RESEARCH ARTICLE

Frequency and risk factors of musculoskeletal disorders in high risk occupation workers in Urban, Karachi

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Abstract

Objective: To determine the frequency and risk factors of musculoskeletal disorders in high-risk occupation workers in an urban setting.

Method: The analytical cross-sectional study was conducted in Karachi from July to December 2020, and comprised office workers, operation theatre technicians and coolies. The presence of musculoskeletal disorders was assessed using the Nordic Musculoskeletal Questionnaire to determine factors associated with moderate to severe condition. Data was analysed using SPSS 20.

Results: Of the 300 male subjects, 100(33.3%) each were office workers, operation theatre technicians and coolies. The overall mean age was 33.25±6.8 years (range: 18-50 years). The overall prevalence of musculoskeletal disorders was 179(59.7%). Besides, 117(65.4%) patients with musculoskeletal disorders had intermediate stage of the disease. The lower back and neck were the most common site of trouble involved in preceding 12 months 111(43.6%) each.

Conclusion: Prevalence of musculoskeletal disorders was found to be a common problem affecting high-risk occupational workers.

Keywords: High-risk occupations, Musculoskeletal disorders. (JPMA 72: 2463; 2022)

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Introduction

Musculoskeletal disorders (MSDs) in adults have a significant risk of morbidity and can contribute to reducing productivity, compromised quality of work, dissatisfaction from jobs, and early retirements.[1] Work-related MSDs are one of the major health problems in high-risk occupations.[2] According to a World Health Organisation (WHO) report, about 1.71 billion persons have MSDs worldwide and low-back pain (LBP) causes the highest burden with a prevalence of 586 million people.[3] A study in 2017 in the Eastern Mediterranean Region (EMR) to assess the global burden of MSDs reported that the total Daily Adjusted Life in Years (DALYs) of MSD almost doubled from 1990 to 2013 in the EMR compared to the rest of the world.[4]

MSDs usually have an impact on tendons, muscles and other soft tissues due to consistent stress.[5] MSDs are defined as a group of painful disorders that affect muscle, tendons, nerves and structures that support limbs, neck and back. It is any musculoskeletal trouble that occurs in the preceding 12 months or in the last 7 days that may or may not interfere with daily routine activities.[6] MSDs are one of the challenging disorders in adults and have a significant risk of morbidity and often require lifestyle modification. They include tension neck syndrome, mechanical back syndrome, rotator cuff tendonitis, muscle strain, and De Quervain's syndrome.[7] In a recent study on the global burden of diseases, LBP accounted for the most common disorder with years lived with disability (YLD), and osteoarthritis and neck pain also contributed significantly to the burden of disability.[8] The burden of disability due to MSD could contribute to the utilisation of medical services which results in compromised quality of life (QOL).[9] Therefore, MSDs are costly for employers worldwide that result in loss of productivity due to an increase in sick leaves, and also put employees of young age under financial burden associated with the cost of treatment.[10]

Although rapid technological advances and increased mechanisation in workplaces seem to reduce the burden on the human body, MSDs continue to be one of the most important disorders as a result of high-risk occupational tasks in different working environments in developed and developing countries. The current study was planned to determine the frequency of MSDs and to identify the risk factors that cause these problems in high-risk populations.

Subjects and Methods

The analytical cross-sectional study was conducted in Karachi from July to December 2020, after approval from the ethics review committee of Jinnah Sindh Medical University, Karachi, and comprised office workers,

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operation theatre (OT) technicians and coolies exposed to prolonged sitting for 8 hours or more per day,[11] prolonged standing for 50% of the total working hours per day[12] and those carrying heavy load approximately weighing >5kg on head, hand or shoulders at least 10 times per day on a daily basis. The sample was raised using -probability convenience quota sampling technique from among male workers aged >18 years exposed to any of the three high-risk occupations for at least 1 year and who gave informed consent before enrolment. These workers were approached at their workplaces, including private and public organisations, hospitals, and railway stations. The others were excluded. The sample size was calculated using Open-Epi calculator by taking MSD prevalence 75.8%[13] with 95% confidence level and 5% bound on error. The sample size was inflated by 5% to adjust for non-response. Data was collected by the principal investigator using the Nordic Musculoskeletal Questionnaire (NMQ), which is a validated tool used previously in several studies.[6,14,15] The tool was piloted on 30 participants; 10 from each group, and its validity was reconfirmed.

Data was analysed using SPSS 20. Chi-square test was used where necessary. Odds ratios (ORs) were calculated for different study with 95% confidence interval (CI). Univariant and multivariant logistic regression was used to determine the factors associated with moderate to severe MSDs. P<0.05 was considered statistically significant. Those found to have severe MSD were referred to the relevant specialty.

Results

Of the 300 male subjects, 100(33.3%) each were office workers, OT technicians and coolies. The overall mean age was 33.25±6.8 years (range: 18-50 years), with 146(48.7%) aged 31-40 years (Table-1).

Table-1: Descriptive characteristics of the participants (n=300).

Sr.	Variables	Responses
1	Age of Employee	33.25 ± 6.8
2	Age in Categories	
	18 – 30 Years	37% (111)
	31 – 40 Years	48.7% (146)
	41 – 50 Years	14.3% (43)
3	Working Hours/Day	10.98 ± 1.81
4	Working Hours/Day Categories	
	8-10 Hours	49% (147)
	>10 Hours	51% (153)
5	Working Days/Week	6.24 ± 0.56
6	Working Days/Week Categories	
	<=6 Days	69.7% (209)
	7 Days	30.3% (91)

The overall MSD prevalence was 179(59.7%); 64(64%) coolies, 61(61%) office workers and 54(54%) OT technicians. Besides, 117(65.4%) MSD patients had intermediate stage of the disease. Lower back and neck were the most common sites of trouble involved in the preceding 12 months (Figure).

Age and working hours per day with significantly associated with MSDs (Table-2)

Among office workers, those maintaining postures of neck bended forward and back bended forward were significantly more affected compared to those who maintained straight back posture (p<0.001). Those who used ergonomic chairs reported significantly lower frequencies of MSD compared to those who used computer and executive chairs (p=0.011).

Table-2: Association of MSDs with different factors (n=300).

Study Variable	Unadjusted OR (95% CI)	P-Value	Adjusted OR (95% CI)	P-Value
Age-Groups (n=300)				
• 18-30 Years (n=111)	Reference		Reference	
• 31-40 Years (n=146)	2.09 (1.25 - 3.46)	0.004	1.99 (1.18 – 3.35)	0.009
• 41-50 Years (n=43)	1.97 (0.95 - 4.08)	0.068	1.94 (0.91 – 4.14)	0.086
Occupation (n=300)				
Coolies (n=100)	Reference		Reference	
Office Workers (n=100)	0.88 (0.49 -1.56)	0.661	0.59 (0.11 – 3.20)	0.547
OT Technicians (n=100)	0.66 (0.37 – 1.16)	0.151	0.27 (0.05 – 1.46)	0.129
Working Hours/Day (n=300)				
• 8-10 Hours (n=147)	Reference		Reference	
• >10 Hours (n=153)	1.81 (1.14 – 2.89)	0.012	2.66 (1.39 – 5.08)	0.003
Working Days/Week (n=300)				
• <= 6 Days (n=209)	Reference		Reference	
• 7 Days (n=91)	1.19 (0.72 – 1.98)	0.489	0.29 (0.05 – 1.63)	0.162

MSD: Musculoskeletal disorders, CI: Confidence interval, OR: Odds ratio.

Table-3: Comparison of MSD and its stages according to patient characteristicsf (n=300).

Study Variable	MSDs		P-value	Stages of MSDs		P-value
	Yes	No		Early/No	Inter/Late	
OFFICE WORKERS (n=100)						
Posture During Siting						
Straight Back (n=22)	06(27.3%)	16(72.7%)	<0.001	19(86.4%)	03(13.6%)	
Back Bended Forward (n=65)	43(66.2%)	22(33.8%)		29(44.6%)	36(55.4%)	<0.001
Neck Bended Forward (n=13)	12(92.3%)	01(7.7%)		03(23.1%)	10(76.9%)	
Type Of Chair						
Ergonomic Chair (n=23)	10(43.5%)	13(56.5%)	0.011	16(69.6%)	07(30.3%)	
Computer Chair (n=35)	28(80.0%)	07(20.0%)		14(40.0%)	21(60.0%)	0.087
Executive Chair (n=42)	23(54.8%)	19(45.2%)		21(50.0%)	21(50.0%)	
OT TECHNICIANS (n=100)						
Duration Of Break						
<= 20 Minutes (n=50)	34(68.0%)	16(32.0%)	0.005	26(52.0%)	24(48.0%)	0.039
> 20 Minutes (n=50)	20(40.0%)	30(60.0%)		36(72.0%)	14(28.0%)	
Posture During Standing						
Sway Back (n=18)	14(77.8%)	04(22.2%)	0.025	07(38.9%)	11(61.1%)	0.026
Flat Back (n=82)	40(48.8%)	42(51.2%)		55(67.1%)	27(32.9%)	
COOLIES (n=100)						
No. Of Times Weight Lifted/Day						
10 Times (n=69)	36(52.2%)	33(47.8%)	<0.001	44(63.8%)	25(36.2%)	0.001
> 10 Times (n=31)	28(90.3%)	03(09.7%)		09(29.0%)	22(71.0%)	
Change Of Arm/Hand While Lifting Weight						
Always (n=15)	07(46.7%)	08(53.3%)		10(66.7%)	05(33.3%)	
Sometimes (n=77)	51(66.2%)	26(33.8%)	0.28	40(51.9%)	37(48.1%)	0.381
Never (n=8)	06(75.0%)	02(25.0%)		03(37.5%)	05(62.5%)	

MSDs: Musculoskeletal disorders.

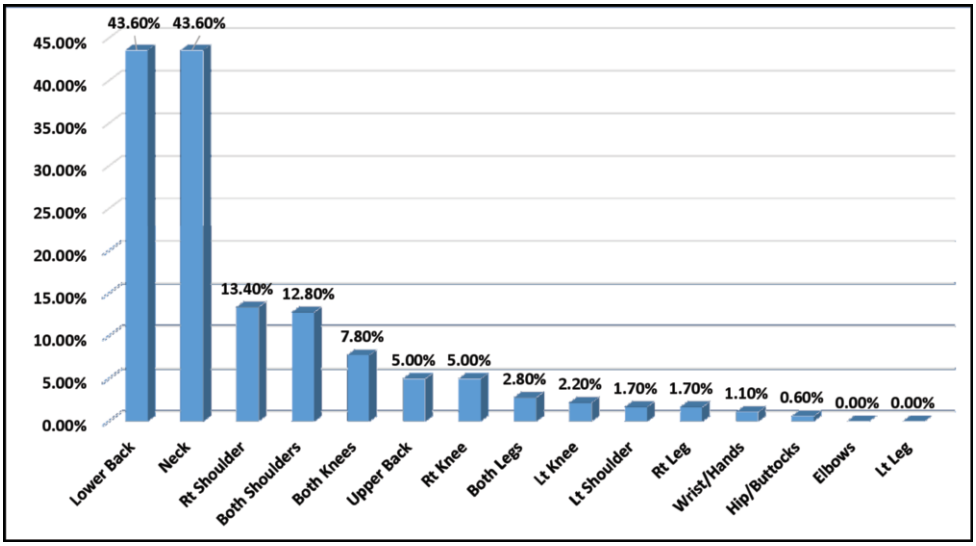

Figure: Most frequent site of trouble in the preceding 12 months (n=300).

Among OT technicians, those who got longer durations of break time were significantly less likely to report MSDs (p=0.025) whereas those who used swayed back posture while standing were significantly more likely to have MSDs compared to those maintaining flat back posture (p=0.025). Among the coolies, the number of times weight lifted per day was also positively associated with MSDs (p<0.001) (Table-3).

Discussion

To our knowledge, the current study is the first in Pakistan to assess the burden of MSDs in high-risk groups, like office workers, coolies and OT technicians. The study found overall 59.7% MSD prevalence. A study in Iran on rubber factory workers also reported 73.6% prevalence.[16] LBP and neck were the most common site of trouble in the preceding 12 months in the current study. Studies conducted in Italy and Tunisia on nurses[10,17] and in Iran[14] on office workers also reported the lower back to be the most common site of MSDs. However, a study conducted on coolies in India found shoulders as the most frequent site of pain, followed by neck and LBP.[18]

The current study found that the majority of participants

(66.4%) from all the three groups affected by MSD fell in the age group 31-40 years, which was in line with studies in India (18) on coolies, in Taiwan[19] on registered nurses and in Pakistan[20] on sonographers. In another study conducted in Saudi Arabia on office workers, older age was associated with MSD.[21] The current study also showed that older age groups had greater severity of MSDs. This finding is also consistent with a study done in Sweden.[22] The current study also found a positive association of long working hours with MSD severity. This is consistent with previous studies conducted in India on MSDs in computer users.[23]

Among office workers, those who maintained a posture of the straight back showed a protective effect which is consistent with a previous study conducted in Belgium.[24] Among OT technicians, the flat back posture was found helpful compared to swayed back. This finding is also consistent with a study done in Iran on OT technicians which revealed a high prevalence of MSD with abnormal standing posture.[25] Among the coolies, a higher frequency of lifting weight was positively associated with MSDs. Almost similar findings were reported in a study conducted in India where lifting the weight on an average 35 times aggravated the frequency of MSDs.[15]

The current study has a few limitations. Study sites and participants were selected conveniently due to limited funding. Therefore, the findings may not be generalisable. Moreover, the participants were assessed based on a self-reported questionnaire without considering any investigations, like serum vitamin D level and serum calcium levels. There is a need to conduct further studies by assessing MSDs based on biochemical investigations to identify the root cause.

Immediate attention of the higher authorities is needed to improved occupational health. In the light of the current findings, certain changes/interventions are recommended,

For those sitting long hours, change of chairs, good posture practices and break from working at regular intervals are encouraged.

Those lifting weights, like coolies, should avoid overload and carry favourable load the definition of which varies from person to person. Carrying heavy weight via trollies or lifting weights by bending the knees instead of bending back may also help.

For those standing long hours, like OT technicians, replacements during prolonged surgeries may be considered, while improved strategies should be adopted to manage work overload, lifting and transferring patients.

The effects of the interventions, where introduced, shall be studied through interventional studies in the future.

Conclusion

MSD prevalence was fairly common among high-risk professional workers. Age and working hours per day were significant risk factors associated with MSD and its stages in all the three occupations. Posture during sitting and standing as well as the number of times weights were lifted per day also had a significant impact on MSD which can be improved with better occupational health policies.

Disclaimer: Dr. Muhammad Ovais is currently appointed as Medical Officer at Sindh Government Liaquatabad Hospital, Karachi.

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