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Musculoskeletal Disorders among Medical School Staff in an Urban Tertiary Care Academic Hospital in Thailand

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ABSTRACT

OBJECTIVE: This study aimed to assess the prevalence of musculoskeletal disorders (MSDs) and explore related factors among medical school workers.

METHODS: A cross-sectional study was conducted among workers at a medical school in Bangkok, Thailand (n = 152). Data were collected via online questionnaires, which gathered general information, sleep quality, working conditions, ergonomics, psychological factors, and the presence of MSDs. Sleep quality was measured using the Thai version of the Pittsburgh Sleep Quality Index. The prevalence of MSDs and psychological factors were measured using the standardized Nordic questionnaire for 12 body parts and the Depression Anxiety and Stress Scale, respectively. The Chi-square test was utilized to evaluate the association between related factors and MSDs. Additionally, binary logistic regression was performed to examine the relationship among sleep quality, ergonomics, psychological factors, and specific body pain.

RESULTS: Out of 152 workers, a significant majority (95.5% in females and 75.0% in males) reported experiencing MSDs in one or more body regions. The highest prevalence of MSDs was observed in the shoulder, with 74.3% reporting discomfort in the past seven days and 69.1% in the past 12 months. Nearly all participants reporting MSDs also experienced depression (97.0%) and anxiety (97.4%). Ergonomics (e.g., twisted postures and repetitive movements) and psychological factors (e.g., depression and anxiety) were significantly associated with the occurrence of MSDs. Repetitive movements (odds ratio (OR) = 2.50; 95% confidence interval (CI) = 1.19-5.25), depression (OR = 3.39; 95% CI = 1.48-7.79), anxiety (OR = 4.22; 95% CI = 1.88-9.50), and stress (OR = 5.40; 95% CI = 1.97-14.81) were significantly linked to shoulder pain.

CONCLUSION: There is a high prevalence of MSDs among medical school workers, with several individual, work-related, ergonomic, burnout-related, and psychological factors being key contributing factors. The findings suggest that both physical and psychological health should be addressed to prevent MSDs in this population.

KEYWORDS: anxiety, depression, musculoskeletal disorders, stress

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INTRODUCTION

Musculoskeletal disorders (MSDs) are among the most significant health-related issues in the workplace, leading to physiological and psychological health problems[1-3]. Long-term MSDs can reduce work activity, increase sick leave absences, result in chronic occupational disability, and diminish the quality of life[1,4]. Over the past decade, there has been a high prevalence of MSDs among working populations worldwide, with contributing factors including personal factors such as gender, age, body mass index (BMI)[5], sleep quality[6], work-related factors, and psychological factors[7-10]. Studies have identified a significant correlation between sleep quality and MSDs, suggesting that sleep quality is a more robust predictor of MSDs than pain is of sleep quality[11,12]. Individuals with musculoskeletal abnormalities exhibit a reduction in sleep quality by up to 86% compared to those without such conditions[13]. A study of medical staff indicated that 57% of them suffered from poor sleep quality, which was associated with high levels of musculoskeletal pain and stress[14].

Work-related factors, particularly ergonomic issues, are key determinants of MSDs. Studies have shown that increased working hours per week raise the odds of low back pain, knee pain, and shoulder pain[7]. Ergonomic factors such as twisted posture, repetitive movements, heavy lifting, improper lifting techniques, prolonged sitting or standing, and awkward postures are also associated with MSDs[1,5,7,15-18]. Additionally, psychological factors play a significant role in MSDs. A study examining both physical and psychosocial factors on body pain symptoms found that workers exposed to high physical demands combined with high psychosocial risk factors had increased odds of experiencing body pain. In contrast, this association was not observed in those exposed to high physical demand and low psychosocial risk factors[1].

Several studies have reported high incidences of MSDs among healthcare professionals, particularly those employed in hospital settings such as nurses[19-21] and physical therapists[8,22,23] with the lower back, neck, and thighs being identified as the most commonly affected regions[7]. In Thailand, healthcare workers report facing to occupational hazards, including ergonomics (e.g., moving heavy materials over 20 kg, standing for prolonged periods) and MSDs affecting various part of the body. Neck pain is most commonly reported by surgical staff (36%), while shoulder pain is highest among nutrition service workers (50%)[24]. A study among dental workers found that musculoskeletal symptoms interfering with daily activities within 12 months were most common in shoulder (47.5%), neck (38.7%) and lower back (31.5%), respectively[25]. Additionally, an investigation into musculoskeletal abnormalities among nursing personnel revealed a 47.8% incidence rate of withdrawals attributed to these disorders[26]. Working in medical schools may further increase the likelihood of suffering from MSDs due to several unique occupational factors. Medical school staff often engage in prolonged standing during lectures and demonstrations, which can strain the lower back and legs, while repetitive movements involved in teaching procedures and laboratory work contribute to repetitive strain injuries. The frequent need to adopt awkward postures during these activities further exacerbates the risk. For those without teaching roles, administrative tasks and prolonged computer use can also lead to MSDs due to poor ergonomic setups and extended periods of sitting. Moreover, the high-stress nature of working in a tertiary hospital, coupled with academic responsibilities, increases the overall physical and mental strain on staff. A study conducted in a tertiary hospital found MSDs among the staff in at least one body region, with the highest prevalence observed in the lower back and knees. This study indicated that psychosocial factors were associated with the incidence of MSDs[7].

Given these occupational challenges, one key objective of this study was to investigate the prevalence of MSDs among medical school staff, as understanding how widespread these conditions are within this specific occupational group can provide valuable insights into the unique challenges they face. Although most of the existing research on MSDs has concentrated on the physical aspects, the impact of psychological factors on MSDs has not been extensively studied. Previous studies have indicated that both physical and psychosocial factors are related to MSDs. However, the specific links between psychological factors such as depression, anxiety, and stress and the incidence of MSDs remain inadequately explored. Thus, the purpose of this study was to examine the relationship between these psychological factors and the occurrence of MSDs among medical school staff in Thailand. The study also aimed to explore the relationship between various factors (i.e., individual, work-related, ergonomic, burnout-related, and psychological) and MSDs among medical school staff. By focusing on a group that is particularly vulnerable to both physical and mental stressors, this research intended to offer a more comprehensive understanding of MSDs. The results could lead to the creation of more holistic intervention strategies that address both the physical and psychological dimensions of workplace health, ultimately enhancing the quality of life and well-being of medical school staff.

METHODS

A cross-sectional survey was conducted on medical school staff in Bangkok, Thailand over three months from January to March 2023. This study was approved by the Ethics Committee of the Faculty of Medicine Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand (approval no. COA: 014/2566).

The medical school encompasses a tertiary hospital, the Faculty of Medicine, and office services. Participants in this study were medical school staff working in the hospital, educational, or service sectors. The sample size was estimated using the formula for calculating the sample size for an infinite population proportion[27], $n = z_{0.975}^2 p(1-p)/d^2$, where d is the margin of error, which was set to 10% and p is the proportion or prevalence of MSDs. Based on a reported prevalence of MSDs at 57.1%[28], the calculated sample size was 95 participants. To account for uncertainty or incomplete data, we increased the sample size by 10%, resulting in a minimum requirement of 105 participants. The actual sample collected was 152 participants, which exceeds the minimum requirement and is considered sufficient.

The inclusion criteria for this study were (a) being a medical school staff member working for more than three months, (b) being either female or male aged 18 or older, (c) being able to understand Thai, and (d) being willing to participate. On the other hand, the exclusion criteria included (a) individuals who had undergone musculoskeletal surgery on any part of the body, (b) those not residing in Bangkok, and (c) pregnant women.

The questionnaire was divided into three sections. The first section collected data regarding individual factors such as age, sex, BMI, underlying disease, exercise habits, and sleep quality. Sleep quality was assessed using the Thai version of the Pittsburgh Sleep Quality Index, which has a sensitivity of 89.1, specificity of 86.5, and Cronbach's alpha coefficient of 0.836[29]. Additionally, this section addressed work-related factors such as work position, working hours, patient contact, and ergonomics. Ergonomic factors were assessed with a dichotomous scale (yes/no) that inquired about working posture, including twisted posture (frequent twisting or turning of the body), repetitive movements (tasks requiring repetitive use of the hands or arms, maintaining the same posture or movement pattern continuously, or performing rapid repetitive motions with a cycle time of less than 30 seconds), prolonged sitting (working in a seated position for more than half of the total working hours), and prolonged standing (working in a standing position for more than half of the total working hours).

The second section collected information on burnout and psychological factors. Burnout was measured using the Thai version of the Copenhagen Burnout Inventory (T-CBI), originally developed by Kristensen et al.[30] and adapted in Thai by Phuekphan with a reported reliability of 0.96[31]. The T-CBI consists of three distinct subscales: personal, work-related, and client-related burnout[26]. First, personal burnout refers to the physical and mental fatigue individuals experience throughout the day. Second, work-related burnout refers to the degree of exhaustion caused by job demands. Finally, client-related burnout refers to the exhaustion resulting from interactions with clients (e.g., patients). In addition to burnout, psychological factors were assessed using the Depression Anxiety and Stress Scale, which is a validated self-reporting scale that measures levels of depression, anxiety, and stress, with Cronbach's alpha coefficient 0.82, 0.78, 0.69, respectively[32].

The third section addressed the Standardized Nordic Musculoskeletal Questionnaires, which is commonly used to assess MSDs over the previous seven days and 12 months. The questionnaires consist of 12 body parts, namely, neck, shoulder, upper back, lower back, upper arm, elbows, lower arm, wrist, hip, knee, calf, and ankle/feet. The participants were asked about the pain they had experienced in each body part (with the potential answer being either "yes" or "no")[33,34]. Those who answered "yes" were classified into the "pain" group, while those who answered "no" were placed in the "no pain" group for the corresponding body part and specific period.

Data were collected using online questionnaires generated with Google Forms. The link and QR code were shared via organization email and social media using an accidental sampling technique. The first page provided an invitation and details about the research, including information on inclusion and exclusion criteria. Participants were required to review the inclusion criteria and indicate 'yes' or 'no.' If they selected 'No,' the online form automatically closed. If they selected 'yes,' they proceeded to the next section. Informed consent was requested on the subsequent page, and participants who did not provide consent were automatically exited from the form. Participants were required to answer all questions. An incomplete form could not be submitted. Thus, there was no missing data.

Statistical analyses were performed using SPSS version 29.0.0.0 (SPSS, Inc., Chicago, IL, USA). Continuous variables such as age were summarized using the median (interquartile range), while categorical variables such as sex were reported as frequencies and proportions. To test significant differences between groups with and without MSDs, the Chi-square test and Fisher's exact test were used for categorical variables, while Mann-Whitney U-test was used for continuous variables. Univariate binary logistic regression analyses were conducted to calculate the crude odds ratios for each independent variable, identifying associations with pain in specific body regions. Statistical significance was determined using a 95% confidence interval and a p-value threshold of 0.05.

RESULTS

This study aimed to investigate the prevalence of MSDs and the factors associated with MSDs among medical school staff in Bangkok, Thailand. As Table 1 shows, the prevalence of MSDs within seven days significantly varied across several individual, work-related, sleep quality, ergonomic, burnout, and psychological factors. Individual factors included age, sex, and BMI. Staff members more likely to report experiencing MSDs were under 50 years old, female, and not overweight. Ergonomic factors, including having a twisted posture and engaging in repetitive movements, were associated with a higher likelihood of experiencing an MSD. Burnout factors included personal, work-related, client-related, and total burnout. Those reporting medium to high levels of these burnout factors were more likely to have an MSD. Psychological factors included depression and anxiety, with affected staff members more likely to experience an MSD.

Similarly, as Table 1 shows, the prevalence of MSDs within 12 months also demonstrated significant variation across several individual, ergonomic, burnout, and psychological factors, as well as a work-related factor. In addition to age, sex, and BMI, having an underlying disease was negatively associated with experiencing MSDs. Among burnout factors, only personal burnout and total burnout were significantly associated with experiencing an MSD. Similar to the seven-day prevalence, both depression and anxiety were significantly associated with MSDs within 12 months. Moreover, patient contact, a work-related factor, was also related to MSDs within 12 months.

Table 1 Individual factors, work-related factors, sleep quality, ergonomic factors, burnout, psychological disorders, and MSDs among medical school staff (n = 152)

Factors	MSDs within 7 days		P-value	MSDs within 12 months		P-value
	Pain	No pain		Pain	No pain	
Individual factors						
Age (%)			0.015[b]			0.013[a]
< 50 years	100 (94.3)	6 (5.7)		98 (92.5)	8 (7.5)	
≥ 50 years	37 (80.4)	9 (19.6)		36 (78.3)	10 (21.7)	
(Median (IQR))	38.00 (30.0–52.0)	50.00 (39.0–58.0)	0.027[c]	38.00 (30.0–52.0)	50.00 (40.5–58.0)	0.025[c]
Sex (%)			< 0.001[b]			0.008[b]
Male	30 (75.0)	10 (25.0)		30 (75.0)	10 (25.0)	
Female	107 (95.5)	5 (4.5)		104 (92.9)	8 (7.1)	
BMI (%)			0.009[a]			0.043[a]
Underweight	60 (98.4)	1 (1.6)		57 (93.4)	4 (6.6)	
Normal	55 (87.3)	8 (12.7)		56 (88.9)	7 (11.1)	
Overweight - Extremely obese	22 (78.6)	6 (21.4)		21 (75.0)	7 (25.0)	
Underlying Disease (%)			0.100			0.042[a]
Have	44 (84.6)	8 (15.4)		42 (80.8)	10 (19.2)	
Not have	93 (93.0)	7 (7.0)		92 (92.0)	8 (8.0)	
Exercise (%)			0.149			0.053
Yes	92 (87.6)	13 (12.4)		89 (84.8)	16 (15.2)	
No	45 (95.7)	2 (4.3)		45 (95.7)	2 (4.3)	
Sleep quality			0.027[a]			0.363
Good	51 (83.6)	10 (16.4)		52 (85.2)	9 (14.8)	
Poor	86 (94.5)	5 (5.5)		82 (90.1)	9 (9.9)	
Work-related factors						
Work position (%)			0.658			0.931
Health care worker	63 (91.3)	6 (8.7)		61 (88.4)	8 (11.6)	
Non-health care worker	74 (89.2)	9 (10.8)		73 (12.0)	10 (12.0)	
Working hours (%)			0.741			1.000
≤ 8 hours	108 (90.8)	11 (9.2)		105 (88.2)	14 (11.8)	
> 8 hours	29 (87.9)	4 (12.1)		29 (87.9)	4 (12.1)	
Patient contact (%)			0.210			0.017[a]
Not contact	69 (93.2)	5 (6.8)		70 (94.6)	4 (5.4)	
Contact	68 (87.2)	10 (12.8)		64 (82.1)	14 (17.9)	

Table 1 Individual factors, work-related factors, sleep quality, ergonomic factors, burnout, psychological disorders, and MSDs among medical school staff (n = 152) (continued)

Factors	MSDs within 7 days				P-value	MSDs within 12 months				P-value
	Pain		No pain			Pain		No pain		
Ergonomics										
Twist posture					0.006[a]					0.005[a]
No	59	(83.1)	12	(16.9)		57	(80.3)	14	(19.7)	
Yes	78	(96.3)	3	(3.7)		77	(95.1)	4	(4.9)	
Repetitive movement					0.014[a]					0.006[a]
No	47	(82.5)	10	(17.5)		45	(78.9)	12	(21.1)	
Yes	90	(94.7)	5	(5.3)		89	(93.7)	6	(6.3)	
Burnout										
Personal burnout (%)					0.006[a]					0.014[a]
Low	50	(82.0)	11	(18.0)		49	(80.3)	12	(19.7)	
Medium to high	87	(95.6)	4	(4.4)		85	(93.4)	6	(6.6)	
Work-related burnout (%)					0.044[a]					0.104
Low	63	(85.1)	11	(14.9)		62	(83.8)	12	(16.2)	
Medium to high	74	(94.9)	4	(5.1)		72	(92.3)	6	(7.7)	
Client burnout (%)					0.037[a]					0.059
Low	45	(83.3)	9	(16.7)		44	(81.5)	10	(18.5)	
Medium to high	92	(93.9)	6	(6.1)		90	(91.8)	8	(8.2)	
Total Burnout (%)					0.005[a]					0.012[a]
Low	49	(81.7)	11	(18.3)		48	(80.0)	12	(20.0)	
Medium to high	88	(95.7)	4	(4.3)		86	(93.5)	6	(6.5)	
Psychological disorders										
Depression (%)					0.013[a]					0.015[a]
No	73	(84.9)	13	(15.1)		71	(82.6)	15	(17.4)	
Yes	64	(97.0)	2	(3.0)		63	(95.5)	3	(4.5)	
Anxiety (%)					0.002[a]					0.010[a]
No	62	(82.7)	13	(17.3)		61	(81.3)	14	(18.7)	
Yes	75	(97.4)	2	(2.6)		73	(94.8)	4	(5.2)	
Stress (%)					0.052					0.066
No	84	(86.6)	13	(13.4)		82	(84.5)	15	(15.5)	
Yes	53	(96.4)	2	(3.6)		52	(94.5)	3	(5.5)	

Abbreviations: BMI, body mass index; IQR, interquartile range; MSDs, musculoskeletal disorders; n, number

Percentages are calculated within each row.

[a] Chi-square test, significant level at $p < 0.05$

[b] Fisher's exact test, significant level at $p < 0.05$

[c] Mann–Whitney U-test, significant level at $p < 0.05$

As Figure 1 illustrates, the most frequently experienced MSDs were neck, shoulder, upper back, and lower back pain, both within seven days and within 12 months. Specifically, within seven days, neck pain was reported by 68.4% of staff, shoulder pain by 74.3%, upper back pain by 65.1%, and lower back pain by 66.4%. Within 12 months, neck pain was reported by 65.1%, shoulder pain by 69.1%, upper back pain by 62.5%, and lower back pain by 63.2%. Other notable MSDs included wrist/arm pain (57.9% within seven days and 55.9% within 12 months) and hip pain (55.3% within seven days and 46.1% within 12 months).

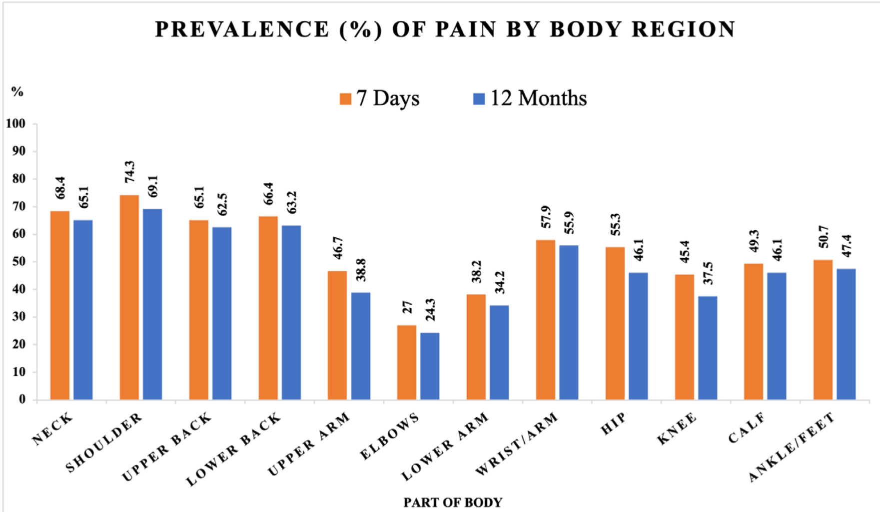

Figure 1 MSDs prevalence both within seven days and within 12 months

In addition to exploring the prevalence, individual, work-related, ergonomic, burnout, and psychological disorder factors that were predictive of MSDs within seven days were examined. The analysis focused on the top four frequently reported MSDs, including neck pain, shoulder pain, upper back pain, and lower back pain, for brevity. These body regions accounted for the highest number of reported cases, making them the most relevant for identifying risk factors and informing targeted interventions. Factors related to MSDs within the past 12 months were not analyzed due to the similarity between the seven-day and 12-month pain reports (i.e., participants who reported pain in the past seven days also reported pain in the past 12 months; see Figure 1). Additionally, the 12-month recall period is more prone to bias. Therefore, we focused on the seven-day results for greater validity.

As Table 2 shows, factors that significantly predicted neck pain included BMI (OR = 2.81, p = 0.030), personal burnout (odds ratio (OR) = 3.43, p < 0.001), work-related burnout (OR = 4.49, p < 0.001), client burnout (OR = 2.47, p = 0.012), depression (OR = 2.43, p = 0.017), anxiety (OR = 5.84, p < 0.001), and stress (OR = 2.90, p = 0.009).

Table 2 Factors associated with neck pain within seven days among medical school staff in urban area Bangkok, Thailand (n = 152)

Factors	Neck pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
BMI				
Overweight - Extremely obese	14 (50.0)	14 (50.0)	1	
Normal	45 (71.4)	18 (28.6)	2.50 (1.00–6.28)	0.051
Underweight	45 (73.8)	16 (26.2)	2.81 (1.10–7.16)	0.030*
Personal burnout				< 0.001*
Low	32 (52.5)	29 (47.5)	1	
Medium to high	72 (79.1)	19 (20.9)	3.43 (1.68–7.01)	
Work-related burnout				< 0.001*
Low	39 (52.7)	35 (47.3)	1	
Medium to high	65 (83.3)	13 (16.7)	4.49 (2.12–9.50)	

Table 2 Factors associated with neck pain within seven days among medical school staff in urban area Bangkok, Thailand (n = 152) (continued)

Factors	Neck pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Client burnout				0.012*
Low	30 (55.6)	24 (44.4)	1	
Medium to high	74 (75.5)	24 (24.5)	2.47 (1.22–5.00)	
Depression				0.017*
No	52 (60.5)	34 (39.5)	1	
Yes	52 (78.8)	14 (21.2)	2.43 (1.17–5.05)	
Anxiety				< 0.001*
No	38 (50.7)	37 (49.3)	1	
Yes	66 (85.7)	11 (14.3)	5.84 (2.67–12.78)	
Stress				0.009*
No	59 (60.8)	38 (39.2)	1	
Yes	45 (81.8)	10 (18.2)	2.90 (1.31–6.43)	

Abbreviations: BMI, body mass index; CI, confidence interval; n, number; OR, odd ratio
Percentages are calculated within each row.
1 = reference group
* P-value by binary logistic regression, significant level at p < 0.05

As Table 3 shows, age (OR = 0.45, p = 0.038), sex (OR = 0.46, p = 0.048), sleep quality (OR = 2.46, p = 0.018), prolonged sitting (OR = 4.42, p < 0.001), repetitive posture (OR = 2.50, p = 0.016), personal burnout (OR = 3.82, p < 0.001), work-related burnout (OR = 3.71, p = 0.001), client burnout (OR = 3.28, p = 0.002), depression (OR = 3.39, p = 0.004), anxiety (OR = 4.22, p < 0.001), and stress (OR = 5.40, p = 0.001) were significant predictors of shoulder pain.

Table 3 Factors associated with shoulder pain within seven days among medical school staff in an urban area in Bangkok, Thailand (n = 152)

Factors	Shoulder pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Age				0.038*
< 50 years	84 (79.2)	22 (20.8)	1	
≥ 50 years	29 (63.0)	17 (37.0)	0.45 (0.21–0.96)	
Sex				0.048*
Female	88 (78.6)	24 (21.4)	1	
Male	25 (62.5)	15 (37.5)	0.46 (0.21–0.995)	
Sleep quality				0.018*
Good	39 (63.9)	22 (36.1)	1	
Poor	74 (81.3)	17 (18.7)	2.46 (1.17–5.16)	
Prolonged sitting				< 0.001*
No	14 (48.3)	15 (51.7)	1	
Yes	99 (80.5)	24 (19.5)	4.42 (1.88–10.38)	
Repetitive movement				0.016*
No	36 (63.2)	21 (36.8)	1	
Yes	77 (81.1)	18 (18.9)	2.50 (1.19–5.25)	

Table 3 Factors associated with shoulder pain within seven days among medical school staff in an urban area in Bangkok, Thailand (n = 152) (continued)

Factors	Shoulder pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Personal burnout				< 0.001*
Low	36 (59.0)	25 (41.0)	1	
Medium to high	77 (84.6)	14 (15.4)	3.82 (1.78–8.21)	
Work-related burnout				0.001*
Low	46 (62.2)	28 (37.8)	1	
Medium to high	67 (85.9)	11 (14.1)	3.71 (1.68–8.19)	
Client burnout				0.002*
Low	32 (59.3)	22 (40.7)	1	
Medium to high	81 (82.7)	17 (17.3)	3.28 (1.54–6.96)	
Depression				0.004*
No	56 (65.1)	30 (34.9)	1	
Yes	57 (86.4)	9 (13.6)	3.39 (1.48–7.79)	
Anxiety				< 0.001*
No	46 (61.3)	29 (38.7)	1	
Yes	67 (87.0)	10 (13.0)	4.22 (1.88–9.50)	
Stress				0.001*
No	63 (64.9)	34 (35.1)	1	
Yes	50 (90.9)	5 (9.1)	5.40 (1.97–14.81)	

Abbreviations: CI, confidence interval; n, number; OR, odd ratio
Percentages are calculated within each row.
1 = reference group
* P-value by binary logistic regression, significant level at p < 0.05

As Table 4 shows, predictors of upper back pain included age (OR = 0.45, p = 0.029), sex (OR = 0.31, p = 0.002), BMI (OR = 3.36, p = 0.013), prolonged standing (OR = 2.56, p = 0.26), prolonged sitting (OR = 4.11, p = 0.001), repetitive posture (OR = 3.96, p < 0.001), personal burnout (OR = 2.86, p = 0.003), work-related burnout (OR = 3.40, p < 0.001), client burnout (OR = 4.08, p < 0.001), depression, anxiety (OR = 4.88, p < 0.001), and stress (OR = 6.19, p < 0.001).

Table 4 Factors associated with upper back pain within seven days among medical school staff in urban area Bangkok, Thailand (n = 152)

Factors	Upper back pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Age				0.029*
< 50 years	75 (70.8)	31 (29.2)	1	
≥ 50 years	24 (52.2)	22 (47.8)	0.45 (0.22–0.92)	
Sex				0.002*
Female	81 (72.3)	31 (27.7)	1	
Male	18 (45.0)	22 (55.0)	0.31 (0.15–0.66)	
BMI				
Overweight - Extremely obese	14 (50.0)	14 (50.0)	1	
Normal	38 (60.3)	25 (39.7)	1.52 (0.62–3.73)	0.360
Underweight	47 (77.0)	14 (23.0)	3.36 (1.30–8.69)	0.013*

Table 4 Factors associated with upper back pain within seven days among medical school staff in urban area Bangkok, Thailand (n = 152) (continued)

Factors	Upper back pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Prolonged standing				0.026*
No	65 (59.6)	44 (40.4)	1	
Yes	34 (79.1)	9 (20.9)	2.56 (1.12–5.86)	
Prolonged sitting				0.001*
No	11 (37.9)	18 (62.1)	1	
Yes	88 (71.5)	35 (28.5)	4.11 (1.77–9.59)	
Repetitive movement				< 0.001*
No	26 (45.6)	31 (54.4)	1	
Yes	73 (76.8)	22 (23.2)	3.96 (1.95–8.02)	
Personal burnout				0.003*
Low	31 (50.8)	30 (49.2)	1	
Medium to high	68 (74.7)	23 (25.3)	2.86 (1.44–5.70)	
Work-related burnout				< 0.001*
Low	38 (51.4)	36 (48.6)	1	
Medium to high	61 (78.2)	17 (21.8)	3.40 (1.68–6.88)	
Client burnout				< 0.001*
Low	24 (44.4)	30 (55.6)	1	
Medium to high	75 (76.5)	23 (23.5)	4.08 (2.00 – 8.30)	
Depression				< 0.001*
No	46 (53.5)	40 (46.5)	1	
Yes	53 (80.3)	13 (19.7)	3.55 (1.69–7.43)	
Anxiety				< 0.001*
No	36 (48.0)	39 (52.0)	1	
Yes	63 (81.8)	14 (18.2)	4.88 (2.38–10.17)	
Stress				< 0.001*
No	51 (52.6)	46 (47.4)	1	
Yes	48 (87.3)	7 (12.7)	6.19 (2.55–15.02)	

Abbreviations: BMI, body mass index; CI, confidence interval; n, number; OR, odd ratio
Percentages are calculated within each row.
1 = reference group
* P-value by binary logistic regression, significant level at p < 0.05

Finally, as Table 5 shows, factors significantly predicting lower back pain included sex (OR = 0.44, p = 0.31), BMI (OR = 2.66, p = 0.042), prolonged standing (OR = 2.85, p = 0.017), work-related burnout (OR = 2.09, p = 0.035), depression (OR = 3.23, p = 0.002), and anxiety (OR = 2.58, p = 0.008).

Overall, factors that were consistently related to neck pain, shoulder pain, upper back pain, and lower back pain were work-related burnout, depression, and anxiety. These findings suggest that psychological factors are crucial in predicting the experience of pain in certain parts of the body.

Table 5 Factors associated with lower back pain within seven days among medical school staff in urban area Bangkok, Thailand (n = 152)

Factors	Lower back pain within 7 days		Crude OR (95%CI)	P-value
	Pain n (%)	No pain n (%)		
Sex				0.031*
Female	80 (71.4)	32 (28.6)	1	
Male	21 (52.5)	19 (47.5)	0.44 (0.21–0.93)	
BMI				
Overweight - Extremely obese	15 (53.6)	13 (46.4)	1	
Normal	40 (63.5)	23 (36.5)	1.51 (0.61–3.72)	0.373
Underweight	46 (75.4)	15 (24.6)	2.66 (1.03–6.83)	0.042*
Prolonged standing				0.017*
No	66 (60.6)	43 (39.4)	1	
Yes	35 (81.4)	8 (18.6)	2.85 (1.21–6.73)	
Work-related burnout				0.035*
Low	43 (58.1)	31 (41.9)	1	
Medium to high	58 (74.4)	20 (25.6)	2.09 (1.05–4.16)	
Depression				0.002*
No	48 (55.8)	38 (44.2)	1	
Yes	53 (80.3)	13 (19.7)	3.23 (1.54–6.77)	
Anxiety				0.008*
No	42 (56.0)	33 (44.0)	1	
Yes	59 (76.6)	18 (23.4)	2.58 (1.28–5.17)	

Abbreviations: BMI, body mass index; CI, confidence interval; n, number; OR, odd ratio
Percentages are calculated within each row.
1 = reference group
* P-value by binary logistic regression, significant level at $p < 0.05$

DISCUSSION

MSDs are significant health-related issues in the workplace, particularly among medical school staff. This study aimed to investigate the prevalence of MSDs and the factors contributing to their occurrence among medical school employees. The findings revealed that 90% and 88% of the participants experienced MSDs in at least one body region within the past seven days and 12 months, respectively. These results are consistent with previous studies that report a high prevalence of MSDs within seven days[7] and 12 months[5,35]. This study also found that the most frequently experienced MSDs were neck, shoulder, upper back, and lower back pain, both within seven days and within 12 months. The highest MSDs prevalence within seven days among medical school staff was 74.3% in the shoulder, which was higher than that reported in studies of healthcare professionals (35.2%)[7], nurses (37.8%)[5], and dermatologists (63.1%)[36]. Furthermore, the highest MSDs prevalence within 12 months was 69.1% in the shoulder, which was higher than that reported in studies of physiotherapists (35%)[35], and nurses (37.8%)[5]. However, it was comparable to the rates reported for dermatologists (63.1%)[36], dental personnel in a dental school (72.1%)[4], and occupational therapists (67.2%)[37]. The high prevalence of MSDs in the upper body, particularly in the neck, shoulder, upper back, and lower back, may attributed to both physical and psychological factors, as reported in previous studies[1,2,10]. The demanding nature of jobs held by staff in this study, which include both service duties in an urban tertiary hospital and academic responsibilities for medical students, likely contributes to this prevalence. Medical school staff in this study also reported awkward postures such as twisted postures, repetitive movements, prolonged sitting, and standing, which are recognized as contributing factors for body pain[5,9]. Additionally, previous studies in this setting have reported high levels of burnout[38] and poor quality of sleep[39].

This study also attempted to investigate the relationships between various factors (i.e., individual, work-related, ergonomic, burnout-related, and psychological) and MSDs among medical school staff in Thailand. Due to potential recall bias associated with reporting MSDs over a 12-month period, the study focused on the presence of MSDs within the past seven days. The results suggested that age and sex were related to certain common MSDs, including shoulder and upper back pain, within the past seven days. This aligns with the findings of previous research, which identified age and sex as determinants of MSDs. Older individuals often have joint and muscle wear and tear, making them more prone to pain[7]. Furthermore, differences in musculoskeletal pain between sexes have been observed, likely due to physiological and hormonal variations, as well as the types of tasks typically performed by each sex[7,9]. Consistent with previous research, women in tertiary hospital experienced more body pain than men[7]. Additionally, sex was found to be related to lower back pain, which is attributed to these physiological differences and task variations. BMI also showed significant relationships with neck, upper back, and lower back pain within seven days. Surprisingly, overweight staff tended to report fewer MSDs compared to underweight staff, which is inconsistent with previous studies[5,21]. One possible explanation is that underweight individuals may experience a higher workload. In performing the same tasks, they may require greater muscle force, potentially leading to increased muscle strain and injury compared to their overweight counterparts.

Poor sleep quality was linked to shoulder pain. This may be because poor sleep quality, which affects the body's ability to repair and recover, can contribute to musculoskeletal pain and is a critical factor in overall health. Studies by Haack and Miettinen provide evidence supporting this link, highlighting the importance of good sleep hygiene and effective sleep management as part of a comprehensive approach to managing musculoskeletal health and preventing the progression of related chronic conditions[40,41]. Moreover, prolonged standing and sitting were related to upper back pain, with prolonged standing also being related to shoulder pain. Prolonged standing can lead to muscle fatigue and strain, particularly in the back and shoulders, as the body must constantly work to maintain an upright position. Similarly, prolonged sitting can contribute to poor posture and muscle imbalances, leading to discomfort and pain in the upper back[5].

Ergonomic factors, including twisted posture and repetitive movement, were associated with the presence of any MSDs within seven days, with repetitive movement also linked to shoulder and upper back pain. These findings are consistent with previous research, which has demonstrated the link between poor ergonomic practices and the development of MSDs[15,17]. It is possible to lower the risk of MSDs by more than 30% by regularly switching between sitting and standing or walking during the workday[42].

Finally, the associations between various forms of burnout, depression, anxiety, stress, and MSDs highlight the significant impact of mental health on physical health. Personal, work-related, and client burnout were linked to neck, shoulder, and upper back pain, while work-related burnout was additionally associated with lower back pain. Further, depression and anxiety were related to the top four MSD areas, while stress was specifically related to neck, shoulder, and upper back pain. One possible explanation is psychological hazards may increase muscle tension and blood flow to muscle[43,44]. Additionally, 80.9% of participants in this study reported working in a seated position for more than half of their working hours, which could contribute to upper body pain. Reports indicate high stress among medical staff[45-47] and psychological factors have been found to contribute to MSDs[48,49]. A study in a tertiary hospital found a relationship between stress and MSDs, specifically in the lower back, knee, and shoulder[7]. Our findings are consistent with those of previous research that reported an association between depressive symptoms and neck and shoulder pain[50]. Additionally, psychosocial factors have been reported as causally related to neck, shoulder, and lower back pain in review studies[9]. Previous studies also suggest that mental health conditions can amplify the perception of pain and contribute to chronic pain conditions through physiological and psychological mechanisms[51,52].

The findings of this study have several practical implications. Employers and healthcare providers should consider integrated approaches that address both the physical and psychological aspects of MSDs. Ergonomic interventions, mental health support, and targeted strategies for high-risk groups (e.g., older individuals) could mitigate the burden of MSDs. For example, in addition to annual physical health check-ups, their should also provide mental health screening. Additionally, promoting healthy lifestyle choices, such as ensuring quality sleep, could further reduce the risk of MSDs.

However, this study also has several limitations that should be acknowledged. First, the cross-sectional design limits the ability to establish causation and the direction of relationships between variables. For example, although several studies suggest that mental health problems lead to MSDs, findings from this study cannot confirm this direction or the reverse. Second, this study focused only on significant results. Non-significant findings do not necessarily imply a lack of effect but may instead reflect a small effect size that could not be detected with the current sample size. Future research could address these factors with larger sample sizes to provide more robust insights. Third, the findings may not be generalizable to all medical school employees or other occupational groups, as the study was conducted within a specific context and population. Fourth, the use of self-reported data introduces the potential for reporting inaccuracies. Finally, The information obtained from Google form may not be fully representative of all medical staff, as the distribution was limited by the sampling method used. Future studies could address these issues by employing experimental designs, using different samples, and incorporating more objective measures of the variables studied.

CONCLUSION

This study highlights the high prevalence of MSDs among medical school staff, particularly shoulder pain, neck pain, and back pain. Several individual, work-related, ergonomic, burnout-related, and psychological factors are significantly associated with MSDs. The findings underscore the influence of both physical and psychological factors, emphasizing the need for a comprehensive approach to the prevention and management of MSDs in medical school settings, which combine healthcare and academic environments.

CONFLICT OF INTEREST

The authors have declared that that they have no conflict of interest.

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DATA AVAILABILITY STATEMENT

The data sets generated and analyzed during the current study are not publicly available due to information but are available from the corresponding author on reasonable request answering the survey.

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