

The prevalence of work-related musculoskeletal disorder among health care workers in Damascus, Syria. A cross-sectional study

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Abstract

Background and Aims: Healthcare workers in particular frequently report Work-related musculoskeletal diseases (WRMSDs). The purpose of this study is to evaluate the prevalence and features of WRMSDs in residents from different specialties and trainee nurses from educational hospitals in Damascus, Syria.

Methods: A cross-sectional survey was undertaken aiming at the medical residents and the trainee nurses working in the public health sector in 11 hospitals. The sample size was found to be 2016. In this study, a modified version of the Standardized Nordic Questionnaire was employed.

Results: After the inclusion and exclusion criteria was the number of the participants 1855. In general, musculoskeletal pain was in the past week (69%) and the past 12 months (85%). Musculoskeletal pain in medical care practitioners was found to be linked to higher mean age ($p = 0.0053$) and body mass index (BMI) ($p = 0.0437$) in the last year. Females had a higher prevalence of WRMSDs than males ($p = 0.0036$), and those who were married also had a higher prevalence ($p = 0.0218$). Working longer hours per week and per month were associated with musculoskeletal pain in the previous 7 days ($p = 0.0043$ and $p = 0.0003$, respectively).

Conclusion: WRMSD prevalence was 85% among our study participants in the previous year. The most common complaint was lower back pain. Aging, female gender, and increasing BMI have been associated with higher reporting of WRMSDs. Our results suggested that doctors were twice as susceptible to developing WRMSDs as nurses. These results highlight the increasing urgency for ergonomics

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training programs and effective interventions to reduce WRMSDs and enhance working conditions for healthcare professionals in Syria.

KEYWORDS

healthcare workers, musculoskeletal disorders, musculoskeletal pain, orthopedics, Syria

1 | BACKGROUNDS

Work-related musculoskeletal diseases (WRMSDs) are a health burden that affects people in many different professions and causes debilitating musculoskeletal pain and injury. WRMSDs are a collection of conditions that affect the muscles, joints, tendons, and nerves, sometimes rendering doing normal daily activities a hard task to achieve. Tendonitis, degenerative spinal conditions, thoracic outlet syndrome, Carpal tunnel syndrome, and tension neck syndrome are a few examples of the wide range of illnesses that WRMSDs include in their definition. These diseases are characterized by insidious discomfort that, if left untreated, can lead to temporary or permanent job incapacity. Common risk factors for these diagnoses include forceful repeated activities and protracted non-neutral postures, which are frequently caused by the subpar equipment design. In Europe for example, and the European Foundation for the Improvement of Living and Working Conditions states that WRMSDs account for more than 50% of severe work-related disorders in 2007 and are the most common occupational disease experienced by European employees.¹ Healthcare workers in particular, such as medical residents, surgeons, nurses, as well as dentists, frequently report WRMSDs.^{2,3} This is a result of extended work hours that require repeated motions, uncomfortable positions when standing still, and difficulties with instrument design, especially given the rapid rate of innovation in the context of a changing workforce.

More than 63% of the nurses reported experiencing chronic lower back pain in a Saudi Arabian research that examined the incidence of musculoskeletal problems associated with work among nurses in 2018.⁴ Furthermore, a systematic review conducted in 2022 discovered that more than 25% of nurses experienced lower limbs pain, and more than 60% of surgeons and dentists had lower back pain.⁵ Doctors' musculoskeletal pain may affect their work capacity or performance, which might limit their ability to provide patients with adequate treatment, the reason that makes this area of study a very important one, as it affects both residents and the patients^{6,7} that they are in charge of.^{6,7} The same could be said regarding the nursing staff, who constantly work in close proximity to patients. Consequently, premature retirement is frequently observed in the medical field mainly due to this kind of injury and disease.⁸ Therefore, a well-thought-out preventative plan, that can be applied to medical residents as well as trainee nurses, would decrease the number of WRMSDs in their future as senior doctors and senior nurses. Furthermore, this area of study has been neglected in developing countries, mainly Syria, which, due to the unfortunate economic status of the country, has been experiencing a number of medical professionals traveling abroad to finish their training with better financial stability.

Consequently, the number of working hours has drastically increased for the medical professionals remaining in the country, and with these increased hours comes an elevated chance of developing WRMSDs.

Our goal in this study is to evaluate the residents' WRMSD prevalence and features among different specialties and trainee nurses working in the public health care system, as we included residents and nurses from multiple public and educational hospitals in Damascus, Syria.

2 | METHODS AND MATERIALS

2.1 | Study design, setting, and participants

A cross-sectional study was conducted with the purpose of targeting medical residents and the trainee nurses working in the public health sector from multiple hospitals, including; The Red Crescent (Al-Hilal Al-Ahmar) Hospital, Damascus Hospital, Al-Zahrawi Hospital, Al-Mowasat Hospital, Children's Hospital, Peronist University Hospital, Assad University Hospital, Ibn Al Nafis Hospital, Eye Surgical Hospital, Surgical Kidney Hospital, and Obstetrics and Gynecology University Hospital. We used convenience sampling to gather the data between January 16, 2022, and March 14, 2022, using a conducted by oneself paper-based survey. To confirm the validity and reliability of the questionnaire, a pilot research with 30 participants was carried out; the results revealed an acceptable Cronbach's α of 0.81. The sample size was determined using Openepi online software available at "<https://www.openepi.com/SampleSize/SSPropor.htm>." The evaluated number of residents in the studied hospitals was approximately 2900, and the sample size was found to be 1279, with a confidence level of 95%. And regarding the trainee nurses, their estimated number was approximately 2250, and the amount of data was 737 with a confidence level of 95%. The inclusion criteria of the study included medical residents and nurses who worked in the public sector and have signed the study consent and fully completed the questionnaire used in this study. Participants with long-term medical musculoskeletal disorders unrelated to their work, those who play an instrument for more than 15 h a week or who practice weightlifting were excluded, as was the Specialist.

2.2 | Instrumentation and procedure

The questionnaire is in English, therefore we translate it into the Arabic language, which is the spoken language here in Syria.

TABLE 1 Demographics characteristics of participants.

		N (%)			N (%)	
Gender	Male	686 (37)	Academic level	First year	213 (11)	
	Female	1169 (63)		Second year	285 (15)	
Age	Mean (SD)	30.45 (\pm 7.49)		Third year	286 (15)	
				Fourth year	231 (12)	
Marital status	Married	684 (37)		Fifth year	104 (6)	
				Single	1112 (60)	Sixth year
	Divorced	29 (2)		Nurse	706 (38)	
	Widow	30 (2)				
Current occupation	Physician	1138 (61)	Habits	Cigarette	264 (14)	
	Nurse	717 (39)		Hubble bubble	235 (13)	
Residence	Urban	1190 (64)		Cigarette and Hubble bubble	185 (10)	
				Rural	665 (36)	Alcohol
	Residence sharing	With family		1189 (64)	All above	35 (2)
Residence sharing	With friends	141 (7)	Interest in playing	Nothing	1130 (61)	
				With colleagues	315 (17)	Yes
	Alone	210 (11)	Hours of playing per week	No	1701 (92)	
	Mean hours working per day	2–4		97 (5)	0	1711 (92)
Mean hours working per day	5–7	782 (42)	Weightlifting	<5	144 (8)	
	>7	976 (53)		Yes	151 (8)	
	Mean hours working per week	20–25		141 (8)	No	1704 (92)
26–30		526 (28)	Hour's training per week	0	1704 (92)	
Economic level	>30	1188 (64)			<10	151 (8)
	Low	212 (11)	BMI		Mean (SD)	24.85 (\pm 4.22)
	Mild	847 (46)				
Economic level	good	669 (36)				
	Excellent	127 (7)				
N (%)						
Having diabetes			Yes	61 (3)		
			No	1794 (97)		
Having asthma			Yes	40 (2)		
			No	1815 (98)		
Having irritable bowel syndrome			Yes	91 (5)		
			No	1764 (95)		

(Continues)

TABLE 1 (Continued)

		N (%)
Having hyperthyroidism/hypothyroidism	Yes	29 (2)
	No	1826 (98)
Having hypertension	Yes	63 (3)
	No	1792 (97)
Having autoimmune disease	Yes	19 (1)
	No	1836 (99)
Having neurologic/psychologic disorder	Yes	58 (3)
	No	1797 (97)
		N (%)
Diagnosed with carpal tunnel syndrome	Yes	174 (9)
	No	1681 (91)
Diagnosed with arthritis	Yes	266 (14)
	No	1589 (86)
Diagnosed with hand tendonitis	Yes	283 (15)
	No	1572 (85)
Trouble with blood circulation in the lower extremities	Yes	202 (11)
	No	1653 (89)
Diagnosed with kyphosis or scoliosis	Yes	103 (6)
	No	1752 (94)
Diagnosed with herniation of the nucleus puposus	Yes	192 (10)
	No	1663 (90)
Diagnosed with neural disorders	Yes	97 (5)
	No	1758 (95)
Diagnosed with bone deformities of the hand	Yes	20 (1)
	No	1835 (99)
Diagnosed with bone deformities of the lower extremities	Yes	37 (2)
	No	1818 (98)
Another explanation for the problems you suffer from, such as falls	Yes	146 (8)
	No	1709 (92)

Three components sections the questionnaire:

1. Socio-demographic features: Age, gender, height, weight, academic year, hospital they work in, residence, social status, history of smoking and alcohol use, history of weightlifting, history of playing an instrument, number of working hours per day and per week, and history of previous musculoskeletal disorders as a result of trauma or medical condition were among the questions covering these topics.
2. Question about hurdles facing medical residents and trainee nurses while working in their hospitals: it included questions about uncomfortable postures, low-quality types of equipment, low-quality lighting, a high volume of patients that need care,

prolonged working hours, hurdles in moving between their wards and laboratories, prolonged standing hours, prolonged sitting hours. It also included a choice of no.

3. The Nordic Musculoskeletal Questionnaire: It questions pain or discomfort in the neck, shoulders, upper extremities, backside, hips, and lower extremities within the last 7 days and the last year.⁹

2.3 | Data analysis

The hard copy questionnaire data were manually transferred to an Excel spreadsheet, where they underwent encoding to ensure compatibility

TABLE 2 Percentages of self-reported musculoskeletal symptoms among all participants.

Body part		Occurrence of MS problems during the last 12 months, n (%)		Normal activity prevented by your problems, n (%)		Occurrence of MS problem during the last 7 days, n (%)	
		Yes	No	Yes	No	Yes	No
Neck		Yes	1007 (54)	Yes	684 (37)	Yes	637 (34)
		No	848 (46)	No	1171 (63)	No	1218 (66)
Shoulders	Right	Yes	472 (25)	Yes	418 (23)	Yes	387 (21)
		No	1383 (75)				
	Left	Yes	375 (20)	No	1437 (77)	No	1468 (79)
		No	1480 (80)				
Elbows	Right	Yes	147 (8)	yes	117 (6)	Yes	109 (6)
		No	1708 (92)				
	Left	Yes	128 (7)	No	1738 (94)	No	1746 (94)
		No	1727 (93)				
Wrists	Right	Yes	386 (21)	Yes	292 (16)	Yes	255 (14)
		No	1469 (79)				
	Left	Yes	240 (13)	No	1563 (84)	No	1600 (86)
		No	1615 (87)				
Upper back		Yes	529 (29)	Yes	323 (17)	Yes	278 (15)
		No	1326 (71)	No	1532 (83)	No	1577 (85)
Lower back		Yes	1163 (63)	Yes	902 (49)	Yes	843 (45)
		No	692 (37)	No	953 (51)	No	1012 (55)
Thighs		Yes	339 (18)	Yes	250 (13)	Yes	250 (13)
		No	1516 (82)	No	1605 (87)	No	1605 (87)
Knees		Yes	445 (24)	Yes	322 (17)	Yes	292 (16)
		No	1410 (76)	No	1533 (83)	No	1563 (84)
Ankles/feet		Yes	505 (27)	Yes	392 (21)	Yes	324 (17)
		No	1350 (73)	No	1463 (79)	No	1531 (83)
Overall (at least one site)		1578 (85)				1283 (69)	

with the statistical tools. Version 25.0 of the Statistical Package for Social Sciences (SPSS Inc.) was utilized by us. The presentation of categorical variables has been performed using proportions as well as frequencies. To examine the relationship between Nordic questionnaire results and sociodemographics, we conducted Chi-square Pearson's correlation and Fisher's test univariate analysis. Multivariable logistic regression analysis was performed. Odds ratios (OR) were reported in relation to a baseline category with 95% confidence intervals (CI). A $p < 0.05$ was deemed statistically notable.

3 | RESULTS

According to the inclusion and exclusion criteria, 1855 individuals in total were included; of them, 686 (37%) were male and 1169 (63%) were female, which may be connected to Syria's already lopsided

gender ratio in society. The participant's age, on average, was 30.45 ± 7.49 years. The majority of medical practitioners put in an over 7 h on average each day and over 30 h each week at their jobs. Table 1 lists the participant demographics, including age, gender, and other factors (Table 1).

According to the results of the Nordic Musculoskeletal Questionnaire (NMQ), 63% of participants reported having low back pain in the preceding 12 months, followed by pain in the neck (54%), and shoulders (45%). In general, 69% of participants reported having musculoskeletal pain in the previous week and 85% in the previous 12 months, which had an adverse effect on their performance for many of them (Table 2).

69% of medical practitioners reported having experienced back pain in the past, with 35% of them facing lower back ache lasting 1–7 days in the year before. In the previous year, just 22% of those with lower back discomfort saw a doctor (Table 3).

TABLE 3 Percentages of self-reported low back pain among all participants.

Have a previous low back pain	Yes	1282 (69)
	No	573 (31)
Enter the hospital due to lower back pain (%)	Yes	178 (10)
	No	1677 (90)
Changing your job due to lower back pain (%)	Yes	231 (12)
	No	1624 (88)
The total time that you are suffer from lower back problem, last 12 months (%)	0	531 (29)
	1–7 days	645 (35)
	8–30 days	279 (15)
	>30 days but not daily	311 (17)
	Everyday	89 (5)
Reducing your activity due to lower back pain, last 12 months (%)	Yes, in work	508 (27)
	Yes, in free time	146 (8)
	No	1201 (65)
The total time that a lower back problem prevented you from doing your usual work (%)	1–7 days	487 (26)
	8–30 days	205 (11)
	>30 days	163 (9)
	Never	1000 (54)
Have you seen a doctor or a physician due to lower back pain for the last 12 months (%)	Yes	407 (22)
	No	1448 (78)
Having lower back problem in any time for the last 7 days (%)	Yes	761 (41)
	No	1094 (59)

A statistically significant link was discovered between higher mean age ($p = 0.0053$) and body mass index (BMI) ($p = 0.0437$) and the occurrence of musculoskeletal pain in medical care practitioners in the previous year. The prevalence of WMSDs in the preceding year was greater among females than males ($p = 0.0036$), among those with a married status ($p = 0.0218$), and among those with a different type of specialty ($p = 0.0120$) (Table 4). In the previous 7 days, there was an association between a rise in the number of working hours per week and the presence of musculoskeletal pain ($p = 0.0043$), as well as an increase in the monthly average number of working hours ($p = 0.0003$) (Table 5).

In a multivariate logistic regression analysis, age (OR = 8.86, 95% CI 2.21–35.42, $p = 0.0020$), gender (OR = 1.83, 95% CI 1.36–2.45, $p < 0.001$), being a physician (OR = 2.03, 95% CI 1.48–2.79, $p < 0.001$), and increased BMI (OR = 12.21, 95% CI 1.12–133.05, $p = 0.0400$) were found to be variables linked with MSP in the previous year in a multivariate logistic regression analysis. (Table 6). Gender (OR = 1.57, 95% CI 1.27–1.94, $p < 0.001$), age (OR = 4.71, 95% CI 1.81–12.22, $p = 0.0014$), and BMI comparing normal to obese (OR = 0.63, 95% CI 0.42–0.94, $p = 0.0264$) and normal to

underweight (OR = 0.37, 95% CI 0.15–0.89, $p = 0.0286$), were all linked to MSP in the previous 7 days (Table 7).

4 | DISCUSSION

Musculoskeletal disorders constitute the third-leading cause of disability in low-income countries.¹⁰ Furthermore, healthcare and hospital professionals in general, were found to be relatively more susceptible to work-related musculoskeletal illnesses.¹¹ Research regarding these disorders is limited in Syria as they are not taken seriously in this country.¹² Therefore, conducting research on WRMSDs in Syria is of the utmost importance. This study is the first study that assesses the prevalence and characteristics of WRMSDs in residents and nurses from multiple public and educational hospitals in Damascus, Syria to the far as we are aware.

In the participants of our study, the prevalence of WRMSDs was 85% over the previous year. Our findings were consistent with a similar study findings conducted by Kakaraparthi et al. in Saudi Arabia, where 83.8% of the participants had WRMSDs.¹³ However, this prevalence was higher than those reported in another Saudi study (54.7%), the United Kingdom (74%), the USA (80%), and Turkey (59%), but was lower than those recorded in Nigeria (91.3%), and Australia (91%).^{14–19} The prevalence of WRMSDs varies across national boundaries and among occupational groups. This variation is due to a variety of factors, including measurement instrument differences, subjective terminology, cultural differences in how musculoskeletal disorders are perceived and reported, organizational differences in workplace environments, and variations in how musculoskeletal disorders are measured, in addition to different research populations, sample sizes, gender distributions, understaffing, and changes in study designs.^{13,20}

Lower back pain accounted for 63% of complaints, with neck pain following closely behind (54%) and upper back pain (29%), while elbow pain was the least common (8%). This almost corresponds to the complaint occurrence order stated by study participants in previous research.^{14,21,22} Long periods of standing, bending over, sitting, kneeling, or shoulder abduction, as well as doing the same task repeatedly, working in awkward or confined spaces, and heavy or awkward lifting, all contributed to the WRMSDs according to studies conducted on healthcare workers.^{14,20} Astonishingly, only 22% of participants reported seeing a doctor for lower back pain, even though it was the most frequent complaint to limit their daily activities (49%). The weak economy caused by the ongoing Syrian conflict resulted in a lack of outreach efforts to raise awareness concerning the risks associated with musculoskeletal disorders and other diseases, in addition to the inability of bearing the costs of seeing a doctor and receiving appropriate treatment. Because of this, a sizable number of our participants have disregarded their WRMSDs.

When comparing the demographic factors of participants with WRMSD in the last 12 months and the last week, age, female gender, being married, and different specialties were factors related to WRMSDs in the last year and the last week. While BMI was

TABLE 4 Comparison of demographic factors between participants with WMSDs and without WMSDs in the last 12 months.

Demographics		Participants with WMSDs	Participants without WMSDs	p Value
Age, mean (SD)		30.62 (\pm 7.69)	29.45 (\pm 6.15)	0.0053 ^a
BMI, mean (SD)		24.92 (\pm 4.32)	24.44 (\pm 3.54)	0.0437 ^a
Gender	Male	562 (82)	124 (18)	0.0036 ^a
	Female	1016 (87)	153 (13)	
Marital status	Married	599 (88)	85 (12)	0.0218 ^a
	Unmarried	955 (84)	187 (16)	
Current occupation	Physician	979 (86)	159 (14)	0.143
	Nurse	599 (84)	118 (16)	
Mean hours working per day	2–4	82 (85)	15 (15)	0.432
	5–7	675 (86)	107 (14)	
	>7	821 (84)	155 (16)	
Mean hours working per week	20–25	123 (87)	18 (13)	0.605
	26–30	442 (84)	84 (16)	
	>30	1013 (85)	175 (15)	
Specialization	Pediatric	56 (85)	10 (15)	0.0120 ^a
	Internal medicine	354 (83)	71 (17)	
	Surgeries	271 (90)	30 (10)	
	OB/Gyn	141 (92)	13 (8)	
	Clinics	184 (84)	36 (16)	
	Nurse	572 (83)	117 (17)	

^aStatistically significant.

associated with these disorders during the last year only, and occupation, increased work hours per day and per week were exclusively related to WRMSDs in the last week. An interpretation of these findings could be that the associated factors in the last week and the last year together are factors that were associated with WRMSDs in the last year and were prevalent enough to be associated with these disorders in the past week. While BMI was an associated factor in the last year but was not a common associate enough to be prevalent in the last week. Moreover, the factors that were associated with WRMSDs in the last week but not in the last year, did not cause pain that lasts long enough to be deemed by the participants to be existing in the last year and thus, these factors were not related to WRMSDs in the last year. This could be caused by the subjective nature of the Nordic scale.

Regarding the predictors of WRMSDs, aging was associated with increased reporting of WRMSDs (OR = 8.86) which is consistent with earlier research.^{13,20,23} This might be because people lose their capacity to exert stress on their muscles without causing injuries as they age. Moreover, changes occur in their skeletal system which includes bone loss, articular cartilage degradation, and narrower, degenerated intervertebral discs.²⁴ Similar to earlier studies, we found that female practitioners are more susceptible to WMSDs than their male colleagues (OR = 1.83).^{14,25} Due to differences in height,

weight, muscle mass, and body composition, a person's gender is suggested that they may be a risk indicator for WMSD progression. These factors put female therapists at a disadvantage, especially when it comes to lifting or moving weak patients, seeing several patients in 1 day, and carrying heavy equipment, which adds to the physical strain. Also, muscle spasms or pain in the joints before menstruation, wearing heels, and other traditionally feminine behaviors can also contribute to WRMSDs.^{12,13} Our findings indicate that doctors are twice as susceptible as nurses to developing WRMSDs (OR = 2.03). The number of nurses employed in the hospitals included in our study was 2250 (43%), whereas the number of doctors employed there was 2900 (57%); this is because our study was conducted in Syrian educational hospitals. When the proportion of doctors to nurses is often greater, which led to doctors performing most of the nurses' duties. Furthermore, the number of doctors in each department decreased as a result of the increased rates of doctors' immigration in Syria. All the aforementioned factors increased the doctors' workload, causing them to experience more physical and mental stress than the nurses, which may have contributed to the doctors' higher risk of developing WRMSDs in our study.^{11,26} Out of all the predictors we have studied, increased BMI had the highest odds ratio (OR = 12.21). Additionally, decreased weight had a protective effect against WRMSDs (OR = 0.63). In

TABLE 5 Comparison of demographic factors between participants with WMSDs and without WMSDs in the last 7 days.

Demographics		Participants with WMSDs	Participants without WMSDs	p Value
Age, mean (SD)		30.96 (±8.00)	29.30 (±6.07)	<0.001 ^a
BMI, mean (SD)		24.93 (±4.39)	24.67 (±3.79)	0.186
Gender	Male	425 (62)	261 (38)	<0.001 ^a
	Female	858 (73)	311 (27)	
Marital status	Married	515 (75)	169 (25)	<0.001 ^a
	Unmarried	745 (65)	397 (35)	
Current occupation	Physician	742 (65)	396 (35)	<0.001 ^a
	Nurse	541 (75)	176 (25)	<0.001 ^a
Mean hours working per day	2–4	59 (61)	38 (39)	0.0043 ^a
	5–7	518 (66)	264 (34)	
	>7	706 (72)	270 (28)	
Mean hours working per week	20–25	89 (63)	52 (37)	0.0003 ^a
	26–30	334 (64)	192 (36)	
	>30	860 (72)	328 (28)	
Specialization	Pediatric	47 (71)	19 (29)	<0.0001 ^a
	Internal medicine	272 (64)	153 (36)	
	Surgeries	204 (68)	97 (32)	
	OB/Gyn	113 (73)	41 (27)	
	Clinics	131 (60)	89 (40)	
	Nurse	516 (75)	173 (25)	

^aStatistically significant.

TABLE 6 Predictors of WMSDs among healthcare professionals during the past year.

Predictor	Category	Odds ratio	95% CI for OR	p Value
Age	–	8.86	2.21–35.42	0.002
Gender	Female-male	1.83	1.36–2.45	<0.001
Physician	1 = yes/0 = no	2.03	1.48–2.79	<0.001
BMI	–	12.21	1.12–133.05	0.0400

previous research, a higher BMI was discovered to be a significant risk factor for the emergence of musculoskeletal disorder symptoms and was a cause of musculoskeletal pain in the upper and lower extremities and the back. This may be explained by several theories, including greater mechanical demands and metabolic processes related to obesity.^{27,28}

Consideration of clinical implications is crucial to come up with solutions for the significantly high prevalence of WRMSDs among hospital staff in Syria. The role of occupational health medicine should be supported in hospitals because of its fundamental role in diagnosing, treating, and preventing WRMSDs. The number of working hours should be reduced with aging, especially for female employees who are more susceptible to musculoskeletal disorders.

Also, more awareness and knowledge programs addressing WRMSDs should be implemented. Individuals with high BMIs should be advised to lose weight because obesity contributes not only to an increase in musculoskeletal disorders but also to a wide range of other diseases and disorders. The obvious lack of nurses in teaching hospitals, combined with the rise in doctors' immigration in Syria, increased the workload for the doctors working in these teaching hospitals, as well as their psychological distress, which doubled their risk of experiencing musculoskeletal disorders. Therefore, more nurses should be employed in these hospitals, and a plan should be put to limit the growing immigration of Syrian doctors. Similar future studies should be conducted on a larger scale in Syria in which the relationship of psychological factors among other factors with WRMSDs is studied.

5 | LIMITATIONS

Like other studies, our study had limitations due to its cross-sectional design and incomplete questionnaire responses. Additionally, because participants in the study self-reported their exposure, it's possible that they overestimated or underestimated it. The relationship between WMSDs and psychosocial factors was not examined in the study. Moreover, it would be preferable to take into

TABLE 7 Predictors of WMSDs among healthcare professionals during the past 7 days.

Predictor	Category	Odds ratio	95% CI for OR	p Value
Age	–	4.71	1.81–12.22	0.0014
Gender	Female versus male	1.57	1.27–1.94	<0.001
BMI	Normal versus obese	0.63	0.42–0.94	0.0264
	Normal versus underweight	0.37	0.15–0.89	0.0268

consideration musculoskeletal ultrasound for future studies, as it is nowadays a worldwide recognized, accurate, and economically effective procedure for detection of neuromuscular and musculoskeletal issues, and the absence of using it in our study was a limitation.

6 | CONCLUSION

WRMSD prevalence was 85% among our study participants in the previous 12 months. The most prevalent complaint was lower back pain (63%) it was also the most frequent complaint to limit their daily activities (49%), while the least common pain site was the elbow (8%). In terms of WRMSD predictors, aging (OR = 8.86), female gender (OR = 1.83), and increasing BMI (12.21) have been associated with higher reporting of WRMSDs. Our results, in contrast to similar studies, suggested that doctors were twice as susceptible to developing WRMSDs as nurses. The increase in doctors' immigration, lack of programs addressing the dangers of chronic illnesses, and financial hardships related to visiting a doctor and receiving the necessary treatments resulted in higher rates of WRMSDs, particularly in doctors, and a disregard for the required treatment. These results highlight the increasing urgency for ergonomics training programs and effective interventions to reduce WMSDs and enhance working conditions for healthcare professionals in Syria.

AUTHOR CONTRIBUTIONS

Hanaa Zahrawi: Investigation; methodology; project administration; writing—original draft; writing—review and editing. **Saja Hasan Al Asaad:** Conceptualization; investigation; methodology; project administration; writing—review and editing. **Ahmad Nabil Al Hour:** Investigation; methodology; project administration; writing—review and editing. **Saeed A Kadri:** Formal analysis; software; writing—original draft. **Fares kahal:** Investigation; writing—original draft. **André Torbey:** Investigation; writing—original draft. **Hasan Nabil Al Hour:** Data curation. **Ameena Odeh:** Data curation. **Nour Alshallah:** Data curation. **Ghaith Dugha:** Data curation. **Lama Ayad Al Adal:** Data curation. **Sara maa albareed:** Data curation. **Fatma Khaled Battah:** Data curation. **Omran Alsakka Dit Akkad:** Data curation. **Shahad Alhattab Alhasan:** Data curation. **Aws Zawda:** Data curation.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The Corresponding author is able to supply the data used to support the outcomes of this study upon reasonable demand.

ETHICS STATEMENT

In all the hospitals included, the study protocol was granted permission by the Research Ethics Committee. Before participation, each individual provided their informed consent.

TRANSPARENCY STATEMENT

The lead author Hanaa Zahrawi affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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