OPEN ACCESS

ORIGINAL ARTICLE

Frequency of Musculoskeletal Pain and its Association with Forward Head Posture among Architecture Students in Lahore: A cross-sectional Study

Talha Ahmed[1], Sidra Syed[2], Ahmed Jahanzab[3], Alisha Akram[4], Maheera Khalid[5], Sana Saeed[6]

[1, 4-6] Physiotherapist, University Institute of Physical Therapy (UIPT, University of Lahore, Lahore, Pakistan
[2] Assistant Professor, University Institute of Physical Therapy (*UIPT),* University of Lahore, Lahore, Pakistan
[3] Physiotherapist, Hameed Latif Hospital, Lahore, Pakistan

Author`s Contribution

[1,4-6] Conception and design, Collection and assembly of data, 2-6Analysis and interpretation of the data, 2Critical revision of the article for important intellectual content, Statistical expertise 1-6Final approval and guarantor of the article.

Article Info.

Received: Dec 23, 2022
Acceptance: July 31, 2023

Conflict of Interest: None
Funding Sources: None

Address of Correspondence

Talha Ahmed
Email: Talha.ahmad7@gmail.com
ORCID: 0000-0002-9398-5210

Cite this article as: Ahmed T, Syed S, Jahanzab A, Akram A, Khalid M, Saeed S. Frequency of Musculoskeletal pain and its Association with Forward Head Posture among Architecture Students in Lahore: A cross-sectional Study. JRCRS. 2023; 11(3):188-191.
DOI:https://doi.org/10.53389/JRCRS.2023110312

A B S T R A C T

Background: Forward head posture has become very common in our society. Pain in the cervical and its surrounding areas results from the protrusion of the neck, which is related to increased spinal flexions due to overworking and their work environment.
Objective: To find the frequency of musculoskeletal pain and its association with forward head posture among architecture students in Lahore.
Methodology: It was cross-sectional study. The data was collected from architecture students due to forward head posture in Lahore from February 2022 to July 2022. 199 participants from 2nd to 5th year who had both acute or chronic musculoskeletal pain but no systemic disease was selected. Students between the age of 18-25 with more than 5 working hours were included. Non-probability convenient sampling technique was used. Standardized Nordic Questionnaire, Visual Analog Scale and ruler measurement method was used for data collection. The Statistical Package of Social Sciences (SPSS 20.0) was used to analyze the data.
Results: Out of 199 students 168 with a prevalence of 84.4% were having musculoskeletal pain due to forward head posture. In which neck pain had the prevalence of 70.9%, shoulder 54.8%, upper back 52.8% and lower back 65.8%. The p-value (chi-square) was 0.000 < 0.05 showing that there is a significant association between forward head posture and musculoskeletal pain.
Conclusion: There was a high prevalence and association of musculoskeletal pain due to forward head posture among architecture students due to the nature of their work in which they assume a forward head posture for many hours and still remain in that posture even when not working causing pain in the neck, shoulder, upper back and lower back.
Keywords: Forward head posture, Cervical pain, Musculoskeletal Pain, Atlanto-Occipital Joint, Nordic Pain scale, Visual Analogue Scale.

Introduction

Forward head posture is a phrase used to describe a condition in which pain can be felt in a variety of places, ranging from the upper back to the neck and shoulders.[1] The upper cervical vertebrae protrude forward while the face turns upward when significant extension between the atlanto-occipital and upper cervical joints occurs as a response to the postural abnormality of forward head posture.[2] Due to an imbalance in muscle work caused by a change in the curvature of the neck bone, resulting in rounded shoulder posture. Rounded shoulder posture is classified as when there is protraction at the acromion joint in front of the line of gravity, protraction and downward rotation at the shoulders and increased internal rotation at the shoulder.[3] Additionally, this aberrant state causes musculoskeletal abnormalities like decreased upward scapular rotation, scapular lateral and outward shifting, all of which can make it challenging to maintain an upright sitting posture.[4] It also shifts the body's center of gravity anteriorly, causing mechanical changes in postural control of upper trunk and multiple joint causing abnormalities.[5] Cervical discomfort, increased kyphosis and pain in the upper limbs have all been demonstrated to be common musculoskeletal issues.[6] Muscle and emotional issues can create poor posture, which can lead to structural or positional abnormalities if the person remains in the incorrect position for a long time.[7] If such aberrant alteration

in the joints and muscles of the cervical region persists, it may lead to limited cervical mobility and impaired muscular function, with early studies suggesting that deep cervical flexors play a crucial role in maintaining and aligning the cervical spine in cases of forward head posture.[8] The body maintains its ideal functional position while at rest by maintaining its center of gravity over its base of support, minimizing mechanical stress at the shoulder, elbow, and wrist joints.[9]

On the other hand, using a laptop encourages postural misalignment, including forward flexion of the neck and head, which results in biomechanical reactions that can lead to a deviation in the normal curve of the neck and spine, resulting in, among other things, facet joint syndrome, degenerative disc disease, and headaches.[10]

To reduce the demand of muscle activity and the stress placed on the cervical tissues, it's crucial to have proper head and neck posture, as neck pain has long been related with forward head posture, which is described as the forward head movement on the cervical spine, which has been correlated with increased stress on the posterior cervical parts, a change in the length tension relationship in the cervical muscles, an increase in muscular activity, a restriction in neck movement, and a loss of cervical proprioception.[11]

Human posture can be affected by a variety of factors, including genetics, physical structure deficiencies, postural habits, and work.[6] Academic focus, computer use, non-neutral body posture, and the use of drafting boards and tables have all been identified as risk factors for developing musculoskeletal pain due to forward head posture.[10] These factors can be prevented by using specific measure like using an ergonomic chair in which there must be aesthetic aspects on one hand, in an ergonomic chair design, and on the other hand, there must be features associated to comfort and relaxation.[12]

In the first two years of their architectural studies, students complete their university projects using a variety of tools, such as drafting boards, tables, laptops, and desktop computers. However, in the last two years, they rely entirely on computers to complete their projects, frequently working for extended periods of 10 to 12 hours without breaks or other forms of physical activity.[13]

Patients with musculoskeletal pain can anticipate a positive prognosis if they show motivation and carefully adhere to physical therapist treatment guidelines, while people with postural pain typically seek relief through manual therapy techniques like manipulation, mobilization, and traction, which, when combined with advised exercises and targeted stretches targeting the relevant muscles for back stabilization, contribute to the successful treatment.[14] Some other methods, such as postural bracing, have shown to improve trunk support, leading to better control of the head and neck and the restoration of normal arm and hand functions; these neck braces are frequently used as effective interventions for the treatment of forward head posture. Notable examples of these neck braces include the universal cervical collar and the Aspen Vista collapsible neck brace.[15] Scapular posture stability, upper trapezius and serratus anterior muscular activity management, and muscle re-education are some of the treatments for dealing with forward head posture, while exercising the neck and shoulder muscles is another approach to improve forward head posture.[16]

Myofascial release can also be used to reduce musculoskeletal pain in which 2–3 minutes of shallow stroke massage on the back region to the neck and shoulders Then, focusing locally on the painful area, perform myofascial release method with pressure appropriate for the patient's pain tolerance.[17]

An important issue that has to be looked into is the prevalence of musculoskeletal pain brought on by forward head posture among Lahore architecture students. Long periods of desk work and drawing might result in bad posture and musculoskeletal problems. This study intends to analyze the relationship between forward head posture and musculoskeletal discomfort in order to estimate the severity of the issue and pinpoint potential risk factors. Knowing how these two factors interact would help promote the general wellbeing and academic success of Lahore's architecture students by increasing awareness of the issue and informing preventive efforts.

Methodology

A cross-sectional research study was conducted about musculoskeletal pains among architecture students due to forward head posture in Lahore (The University of Lahore, National College of Arts, and Lahore College for Women University) from February 2022 to July 2022 with a total of 199 participants which was calculated by using formulae n= [DEFF*Np(1-p)] / [d²/Z ² 1-α/2* (N-1) +p*(1-p)].[2] The estimated population proportion is taken as 0.247, the absolute precision is 0.06, and the confidence interval is 95%. Ethical Approval was taken from The University of Lahore Ref no: REC-UOL-/22-08/2022. Non-probability convenience sampling technique was used for the selection of the sample. The data was collected by using Nordic Musculoskeletal Questionnaire (NMQ), Visual Analogue Scale (VAS), and ruler measurement method used to determine whether the participant had any forward head posture. The participants stood against a wall and a ruler was

used to measure the distance between the occiput and the wall this was used to determine whether students had forward head posture or not. For data analysis, SPSS 20.0 was used. The categorical data were presented in the form of frequency and percentages, and the association is presented in the form of chi-square where p-value <0.05 is considered significant. Students of both genders from second, third, fourth, and fifth years who had more than 5 working hours which either acute or chronic musculoskeletal pain and were between the age of 18-25 were included while any students who previously had any spinal injury, fracture or neurological disorders were excluded.[13]

Results

The result of this study showed the descriptive statistics of pain in last 12 months of different body regions. There were 77 (38.7%) male and 122 (61.3%) were female. Table I describes the frequency of patients having pain in different regions. An association was seen between forward head posture and VAS scale with p-value of 0.000. (Table II)

Discussion

Table I: Descriptive statistics of pain and forward head posture using NMQ.

		Forward head posture (Yes) Frequency (%)
Neck pain	Yes	132 (78.5%)
	No	36 (21.4%)
Shoulder pain	Yes	101 (60.1%)
	No	67 (39.8%)
Elbow pain	Yes	40 (23.8%)
	No	128 (76.1%)
Wrist pain	Yes	82 (48.8%)
	No	86 (51.1%)
Upper back pain	Yes	88 (52.3%)
	No	80 (47.6%)
Lower back pain	Yes	111 (66.1%)
	No	57 (33.9%)
Hips/thighs	Yes	41 (24.4%)
	No	127 (75.6%)
Knees pain	Yes	27 (16.1%)
	No	141 (83.9%)
Ankle pain	Yes	27 (16.1%)
	No	141 (83.9%)

An investigation of the prevalence of musculoskeletal pain linked to forward head posture in this population was done with the help of architecture students from the National College of Arts, University of Lahore, and Lahore College for Women University. The results showed a significant prevalence of musculoskeletal pain (84.4%) that was linked to the nature of their study, which involved continuous usage of drafting boards and laptops, which resulted in the adoption of a forward head posture. With a prevalence of 70.9%, the cervical region was discovered to be the most impacted. certain findings are in line with Kuorinka's research, which highlighted the importance of certain body parts and inspired the creation of the Standardized Nordic questionnaire.[13]

The p-value for the current study's findings of 0.000 suggested a statistically significant link between forward head posture and musculoskeletal pain. These results are in line with earlier study that found that using a computer or mobile device increases the probability of adopting a forward head posture by 63.96%.[18] Notably, the present study found a higher incidence rate, suggesting that architecture students are more susceptible to forward head posture as a result of their daily job routine. Long periods of forward head posture while using computers and drafting boards might lead to muscular imbalances in the neck area. In particular, some neck muscles shorten and tighten, whilst others elongate and weaken. As a result, these structural changes in the neck cause musculoskeletal discomfort to occur often in the cervical area, along with related symptoms such neck stiffness, cervicogenic headaches, and cervicogenic dizziness. Additionally, the neighboring structures are also impacted by the strain placed on the spine as a result of these biomechanical alterations, which results in discomfort felt in the shoulder, upper back, and lower back areas.[11]

Conclusion

The study discovered that more than half of the students had musculoskeletal pain due to forward head posture in the neck, shoulder, upper back and lower back. So, there is an association between pain in these regions and forward head posture. There were few participants who had musculoskeletal pain in elbow, wrist, hip, knee and ankle but there was no forward head posture which led to believe that there was no direct link between the pain in elbow, wrist, hip, knee and ankle

Table II: Association between forward head posture and VAS.

		Visual Analogue Scale (VAS)			Total	p- value (Chi-square)
		1-3 mild pain	4-6 moderate pain	7-10 severe pain		
Forward head posture	**Yes**	34	91	43	168(84.4%)	0.000
	No	10	3	18	31(15.6%)	
Total		44	94	61	199(100%)	

and forward head posture. Discomfort in these extremities could be due to over exertion or some other factor.

Limitations:

The data was only taken from three universities (The University of Lahore, National College of Arts, and Lahore College for Women University); therefore, the results cannot be applied to the whole population. The pain was only associated with forward head posture other factors were not considered. Due to the cross-sectional nature of the study only prevalence and its association were analyzed.

Conflict of interest: None
Funding Source: None

References

1. Naz A, Bashir MS, Noor R. Prevalance of forward head posture among university students. Rawal Med J. 2018;43(2):260-2.
2. Raykar R, Tajne K, Palekar TJWJoPR. Effect of forward head posture on static and dynamic balance. 2018;7(9):797-808.
3. Kim E-K, Kim JSJJopts. Correlation between rounded shoulder posture, neck disability indices, and degree of forward head posture. 2016;28(10):2929-32.
4. Kwon JW, Son SM, Lee NKJJopts. Changes in upper-extremity muscle activities due to head position in subjects with a forward head posture and rounded shoulders. 2015;27(6):1739-42.
5. Lee J-HJJopts. Effects of forward head posture on static and dynamic balance control. 2016;28(1):274-7.
6. Malepe M, Goon D, Anyanwu F, Amusa L. The relationship between postural deviations and body mass index among university students. Biomedical Research. 2015;26(3):437-42.
7. Van Der Beek AJ, Dennerlein JT, Huysmans MA, Mathiassen SE, Burdorf A, Van Mechelen W, et al. A research framework for the development and implementation of interventions preventing work-related musculoskeletal disorders. Scandinavian Journal of Work, Environment & Health. 2017:526-39.
8. Kang DY. Deep cervical flexor training with a pressure biofeedback unit is an effective method for maintaining neck mobility and muscular endurance in college students with forward head posture. Journal of physical therapy science. 2015;27(10):3207-10.
9. Schlussel AT, Maykel JAJCic, surgery r. Ergonomics and musculoskeletal health of the surgeon. 2019;32(06):424-34.
10. Osama M, Ali S, Malik RJ. Posture related musculoskeletal discomfort and its association with computer use among university students. J Pak Med Assoc. 2018;68(4):639-41.
11. Ghamkhar L, Kahlaee AHJBJoPT. Is forward head posture relevant to cervical muscles performance and neck pain? A case–control study. 2019;23(4):346-54.
12. Al-Hinai N, Al-Kindi M, Shamsuzzoha AJIJoME, Research R. An ergonomic student chair design and engineering for classroom environment. 2018;7(5):534-43.
13. Ilyas T, Umer B, Taufiq F. Frequency of Musculoskeletal Disorders and their Related Causative Factors Among Female Architecture Students in Lahore: JRCRS. 2018; 6 (1): 38-42. Journal Riphah College of Rehabilitation Sciences. 2018;6(1):38-42.
14. Southerst D, Yu H, Randhawa K, Côté P, D'Angelo K, Shearer HM, et al. The effectiveness of manual therapy for the management of musculoskeletal disorders of the upper and lower extremities: a systematic review by the Ontario Protocol for Traffic Injury Management (OPTIMa) Collaboration. Chiropractic & manual therapies. 2015;23(1):1-17.
15. Kuo YR, Fang JJ, Wu CT, Lin RM, Su PpF, Lin C-LJESJ. Analysis of a customized cervical collar to improve neck posture during smartphone usage: a comparative study in healthy subjects. 2019;28(8):1793-803.
16. Im B, Kim Y, Chung Y, Hwang SJJopts. Effects of scapular stabilization exercise on neck posture and muscle activation in individuals with neck pain and forward head posture. 2015;28(3):951-5.
17. El-Gendy MH, Lasheen YR, Rezkalla WKJPQ. Multimodal approach of electrotherapy versus myofascial release in patients with chronic mechanical neck pain: A randomized controlled trial. 2019;27(4):6.
18. Ramalingam V, Subramaniam AJSICS. Prevalence and associated risk factors of forward head posture among university students. 2019;10(7):775.