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PREVALENCE OF MUSCULOSKELETAL DISORDERS AND ITS CORRELATION TO PHYSICAL ACTIVITY AMONG UNDERGRADUATE HEALTHCARE STUDENTS.

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ABSTRACT

BACKGROUND: Musculoskeletal disorders (MSDs), characterized by self-reported musculoskeletal strain, are among the conditions that physical activity (PA) can help prevent. Conversely, insufficient PA increases the risk of developing MSDs. In Malaysia, studies have shown that musculoskeletal pain is prevalent among medical undergraduates, influenced by factors such as a family history of trauma and academic-related stressors. This study aims to determine the prevalence of MSDs and assess how these disorders affect levels of physical activity in undergraduate medical students. **OBJECTIVE:** study was planned to explore the prevalence of MSDs and its correlation to PA in undergraduate healthcare students. **METHODS:** The cross sectional study was carried out among the medical students of various subjects for the time period of 06 months. Total 403 sample were selected through convenience sampling technique. Standardized Nordic Musculoskeletal Questionnaire (NMQ) and Physical activity measured through IPAQ questionnaires were used to assess the sensitivity and severity of musculoskeletal pain. **RESULTS:** From the collected data, it was observed that 32.5% (131) were involved in less physical activity during their routine work whereas 23.1% had maintained their life with routine exercise. The severity of pain was different among medical students as low back pain was observed among 59.3%, followed by neck pain 55.3%, shoulder pain 54.6%, upper back 43.9%, wrists/hands 40.4%, and ankles/feet 36.5%. There was a significant association between the musculoskeletal disorders in elbow, knee and ankles/feet region with the level of PA. **CONCLUSION:** The present study revealed a high prevalence of musculoskeletal disorders among undergraduate medical students, with pain most frequently reported in the lower back (59.3 %), neck (55.3 %), and shoulder (54.6 %). A subset of participants maintained sufficient levels of physical activity to permit analysis of the relationship between musculoskeletal complaints in the elbow, knee, and ankle/foot regions and overall activity level.

KEYWORDS: Musculoskeletal disorders, Physical activity, Undergraduate healthcare students.

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INTRODUCTION

Musculoskeletal pain refers to discomfort originating in muscles, bones, joints, tendons, or ligaments. Musculoskeletal disorders encompass a spectrum of such conditions—ranging from low- or upper-back pain and muscle spasms to neck and shoulder pain—characterized by varying degrees of severity across different anatomical regions [1]. Physical activity can be described as energy needed to move the skeletal muscle up to stretched level [2]. Muscular spasm and musculoskeletal movement are the frequent complains reported by numerous patients with their health care providers [3]. Due to the exposure to ergonomic risks such as extended gripping, prolonged sitting, wearing fashionable however much less ergonomic shoes, and the increased physical demands brought on by learning professional skills, university students may be more susceptible to developing acute or chronic musculoskeletal pain (MSP) disorders [4]. The students of medical side experienced the most prone to wards such type of risk factors, they had experience chronic pain, stiffness, numbness, or pains in their neck, shoulders, and lower back as a result of MSDs [5]. According to a WHO report, low back pain ranked first and neck pain fourth among the leading causes of years lived with disability [6].

Deskbound lifestyles and low levels of physical activity (PA) are serious public health issues that are linked to a higher prevalence of chronic diseases and a lower life expectancy globally[7]. The WHO and CDC's global guidelines for adults aged 18–64 emphasize regularly engaging in physical activity—consistent in frequency, duration, intensity, type, and total volume—to reduce the risk of non-communicable diseases. This suggests ''to a minimum of 150–300 minutes of moderate-intensity aerobic physical activity, or 75–150 minutes of vigorous-intensity aerobic physical activity, or an equivalent mix of moderate-intensity and vigorous-intensity physical activity spread out over the course of the week'' [8, 9]. In an Egyptian survey of medical students, 82.97% reported musculoskeletal pain in at least one body region over the past year, and 62% of those cases were chronic[5]. Consequently, according to the findings of the Egyptian study, the area most frequently afflicted among the students was the lower back, with 83% of those experiencing discomfort citing this region. This pain significantly disrupted their study routines and attendance at lectures (5). 52.5% of people reported having neck discomfort in the previous 12 months, causing the neck the second most commonly reported anatomically impacting area [10]. In a Saudi Arabian survey, 64.8% of undergraduates reported musculoskeletal pain, of whom 48.4% were medical students. The low back was the most affected region (33.4%), and 42.9% of those with symptoms engaged in moderate physical activity[11]. Hoogendoorn et al. found no association between leisure-time physical activity and low back pain [12]. Among all the characteristics, the most prevalent ones were physically inactive people, obese females, frequent mobile users, and those in the age group of 18 to 20. The prevalence of spinal column pain is significant, accounting for 74.9% of musculoskeletal pain[13]. Many musculoskeletal disorders can develop among undergraduate students, and various

studies have shown a strong correlation between undergraduate students' physical activity levels and MSK discomforts [14, 11]. No studies from Sindh, Pakistan have assessed the prevalence of musculoskeletal disorders and their association with physical activity in undergraduate healthcare students. However, data exploring association of MSDs with PA from Sindh, Pakistan is limited. Specially in undergraduate healthcare students, due to the nature of their work medical students are more likely to be impacted by increased workload in hospital wards, stress, and lengthy study hours[3]. Therefore, the current study was planned to explore the prevalence of MSDs and its correlation to PA in undergraduate healthcare students.

SUBJECTS AND METHODS:

The cross sectional study was carried out among the medical students of various subjects for the time period of 06 months. Total 403 study subjects were involved in the study belonging to various universities including PUMHSW Nawabshah, LUMHS Jamshoro, Isra University Hyderabad, DUHS Karachi, JSMU Karachi and SMBBMU Larkana. Students were belonging to various disciplines such as MBBS, DPT, BDS, PHARM.D, BSPH and BSN(G), both gender were involved with the age group from 18-25 years and samples were collected through non-probability convenience sampling technique. The study was conducted from March 2023 to May 2024. Subjects with known cases of fractures in any part of their body within the last year, participants had any history of musculoskeletal surgery, diagnosed disable students, pregnant female students and diagnosed psychological disorders participants were excluded. Data was collected after the approval of study from Institutional Review Board (IRB) of IPRS, PUMHSW Nawabshah. Only those students were included who participated voluntarily after accepting informed consent form. Collected data comprises of demographic data, analysis of musculoskeletal symptoms and evaluation for accessing level of physical activity. Participants could withdraw at any point. Data were analyzed using Microsoft Excel 2016 and SPSS v21. Statistical significance was set at $p < 0.05$.

RESULTS:

Table-1: Demographic and health characteristics of the participants (n=403).

Variables	Frequency (n)	Percentage (%)
Age	**Mean±SD**	21.6±1.8
Gender		
MALE	44	10.9%
FEMALE	359	89.1%
MARITAL STATUS		
SINGLE	388	96.3%
MARRIED	14	3.5%
DIVORCED	1	0.2%
DISCIPLINE		
MBBS	136	33.7%
BDS	4	1.0%
DPT	154	38.2%
PHARM-D	25	6.2%
BSPH	16	4.0%
BSN	68	16.9%
YEAR OF STUDY		
1st year	78	19.4%
2nd year	64	15.9%
3rd year	69	17.1%
4th year	89	22.1%

5th year	103	25.6%
BODY MASS INDEX		
Underweight	103	25.6%
Normal	178	44.2%
Overweight	50	12.4%
Obesity	72	17.9%

This study included 403 undergraduate healthcare students. Most of them were females 359 (89.1%). The mean age of the students was 21.6 (±1.8) years. Students from 1st to 5th year were included in this study from several universities of Sindh, Pakistan but majority of the students 103 (25.6%) were of 5th year. Most of the participated students were of physical therapy 154 (38.2%) followed by MBBS 136 (33.7%), BSN 68 (16.9%), PHARM-D 25 (6.2%), BSPH 16 (4%) and BDS 4 (1%) from which majority of the students had a normal BMI 178 (44.2%). **TABLE 1**

Table 2 Frequencies of physical activity level among undergraduate healthcare students:

Level of physical activity	Frequency (n)	Percentage (%)
Low	131	32.5%
Moderate	179	44.4%
High	93	23.1%

Among the total population surveyed, majority of the students fell within the moderate level of physical activity. **TABLE 2**

Table 3 Prevalence of Musculoskeletal Disorders:

Variable	Frequency (n)	Percentage (%)
Pain during the last 12 months		
Neck	223	55.3%
Shoulder	220	54.6%
Elbows	102	25.3%
Wrists/hands	163	40.4%
Upper back	177	43.9%
Lower back	239	59.3%
Hips/thighs	139	34.5%
Knees	132	32.8%
Ankles/feet	147	36.5%
Pain interferes with work		
Neck	138	34.2%
Shoulder	140	34.7%
Elbows	74	18.4%
Wrists/hands	113	28.0%
Upper back	117	29.0%
Lower back	147	36.5%
Hips/thighs	99	24.6%
Knees	91	22.6%
Ankles/feet	102	25.3%
Pain during the last 7 days		
Neck	147	36.5%
Shoulder	155	38.5%
Elbows	66	16.4%
Wrists/hands	111	27.5%
Upper back	135	33.5%
Lower back	166	41.2%
Hips/thighs	88	21.8%
Knees	87	21.6%
Ankles/feet	103	25.6%

Over the past 12 months, pain was most commonly reported in the lower back (239 participants; 59.3 %), neck (223; 55.3 %), and shoulder (220; 54.6 %). These sites not only interfered with work but were also the most prevalent during the previous seven days. **TABLE 3**

TABLE 4 Association between musculoskeletal disorders and physical activity level:

Level of physical activity	Pain in the neck during the last 12 months		p-value
	No n (%)	Yes n (%)	
Low	60 (33.3%)	71 (31.8%)	.293
Moderate	73 (40.6%)	106 (47.5%)	
High	47 (26.1%)	46 (20.6%)	
	Pain in the shoulders during the last 12 months		
	No n (%)	Yes n (%)	
Low	60 (32.8%)	71 (32.3%)	.31
Moderate	75 (41.0%)	104 (47.3%)	
High	48 (26.2%)	45 (20.5%)	
	Pain in the elbows during the last 12 months		
	No n (%)	Yes n (%)	
Low	105 (34.9%)	26 (25.5%)	.000
Moderate	117 (38.9%)	62 (60.8%)	
High	79 (26.2%)	14 (13.7%)	
	Pain in the wrists/hands during the last 12 months		
	No n (%)	Yes n (%)	
Low	82 (34.2%)	49 (30.1%)	.665
Moderate	105 (43.8%)	74 (45.4%)	
High	53 (22.1%)	40 (24.5%)	
	Pain in the upper back during the last 12 months		
	No n (%)	Yes n (%)	
Low	78 (34.5%)	53 (29.9%)	.328
Moderate	93 (41.2%)	86 (48.6%)	
High	55 (24.3%)	38 (21.5%)	
	Pain in the lower back during the last 12 months		
	No n (%)	Yes n (%)	
Low	55 (33.5%)	76 (31.8%)	.918
Moderate	71 (43.3%)	108 (45.2%)	
High	38 (23.2%)	55 (23.0%)	

	Pain in the hips/thighs during the last 12 months		
	No n (%)	Yes n (%)	
Low	90 (34.1%)	41 (29.5%)	.414
Moderate	111 (42.0%)	68 (48.9%)	
High	63 (23.9%)	30 (21.6%)	

	Pain in the knees during the last 12 months		
	No n (%)	**Yes n (%)**	
Low	96 (35.4%)	35 (26.5%)	.009
Moderate	106 (39.1%)	73 (55.3%)	
High	69 (25.5%)	24 (18.2%)	
	Pain in the ankles/feet during the last 12 months		
	No n (%)	**Yes n (%)**	
Low	91 (35.5%)	40 (27.2%)	.017
Moderate	100 (39.1%)	79 (53.7%)	
High	65 (25.4%)	28 (19.0%)	

This study demonstrated a significant association between MSDs prevalence in last 12 months with level of physical activity was statistically significant in elbow region (p= 0.000*) followed by knees (p= 0.009*) and ankles/feet region (p= 0.017*). **TABLE 4**

DISCUSSION

According to results more affected region found in this study was lower back region because prevalence of this region was more as compare to other body parts. The prevalence of lower back pain was 59.3% during last 12 months, 36.5% participants were prevented from performing work and 41.2% had difficulties in doing activities during last 7 days. Low back pain is a highly prevalent condition experienced by the majority of individuals at some time during their lives and injury can occur because of overuse, improper use, or trauma. The low back pain commonly caused due to prolong standing, prolong sitting, repetitive movements and awkward postures. Prevalence of MSDs is different among various undergraduate healthcare students due to their different discipline, working environments, working pace, schedule and perceptions regarding the MSDs. The prevalence of lower back pain during last 12 months, of current study was much higher than previous study conducted by Hendi *et al.*, 2019 [11)] in this study lower back pain was (33.4%), Khattak *et al.*, 2022 [14] low back pain (43.3), and Grabara., 2023[15] low back pain (57%). Prevalence of lower back pain during last 12 months, of this study was lower than the study conducted by Ogunlana *et al.*, 2021 [(4)] in this study lower back pain was (64.4%), Hashim *et al.*, 2021[10] low back pain (61.4%), Mohamed 2021[5] low back pain (78%), Kamalruzaman *et al*., 2021[16] low back pain (63.3%), and Agatha *et al.*, 2022 [17] low back pain (61.7%).

The second most common complain found was neck pain (55.3%). Neck pain prevalence in this study exceeded that reported by Hendi et al, 2019 [11] (29.3%), Mohamed 2021 [5] (52%), Kamalruzaman *et al.*, 2021[16] (53.6%), Hashim *et al.*, 2021 [10] (52.5%), Khattak *et al.*, 2022 [14] (5.7%), and Grabara 2023[(15)] (53%). The prevalence of neck pain in this study was lower than that reported by Ogunlana et al., 2021[4] (66.2%). The prevalence of shoulder pain in this study was higher than study conducted by Kamalruzaman *et al.*, 2021 [16] (50.6%), Hashim *et al.*, 2021 [10] (44.1%), and Khattak *et al.*, 2022) [14] (27.7%). Insufficient physical activity contributes to the development of musculoskeletal disorders[18]**.** Numerous studies have documented low levels of physical activity i.e. Padmapriya, Krishna, & Rasu(2013) (19) (15.4%), Kokic et al(2019) [7] (11%), Hafeez *et al.*, 2013[20] (26.2%) and Rajappan, Selvaganapathy, & Liew (2015) [21] (22%). The result presented in our study indicate that majority of undergraduate healthcare students had moderate level of physical activity (44.4%), 32.5% had low level of physical activity, and 23.1% had a high level of physical activity. In this study

the association of prevalence of MSDs in last 12 months with level of physical activity was statistically significant in elbow region (p= 0.000*) followed by knees (p= 0.009*) and ankles/feet region (p= 0.017*). However association between MSDs and PA in neck (p= 0.293), shoulders (p= 0.31), wrists/hands (p= 0.665), upper back (p= 0.328), lower back (p= 0.918), and hips/thighs (p= 0.414) were not significant.

CONCLUSION:

The study found that there is a relatively high prevalence of MSDs among undergraduate healthcare students. The neck (55.3%), lower back (59.3%), and shoulders (54.6%), were the most affected body regions. The majority of healthcare undergraduate students (44.4%) had a moderate level of PA. According to the current study, there is a significant association between PA and MSDs in the elbows, knees, ankles/feet region.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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CONFLICT OF INTEREST: No competing interest declared

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