



**Received:** 05 October 2021

**Accepted:** 21 October, 2021

**Published:** 22 October, 2021

**\*Corresponding authors:** Dr. Hafsa Imtiaz Khokhar, Department of Physiotherapy & Rehabilitation Sciences, Faculty of Pharmacy & Health Sciences, University of Balochistan, Quetta, Pakistan, Tel: +923002929464; E-mail: aadilamirali@hotmail.com

**Keywords:** Upper cross syndrome; Muscle imbalance; Poor posture; Postural stress; Students; Balochistan; Physiotherapy; BEMS

**Copyright:** © 2021 Khokhar HI, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

<https://www.peertechzpublications.com>



Check for updates

## Research article

# Prevalence of Upper Cross Syndrome among Students of University of Balochistan, Quetta Pakistan

Hafsa Imtiaz Khokhar\*, Amanullah Khan, Amber Zia, Deen Muhamad, Fatima Hamid, Ghulam Sarwar, Maqbool Qamar, Maryam Sabir Hussain, Muhammad Salah, Shah Nawaz and Shehzad Sharif

Department of Physiotherapy & Rehabilitation Sciences, Faculty of Pharmacy & Health Sciences, University of Balochistan, Quetta, Pakistan

## Abstract

**Objective:** To assess the prevalence of upper crossed syndrome among students of Doctor of Physical Therapy (DPT) and Bachelors of Eastern Medicine and Surgery (BEMS) at university of Balochistan Quetta, Pakistan.

**Background:** Upper cross syndrome is characterized as a pattern of tightness or over facilitation of chronically contracted and shortened muscles on one side and weakness or inhibition of chronically lengthened muscles on other side due to the muscle imbalance leading to postural abnormalities including, forward head posture, shoulder protraction, winging of scapula. These changes, in turn, lead to overstress of the cervical cranio-cervical junction, cervical and thoracic spine and shoulders, which can cause neck and/or jaw pain, headaches, and shoulder problems.

The purpose of this study was to figure out the number of students of DPT and BEMS suffering from upper crossed syndrome at university of Balochistan Quetta, Pakistan.

**Methodology:** A descriptive cross-sectional study was conducted. A self-constructed questionnaire having two parts, the first part comprised of demographics data while second part comprised of 18 questions and consent form was filled by 340 students both males and females from DPT and BEMS department. The Data was analyzed by Statistical Package for Social Sciences (SPSS) version 16.

**Results:** The study participants had a mean age of  $\pm 21.85$ , most of them were, from 22-25 years  $n=182$  (53.5%) age group, males  $n=178$  (52.4%) and from 3<sup>rd</sup> semester  $n=107$  (31.5%). The prevalence of upper cross syndrome in the current study was 45.0%.

**Conclusion:** The study concludes that upper cross syndrome has high prevalence in the students of DPT and BEMS in faculty of pharmacy and health sciences, at university of Balochistan Quetta, Pakistan.

## Introduction

Upper cross syndrome first discovered by DR. Valdamir Janda, is characterized as a pattern of tightness or over facilitation of chronically contracted and shortened muscles on one side and weakness or inhibition of chronically lengthened muscles on other side [1,2]. It is so titled due to the fact that

X (cross) can be drawn across the upper body, when weak and short muscles associates in the upper body [1,3]. On dorsal side tightness of upper trapezius and levator scapulae crosses with the tightness of pectoralis major, while on ventral side weakness of middle and lower trapezius crosses weakness of deep cervical flexors [4].

Those experiencing upper cross syndrome gives characteristic postural brokenness such as protracted scapulae, internally rotated humerus, hyperkyphotic upper thoracic spine, and a forward head, which occur due to hypo-lordosis of the lower cervical spine, hyper-lordosis of the upper cervical spine and head, anterior translation of the head upon the atlas and, winging of scapula [1,5]. Forward head posture in concurrence with round shoulder posture indicates upper cross syndrome [6].

Upper cross syndrome can cause a huge number of dysfunctions inside the body, which includes “headache, early degeneration of cervical spine, and loss of cervical lordosis” [7]. UCS is related with cervicogenic headache which is portrayed as unilateral head pain, duration varies from hours to weeks and is generally moderate, spreading into the frontal temporal and orbital regions, compromised breathing proficiency due to forward posture of thorax and pain in upper back and neck due to muscle tightness and poor head posture placing excessive stress on posterior extensor muscles of cervicothoracic regions [1,8,9].

Janda noticed that UCS develop generally because of postural positioning in stationary conditions and repetitive work undertakings [10]. This condition is a part of a pestilence inside the working environment that prompts days missed from work [7]. Work-related musculoskeletal disorders are significant medical issue in many industrialized nations, as they represent countless working days lost and impressive laborers remuneration and disability installments [11]. The PC laborers displayed a more FHP and an anteriorly extended directed Center of Gravity (COG) [12].

Studies with a common goal were conducted in Pakistan and India in year 2016 and 2019 respectively indicates high prevalence of upper cross syndrome therefore will add to the worth of finding out prevalence of upper cross syndrome in Undergraduate DPT and BEMS students [4,13]. Hence the present study will be focusing on the assessment of upper cross syndrome in undergraduate DPT and BEMS students. This is the first study of its type to be conducted in Balochistan, Pakistan.

## Methodology

### Study design, setting and duration

A cross sectional study design was conducted from October 2020 to January 2021. The data was collected from students at University of Balochistan, Quetta Pakistan.

### Sampling

A convenient non-probability sampling was used among 340 students included from the Faculty of Pharmacy and Health Sciences at university of Balochistan Quetta, Pakistan, who were agreed to participate in a study. Males and females between the age of 18 to 31 years, with the history of neck pain and movement restriction in neck were included in the study while the participants having any soft tissue related problem, history of fracture, structural deformity, any other pathology, and those who were unwilling to sign informed consent were excluded from the study Figure 1.

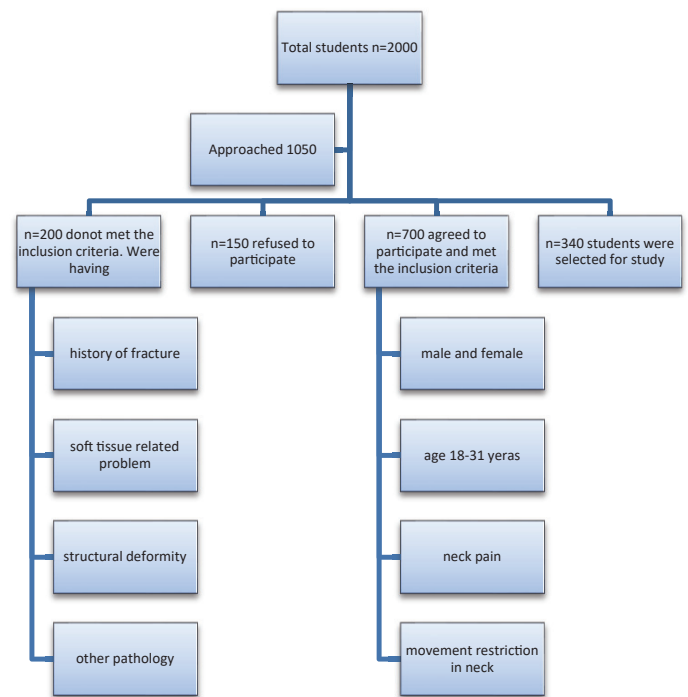


Figure 1: Flow chart of convenient non-probability sampling.

### Data collection tool

A self-designed questionnaire consisting of two portions, where the first portion contains the demographic information of the participants while the second portion was comprised of 18 questions related to symptoms of upper cross syndrome, was used to collect data.

### Data collection method

Data was collected from the eligible students. A consent form and self-designed questionnaire was circulated among DPT and BEMS students to take informed consent and find out the frequency of upper cross syndrome, respectively.

### Data analysis procedure

Data was analyzed by using Statistical Package for Social Sciences (SPSS) version 16 and presented in percentages and frequencies for categorial variables, mean values were presented for continuous variables.

### Ethical consideration

Ethical committee and Department of the Physiotherapy University of Balochistan approved to conduct the study in the University. Informed consent was taken from the participants prior to data collection that their participation is voluntary, information of their responses will be kept confidential, and they can leave the study anytime.

## Results

### Demographic characteristics

Demographic characteristics are described in Table 1, which reports that the participants were having mean age of

**Table 1:** Demographic Characteristics of Participants.

Demographics	Frequency n=340 (%)
<b>Gender</b>	
Male	178 (52.4)
Female	162 (47.6)
<b>Age (Mean Age= ±21.85) (S.D=±1.780)</b>	
18-21	152 (44.7)
22-25	182 (53.5)
26-29	05 (1.5)
30 and above	01 (0.3)
<b>Marital status</b>	
Married	36 (10.6)
Unmarried	302 (88.8)
Divorced	02 (0.6)
<b>Locality</b>	
Urban	218 (64.1)
Rural	122 (35.9)
<b>Department</b>	
DPT	207 (60.9)
BEMS	133 (39.1)
<b>Semester</b>	
1 <sup>st</sup> semester	40 (11.8)
2 <sup>nd</sup> semester	06 (1.8)
3 <sup>rd</sup> semester	107 (31.5)
4 <sup>th</sup> semester	03 (0.9)
5 <sup>th</sup> semester	48 (14.1)
6 <sup>th</sup> semester	01 (0.3)
7 <sup>th</sup> semester	68 (20.0)
8 <sup>th</sup> semester	04 (1.2)
9 <sup>th</sup> semester	16 (4.7)
10 <sup>th</sup> semester	47 (13.8)

±21.85. Majority of the participants belongs to age group 22-25 years n=182 (53.5%). Most of the respondents were males n=178 (52.4%). Most of the respondents were unmarried n=302 (88.8%), belongs from urban areas n=218 (63.8%), from department of DPT n=207 (60.7%), and from 3<sup>rd</sup> semester n=107 (31.5%).

### Frequencies and percentages of participants response to symptoms of upper cross syndrome

Figure 2 Displays response of participants to questions asked via questionnaire about symptoms of upper cross syndrome. Most of the participants were having no neck pain n=182 (53.5%) and no tightness in neck n=183 (53.8%). Most of the respondents n=236 (69.4%) reported that they do not feel numbness in their neck and shoulder. Most of the participants were having no pain during neck flexion and extension n=222 (65.3%) and many of them reported no exacerbation in neck pain during neck flexion and extension n=229 (67.4%). N=192 (56.5%) were having headache. Many of them reported that they have no difficulty in breathing n=266 (78.2%). n=279

(81.2%) respondents reported no tightness in chest. Most of the participants were having no disturbance in sleep n=220 (64.7%) and activities of daily living n=211 (62.1%). Many of them n=243 (71.5%) does not feel that their shoulders are pulled forward. Most of the respondents n=270 (79.4%) have never visited doctor for their neck pain and n=212 (62.4%) do not use any pain-relieving medications.

### Visual Analogue Scale (VAS) distribution

Table 2. displays visual analogue scale (VAS) distribution for neck pain intensity. Most of the respondents n=186 (55.0%) were having no neck pain (0).

### Frequencies and Percentages of participants hours of using laptop/pc and study and neck pain during study

Table 3 displays frequencies and percentages of participants hours of using laptop/PC and study and neck pain during study. Most of the respondents n=229 (67.4%) reported that they use personal computer and laptops. Most of the participants n=122 (35.9%) use PC/laptop for 1-2 hours. Most of the participants were having neck pain while studying n=248 (72.9%). Most of the participants reported that they study for 2-3 hours n=117(34.40%).

### Prevalence of upper cross syndrome among DPT and BEMS students.

Prevalence of upper cross syndrome is displayed in Figure 3. 45.0% of the students were having upper cross syndrome.

### Discussion

The current study discloses that the prevalence of upper cross syndrome among Doctor of Physical Therapy (DPT) and Bachelors of Eastern Medicine and Surgery (BEMS) students in the university of Balochistan was high that is 45.0%. The result of current study in lines with the previous studies conducted in Ahmednagar, India, and Lahore, Pakistan by DR. Pooja Dhage, et al. and Iqra Muneeb, et al. respectively [13,14] also reported higher prevalence among students, while the study conducted in Lahore Pakistan by Sana Shahid, et al. reported low prevalence of UCS among students [15]. It is a highly prevalent work-related musculoskeletal disorder among other professional areas as indicated by extensive literature review such as studies conducted in: Chennai, India (38.3%) by Dr. Jyothi Seshan, et al. Seshan, 202 [16], Iran, Rasht by Hasan Daneshmandi, et al. [5], Karad, Maharashtra, India by Junaid Chandsaheb Mujawar, et al. (28%) [6] and, Isfahan, Iran by Raziieh Karimian, et al. (43.0%) [17] among IT professionals, bodybuilders, laundry workers and teachers, respectively.

The Significant reason for the upper cross syndrome is the persistent postural stress to the upper limb which necessitates contraction and shortening of certain muscles while causing lengthening and inhibition of other muscles [1]. the upper cross syndrome occurs due to persistent static posture and repetitive work which leads to metabolic, biomechanical, and muscular problems. Previous studies line with this opinion [10,18]. Typically, poor posture causes the upper cross syndrome, including the forward head posture, which occurs

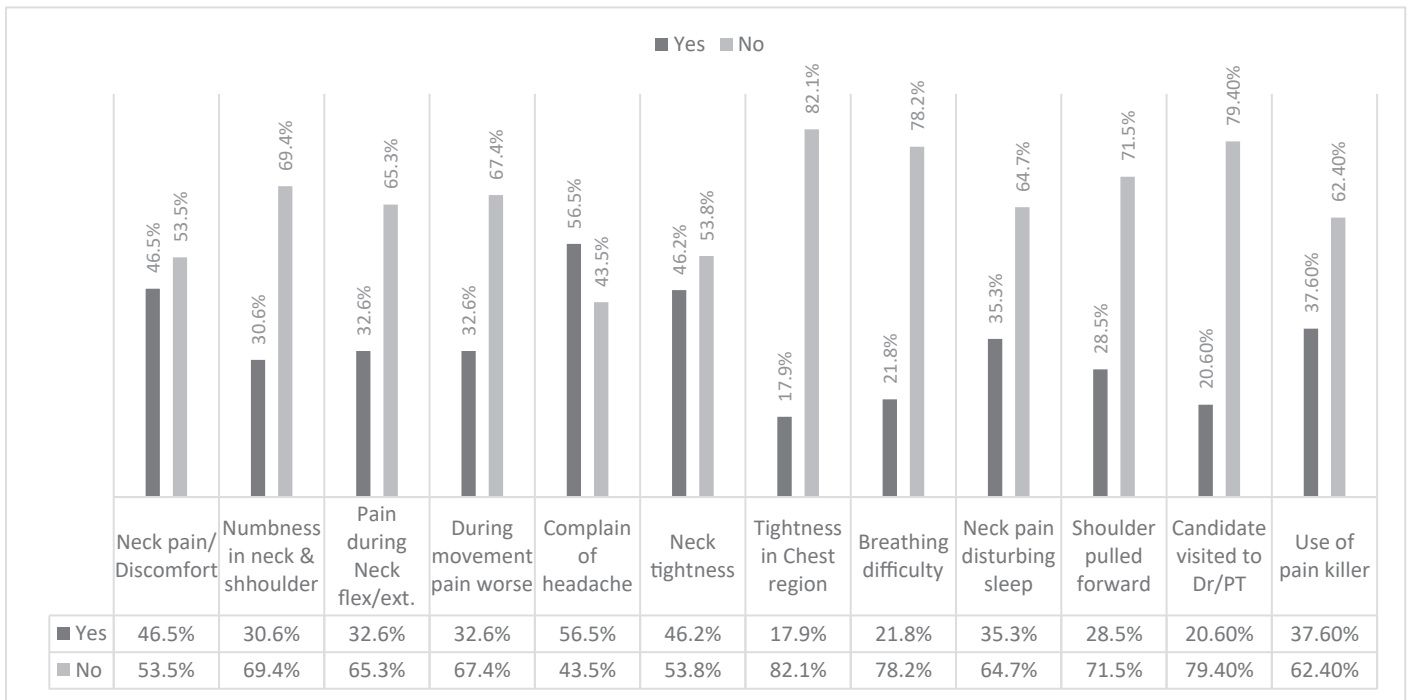


Figure 2: Frequencies and percentages of participants responses to Symptoms of Upper Cross Syndrome.

Table 2: Visual Analogue Scale (VAS) distribution.

S.NO	Pain Descriptors	Pain Intensity	Frequency(n=340)	Percentage
1	No pain	0	186	55.0
2	Slight pain	1	3	0.9
3	Mild annoying	2	36	10.6
4	Nagging pain	3	13	3.8
5	Nagging uncomfortable troublesome pain	4	52	15.3
6	Moderate pain	5	24	7.1
7	Distressing pain	6	25	7.4
8	Distressing miserable pain	7	4	1.2
9	Intense dreadful pain	8	9	2.6
10	Severe pain	9	2	0.6
11	Worst possible pain	10	4	1.2

Table 3: Frequencies and Percentages of Participants Hours of Using Laptop/PC and Study and Neck Pain During Study.

Variables	Frequency (N=340)	Percentage (%=100.0)
Laptop/Computer user	Yes: 229	67.40
	No: 111	32.60
Hours of working on laptop/ computer	No Use: 98	28.80
	1-2 hours: 122	35.90
	3-4 hours: 71	20.90
	4-5 hours: 31	9.10
	more than 5 hrs.: 18	5.30
Neck pain during study	Yes: 248	72.90
	No: 92	27.10
Hours of Study	1-2 hours: 99	29.10
	2-3 hours: 117	34.40
	3-4 hours: 64	18.80
	more than 4 hours: 60	17.60

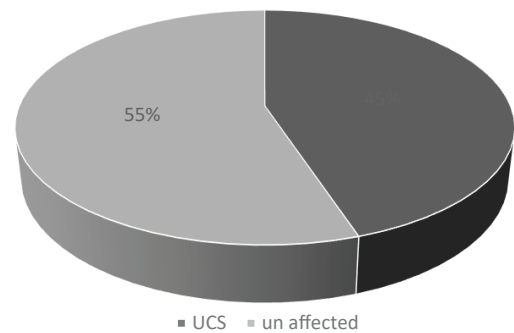


Figure 3: Prevalence of upper cross syndrome among DPT and BEMS Students.

when people use electronic devices, read, and drive [19]. Poor posture usually leads to muscle imbalance which makes one prone to UCS [1,20-22]. Poor posture had a negative impact on the Musculoskeletal system, which causes localized muscle fatigue, that have a negative influence on physical function and level of abilities [23].

Studies reported wide spread postural abnormalities among adolescent and students and are major contributing factor to musculoskeletal symptoms [24,25]. If the cervical spine is held in a protracted position for a prolonged duration such as during study or computer usage, it can lead to alterations in head posture ultimately leading to poor posture [26]. In UCS forward head posture makes postural muscles such as the upper trapezius, sternocleidomastoid, and pectoral work more and become tighter while phasic muscles such as deep flexors and lower trapezius become weak [27] this happens because the postural muscles can become tighten easily while the phasic muscles tendency to become weaker easily [6].





A study suggested that following Ergonomic principles may prove to be effective in avoiding unnecessary or excessive stress on muscles, joints, tendons, and on the cardiovascular and respiratory systems. The study further discloses that administration of ergonomic interventions can lead to significant decrease in musculoskeletal disorders of the neck, shoulders, and the back [28].

The result of the present study concludes that upper cross syndrome is highly prevalent among students of DPT and BEMS in Faculty of Pharmacy and Health Sciences at University of Balochistan Quetta, Pakistan.

## Conclusion

The study concludes that upper cross syndrome has high prevalence in the students of DPT and BEMS in Faculty of Pharmacy and Health Sciences at University of Balochistan Quetta, Pakistan. The current study reported that it is highly prevalent among students of DPT and BEMS.

## Recommendation

It is recommended that we should use special ergonomics principals for office work and studies to avoid the catastrophic consequences which we can face in future decades if these principals are not getting focused and the future research on what positive effects can occur on UCS patients if we use proper ergonomically designed workplace.

## Acknowledgement

We acknowledge the support of university staff and students who helped us in data collection.

## References

- Muscolino J (2015) Upper Crossed Syndrome Causes, Symptoms and Treatment. *Journal of Australian Traditional Medicine Society* 21. [Link: https://bit.ly/3nkTGUG](https://bit.ly/3nkTGUG)
- Izraelski J (2012) Assessment and Treatment of Muscle Imbalance: The Janda Approach. *J Can Chiropr Assoc* 56: 158. [Link: https://bit.ly/3AX2moJ](https://bit.ly/3AX2moJ)
- DC MKM (2004) Upper Crossed Syndrome and Its Relationship to Cervicogenic Headache. *ELSVIER*. [Link: https://bit.ly/3aVqI83](https://bit.ly/3aVqI83)
- Dhage DP (2019) Prevalence of an "Upper Crossed Syndrome in Physiotherapy College Students" – A Cross-Sectional Study. *VIMS Health Science Journal* 1. [Link: https://bit.ly/3G84a28](https://bit.ly/3G84a28)
- Daneshmandi H, Harati J, Poor SF (2017) Bodybuilding links to Upper Crossed Syndrome. *Polish Scientific Journal Database* 5: 124-131. [Link: https://bit.ly/3aVvSk7](https://bit.ly/3aVvSk7)
- Mujawar JC, Sagar JH (2019) Prevalence of Upper Cross Syndrome in Laundry Workers. *Indian J Occup Environ Med* 23: 54-56. [Link: https://bit.ly/3aUK6qq](https://bit.ly/3aUK6qq)
- Thacker D, Jameson J, Baker J, Divine J, Unfried A (2011) Management of upper cross syndrome through the use of active release technique and prescribed exercises. [Link: https://bit.ly/3B3VvKa](https://bit.ly/3B3VvKa)
- Page P (2011) Cervicogenic headaches: an evidence-led approach to clinical management. *Int J Sports Phys Ther* 6: 254-266. [Link: https://bit.ly/3vWKPTm](https://bit.ly/3vWKPTm)
- Pfaffenrath V, Dandekar R, Pöllmann W (1987) Cervicogenic Headache - The Clinical Picture, Radiological Findings and Hypotheses on Its Pathophysiology. *Headache: Journal of Head and Face Pain* 27:495-499. [Link: https://bit.ly/2XwHGGY](https://bit.ly/2XwHGGY)
- Lee HM (2000) Rehabilitation of the proximal crossed syndrome in an elderly blind patient: a case report. *J Can Chiropr Assoc* 44: 223-229. [Link: https://bit.ly/2Ze9NuQ](https://bit.ly/2Ze9NuQ)
- Ostergren PO, Hanson BS, Balogh I, Ektor-Andersen J, Isacsson A, et al. (2005) Incidence of shoulder and neck pain in a working population: effect modification between mechanical and psychosocial exposures at work? Results from a one year follow up of the Malmö shoulder and neck study cohort. *J Epidemiol Community Health* 59: 721-728. [Link: https://bit.ly/3pp7EHK](https://bit.ly/3pp7EHK)
- Kang JH, Park RY, Lee SJ, Kim JY, Yoon SR, et al. (2012) The Effect of The Forward Head Posture on Postural Balance in Long Time Computer Based Worker. *Ann Rehabil Med* 36: 98-104. [Link: https://bit.ly/3B1P2PW](https://bit.ly/3B1P2PW)
- Dhage P, Anap D (2019) Prevalence of an "Upper Crossed Syndrome in Physiotherapy College Students" – A Cross-Sectional Study. *VIMS Health Science Journal* 6. [Link: https://bit.ly/30Mmm0G](https://bit.ly/30Mmm0G)
- Mubeen I, Malik S, Akhtar W, Iqbal M, Asif M, et al. (2016) Prevalence of upper cross syndrome among the medical students of university of lahore. *International Journal of Physiotherapy (IJPHY)* 3. [Link: https://bit.ly/3C20BrH](https://bit.ly/3C20BrH)
- Shahid S, Tanveer F, Dustgir A (2013) Prevalence and Risk Factors for the Development of Upper-Crossed Syndrome (UCS) among DPT Students of University of Lahore. *International Journal of Science and Research (IJSR)* 5: 768-771. [Link: https://bit.ly/3vAD3li](https://bit.ly/3vAD3li)
- Seshan J, Sundaram D, Umashankar I (2020) To analyze the frequency of upper crossed syndrome and the extent of neck disability among it professionals. *World Journal of Pharmaceutical Research* 9.
- Karimian R, Rahnama N, Ghasemi GA, Lenjannejadian S (2020) Association between Upper-extremity Musculoskeletal Disorders and Upper Cross Syndrome among Teachers, and the Effects of NASM Corrective Exercises along with Ergonomic Intervention on their Upper-extremity Musculoskeletal Disorders. *Studies in Medical Sciences* 31. [Link: https://bit.ly/3ngolwQ](https://bit.ly/3ngolwQ)
- Ford ES, Kohl HW, Mokdad AH, Ajani UA (2005) Sedentary behavior, physical activity, and the metabolic syndrome among U.S. adults. *Obes Res* 13: 608-614. [Link: https://bit.ly/2Zbtcpw](https://bit.ly/2Zbtcpw)
- Rayjade A, Trupti Y, Radhika C, Nisha J (2020) Comparative Effectiveness of Kinesio Taping and Ift in Upper Cross Syndrome- A Randomized Clinical Trial. *Indian Journal of Forensic Medicine & Toxicology* 14. [Link: https://bit.ly/2ZbgxJB](https://bit.ly/2ZbgxJB)
- Florence Peterson Kendall EKM, Provance PG, McIntyre Rodgers M, Romani WA (202) Testing and Function with Posture and Pain 5<sup>th</sup> edn. [Link: https://bit.ly/3pofhOk](https://bit.ly/3pofhOk)
- Page P, Frank CC, Lardner R (2010) Assessment and treatment of muscle imbalance. *Human Kinetics* 297. [Link: https://bit.ly/2Z7py6L](https://bit.ly/2Z7py6L)
- Langford ML (1994) Poor posture subjects a worker's body to muscle imbalance, nerve compression. *Occup Health Saf* [Link: https://bit.ly/3GapKQO](https://bit.ly/3GapKQO)
- Ahmad I, Kim JY (2018) Assessment of Whole Body and Local Muscle Fatigue Using Electromyography and a Perceived Exertion Scale for Squat Lifting. *Int J Environ Res Public Health* 15: 84. [Link: https://bit.ly/3G7p6WR](https://bit.ly/3G7p6WR)
- Cho CY (2008) Survey of Faulty Postures and Associated Factors Among Chinese Adolescents. *J Manipulative Physiol Ther* 31: 224-229. [Link: https://bit.ly/3AZWewc](https://bit.ly/3AZWewc)
- Czakwari ACK, Durmala J (2008) Faulty posture and style of life in young adults. *Stud Health Technol Inform* 140: 107-110. [Link: https://bit.ly/3aVNHjh](https://bit.ly/3aVNHjh)



26. Thigpen CA, Padua DA, Michener LA, Guskiewicz K, Giuliani C, et al. (2010) Head and shoulder posture affect scapular mechanics and muscle activity in overhead tasks. *J Electromyogr Kinesiol* 20: 701-709. [Link: https://bit.ly/3E7E8ud](https://bit.ly/3E7E8ud)
27. Weon JH, Oh JS, Cynn HS, Kim YW, Kwon OY, et al. (2009) Influence of forward

head posture on scapular upward rotators during isometric shoulder flexion. *J Bodyw Mov Ther* 14: 367-374. [Link: https://bit.ly/3lZlxdm](https://bit.ly/3lZlxdm)

28. Karimian R (2020) Association between Upper-extremity Musculoskeletal Disorders and Upper. *Studies in Medical Sciences* 31: 11

### Discover a bigger Impact and Visibility of your article publication with Peertechz Publications

#### Highlights

- ❖ Signatory publisher of ORCID
- ❖ Signatory Publisher of DORA (San Francisco Declaration on Research Assessment)
- ❖ Articles archived in worlds' renowned service providers such as Portico, CNKI, AGRIS, TDNet, Base (Bielefeld University Library), CrossRef, Scilit, J-Gate etc.
- ❖ Journals indexed in ICMJE, SHERPA/ROMEO, Google Scholar etc.
- ❖ OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting)
- ❖ Dedicated Editorial Board for every journal
- ❖ Accurate and rapid peer-review process
- ❖ Increased citations of published articles through promotions
- ❖ Reduced timeline for article publication

**Submit your articles and experience a new surge in publication services**  
(<https://www.peertechz.com/submission>).

*Peertechz journals wishes everlasting success in your every endeavours.*