress.

Psychosocial Risks at Work

Psychosocial risks are recognised as one of the main risks at work that threaten today's workers in the labour market (Schulte et al., 2020), including office workers. In 2023, the European Union information agency for occupational safety and health defined psychosocial risks at work as "aspects of work that are linked to the experience of stress at work and can have significant implications for worker safety and health" (EU OSHA, 2023). The rapid development of information and communication technologies, digitalisation, robotics, flexible forms of work and work requirements have contributed to the presence of psychosocial risks, which must be given serious attention when caring for the health and safety of employees at work (Leka et al., 2015). Nowadays, computers are used in practically all professions, as digitisation is necessary to ensure process flexibility and product personalisation (Menon et al., 2020). The authors note that psychosocial risks can lead to the development of stress-related health problems (Sun et al., 2022), including cardiovascular disease (Stadin et al., 2016), depression and anxiety (Madsen et al., 2017), and even increased mortality (Taouk et al., 2020). Other studies, based on surveys of office workers, have also concluded that psychosocial risks at work and low social support can contribute to stress and even insomnia, as well as negatively affect work efficiency (Furuichi et al., 2020).

Another survey on psychosocial risks indicates that psychosocial risks related to employee absenteeism due to illness are mainly linked to freedom of decision-making, self-reformation opportunities, job diversity, and job evaluation (Anttila et al., 2024).

Several publications have highlighted the link between psychosocial risks at work and WRMSDs. In many earlier publications, only physical risks at work, i.e., static work postures and strain on individual body parts, which cause pain or discomfort in the long term, were considered significant WRMSD risks for office workers. However, several recent studies have demonstrated the link between psychosocial risks and Work Related Musculoskeletal Disorders (WRMSDs) (Liu et al., 2020; Nicolakakis et al., 2017; Mateos-Gonzalez et al., 2023). Prolonged exposure to stress causes discomfort or even pain in certain parts of the body, which can manifest as mental and physical health problems (Arnsten & Shanafelt, 2021), as confirmed by electromyographic examinations (Johanson et al., 2011; Jabłońska et al., 2021; Esmaeili & Askari, 2020). Scientists point out that working at a computer in a static position for long periods of time puts particular strain on the neck and shoulder area, wrists, and hands. This, in turn, increases the risk of developing visual, musculoskeletal, and psychological health problems (Dessie et al., 2018; Medin-Ceylan et al., 2023). This fixed position often causes lower back pain in individuals, which is caused by increased pressure on the vertebrae during prolonged sitting (Padula et al., 2017). A study on the impact of stress on WRMSD has shown that educating employees about ergonomic risks at work is also important. However, long-term improvements require engineering and administrative measures, including workstation setup tailored to the employee's comfort, appropriate lighting, and suitable chairs and footrests (Can Yildiz & Turkay, 2025). Psychosocial risks at work, such as lack of support from managers or colleagues, little control, and high demands at work, are the most common risks mentioned in publications related to WRMSDs (Bezzina, 2023). Studies have also concluded that WRMSDs are often the result of the interaction between physical and psychosocial risks (Celik et al., 2018; Patel et al., 2024). However, other authors deny that WRMSDs are related to psychosocial risks for computer users, namely, neck pain does not show a significant trend in relation to high job demands, low autonomy, restricted decision-making, and insufficient support from colleagues or management (Keown, & Tuchin, 2018). Psychosocial risks at work often lead to absenteeism (Russo et al., 2021), presenteeism at work (Navarro et al., 2018; Anttila et al., 2024), and early retirement due to disability (Leineweber et al., 2019). Recently, there has been an increasing number of publications reflecting the impact of technostress on employees. Scientists conclude that technostress significantly affects not only a person's social life, but also their psychophysical health (Dragano & Lunau, 2020).

Multidimensional Fatigue at Work

Fatigue is a multidimensional phenomenon with a profound impact on performance, health, and well-being (Lane et al., 2025). Fatigue is associated with work overload and lack of leisure time, frequent overtime, frequent

conflicts at work, shift work, piecework, and often even with the inactivity of colleagues (Rose et al., 2017; Latief & Mandiri, 2025). Studies have shown that this can lead to cognitive impairment, reduced workability, sleep disorders, and even unhealthy eating habits, as well as musculoskeletal health problems and cardiovascular health disorders. (Sutherland et al., 2023; Montgomery & Lainidi, 2022; Ghaisani & Susilowati, 2025; Roja et al., 2018). The interaction between mental and physical fatigue increases the risk of errors at work, which in turn affects overall work performance (Arefian et al., 2025; Fan & Smith, 2020; Fan & Smith, 2017; Sadeghniiat-Haghighi & Yazdi, 2015), and this is particularly true for those employed in the IT sector (Wang et al., 2018). Prolonged exposure to stressors causes burnout, which manifests itself as emotional exhaustion, depersonalisation and a reduced sense of personal accomplishment (Singh et al., 2023; Babiker et al., 2024; Edú-Valsania et al., 2022). Organisational and task-related psychosocial risks show a stronger and more stable association with mental and emotional fatigue than with physical fatigue (Bolis et al., 2024; Frone et al., 2018). Emotional fatigue, often described as emotional exhaustion, is one dimension of fatigue. It is often associated with an employee's heightened sensitivity to the internal "microclimate" of the organisation, i.e., perceived injustice, ethical conflicts and discrepancies between the organisation's values and employees' expectations (Bolis et al., 2024). The literature has demonstrated a link between workload, work pace, long working hours, mental health problems, and fatigue (Niedhammer et al., 2021; Lee & Park, 2022).

A study on physical and mental fatigue (Wang et al., 2018) has shown that occupational stress, burnout, and musculoskeletal overload increase the risk of fatigue, while sleeping for more than 7 hours reduces fatigue. When working intensively without breaks, work-related fatigue is inevitable, as confirmed by other studies. A study on occupational stress, cumulative fatigue, and the prevalence of WRMSDs among information technology workers (Zheng et al., 2023) showed that employees in the IT sector experience symptoms of occupational stress related to fatigue much more than those working in other sectors, because they work overtime, have insufficient support from management and colleagues, face high psychological demands, and have limited decision-making freedom, which is consistent with the findings of other authors (Allison et al., 2022; Nikunlaakso et al., 2022). Scientists have proven that prolonged work in terms of years and overtime, as well as sleep problems, contribute to stress (Siu et al., 2020; Sun et al., 2022; Lin et al., 2023; Zhang et al., 2022), which can lead to cumulative fatigue over a longer period of time. It is no secret that constant and prolonged fatigue exacerbates physical and psychological health problems in employees (Lock et al., 2018). A consistent trend observed in studies shows that organisational and task-related psychosocial risks have a stronger and more stable association with mental and emotional fatigue than with physical fatigue (Bolis et al., 2024; Frone et al., 2018). Heavy workloads and limited time to complete tasks are associated with mental fatigue, which can manifest itself in reduced concentration, cognitive endurance, and sustained attention. Limited control over the work to be done and limited freedom in decision-making have been repeatedly linked to both mental and emotional fatigue (Bolis

et al., 2024). In computer-intensive office work, psychosocial stress (high demands, time constraints, low control over work, insufficient support from management and colleagues, role ambiguity, and technostress components) create persistent cognitive and emotional tension, which increases the risk of multidimensional fatigue. Such fatigue in this context manifests itself not only as subjective exhaustion, but also as impaired concentration, decreased cognitive endurance, sleep disturbances, and reduced productivity (e.g., presenteeism), which are particularly significant in office work involving prolonged attention and frequent task changes. Empirical data indicate that psychosocial risks often interact with ergonomic factors (prolonged sitting, static postures, insufficient breaks), exacerbating both fatigue and musculoskeletal complaints, which in turn create a vicious circle of discomfort/pain and mental exhaustion. Studies with office/IT workers quantitatively show a link between occupational stress, cumulative fatigue, and WRMSDs, as well as between stress due to high job demands and WRMSDs symptoms. This indicates that managing psychosocial stress is essential for reducing fatigue and promoting health and work performance.

Overall, the analysis indicates a consistent link between psychosocial stress (demands, control, support, work intensity/technostress) and increased fatigue (especially mental/emotional) in computer-intensive work. A review of the literature shows that several studies have analysed the factors of management, organisation and task complexity in relation to the health problems and fatigue of office workers, in line with the realities of modern office work.

CONCLUSIONS

The scientific articles analysed indicate that psychosocial load in computer-intensive office work is consistently associated with increased multidimensional fatigue, which can manifest in various ways. This can lead to a decline in concentration, emotional exhaustion, and disorders affecting recovery, which can lead to reduced productivity, presenteeism, and a higher risk of errors in everyday digital tasks. At the same time, several studies also highlight the interrelationship between stress, cumulative fatigue, and musculoskeletal complaints, indicating that psychosocial factors should not be assessed in isolation from physical workload and workplace ergonomics.

Scientific research is dominated by cross-sectional studies, which differ in their methods of investigating fatigue and psychosocial factors, and do not always consistently analyse possible confounding factors (e.g., ergonomics, working hours, sleep, individual health). Therefore, future studies will focus on analysing the causal relationship between fatigue and psychosocial risks at work. They will also aim to identify the psychosocial stress indicators that most influence mental fatigue, and the most beneficial intervention mechanisms in computer-intensive work environments.

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