Original Article

Prevalence of Musculoskeletal Disorders and Associated Factors Among Remote Computer Workers: A Cross-Sectional Online Survey

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ABSTRACT

Background: The rapid shift to remote work during the COVID-19 pandemic has heightened concerns about musculoskeletal disorders (MSD) among computer users, driven by poor ergonomic setups and prolonged sedentary behavior. This study assesses the prevalence of MSD and associated risk factors in remote computer workers using an online cross-sectional survey. **Methods**: An anonymous online survey was distributed to remote computer workers via social media and professional networks. Participants (n=56) reported socio-demographic data, work characteristics, and MSD using a modified Nordic Musculoskeletal Questionnaire. Descriptive statistics summarized prevalence, while chi-square tests and odds ratios (OR) with 95% confidence intervals (CI) evaluated associations. **Results**: Of the 56 participants (mean age 31.4 ± 6.2 years; 53.6% male), 69.6% reported at least one MSD in the past 12 months. The most affected regions were the neck (58.9%), lower back (55.4%), and shoulders (53.6%). Significant associations included female gender (OR 4.21, 95% CI 1.16–15.23), lack of dedicated workspace (OR 4.43, 95% CI 1.10–17.91), and physical activity <150 min/week (OR 3.64, 95% CI 1.10–11.97) (all p<0.05). **Conclusion**: MSD prevalence is high among remote computer workers, with modifiable risk factors highlighting the need for ergonomic interventions. Online surveys prove feasible for such assessments.

Keywords: Musculoskeletal disorders, remote work, ergonomics, cross-sectional survey, computer users

INTRODUCTION

The transition to remote work, accelerated by the COVID-19 pandemic, has reshaped the occupational landscape for computer-dependent professionals. Teleworking, or work from home (WFH), offers flexibility but introduces health risks, particularly musculoskeletal disorders (MSD), which include pain and discomfort in muscles, joints, and connective tissues (1,2). Prolonged computer use in non-optimized home environments exacerbates these issues through awkward postures, repetitive movements, and sedentary lifestyles (3,4).

Pre-pandemic studies on computer users reported MSD prevalence ranging from 33.8% to 95.3%, with common risk factors such as older age, female gender, poor posture, and lack of ergonomics training (1,5). The pandemic intensified these challenges; scoping reviews of teleworkers identified poor workstation setups, extended workdays, and psychosocial factors

as contributors to increased MSD, affecting up to 83% of participants (2,6). Cross-sectional surveys during lockdowns noted rises in neck, shoulder, and lower back pain, particularly among females and those with inadequate workspaces (7-9). For instance, among medical students and office workers shifted to online modes, MSD increased from 53.8% pre-pandemic to 73.1%, linked to longer sitting hours and static postures (3,10).

Despite this evidence, specific data on remote computer workers, a group heavily reliant on digital tools, remain limited, especially from feasibility-focused online surveys that can reach dispersed populations efficiently (11,12). This cross-sectional study aims to determine the prevalence and anatomical distribution of MSD among remote computer workers and identify associated socio-demographic and work-related factors using an online survey.

MATERIAL AND METHODS

This cross-sectional study utilized an anonymous online survey to assess MSD among remote computer workers. The survey was distributed via social media platforms and professional networks from February to July 2025. Eligibility criteria included adults aged ≥18 years engaged in remote work with ≥4 hours of daily computer use for at least 6 months. A convenient sample of 56 complete responses was obtained. Informed consent was provided electronically, and data were anonymized to ensure confidentiality. No formal institutional review board approval was required for this non-interventional survey.

The survey consisted of three sections: (1) socio-demographic characteristics (age, gender); (2) work-related factors (daily computer use hours, remote work duration, presence of a dedicated workspace, use of an ergonomic chair, and moderate-vigorous physical activity levels based on World Health Organization guidelines of ≥150 min/week); and (3) MSD assessment via a modified Nordic Musculoskeletal Questionnaire (NMQ) (13). Participants self-reported pain or discomfort in specific body regions (neck, shoulders, upper back, lower back, elbows, hands/wrists, hips/thighs, knees, ankles/feet) over the past 12 months and 7 days, attributed to remote work. Multiple regions per participant were allowed.

Data were analyzed using SPSS version 28. Descriptive statistics (means ± standard deviations for continuous variables; frequencies and percentages for categorical variables) summarized participant characteristics and MSD prevalence. Chi-square tests (with degrees of freedom =1) evaluated associations between any MSD (defined as pain/discomfort in ≥1 body region in the past 12 months) and selected risk factors (gender, dedicated workspace, physical activity). Odds ratios with 95% confidence intervals were calculated, with significance at $p<0.05$.

RESULTS

Table 1 presents the characteristics of the 56 participants. The mean age was 31.4 ± 6.2 years, with 53.6% males. Most reported 8–10 hours of daily computer use (42.9%) and 1–3 years of remote work duration (50.0%). A dedicated workspace was available for 60.7%, while 41.1% used an ergonomic chair. Only 37.5% met the ≥150 min/week physical activity threshold.

Table 1. Socio-demographic and work-related characteristics of remote computer workers (n = 56)

Variable	Category	n (%)
Age (years)	Mean ± SD	31.4 ± 6.2
Gender	Male	30 (53.6)
	Female	26 (46.4)
Daily computer use (remote work, hours)	< 8 h/day	18 (32.1)
	8–10 h/day	24 (42.9)
	> 10 h/day	14 (25.0)

Variable	Category	n (%)
Duration of remote work	< 1 year	12 (21.4)
	1–3 years	28 (50.0)
	> 3 years	16 (28.6)
Dedicated workspace at home	Yes	34 (60.7)
	No	22 (39.3)
Use of ergonomic chair	Yes	23 (41.1)
	No	33 (58.9)
Physical activity (moderate–vigorous)	≥ 150 min/week	21 (37.5)
	< 150 min/week	35 (62.5)

In this sample of 56 remote computer workers, 69.6% reported at least one musculoskeletal symptom in the previous 12 months. Neck (58.9%), lower back (55.4%), and shoulders (53.6%) were the most commonly affected regions, with approximately 40% still reporting neck or low back symptoms in the preceding 7 days (Table 2). Elbows, knees, and ankles/feet were not reported in the data and thus excluded.

Table 2. Prevalence and anatomical distribution of musculoskeletal symptoms among remote computer workers (n = 56)

Outcome / Body region	Symptoms in last 12 months (%)	Symptoms in last 7 days (%)
Any MSD	39 (69.6)	–
Neck	33 (58.9)	23 (41.1)
Shoulders	30 (53.6)	20 (35.7)
Lower back	31 (55.4)	22 (39.3)
Upper back	20 (35.7)	13 (23.2)
Hands / wrists	18 (32.1)	11 (19.6)
Hips / thighs	10 (17.9)	6 (10.7)

Significant associations were observed between any MSD in the past 12 months and female gender (χ^2=5.15, p<0.05; OR 4.21, 95% CI 1.16–15.23), lack of dedicated workspace (χ^2=4.79, p<0.05; OR 4.43, 95% CI 1.10–17.91), and physical activity <150 min/week (χ^2=4.74, p<0.05; OR 3.64, 95% CI 1.10–11.97) (Table 3).

Table 3. Association between any musculoskeletal disorder in the past 12 months and selected risk factors (n = 56)

Risk factor	Category	MSD present n (%)	MSD absent n (%)	χ^2	p-value*	Odds ratio (OR)	95% CI OR
Gender	Male (n = 30)	17 (56.7)	13 (43.3)	5.15	< 0.05	1.00 (ref)	–
	Female (n = 26)	22 (84.6)	4 (15.4)			4.21	1.16 – 15.23
Dedicated workspace at home	Yes (n = 34)	20 (58.8)	14 (41.2)	4.79	< 0.05	1.00 (ref)	–
	No (n = 22)	19 (86.4)	3 (13.6)			4.43	1.10 – 17.91
Physical activity	≥ 150 min/week (n = 21)	11 (52.4)	10 (47.6)	4.74	< 0.05	1.00 (ref)	–
	< 150 min/week (n = 35)	28 (80.0)	7 (20.0)			3.64	1.10 – 11.97

*p-values interpreted against χ^2 critical value 3.84 for df = 1 (all associations statistically significant at α = 0.05).

DISCUSSION

This cross-sectional online survey revealed a high prevalence of MSD (69.6%) among remote computer workers, aligning with pandemic-era studies reporting 53.6% to 90.5% in similar populations (7,14,15). The neck, lower back, and shoulders were most affected, consistent with literature attributing these to prolonged sitting and poor postures in home setups (2,6,16). For example, a scoping review of 79 articles noted increased discomfort from sedentary lifestyles and non-ergonomic workstations (2), while surveys of university staff and bankers reported comparable prevalences of 83% and 58.8%, respectively (6,5).

Significant risk factors included female gender, absence of a dedicated workspace, and insufficient physical activity, corroborating prior findings. Females showed higher odds (OR

4.21), echoing gender disparities in MSD due to biomechanical and psychosocial factors (7,10). Lack of dedicated spaces (OR 4.43) highlights ergonomic deficiencies in improvised home environments, as systematic reviews identified awkward postures and poor furniture as key contributors (1,17). Low physical activity (OR 3.64) aligns with evidence linking sedentary behavior to MSD exacerbation (4,18).

There must be further investigated having a link with history of manual therapy taken for musculoskeletal issue because that may delay or treat MSK problem due to proven effectiveness of Maitland's Mobilization and conventional physical therapy (19). Furthermore, benefiting from the use of a validated NMQ and an online format ensuring feasibility for remote populations. However, its conclusions are limited by a small convenience sample (n=56), potential self-report bias, and a cross-sectional design which precludes establishing causality between the intervention and outcomes; future research should therefore employ larger, representative samples and longitudinal designs to explore causality and evaluate specific interventions like ergonomics training. (5,19).

CONCLUSION

MSD is prevalent among remote computer workers, with gender, workspace setup, and physical activity as modifiable factors. Promoting ergonomic practices and activity could mitigate risks, warranting further research and policy interventions.

DECLARATIONS

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