

Prevalence of Musculoskeletal Disorders among Egyptian Students of Faculty of Applied Arts

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) are common among students performing posture-intensive tasks. Applied Arts students frequently maintain static postures and repeat movements during sketching or model-making, increasing their MSD risk. However, research on this group in Egypt is limited.

Objective: To determine the prevalence and severity of MSDs across nine body regions and identify demographic and occupational factors among students in the Faculty of Applied Arts engaged in posture-intensive tasks such as sketching, model-making, and operating specialized tools. **Subjects and Methods:** A cross-sectional survey was conducted among 350 undergraduates (mean age 21.96 ± 1.12 years; 77.4% females, 22.6% males) from the two main Faculties of Applied Arts in Egypt; Helwan University and Banha University. Participants completed the Arabic version of the Extended Nordic Musculoskeletal Questionnaire (NMQ-E). Data on BMI, academic grade, department, posture, and daily work hours were collected. Pain intensity (0–10) and frequency were analyzed using chi-square tests to assess associations with demographic and occupational variables. **Results:** Overall, 92.6% of students reported neck pain, followed by lower back (74.9%), shoulders (66.3%), and upper back (65.4%). Mean pain intensity ranged from 5.9 ± 0.8 (ankle/foot) to 7.3 ± 0.7 (lower back). Female students, those working over 10 hours daily, and those in high-risk departments (e.g., Interior Design, Glass) had significantly higher MSD prevalence ($p < 0.01$). Standing or alternating postures were linked to ankle/foot discomfort ($p = 0.008$). **Conclusion:** MSDs are highly prevalent among Applied Arts students. Ergonomic training, adjustable workstations, and regular micro-breaks are crucial for prevention and well-being.

Keywords: Musculoskeletal disorders, Applied Arts, Ergonomics, NMQ-E, Pain intensity.

INTRODUCTION

Work is basically a human activity that is continuously developing due to advancements in organizational structures and the application of new technologies. In addition to offering advantages, these changes and novel forms of workplace organization can cause difficulties for employees, leading to the emergence of new illnesses ⁽¹⁾.

Work-related musculoskeletal disorders (WMSDs) are among the most prevalent occupational health risks in the workplace, having a detrimental impact on the quality of life of working professionals. Clinical syndromes such as tendon inflammation and related conditions (tenosynovitis) and nerve damage (carpal tunnel syndrome) are included among them. When the demands of work exceed the musculoskeletal tissue's ability to adapt, WMSDs develop progressively over time as a result of physical and psychological stressors ⁽²⁾. The etiology and pathogenesis of WRMSDs are complex and multifactorial. Numerous contributing factors have been extensively examined across various occupations. The risk factors for MSDs are generally categorized as biomechanical, psychosocial, or individual. These factors often vary across time and work settings and typically interact to amplify overall risk. In mining environments, specific risk factors may include poor equipment or vehicle design; adverse work organization characterized by high job demands, time pressure, lack of job rotation, and extended working hours without sufficient rest, restricted working spaces, prolonged task duration, frequent overtime, and equipment maintenance issues or breakdowns ⁽³⁾. Applied art students regularly engage in tasks such as sculpting, carving, painting, or digital

design, which require long periods of static posture, repetitive hand movements, fine motor control, and awkward body positions. These demands increase their risk of developing WMSDs. Common ergonomic hazards include leaning over workbenches, carving while seated on the floor, or maintaining fixed postures for extended periods. Repetitive hand and wrist motions are also common, especially with the frequent use of phones and laptops. Such factors can lead to muscle fatigue, joint stress, and gradual micro-trauma to muscles and nerves ⁽⁴⁾. A mismatch between students' physical dimensions and non-adjustable studio furniture exacerbates the problem, especially during long hours of drawing or computer-based work. In addition, psychosocial stressors such as tight deadlines, heavy workloads, and poorly organized breaks further increase the risk, since stress often causes muscle tension and limits recovery, reducing the body's resilience to strain ⁽⁵⁾. This study investigated the MSDs for Egyptian students of the Faculty of Applied Arts at the university by using The Extended Nordic Musculoskeletal Questionnaire (NMQ-E) as it has been used to assess the severity and impact of musculoskeletal symptoms in occupational groups ⁽⁶⁾.

NMQ-E is a valid and reliable instrument for assessing musculoskeletal symptoms. It shows strong content validity through expert review and population-specific adaptations and strong criterion validity with moderate to perfect agreement with clinical records. It also demonstrates high test-retest reliability and strong internal consistency, confirmed by Cronbach's alpha. Overall, it is widely accepted, though adaptations in wording or layout may influence results ⁽⁷⁾.

This study aimed to determine the prevalence and severity of MSDs across nine body regions and identify demographic and occupational factors among students in the Faculty of Applied Arts engaged in posture-intensive tasks such as sketching, model-making, and operating specialized tools.

SUBJECTS AND METHODS

Participants:

This study was conducted on 350 students from various governmental colleges of applied arts across Egypt. Both genders were included, with participants aged 20 to 22 years, and all were enrolled in the last three academic years.

Exclusion Criteria: Pregnancy, unstable health state, and patients with previous neuropathy or other neurological conditions that cause pain, including spinal stenosis, spinal nerve root compression, and lumbar plexopathy. Also, a student who has a history of primary or metastatic cancer of the central nervous system and any musculoskeletal issues brought on by accidents or prior surgeries was excluded.

Ethical approval:

The Institutional Review Board of the Faculty of Physical Therapy, Cairo University, approved this cross-sectional study (No: P.T.REC/012/005019) in compliance with the applicable ethical standards. The involvement in the study was entirely voluntary. The study's purpose and confidentiality were explained, and students were assured that their data would be used only for academic purposes. Although some personal information was collected, this was limited to what was necessary for research purposes. All identifying details were kept private, stored securely, and used exclusively for academic analysis without disclosure of participants' identities. By following these procedures, the study ensured respect for participants' rights, confidentiality, and academic integrity, while also achieving reliable and comprehensive data collection. Following receipt of all information, signed consent was provided by each student. The study adhered to the Helsinki Declaration throughout its execution.

The sample size calculation:

The sample size was determined utilizing a sample size calculator. Considering a confidence interval of 0.95 and α level of 0.05, the population size was about 9600, a minimum of 250 participants was estimated as necessary; nevertheless, 350 students were ultimately included to improve the study's reliability and validity.

Instrumentations:

The NMQ-E is utilized to assess the incidence of musculoskeletal disorders by determining the locations of pain and symptoms in nine different body areas, including the neck, shoulders, upper back, lower back, elbows, wrists and hands, hips and thighs, knees, and ankles and feet. The NMQ-E in Arabic ⁽⁸⁾ was the main instrument utilized in this study for gathering data. To

guarantee its accuracy and applicability for Arabic-speaking communities, this tool has undergone extensive translation and cultural adaptation. The psychometric characteristics of the Arabic version of NMQ-E have been thoroughly evaluated. Studies have demonstrated its high internal consistency and excellent test-retest reliability, making it a robust instrument for screening musculoskeletal pain prevalence and its impacts. Permission to use the NMQ-E in Arabic was gained from **Al Amer and Alharbi** via email ⁽⁸⁾.

The study procedures:

This study was carried out on undergraduates at their last three academic years enrolled in the Faculties of Applied Arts at various public universities across Egypt. The primary data collection tool was an Arabic version of the NMQ-E developed to assess MSDs and their related risk factors. Before distributing the questionnaire, I organized orientation sessions for groups of participants. Each session lasted approximately 30 minutes and included a detailed explanation of the study's objectives, the significance of musculoskeletal health, and the potential impact of MSDs on students' physical well-being, daily activities, and long-term professional productivity. Special emphasis was given to how musculoskeletal health directly relates to the nature of applied arts education, which often involves practical training, prolonged postures, and repetitive movements, making students more vulnerable to such disorders, and also highlighted the value of early detection and prevention of MSDs in improving the quality of life and academic performance of students in this particular field.

Students received detailed instructions on how to fill out the questionnaire. They were asked to carefully read each item and respond based on their personal experiences within the past 12 months. For musculoskeletal complaints, they were guided to indicate the specific body regions affected, the onset of symptoms, their severity, and the frequency of occurrence. Visual aids, such as body diagrams, were included to help students accurately identify the affected regions. The researcher remained available during the session to clarify any doubts, ensuring consistency and accuracy in responses. After the explanation, participants were invited to complete the questionnaire individually, which typically required between 20 and 30 minutes. I remained present during this stage to provide guidance, address participants' questions, and ensure proper understanding of the items, thereby improving the reliability of responses.

Data collection was carried out over six months across various public universities in Egypt that offer applied arts programs. This allowed for the inclusion of students from different regions and educational contexts, thereby enriching the representativeness of the sample. At the end of each session, the completed questionnaires were carefully checked by the researcher to verify their accuracy and completeness before being accepted.

Statistical analysis

The demographic and clinical information of the subjects was presented using descriptive statistics such as range, mean, standard deviation, frequencies, and percentages. The range, mean, and standard deviation were utilized to summarize quantitative variables, whereas frequencies and percentages were used to summarize categorical variables. The chi-square test (Fisher's Exact test) was utilized to investigate the relationship between MSDs and the subjects' work characteristics. For every statistical test, the significance level was set at $p < 0.05$. The statistical package for social studies (SPSS) version 25 for Windows was implemented to conduct all statistical analyses.

RESULTS

Subjects' characteristics

A total of 350 Egyptian students from the Faculty of Applied Arts participated in the study. Their mean

age and BMI were 21.96 ± 1.12 years and 23.31 ± 3.83 kg/m², respectively. Based on BMI classification, 68.0% had normal weight. Regarding work position, most participants (73.7%) reported working primarily in a sitting position. The mean working hours per day were 9.39 ± 1.54 hours. Half of the participants (50.6%) reported working 5-9 hours per day, while 49.4% worked 10-13 hours daily (Table 1).

Most participants were female (77.4%). Students were distributed across academic levels: 30.9% in grade 3, 31.1% in grade 4, and 38.0% in grade 5. They represented various departments, with the highest representation coming from Interior Design and Furniture (15.7%) and Spinning, Weaving, and Knitting (10.9%) (Table 1). One limitation of this study is that the sample was mainly collected from two faculties (Banha and Helwan Universities). Due to the distant locations of other faculties, data from two additional universities were collected using a Google form to ensure broader coverage.

Table (1): Participants' characteristics

	Mean $\pm$ SD	Minimum	Maximum
Age (years)	21.96 ± 1.12	20.00	25.00
Weight (kg)	64.46 ± 13.05	40	120
Height (cm)	166.14 ± 8.69	150.00	195.00
BMI (kg/m ²)	23.31 ± 3.83	14.70	38.10
Work hours/day	9.39 ± 1.54	5	13
	N	%	
Weight distribution			
Underweight (< 18.5 kg/m ²)	19	5.4	
Normal weight (18.5-24.9 kg/m ²)	238	68.0	
Overweight (25.0–29.9 kg/m ²)	75	21.4	
Obese (≥ 30 kg/m ²)	18	5.1	
Sex distribution			
Females	271	77.4	
Males	79	22.6	
Grade			
Grade 3	108	30.9	
Grade 4	109	31.1	
Grade 5	133	38.0	
Working position			
Sitting	258	73.7	
Standing	40	11.4	
Sitting and standing	52	14.9	
Work hours/day			
5- 9 h/day	177	50.6	
10- 13 h/day	173	49.4	
Department			
Decoration	17	4.9	
Glass	9	2.6	
Industrial Design	27	7.7	
Interior Design and Furniture	55	15.7	
Metal And Ornamental Products	8	2.3	
Metal Furniture and Metal and Iron Constructions	4	1.1	
Photography Cinema and Television	16	4.6	
Porcelain	18	5.1	
Printing, Publishing, and Packaging	26	7.4	
Ready Made Clothing	4	1.1	
Sculpture Architectural Formation and Restoration	15	4.3	
Spinning, Weaving, And Knitting	38	10.9	
Textile Printing and Dyeing and Finishing	3	0.9	

SD: Standard deviation.

- Prevalence of MSDs among Egyptian students of the Faculty of Applied Arts:

The most commonly affected region was the neck, reported by 324 (92.6%) students, followed by the lower back, reported by 262 (74.9%); the shoulder, by 232 (66.3%); the upper back, by 229 (65.4%); and the wrist and hand, reported by 184 (52.6%) (Table 2).

- Severity of MSDs

The mean severity across all body regions was 6.58 ± 0.48 , indicating a moderate to high level of discomfort among the students. The highest mean pain intensity was reported for the lower back (7.35 ± 0.74), followed

by the neck (7.13 ± 0.81) and upper back (7.01 ± 0.81) (Table 2).

- Frequency of MSDs

The most frequently reported MSDs among students were in the neck and lower back, with daily symptoms reported by 71.91% and 75.57% of affected students, respectively. Upper back complaints were also common, with 60.26% experiencing daily symptoms. Shoulder pain showed a more even distribution across daily and weekly frequencies, but MSDs in the elbow, wrist/hand, hip/thigh, knee, and ankle/foot were less common (Table 2).

Table (2): Prevalence, severity and frequency of MSDs among Egyptian students of Faculty of Applied Arts:

Regions	Prevalence		Severity	Frequency (%)		
	N	%	Mean $\pm$ SD	Daily	Weekly	Monthly
Neck	324	92.6	7.13 ± 0.81	71.91	20.68	7.41
Shoulder	232	66.3	6.49 ± 0.73	40.52	40.95	18.53
Upper back	229	65.4	7.01 ± 0.81	60.26	30.13	9.61
Lower back	262	74.9	7.35 ± 0.74	75.57	17.56	6.87
Elbow	32	9.1	6.22 ± 0.75	21.88	50.00	28.13
Wrist and hand	184	52.6	6.33 ± 0.88	44.57	36.41	19.02
Hip and thigh	41	11.7	6.56 ± 0.77	51.22	34.15	14.63
Knee	112	32	6.19 ± 0.80	43.75	35.71	20.54
Ankle and foot	75	21.4	5.96 ± 0.78	38.67	40.00	21.33
Average	165.67	47.33	6.58 ± 0.48			

Association between MSDs, weight, sex grade, work positions, and working hours:

Weight status had no significant association with MSD prevalence across all body areas. However, sex showed a significant association in multiple areas: females reported significantly more neck, shoulder, wrist/hand, and hip/thigh complaints than males.

Academic grade was significantly associated with elbow and hip/thigh symptoms in Grade 5 compared with Grades 3 and 4.

Work posture was significantly related only to ankle/foot complaints, with more frequent symptoms among those who stood and alternated between sitting and standing.

Working hours of 10- 13 h/day were significantly associated with raised MSD prevalence in the upper back, lower back, elbow, wrist/hand, knee, and ankle/foot (Table 3).

Table (3): Association between MSDs, weight, sex grade, work positions and working hours:

Prevalence of MSDs	Neck	Shoulder	Upper back	Lower back	Elbow	Wrist and hand	Hip and thigh	Knee	Ankle and foot
Weight status									
Underweight and normal weight	240 (93.4%)	170 (66.1%)	168 (65.4%)	191 (74.3%)	20 (7.8%)	136 (52.9%)	31 (12.1%)	75 (29.2%)	51 (19.8%)
Overweight and Obese	84 (90.3%)	62 (66.7%)	61 (65.6%)	71 (76.3%)	12 (12.9%)	48 (51.6%)	10 (10.8%)	37 (39.8%)	24 (25.8%)
χ^2 value	0.93	0.008	0.001	0.15	2.16	0.05	0.11	3.53	1.44
p-value	0.33	0.93	0.97	0.70	0.14	0.83	0.74	0.06	0.23
Sex									
Females	258 (95.2%)	190 (70.1%)	181 (66.8%)	200 (73.8%)	23 (8.5%)	158 (58.3%)	38 (14.0%)	89 (32.8%)	57 (21.0%)
Males	66 (83.5%)	42 (53.2%)	48 (60.8%)	62 (78.5%)	9 (11.4%)	26 (32.9%)	3 (3.8%)	23 (29.1%)	18 (22.8%)
χ^2 value	12.09	7.86	0.98	0.71	0.62	15.82	6.18	0.39	0.11
p-value	0.001	0.005	0.32	0.39	0.43	0.001	0.01	0.53	0.74
Grade									
Grade 3	97 (89.8%)	65 (60.2%)	76 (70.4%)	80 (74.1%)	10 (9.3%)	51 (47.2%)	7 (6.5%)	36 (33.3%)	31 (28.7%)
Grade 4	104 (95.4%)	75 (68.8%)	68 (62.4%)	78 (71.6%)	4 (3.7%)	54 (49.5%)	8 (7.3%)	26 (23.9%)	17 (15.6%)
Grade 5	123 (92.5%)	92 (69.2%)	85 (63.9%)	104 (78.2%)	18 (13.5%)	79 (59.4%)	26 (19.5%)	50 (37.6%)	27 (20.3%)
χ^2 value	2.47	2.61	1.75	1.45	7.02	4.13	12.77	5.33	5.69
p-value	0.29	0.28	0.42	0.48	0.03	0.13	0.002	0.07	0.06
Sitting/Standing									
Sitting	237 (91.9%)	172 (66.7%)	168 (65.1%)	200 (77.5%)	27 (10.5%)	140 (54.3%)	30 (11.6%)	78 (30.2%)	45 (17.4%)
Standing	39 (97.5%)	25 (62.5%)	24 (60.0%)	27 (67.5%)	4 (10.0%)	20 (50.0%)	4 (10.0%)	11 (27.5%)	12 (30.0%)
Sitting and Standing	48 (92.3%)	35 (67.3%)	37 (71.2%)	35 (67.3%)	1 (1.9%)	24 (46.2%)	7 (13.5%)	23 (44.2%)	18 (34.6%)
χ^2 value	1.61	0.29	1.29	3.69	3.84	1.26	0.27	4.32	9.55
p-value	0.45	0.86	0.53	0.16	0.15	0.53	0.87	0.12	0.008
Working hours									
5-9 hrs/day	164 (92.7%)	111 (62.7%)	106 (59.9%)	121 (68.4%)	8 (4.5%)	80 (45.2%)	17 (9.6%)	44 (24.9%)	22 (12.4%)
10-13 hrs/day	160 (92.5%)	121 (69.9%)	123 (71.1%)	141 (81.5%)	24 (13.9%)	104 (60.1%)	24 (13.9%)	68 (39.3%)	53 (30.6%)
χ^2 value	0.004	2.05	4.86	8.03	9.21	7.81	1.54	8.39	17.22
p-value	0.95	0.15	0.02	0.005	0.002	0.005	0.21	0.004	0.001

χ^2 , Chi-squared test.

- Association between MSDs and department:

Neck complaints were most common in departments of Decoration, Industrial Design, Metal and Ornamental Products, Ready-Made Clothing, and Sculpture and Restoration, all reporting 100%.

Shoulder and upper back issues were highest in the Decoration, Porcelain, and Glass departments. Lower back complaints were especially high in Glass (100%) and Decoration (88.2%). Elbow issues were most reported in Interior Design and Furniture, Advertising, and Photography. Wrist and hand complaints were most

frequent in Porcelain, advertising, and Interior Design and Furniture.

Knee and ankle/foot discomfort was particularly high in glass, porcelain, and metal furniture and iron constructions.

Statistical analysis indicated significant associations between department and MSDs, particularly for wrist/hand, knee, and ankle/foot complaints, with higher rates in the Porcelain, Glass, Advertisement, Interior Design and Furniture, and Metal Furniture and Iron Constructions departments (Table 4).

Table (4): Association between MSDs and department.

Department	Neck (%)	Shoulder (%)	Upper Back (%)	Lower Back (%)	Elbow (%)	Wrist/Hand (%)	Hip/Thigh (%)	Knee (%)	Ankle/Feet (%)
Advertisement	101 (91.8%)	76 (69.1%)	79 (71.8%)	85 (77.3%)	14 (12.7%)	72 (65.5%)	23 (20.9%)	42 (38.2%)	23 (20.9%)
Decoration	17 (100.0%)	15 (88.2%)	14 (82.4%)	15 (88.2%)	2 (11.8%)	9 (52.9%)	0 (0.0%)	6 (35.3%)	4 (23.5%)
Glass	8 (88.9%)	6 (66.7%)	7 (77.8%)	9 (100.0%)	1 (11.1%)	4 (44.4%)	1 (11.1%)	5 (55.6%)	5 (55.6%)
Industrial Design	27 (100.0%)	13 (48.1%)	19 (70.4%)	21 (77.8%)	2 (7.4%)	8 (29.6%)	2 (7.4%)	3 (11.1%)	2 (7.4%)
Interior Design and Furniture	50 (90.9%)	36 (65.5%)	36 (65.5%)	43 (78.2%)	8 (14.5%)	34 (61.8%)	4 (7.3%)	21 (38.2%)	18 (32.7%)
Metal and Ornamental Products	8 (100.0%)	6 (75.0%)	3 (37.5%)	3 (37.5%)	0 (0.0%)	5 (62.5%)	0 (0.0%)	2 (25.0%)	0 (0.0%)
Metal Furniture and Iron	3 (75.0%)	3 (75.0%)	3 (75.0%)	2 (50.0%)	0 (0.0%)	1 (25.0%)	0 (0.0%)	2 (50.0%)	2 (50.0%)
Constructions Photography, Cinema and TV	14 (87.5%)	9 (56.3%)	12 (75.0%)	12 (75.0%)	2 (12.5%)	4 (25.0%)	1 (6.3%)	6 (37.5%)	6 (37.5%)
Porcelain	15 (83.3%)	15 (83.3%)	10 (55.6%)	15 (83.3%)	0 (0.0%)	12 (66.7%)	4 (22.2%)	9 (50.0%)	9 (50.0%)
Printing, Publishing, and Packaging	23 (88.5%)	16 (61.5%)	18 (69.2%)	20 (76.9%)	3 (11.5%)	11 (42.3%)	3 (11.5%)	7 (26.9%)	3 (11.5%)
Ready Made Clothing	4 (100.0%)	2 (50.0%)	1 (25.0%)	2 (50.0%)	0 (0.0%)	1 (25.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Sculpture and Restoration	15 (100.0%)	7 (46.7%)	7 (46.7%)	11 (73.3%)	0 (0.0%)	5 (33.3%)	0 (0.0%)	3 (20.0%)	0 (0.0%)
Spinning, Weaving, and Knitting	37 (97.4%)	26 (68.4%)	18 (47.4%)	23 (60.5%)	0 (0.0%)	17 (44.7%)	3 (7.9%)	4 (10.5%)	3 (7.9%)
Textile Printing and Dyeing	2 (66.7%)	2 (66.7%)	2 (66.7%)	1 (33.3%)	0 (0.0%)	1 (33.3%)	0 (0.0%)	2 (66.7%)	0 (0.0%)
χ^2 value	15.65	14.91	20.25	21.64	13.37	28.92	20.22	27.26	40.56
p -value	0.18	0.31	0.09	0.06	0.37	0.007	0.09	0.01	0.001

χ^2 , Chi-squared test

DISCUSSION

This study investigated the prevalence, severity, and associated factors of musculoskeletal disorders (MSDs) across Egyptian students at the Faculty of Applied Arts. The results demonstrated a remarkably high overall prevalence of MSDs, with the neck (92.6%) and lower back (74.9%) being the most affected anatomical sites, followed by the shoulder (66.3%), upper back (65.4%), and wrist and hand (52.6%) discomfort. Such findings illustrate the significant musculoskeletal burden within this education.

Our prevalence rates are in agreement with a study conducted in 2024 among medical students at Umm Al-Qura University in Saudi Arabia, which found that the most common MSDs in the previous 12 months were low back pain (50.20%), neck pain (31.70%), and shoulder pain (27.20%) ⁽⁹⁾.

Furthermore, our prevalence rates align closely with **Al Amer and Alharbi** ⁽⁸⁾, who reported that among their validation sample (n = 127), the lifetime incidence of musculoskeletal pain was 33.9% in the lower back and 5.5% in the elbows. The lower back had the highest yearly prevalence at 21.3%, followed by the neck at 18.9%.

Also similar prevalence rates were reported by **Alshagga et al.** ⁽¹⁰⁾ among Malaysian medical students, where 45.7% experienced MSP in at least one site during the previous week and 65.1% during the past year, with low back (27.2%/46.1%), neck (24.1%/41.8%), and shoulders (8.6%/22.8%) being the most affected regions.

Similarly, a study among nursing students at the University of Johannesburg showed exceptionally high MSD prevalence; the study's sample of nursing students revealed a high prevalence of pain and discomfort in the majority of body parts. In the past 12 months, the most affected body parts with the highest prevalence rates were the neck (65.9%), shoulder, ankle, and foot (63.6%), lower back (81.8%), and upper back (62.2%) ⁽¹¹⁾.

In contrast, studies in some Western contexts report slightly lower prevalence rates. For example, Australian medical colleges indicated a prevalence of around 50%, with back pain being the most frequent complaint ⁽¹²⁾. The comparatively lower figures may reflect differences in academic workload, ergonomic facilities, or lifestyle habits such as exercise and rest breaks.

In our study, the students' average working hours per day (9.39 ± 1.54 hours), mostly involving sitting postures, likely contribute to cumulative musculoskeletal strain and discomfort. In a similar study, it was reported that among university students, sitting duration, awkward postures, and prolonged working hours (more than eight hours per day) were significantly associated with musculoskeletal

discomfort. Long durations without breaks were also found to be strongly related to musculoskeletal pain. The authors emphasized that promoting good computing habits among college students can help prevent musculoskeletal symptoms and reduce morbidity in the future workforce ⁽¹³⁾.

In contrast to our findings, which demonstrated a clear link between extended working hours and increased MSD prevalence and severity, a study among undergraduate medical students in Jeddah reported no significant association between the study hour numbers and musculoskeletal pain, despite similarly high rates of discomfort ⁽¹⁴⁾.

The gender differences observed in our study also mirror global trends. Female students often demonstrate higher prevalence and severity of MSDs compared to males, as documented in one study, the sample comprised 232 females (68.6%) and 106 males (31.3%). Overall, 61% of the students reported experiencing musculoskeletal discomfort during or after computer use. Female students were more likely than males to report such discomfort (66% vs. 51%) ⁽¹³⁾. This may be explained by differences in musculoskeletal structure, hormonal influences, and cultural or occupational roles that increase exposure to physical strain. On the other hand, some studies, such as those on dental students in Europe, found no significant gender difference, suggesting that professional training environments may mitigate or override gender-related disparities ⁽¹⁵⁾.

Interdepartmental variability in MSD rates in this study further suggests that task-specific ergonomic challenges and environmental conditions contribute to risk heterogeneity. Departments such as Porcelain, Glass, Advertisement, and Interior Design reported significantly higher rates of wrist/hand, knee, and ankle/foot MSDs, likely reflecting distinct workflows and postural exposures.

This result aligns with **Mohamed** ⁽¹⁶⁾, who observed that Egyptian nursing students reported a particularly high prevalence of MSDs, especially in the lower back (72%) and neck (69%), which the authors attributed to long clinical shifts and the physical nature of nursing tasks. Likewise, a study investigating computer usage and its association with musculoskeletal discomfort among college students revealed a high overall burden of musculoskeletal pain. Approximately 61% of the participants reported experiencing discomfort during or after working on computers, indicating that prolonged screen-based activities may substantially contribute to musculoskeletal strain. The most frequently affected body regions were the neck (68.5%) and the lower back (66%), reflecting the impact of sustained static postures and inadequate ergonomic practices during computer use. These findings highlight the growing concern regarding posture-related musculoskeletal symptoms

among young adults engaged in extended periods of work ⁽¹³⁾.

On the other hand, not all studies have supported a strong departmental effect. Studying Malaysian medical and health sciences students, reported that although overall prevalence was high (ranging between 60–75%), there were no statistically significant differences between faculties ⁽¹⁰⁾. More recently, some authors examined Saudi medical students and found MSD prevalence exceeded 80%, yet the distribution of pain across body regions did not differ meaningfully between preclinical and clinical students. The authors suggested that stress, sedentary lifestyle, and limited physical activity may play a more consistent role than the academic department alone ⁽⁹⁾.

Posture was also found to be a critical determinant of MSD occurrence. Students who frequently adopted prolonged forward-bending or static postures during drawing, modeling, or computer-based design tasks reported significantly higher rates of neck and back pain. This aligns with findings of **Tinubu et al.** ⁽¹⁷⁾, who highlighted poor posture and static workload as predictors of musculoskeletal discomfort among students.

The academic year has been examined as a possible determinant of MSD prevalence. Several studies support the idea that advancing academic year increases MSD risk, likely due to longer study hours, heavier workload, and cumulative ergonomic exposure. For instance, **Alshagga et al.** ⁽¹⁰⁾ reported higher rates of neck and lower back pain among senior medical students compared to juniors. Similarly, **Mohamed** ⁽¹⁶⁾ observed that MSD prevalence rose with the year of study among nursing students, reflecting increased exposure to clinical tasks. In contrast, other studies found no significant association between MSD prevalence and academic year. **Goweda et al.** ⁽⁹⁾ demonstrated that although more than 80% of Saudi medical students experienced MSDs, the distribution of complaints was similar between preclinical and clinical students. These findings indicate that factors such as stress, sedentary behavior, and limited physical activity may overshadow the academic year as a predictor of musculoskeletal complaints.

Although our study found no significant association between body mass index (BMI) and MSDs, our results are consistent with a study conducted among employees of Ahlia University in the Kingdom of Bahrain, which aimed to investigate the prevalence of work-related MSDs and their relationship with BMI. That study reported a negative correlation between BMI and symptoms in the neck, wrist/hand, and knee regions, and a positive correlation with MSDs in other body parts; however, all these correlations were statistically insignificant ⁽¹⁸⁾.

In contrast, other studies have reported that a higher BMI is positively correlated with the

development of MSDs, particularly in the lower extremities, and is associated with a slower rate of recovery. It is well established that individuals with increased body weight (elevated BMI) are more prone to musculoskeletal pain than those with lower body weight. Moreover, BMI has been identified as an independent risk factor for the development of MSDs and has been shown to increase their 12-month prevalence ⁽¹⁹⁾.

CONCLUSION

Our research among Egyptian applied arts students revealed a striking reality: over nine in ten endure neck pain, and three-quarters suffer lower back aches. These musculoskeletal issues arise from a blend of poor ergonomics, extended workshop hours, and department-specific tasks—factors that impact female students most severely. The takeaway is clear: to protect student health and support learning, institutions must implement practical measures—ergonomic workstations, regular micro-breaks, and hands-on wellness training—to prevent MSDs and foster a more sustainable, pain-free creative environment.

Acknowledgment: The authors express their gratitude to all participants in this study.

Conflict of interest: None.

Financial disclosures: None.

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