Cross-Sectional Research

Prevalence of Upper Quadrant Musculoskeletal Disorders among Healthcare Professionals in a Tertiary Care Hospital

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Abstract

Background: Healthcare professionals (HCPs) are vulnerable to acquire musculoskeletal disorders during their work routine. Shortage of HCPs, long working hours and mandatory overtime results in overburden on those available, especially during pandemic such as in COVID -19. Objective of the study was to evaluate the prevalence of upper quadrant musculoskeletal disorders (UQMSDs) among HCPs.

Methodology: A total of 370 HCPs including doctors, dentists, physiotherapists and nurses were evaluated for the presence of trigger points (TrPs) in upper trapezius, levator scapula, infraspinatus and sternocleidomastoid muscles, severity of pain (NPRS), neck disability (NDI) and cervical and shoulder ROM (goniometer).

Results: The prevalence rate of UQMSDs was found to be high among HCPs. TrPs were more prevalent in upper trapezius muscle (46.21%) followed by levator scapulae, infraspinatus and sternocleidomastoid muscles. 4.1% of HCPs reported severe pain, 16.7% reported moderate pain and 48.36% reported mild pain in upper quadrant. 0.8% of HCPs had complete, 1.2% had severe, 5.3% had moderate and 37.6% had mild neck disability. The cervical rotation and shoulder horizontal adduction ROM were found to be more restricted among HCPs.

Keywords: upper quadrant musculoskeletal disorders, myofascial trigger points

Introduction

Musculoskeletal disorders (MSDs) in healthcare professionals (HCPs) represents a widespread series of disorders, which can differ in severity from minor periodic symptoms to major chronic symptoms occurring due to overuse, repetitive micro-injury, psychosocial factors and workplace characteristics.[1] HCPs are susceptible to acquire musculoskeletal disorders during the course of their work routine due to extended night work, longer shifts (greater than 8 h per day), on-call work and mandatory overtime to deliver care around the clock, which become even more demanding during pandemic such as COVID-19.[2,3] Shortage of HCPs results in over burden on those available, which further increase their mechanical workload than load bearing capacity of musculoskeletal system.[4] The WHO in 2006 recognized the occupational hazards and stress in healthcare providers and stated that MSDs contribute to high sickness absent rates among HCPs.

Upper quadrant musculoskeletal disorders (UQMSDs) include the MSDs of upper quadrant

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including occiput, cervical and upper thoracic spine counting the clavicles and scapulae.[5] Different postures and poor ergonomics acquired during performing operations, patient care can significantly influence the head/neck posture resulting in stiffness of soft tissue, restriction in ROM, impaired motor recruitment, local muscle weakness and formation of myofascial trigger points (MTrPs). Simons et al. (1992) described myofascial trigger points as a hyperirritable spot, a taut band in skeletal muscle or in the muscle fascia which are painful on compression. An adequate amount of healthy HCPs are crucial for the effective and efficient working of health care systems. Studies specifically investigating UQMSDs among HCPs are limited.

Therefore, there is need to evaluate prevalence of UQMSDs among HCPs. Finding out the prevalence may help to find out strategies for effective and efficient working of healthcare system.

Materials and Methods

Ethical clearance was taken from Institutional Ethical Committee (No. – BREC/21/163) of Pandit Bhagwat Dayal Sharma University of Health sciences, Rohtak, India. A total of 370 HCPs of age 24-65, both male and female including doctors, dentists, physiotherapists and nurses were recruited from among the staff working in Post Graduate Institute of Medical Sciences (PGIMS), Rohtak. Subjects with current musculoskeletal trauma, having history of injury to upper quadrant, upper limbs and back and medical graduates having less than 1 year of experience of working in a hospital set up were excluded from the study. On the bases of inclusion and exclusion criteria the illegible participants were requested to sign an informed consent. The participants were evaluated for MTrPs, pain, neck disability and restricted cervical and shoulder ROM.

Pain - Pain was assessed using Numeric Pain Rating Scale (NPRS).[6]

Assessment of myofascial trigger points -Upper trapezius (UT), levator scapulae (LS), sternocleidomastoid (SCM), infraspinatus (IS) muscle were palpated on both side for the presence of MTrPs. (Figure 1) Trigger points were diagnosed using three criteria (Presence of taut band, hypersensitive spot and referred pain) recommended by a panel of 60 international experts. Presence of any two criteria out of these were considered to have MTrPs.[7,8]

Neck disability – Neck disability was assessed using Neck Disability Index (NDI) self-reporting questionnaire which is a valid and reliable to assess the effect of neck pain on subject ability to manage his/her everyday life.[6]

Measurement of range of motion (ROM) - The physical measurements of cervical spine and shoulder ROM were carried out by using universal goniometer. American Medical Association for cervical spine and shoulder joint range of motion were considered for reference ranges.[9] For horizontal adduction Luttgens et al. 1997 horizontal adduction normative value was taken as reference range.[10]

Data analysis was carried out using the software SPSS 26 version to determine frequency distribution, means and proportions.

Figure 1. Procedure for palpation of trigger points in (a) upper trapezius (b) levator scapulae, (c) infraspinatus (d) sternocleidomastoid

Results

A total of 370 HCPs were included in the study. The mean age of HCPs was 32.5 $\pm$ 8.54 years with a minimum age of 25 years and maximum of 61 years. The mean value of BMI was 24.16 $\pm$ 3.39 Kg/m^2 with minimum Body Mass Index (BMI) of 14.50 Kg/m^2 and maximum of 34.96 Kg/m^2 (Table 1).

Table 1: shows the distribution of socio demographic characteristics of the healthcare professionals

Socio-demographic characteristics	Frequency (n)	Percentage (%)
Age-		
25-34	277	74.86%
35-44	53	14.32%
45-54	27	7.29%
55-65	13	3.51%
Gender -		
Males	110	29.7%
Females	260	70%
BMI-		
Normal	228	57.83%
Underweight	12	3.2%
Overweight	107	28.9%
Obese	23	6.21%
Occupation-		
Doctors	165	44.59%
Dentists	49	13.24%
Physiotherapists	29	7.83%
Nurses	127	34.32%
Physical activity		
Yes	213	57.56%
No	157	42.43%

The prevalence of MTrPs was found to higher in right upper trapezius (46.21%) followed by in right levator scapulae (27.56%), left upper trapezius (25.9%) left levator scapulae (16.48%), infraspinatus (7.8% right side, 7.56% left side) and sternocleidomastoid (6.21% right side, 2.9% left side). Physiotherapists had higher percentage of MTrPs in upper trapezius (79.31% right side, 51.73% left side) and in right levator scapulae (41.38%). Dentists had higher percentage of MTrPs in left levator scapulae (26.53%). Nurses had higher prevalence of MTrPs in left sternocleidomastoid (39.37%) and infraspinatus (11% right side and 10.24% left side). (Table 2, Figure 2 a-d)

Table 2: Prevalence of myofascial trigger points

Myofascial Trigger points in muscles	Frequency (n)	Percentage (%)
Upper trapezius (R)	171	46.21%
Upper trapezius (L)	96	25.9%
Levator scapulae (R)	102	27.56%
Levator scapulae (L)	61	16.48%
Sternocleidomastoid(R)	23	6.21%
Sternocleidomastoid (L)	11	2.9%
Infraspinatus (R)	29	7.8%
Infraspinatus (L)	28	7.56%

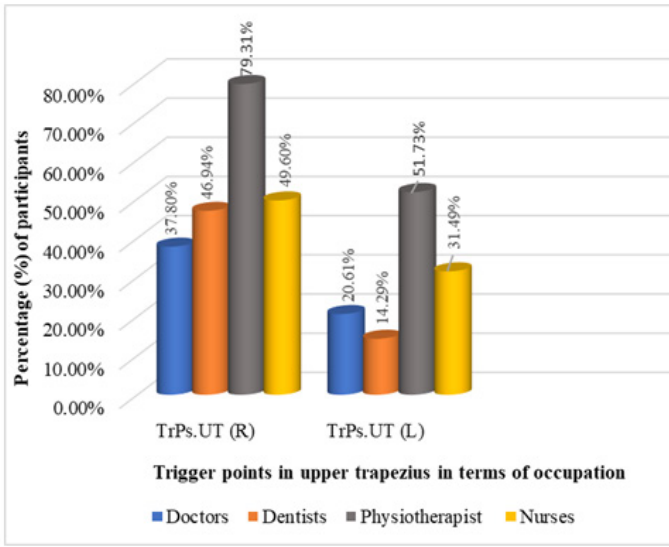

Figure 2(a) – Prevalence of MTrPs in upper trapezius in term of occupation

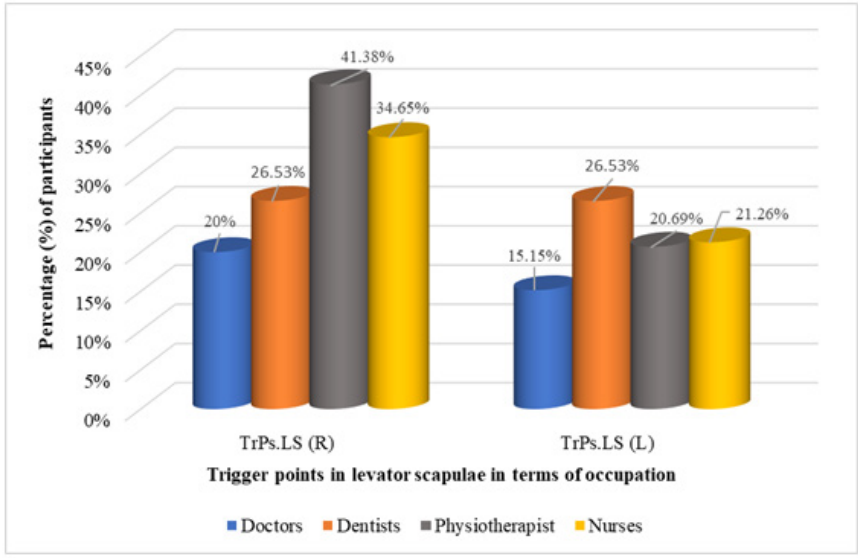

Figure 2(b) - Prevalence of MTrPs in levator scapulae in term of occupation

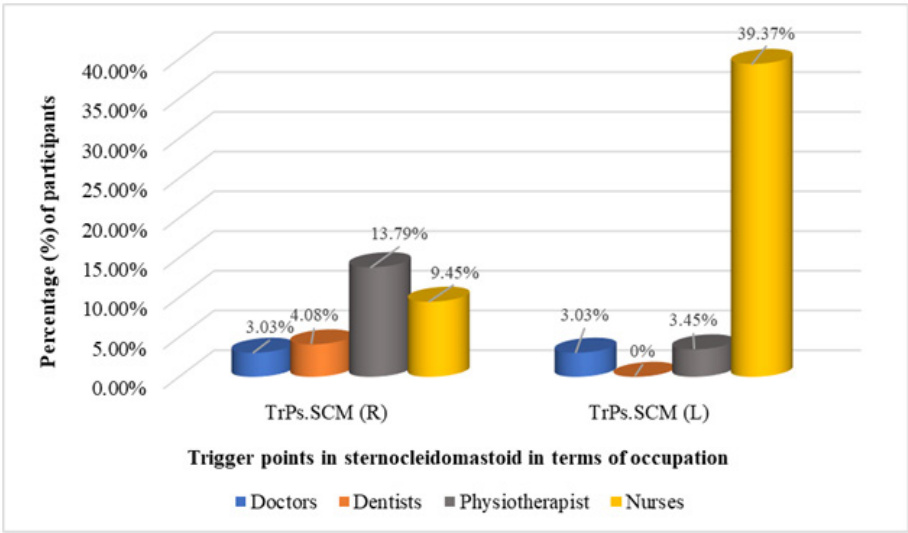

Figure 2(c) - Prevalence of MTrPs in sternocleidomastoid in term of occupation

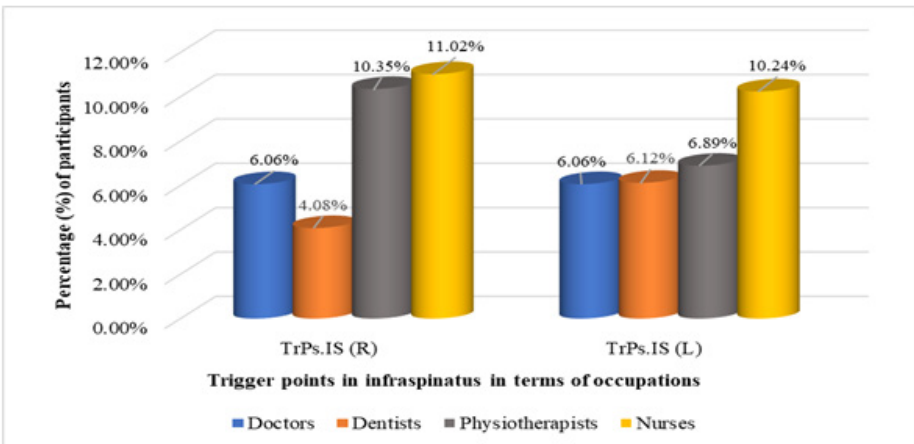

Figure 2(d) - Prevalence of MTrPs in infraspinatus in term of occupation

Interpretation of NPRS scores of HCPs revealed, 4.1% (n = 16) had severe pain, 16.7% (n = 62) had moderate pain, 48.36% (n =179) had mild pain and 30.54% (n = 113) had no pain. Interpretation of NPRS data in terms of occupation revealed, The high prevalence of moderate (22%) and severe (7.1%) musculoskeletal pain in upper quadrant was found in nurses and high prevalence of mild (62.1%) musculoskeletal pain in upper quadrant was found in physiotherapists. (Table 3 and Figure 3).

Table 3. Prevalence of pain among HCPs

Pain (NPRS score)	Doctors	Dentists	Physiotherapists	Nurses
	% (n)	% (n)	% (n)	% (n)
No pain (0 score)	34.54% (57)	28.6% (14)	17.2% (5)	29.9% (38)
Mild pain (1-3 score)	50.9% (84)	51.0% (25)	62.1% (18)	40.9% (52)
Moderate pain (4-6 score)	12.72% (21)	14.3% (7)	17.2% (5)	22.0% (28)
Severe pain (7-10 score)	1.8% (3)	6.1% (3)	3.4% (1)	7.1% (9)

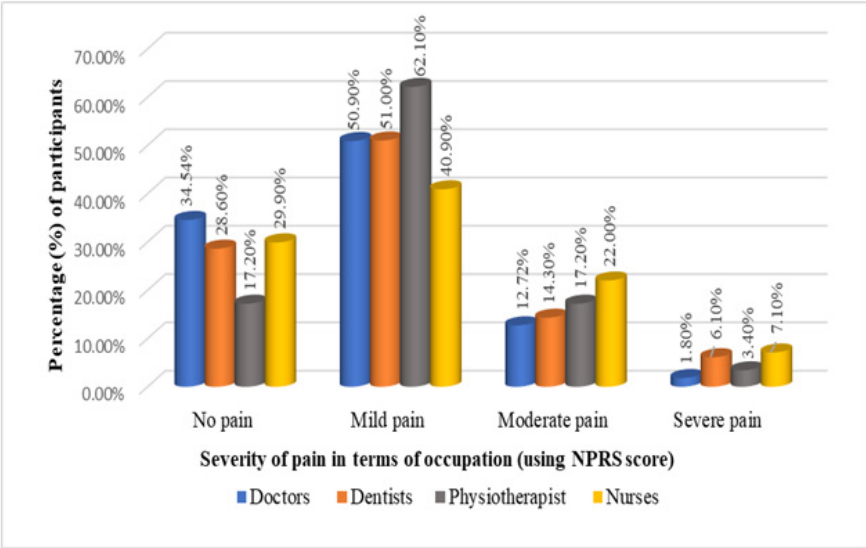

Figure 3: Severity of pain among HCPs

Interpretation of NDI scores of HCPs revealed high prevalence of mild neck disability (37.6%, n = 139) in HCPs followed by moderate disability (5.3%, n = 20), severe disability (1.2%, n = 4) and complete (0.8%, n = 3) neck disability. Interpretation of NDI data in terms of occupation revealed, high prevalence of complete neck disability in doctors (1.2%, n= 2). High prevalence of moderate (7.87%) and severe (2.36%) neck disability was seen in nurses. High prevalence of mild neck disability (48.27%) was seen in physiotherapists (Table IV and Figure 4).

Table 4: Description of neck disability in terms of occupation

N.D.I. score	Doctors Percentage(n)	Dentists Percentage (n)	Physiotherapists Percentage (n)	Nurses Percentage (n)
0-4	60% (99)	61.22% (30)	48.27% (14)	48.03% (61)
5-14	33.9% (56)	34.69% (17)	48.27% (14)	40.94% (52)
15-24	4.8% (8)	2.04% (1)	3.44% (1)	7.87% (10)
25-34	0% (0)	2.04% (1)	00% (0)	2.36% (3)
35-50	1.21% (2)	0% (0)	00% (0)	0.78% (1)

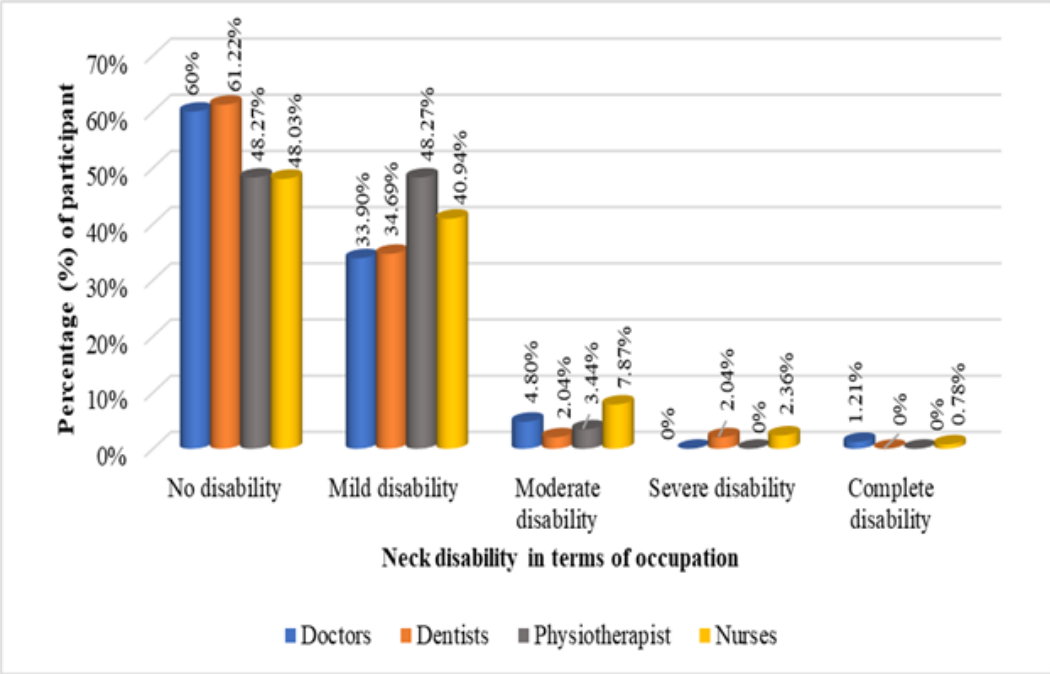

Figure 4: Prevalence of neck disability in terms of occupation

As per AMA reference range prevalence of restriction in cervical ROM among HCPs was found to be greater in cervical rotation ROM (98% both side) followed by cervical extension (71%), lateral flexion (53% in right side and 47% in left side) and cervical flexion (40%). Prevalence of restriction in shoulder ROM among HCPs was found to be greater in horizontal adduction (29%in left side, 28% in right side) followed by shoulder flexion (21.3% in left side and 20.8% in right side), shoulder internal rotation (13.5% in right side and 10.5% in left side), shoulder extension (10.2% in right side, 10% in left side) and shoulder abduction (7 % in left side and 6% in right side). Regarding cervical ROM, physiotherapist had more restriction followed by doctors, nurses and dentists. Regarding restriction of shoulder ROM, nurses had higher restriction followed by doctors, physiotherapists and dentists. (Figure 5 (a),(b))

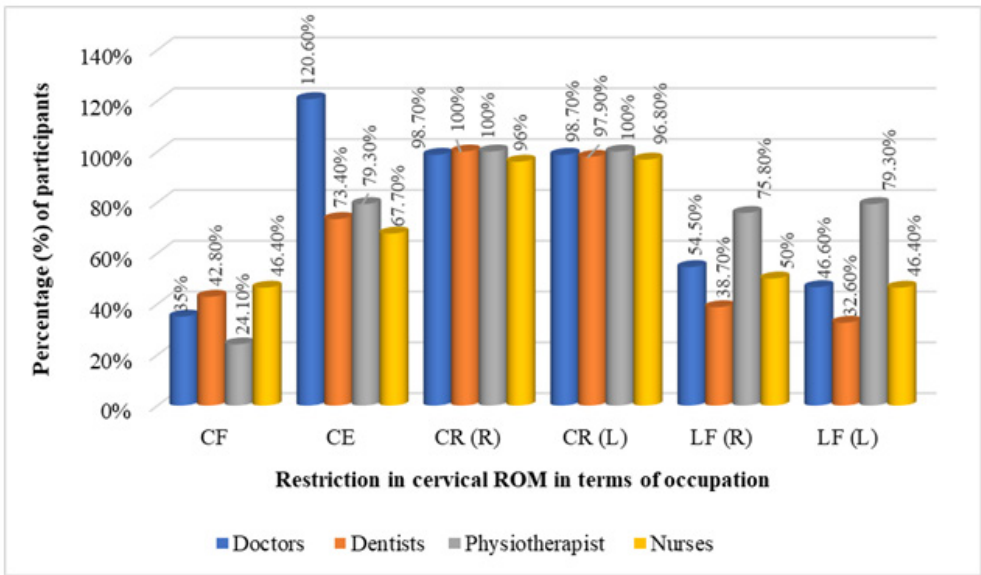

Figure 5(a): Prevalence of cervical ROM in terms of occupation

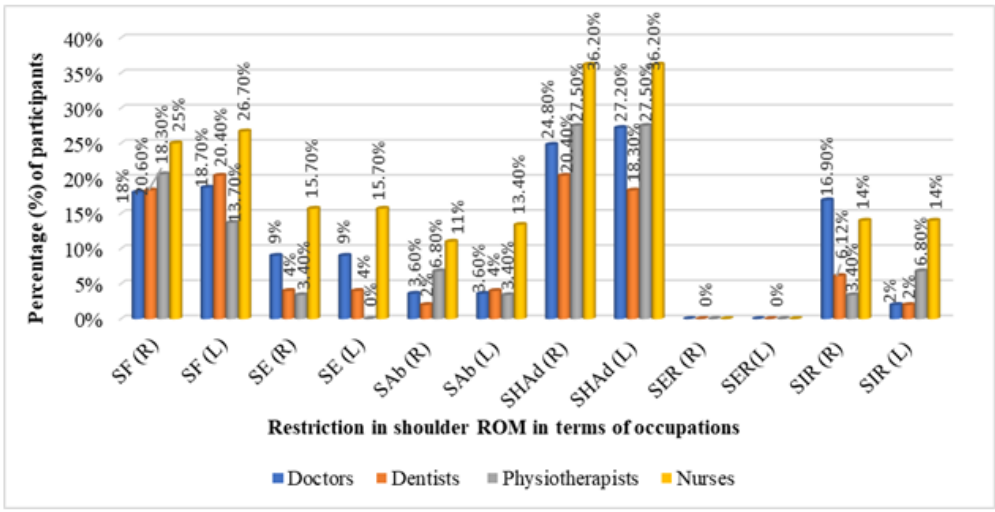

Figure 5(b): Prevalence of shoulder ROM in terms of occupation

Discussion

This study found high prevalence of UQMSDs among HCPs. MTrPs were higher in upper trapezius (46.21% on right side, 25.9% on left side) followed by in levator scapulae, infraspinatus and sternocleidomastoid. Physical workload and psychological stresses in HCPs might be the cause of higher percentage of MTrPs in upper quadrant muscles. Lundberg U. et al. (2002) reported a significant increase in trapezius electromyography activity during mental stress and cognitive task performance.[11] Fernández-De-LasPeñas et al. (2012) also reported high prevalence of MTrPs in upper trapezius, infraspinatus, levator scapulae, and extensor carpi radialis brevis muscles in both manual (blue collar) and office (white-collar) workers with nonspecific neck or shoulder pain.[12] In terms of occupation, physiotherapists had higher percentage of MTrPs in upper trapezius and in right levator scapulae. Dentists had higher percentage of MTrPs in left levator scapulae. Nurses had higher prevalence of MTrPs in left sternocleidomastoid and infraspinatus. Latif et al. (2020) also reported that 70.5% physiotherapists had MTrPs in upper trapezius and only 13.7% of them maintain their ideal posture during treating patients.[13] In case of nurse, working with poor postural adaptations, performing more of twisting movements, working with lying patients and transferring patients from bed might be the reason for development of MTrPs in upper quadrant muscles.[14] Dentists usually had to work with the arms abducted away from the body, hunched shoulder, sitting in strained positions and poor physical ergonomics of workspace all attribute to the higher incidence of MTrPs.[15]

When considering pain, 69.16% (n = 257) of HCPs had pain in upper quadrant. Long et al. (2013) also found prevalence rate of neck and upper back pain among physician, nurses and midwives to be 70%.[16] Occupation wise, pain was more prevalent among physiotherapists (82.7%) followed by dentists (71.4%), nurses (70%) and doctors (65.42%). Wang et al. (2015) concluded, compared with dentists, physical therapists, registered nurses, and doctors also show higher risk of MSDs.[17] The high prevalence among physiotherapists might be due to physical therapy practice which involve more manual techniques, performing the same task over and over, patient treatment in different positions. Poor ergonomic knowledge and practice have been reported to be one of the reasons for MSDs. El-sallamy et al. (2018) reported that 48.9% of undergraduate dental students had fair knowledge regarding ergonomics, but only 5% had good practice of ergonomics in their routine dental practices.[18] Rahman et al. (2017) found that nurses (77.6%) had greater percentage of musculoskeletal pain as compared with doctors (61.3%).[19]

On the bases of neck disability, 37.6% had mild, 5.3% had moderate, 1.2% had severe and 0.8% had complete neck disability. As per NDI score, complete neck disability was more prevalent among doctors. Severe and moderate neck disability was more prevalent among nurses. Mild neck disability was

more prevalent in physiotherapists. Babar et al. (2020) found that, 44% of dentists had mild neck disability and 35% had moderate neck disability.[20] Khadim et al. (2018) also reported high prevalence of moderate disability among nurses.[21]

MTrPs have been found to be associated with reduced flexibility which might lead to restriction of shoulder and cervical ROM in various planes. Fernández-de-las-Peñas et al. (2005) found significant relationship between MTrPs in upper trapezius muscle and the presence of joint hypomobility at the C3-C4 segment.[22] Abnormal thoracic posture also effects shoulder and cervical ROM.[23]

Conclusion

In this study, the prevalence rate of UQMSDs was found to be high among HCPs. In future prevalence of UQMSDs can be minimized by adopting various strategies such as awareness about general exercise, timely treatment and implication of ergonomic knowledge in clinical practice for effective and efficient working of healthcare system.

Conflict of interest: none

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