Original Research

Musculoskeletal discomforts among urban bankers in Sri Lanka

W T Oshadi [1*], C Pathmanathan[2], K R M Chandrathilaka[2]

*Correspondence: thilinioshadiw@gmail.com https://orcid.org/0009-0003-5750-041X

Received on 03 Jan 2025

Accepted on 11 Feb 2025

Abstract

Background & Aim: Improper working postures, including flexed or rotated trunk, overreaching, and repetitive tasks, are known contributors to musculoskeletal (MSK) disorders in office workers. During the COVID-19 pandemic, working from home (WFH) gained attraction across multiple sectors in Sri Lanka, including banking, to ensure public service continuity. Post-pandemic, WFH remained prevalent alongside onsite work, primarily due to reduced infrastructure demands. However, the health implications of this shift are not fully understood hence, this study aimed to determine the prevalence of musculoskeletal discomforts among urban bankers and describe their impact on possible musculoskeletal discomforts.

Methods: This descriptive cross-sectional study surveyed 376 urban bank officers randomly selected from branches of nine private banks in the Colombo District, Sri Lanka. A multi-stage random sampling method was employed to recruit participants aged 18–60 years with over three months of work experience and daily working periods exceeding five hours. Data on MSK discomfort levels were collected using the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ). Ethics approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo, Sri Lanka.

Results: The Mean age of the participants was 32 (9) years. Of all the participants (n=212), 139 worked onsite, while 73 engaged in hybrid (onsite and WFH) mode. The majority worked more than eight hours daily. Onsite officers predominantly had shorter tenures (3–12 months), whereas hybrid mode officers typically had longer tenures (more than 12 months). Hybrid mode officers reported a higher prevalence of musculoskeletal discomfort in the neck (12.3% vs. 7.9%) and hip/buttocks (11.0% vs. 1.4%). Work ability interference was notably higher among hybrid mode officers, particularly in the neck (17.8% vs. 12.2%) and the wrists (17.3% vs. 2.2%).

Conclusions & Recommendations: Findings suggest that hybrid work environments may exacerbate musculoskeletal discomforts, which can interfere with work ability, particularly in the neck and shoulder regions. Targeted ergonomic interventions are recommended to enhance the health of bank officers.

Keywords: *musculoskeletal discomfort, bank officers, work from home, ergonomics*

Introduction

Musculoskeletal disorders can be defined as injuries to muscles, nerves, joints, connective tissues such as ligaments and tendons, or any other body structures that support or comprise the neck, back, and limbs (1). Work-related musculoskeletal disorders can be identified as impairments of the musculoskeletal system, primarily caused by the performance of work tasks and the direct working environment (2). The posture and movement of a worker are important factors for determining the risk of musculoskeletal disorders in the workplace. Musculoskeletal disorders have been common complaints among workers involved in static work, tasks requiring repetitive motion of the upper limbs and prolonged computer work (3).

Several physical, psychological, and organizational factors contribute to musculoskeletal pain among workers (4). Physical factors include static postures, poor postures, and repetitive movements, while psychological factors encompass stress and mental workload. Organizational factors involve an improper work-rest cycle and a lack of job enrichment (4). In Sri Lanka, 12% of computer operators who used a keyboard for 4 hours per day were reported with low back pain (5). Varying prevalences of work-related musculoskeletal pain have been reported worldwide with overall back region (60%), shoulder/neck (54%), neck alone (51%), shoulder alone (50%), lower back (47%), and wrist (42%) (6) being common sites of pains. Prolonged sitting risks the computer users to develop pain in the neck, upper extremities and lower back regions (7).

Many studies on musculoskeletal problems among office workers have been conducted in developed countries, while research in developing countries, particularly among the Sri Lankan working population, remains limited. Only a few Sri Lankan studies have assessed musculoskeletal discomforts in office settings, and research on discomforts related to working from home is non-existent therefore, this study aimed to determine the prevalence of musculoskeletal discomforts among urban bank officers and evaluate its impact on work ability. The findings could contribute to practical occupational health interventions.

Methods

This descriptive cross-sectional study was conducted among 376 randomly recruited bank officers in Colombo District. Those aged 18- 60 years, possessed a minimum of one month's work experience in the banking sector, worked for a minimum of 5 hours per day of both genders were included. Those who had a diagnosis of musculoskeletal discomfort prior to being employed as a bank officer, experienced acute musculoskeletal injuries due to unforeseen incidents or had undergone surgery involving the musculoskeletal system, were excluded from the study.

A multi-stage random sampling technique was used to recruit the study participants based on a list of banks located in the Colombo Municipal Council area (Figure 1).

Data were collected using two self-administered, web-based questionnaires: a general information questionnaire to gather socio-demographic details and Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), with versions for both male and female sedentary workers to record musculoskeletal (MSK) discomforts, its severity and its impact on individual's work. The questionnaires were administered as Google Forms in English, Sinhala, and Tamil languages. Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo.

Statistical Package for Social Sciences software

(IBM SPSS Statistics 20.0) was used to analyse data. Descriptive statistics were employed to analyse socio-demographic characteristics while analytical statistics with the Chi Square test was used to find any significant differences in musculoskeletal discomforts due to differences in work environments.

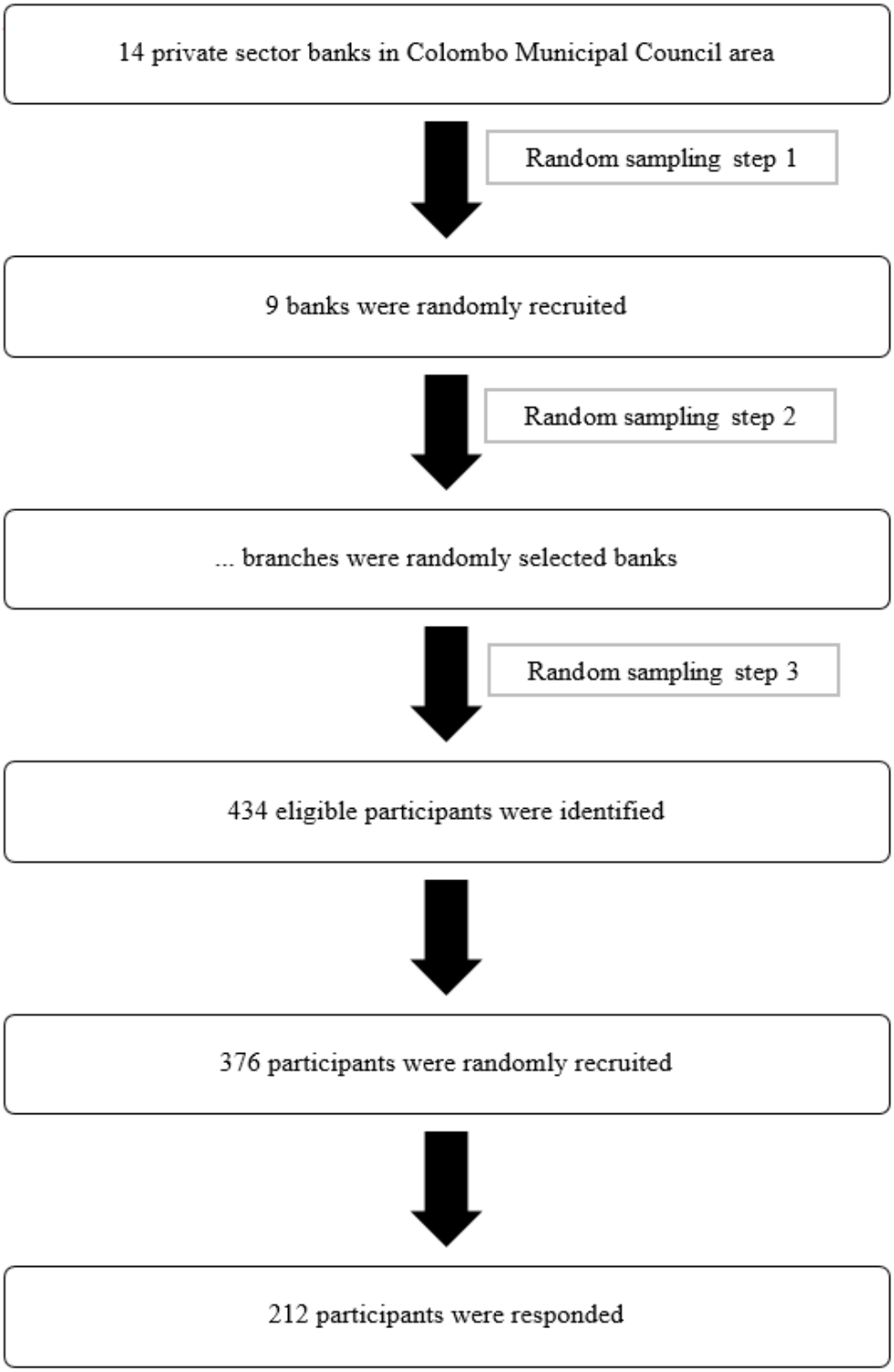

Figure 1. Process multi-stage sampling in the study

Results

The questionnaires were administered to 376 bank officers, and despite numerous reminders, only 212 (56.3%) responded. Two main working patterns were identified which were, working at office (n=139) and in hybrid mode, i.e., working at both office and home (n=73). Participants in the hybrid group worked from home for 2-3 days per week, transitioning to the office and working on-site for the remaining days.

Socio-demographic characteristics

Study participants' age ranged from 18 to 54 years, with a mean age of 32 years (SD=9). Among them, office-based officers (n=139) reported 6-9 hours of work per day, with a mean of 9 hours (SD=1) and had a service duration of 2-120 months, averaging 28 months (SD=29). During their office time, the hybrid officers (n=73) were employed for 6-9 hours daily at the office, with a mean of 9 hours (SD=1), and had a service duration of 2-120 months (mean=18; SD=21 months). When they worked at home setup, hybrid officers had worked 3-9 hours per day, averaging 7 hours (SD=2), with a shorter service duration of 2-14 months (mean=13; SD=0.5) (Table 1).

Socio-demographic characteristics of the participants were analysed for both office-based and hybrid officers categorically, as mentioned in Tables 2 and 3.

The majority of the participants were in the 18-30 age range (n=102, 48.1%) and were males (n=136, 64.2%) despite the working pattern. The majority of the participants worked more than 8 hours per day overall (n=102, 73.4%), while it was 65.8% (n=48) for office-based officers. Hybrid-based employees mostly worked 5-8 hours per day. The majority of the participants as a whole (n=76, 54.7%) and office-based employees (n=50, 68.5%) had a service duration of 3-12 months, while in the hybrid work-based setup, most of the officers (n=61, 83.6%) have exceeded 12 months of service.

Body discomfort levels among bankers

In the office setting, mild discomfort was most prevalent in the neck (n=11, 7.9%), hip/buttocks (n=18, 12.9%), and lower back (n=3, 2.2%) regions, while hybrid work-based individuals mostly experienced mild discomfort in the neck (n=9, 12.3%) and left upper arm (n=5, 3.6%).

Table 1. Sociodemographic characteristics of the sample

Type of officers		Characteristic	No.	Minimum	Maximum	Mean (SD)
All the officers		Age of the participant (years)	212	18	54	32 (9)
Office-based officers		Working hours per day (hours)	139	6	9	9 (1)
		Service duration (months)	139	2	120	28 (29)
Hybrid officers	**At office**	Working hours per day (hours)	73	6	9	9 (1)
		Service duration (months)	73	2	120	18 (21)
	At home	Working hours per day (hours)	73	3	9	7 (2)
		Service duration (months)	73	2	14	13 (0.5)

Table 2. Socio-demographic characteristics of office and hybrid officers

Socio-demographic characteristic	Categories	Total	Office-based officers (n=139)	Hybrid officers (n=73)
Age	18-30	102 (48.1%)	58 (41.7%)	44 (60.3%)
	31-40	62 (29.2%)	40 (28.8%)	22 (30.1%)
	41-50	36 (17%)	30 (21.6%	6 (8.3%)
	51-60	12 (5.7%)	11 (7.9%)	1 (1.4%)
Gender	Male	136 (64.2%)	89 (64%)	47 (64.4%)
	Female	76 (35.8%)	50 (36%)	26 (35.6%)

Data are shown as No. (%)

Table 3: Socio-demographic characteristics of office and hybrid officers (Working hours and service duration)

Socio-demographic characteristic	Categories	Office-based officers (n=139)	Hybrid officers (n=73)	
			WIO	WFH
Number of working hours per day (hours)	Less than 5 hours	0	0	1 (1.4%)
	5 – 8 hours	37 (26.6%)	25 (34.2%)	46 (63.0%)
	more than 8 hours	102 (73.4%)	48 (65.8%)	26 (35.6%)
Service duration (months)	less than 3 months	5 (3.6%)	0	0
	3-12 months	76 (54.7%)	50 (68.5%)	12 (16.4%)
	more than 12 months	58 (41.7%)	23 (31.5%)	61 (83.6%)

Data are shown as No. (%)
Abbreviations: WIO- Work in office, WFH- Work from home

Moderate discomfort was notable in the office setting for the neck (n=27,19.4%), shoulder (right) (n=29,20.9%), upper back (n=28,20.1%), and knee (right) (n=10,7.2%) regions, whereas hybrid officers reported moderate discomfort mainly in the neck (n=16,21.9%) and right shoulder (right) (n=13,17.8%). Severe discomfort was minimal overall. Those working at office setting reported severe discomfort in the neck (n=14,10.1%) and lower back (n=8,5.8%) regions while those working at hybrid setting complained discomfort in the neck (n=3,4.1%) and right knee (n=2,2.7%) regions (Table 4).

Interference of musculoskeletal discomforts with work ability

In the office setting, neck discomfort had not interfered with work ability for 12.2% (n=17), slightly interfere for 22.3% (n=31), and substantially interfere for 7.2% (n=7), while in the hybrid setting, corresponding percentages are higher at 17.8% (n=13), 17.8% (n=13), and 2.7% (n=2), respectively. Similar trends were observed in other regions such as the shoulders, upper back, and upper arms, indicating that hybrid bank officers tend to experience a higher degree of interference with work ability due to musculoskeletal discomforts compared to their office-based counterparts. Right wrist was reported with the second highest site of discomforts at hybrid setting (17.3%, n=24) (Table 5).

Table 4. Body discomfort levels among bank officers

Region	Mild discomfort			Moderate discomfort			Severe discomfort		
	Total	Office n=139	Hybrid n= 73	Total	Office n=139	Hybrid n= 73	Total	Office n=139	Hybrid n= 73
Neck	20 (9.4)	11 (7.9)	9 (12.3)	43 (20.3)	27 (19.4)	16 (21.9)	17 (8)	14 (10.1)	3 (4.1)
Shoulder (Right)	6 (2.8)	4 (2.9)	2 (2.7)	42 (19.8)	29 (20.9)	13 (17.8)	0 (0)	0 (0)	0 (0)
Shoulder (Left)	6 (2.8)	4 (2.9)	2 (2.7)	35 (16.5)	22 (15.8)	13 (17.8)	0 (0)	0 (0)	0 (0)
Upper back	10 (4.7)	6 (4.3)	4 (5.5)	40 (18.9)	28 (20.1)	12 (16.4)	0 (0)	0 (0)	0 (0)
Upper arm (Right)	0 (0)	0 (0)	0 (0)	4 (1.9)	2 (1.4)	2 (2.7)	0 (0)	0 (0)	0 (0)
Upper arm (Left)	6 (2.8)	5 (3.6)	1 (1.4)	24 (11.3)	2 (1.4)	22 (7)	0 (0)	0 (0)	0 (0)
Lower back	7 (3.3)	3 (2.2)	2 (2.7)	32 (15.1)	22 (15.8)	10 (13.7)	13 (6.1)	8 (5.8)	5 (6.8)
Forearm (Right)	0 (0)	0 (0)	0 (0)	4 (1.9)	2 (1.4)	2 (2.7)	2 (0.9)	2 (1.4)	0 (0)
Forearm (Left)	0 (0)	0 (0)	0 (0)	4 (1.9)	2 (1.4)	2 (2.7)	2 (0.9)	2 (1.4)	0 (0)
Wrist (Right)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (1.9)	2 (1.4)	2 (2.7)
Wrist (Left)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4 (1.9)	2 (1.4)	2 (2.7)
Hip/Buttocks	0 (0)	0 (0)	0 (0)	26 (12.3)	18 (12.9)	8 (11.0)	4 (1.9)	2 (1.4)	2 (2.7)
Thigh (Right)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (2.8)	3 (2.2)	3 (4.1)
Thigh (Left)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (2.8)	3 (2.2)	3 (4.1)
Knee (Right)	0 (0)	0 (0)	0 (0)	16 (7.5)	10 (7.2)	6 (8.2)	8 (3.8)	6 (4.3)	2 (2.7)
Knee (Left)	4 1.9	3 2.2	1 1.4	12 (5.7)	7 (5.0)	5 (6.8)	5 (2.4)	2 (1.4)	3 (4.1)
Lower leg (Right)	0 (0)	0 (0)	0 (0)	20 (9.4)	15 (10.8)	5 (6.8)	6 (2.8)	3 (2.2)	3 (4.1)
Lower leg (Left)	0 (0)	0 (0)	0 (0)	15 (7.1)	15 (10.8)	5 (6.8)	7 (3.3)	4 (2.9)	3 (4.1)

Data are shown as No. (%)

Table 5. Analysis of interference with work ability

Region	Not at all			Slightly interfered			Substantially interfered		
	Total n=212	Office n=139	Hybrid n= 73	Total n=212	Office n=139	Hybrid n= 73	Total n=212	Office n=139	Hybrid n= 73
Neck	30 (14.2)	17 (12.2)	13 (17.8)	44 (20.8)	31 (22.3)	13 (17.8)	12 (5.7)	10 (7.2)	2 (2.7)
Shoulder (Right)	16 (7.5)	10 (7.2)	6 (8.2)	8 (3.8)	6 (4.3)	2 (2.7)	0 (0)	0 (0)	0 (0)
Shoulder (Left)	13 (6.1)	8 (5.8)	5 (6.8)	10 (4.7)	7 (5.0)	3 (4.1)	0 (0)	0 (0)	0 (0)
Upper back	13 (6.1)	8 (5.8)	5 (6.8)	15 (7.1)	11 (7.9)	4 (5.5)	0 (0)	0 (0)	0 (0)
Upper arm (Right)	6 (2.8)	3 (2.2)	3 (4.1)	4 (1.9)	2 (1.4)	2 (2.7)	0 (0)	0 (0)	0 (0)
Upper arm (Left)	12 (5.7)	8 (5.8)	4 (5.5)	4 (1.9)	2 (1.4)	2 (2.7)	0 (0)	0 (0)	0 (0)
Lower back	24 (11.3)	15 (10.8)	9 (12.3)	24 (11.3)	17 (12.2)	7 (9.6)	8 (3.8)	5 (3.6)	3 (4.1)
Forearm (Right)	6 (2.8)	3 (2.2)	3 (4.1)	6 (2.8)	4 (2.9)	2 (2.7)	0 (0)	0 (0)	0 (0)
Forearm (Left)	6 (2.8)	3 (2.2)	3 (4.1)	6 (2.8)	4 (2.9)	2 (2.7)	0 (0)	0 (0)	0 (0)
Wrist (Right)	6 (2.8)	3 (2.2)	3 (4.1)	32 (15.1)	24 (17.3)	8 (11.0)	0 (0)	0 (0)	0 (0)
Wrist (Left)	6 (2.8)	3 (2.2)	3 (4.1)	4 (1.9)	2 (1.4)	2 (2.7)	0 (0)	0 (0)	0 (0)
Hip/Buttocks	12 5.7	8 5.8	4 5.5	24 11.3	17 12.2	7 9.6	4 (1.9)	3 (2.2)	1 (1.4)
Thigh (Right)	0 (0)	0 (0)	0 (0)	6 2.8	3 2.2	3 4.1	0 (0)	0 (0)	0 (0)
Thigh (Left)	0 (0)	0 (0)	0 (0)	6 2.8	3 2.2	3 4.1	0 (0)	0 (0)	0 (0)
Knee (Right)	4 1.9	3 2.2	1 1.4	40 18.9	27 19.4	13 17.8	10 (4.7)	8 (5.8)	2 (2.7)
Knee (Left)	10 4.7	8 5.8	2 2.7	34 16.0	22 15.8	12 16.4	10 (4.7)	8 (5.8)	2 (2.7)
Lower leg (Right)	0 (0)	0 (0)	0 (0)	26 12.3	18 12.9	8 11.0	0 (0)	0 (0)	0 (0)
Lower leg (Left)	0 (0)	0 (0)	0 (0)	26 12.3	18 12.9	8 11.0	0 (0)	0 (0)	0 (0)

Data are shown as N (%)

Discomforts in multiple regions

Of all the participants, 18.9% (n=40) reported discomforts in more than one region, while other regions are listed in Table 6.

Relationship between the site of discomfort and type of workstation

Only the associations between discomfort experienced with neck, lower back, and hip/buttock regions were tested, as these were the most reported sites of discomfort. The pattern of work (office-based or hybrid) did not significantly relate to the region of discomfort ($p>0.05$) (Table 7).

Discussion

The most frequently reported sites of musculoskeletal discomfort among bankers were neck (37.7%), lower back (23.6%) and hip/buttocks (14.2%) regions in the current study. This aligns with previous research conducted in Iran and Germany (4,8) in which, the neck region emerged as one of the most affected sites of discomfort. The lower back pain prevalence in our study (23.6%) was much lower than the Iranian study (57.10%). The larger sample size in the Iranian study (4) might have provided a more representative picture of the population, potentially leading to higher prevalence rates than this study.

Compared to our study, slightly higher discomfort levels were reported in literature where neck pain discomfort ranged from low (15%), mild (51%), to severe (33.9%) and lower back pain from low (19.3%), mild (50.7%), to severe (30%) (9). Although both studies used the CMDQ questionnaire and had approximately same age range in the study sample, the larger sample size (n=753) in the referred study, work experience criteria, and methodological differences might have caused the differences in results.

Table 6. Different combinations of body sites where participants reported experiencing discomfort

Body site	No.	%
Only one site (Neck or lower back or hip/buttocks)	71	33.4
Neck + Lower Back	12	5.7
Neck + Hip/Buttocks	18	8.5
Lower back + Hip/Buttocks	1	0.5
Neck + Lower back + Hip/Buttocks	9	4.2

Table 7. Association of body discomforts with type of workstation

Characteristic		Office bank officers (n=139) No. (%)	Hybrid bank officers (n=73) No. (%)	Significance
Neck discomfort	Yes	52 (37.4)	28 (38.4)	$\chi^2 = 3.222$
	No	87 (62.6)	45 (61.6)	df = 1
				p = 0.2
Lower back discomfort	Yes	33 (23.7)	17 (23.3)	$\chi^2 = 0.303$
	No	106 (76.3)	56 (76.8)	df = 1
				p = 0.86
Hip/buttock discomfort	Yes	20 (14.4)	10 (13.7)	$\chi^2 = 0.577$
	No	119 (85.6)	63 (86.3)	df = 1
				p = 0.45

We did not find a statistically significant association between the type of workstation and the site of musculoskeletal discomfort. However, other studies report that musculoskeletal discomforts among office workers may occur due to various reasons including, but not limited to workstation type, posture, duration of computer usage, individual ergonomic awareness, and pre-existing conditions (10). Additionally, variations in workstation setups within the same job category, e.g., differences in chair support, desk height, and monitor positioning, may also affect (11). Self-administered nature of tools used in our study might have underestimated the influence of above factors.

Ergonomic compliance of workstations also plays a crucial role. Studies have shown that many office and home workstations do not fully adhere to ergonomic guidelines, leading to discomfort, irrespective of workstation classification (12). Furthermore, individual adaptations to discomfort, such as changes in posture, frequent breaks, or use of external ergonomic accessories, may contribute to the lack of direct relationship between workstation type and musculoskeletal discomfort (13). Psychological and environmental factors, such as stress, workload, and work-life balance, may also influence musculoskeletal pain, potentially overshadowing workstation-related effects (14). These findings suggest that while ergonomic factors play a crucial role in musculoskeletal discomfort, a simple classification of workstations may not be sufficient to establish a direct association with discomfort sites.

The current study has several strengths. The multi-stage random sampling method used in this study has minimized the selection bias. The Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) is a validated tool, and cultural adaptation of the tool further ensured its validity. The principal investigator personally explained the questionnaires, reducing comprehension bias, and remained available for participant queries.

Despite these strengths, we could not exclude some limitations that may have affected the findings. The response rate was as low as 56.3%, most likely due to participants' busy schedules, technical issues, and internet access requirements. Reliance on self-administered questionnaires introduced potential biases despite efforts to enhance comprehension with detailed explanations. Additionally, some responses were subjective and could have influenced by participants' moods or daily events, impacting data accuracy and reliability.

Conclusions

Based on the findings of this study, it is evident that bank officers, whether working in office-based or hybrid setups, experience varying degrees of musculoskeletal discomfort, particularly in the neck, lower back, and hips/buttocks. Hybrid officers report a higher prevalence of discomfort, which also more frequently interferes with their work ability, especially in the neck and shoulders. Our findings underscore the need for targeted ergonomic interventions and adaptive work practices to mitigate discomforts, enhance workplace ergonomics, and improve overall work ability and satisfaction among bank officers in both work settings.

Author Affiliations

[1]School of Physiotherapy, Department of Allied Health Sciences, International Institute of Health Sciences, [2]Department of Allied Health Sciences, Faculty of Medicine, University of Colombo

Author Declarations

Competing interests: The authors declare no conflicts of interest related to this research. All data collection, analysis, and interpretation were conducted impartially, without any influence from personal, financial, or professional relationships that could have biased the study's outcomes. Additionally, no external entity influenced the design, execution, or publication of this work.

Funding: self-funded.

Acknowledgments: All the study participants are highly acknowledged for their voluntary participation and immense support.

Author contributions: All authors contributed equally to the conceptualization of the study. Data collection was conducted by TO under the direct guidance and supervision of KC and CP. TO prepared the manuscript under the guidance of KC and CP. KC contributed to the manuscript by editing and reviewing it. The final manuscript was reviewed and approved by all authors before submission.

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