Open Access

Original Article

Evaluation of Forward Head Posture in School-Going Students and its Association with Shoulder Pain

Laiba Pervez, Ayesha Jamil, Sana Akram

Department of Physiotherapy, University Institute of Physical Therapy, The University of Lahore Pakistan

ABSTRACT

Objective: To determine the frequency of forward head posture (FHP) and its association with shoulder pain in school-going students.

Study Design: Cross-sectional study.

Place and Duration of Study: University of Lahore with fieldwork in government and private schools in Sialkot, Pakistan from Jan to Jun 2024.

Methodology: The sample of one hundred and eleven participants was selected by convenient sampling and consent was taken before the study. The students of 10 to 14 years of age, both genders, 5th to 8th class, were included in the study. Those with recent injuries in the neck or shoulder region or having any congenital abnormality were excluded. Forward head posture was evaluated using a meter scale by measuring the distance from the tragus of the ear to a point 25cm away from the plumb line. Shoulder pain was assessed using the Shoulder Pain and Disability Index (SPADI). Pearson's chi-square test was used to find the association between forward head posture and shoulder pain.

Results: The mean age of participants was 12.42±1.44 years. About 64(57.65%) had a forward head posture, and 42(37.8%) had a moderate level of FHP. Around 39(35.1%) had mild shoulder pain and disability. Forward head posture was found to be significantly associated with shoulder pain (p<0.001).

Conclusion: The forward head posture is common among school-going children, and it is associated with shoulder pain and related disability.

Keyword: Disability, Posture, Shoulder Pain, Students.

How to Cite This Article: *Pervez L, Jamil A, Akram S. Evaluation of Forward Head Posture in School-Going Students and its Association with Shoulder Pain. Pak Armed Forces Med J 2026; 76(Suppl-1): S88-S91. DOI: https://doi.org/10.51253/pafmj.v76iSUPPL-1.12722*

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Forward head posture (FHP) is a common postural problem that causes the head to be positioned forward with the body's vertical line. Its prevalence varies with age, gender, job nature, and lifestyle. It causes neck pain, muscle tightness, decreased cervical range of motion, and compression of the nerve roots.[1] According to a study, around 63% of school going children have postural problems, especially FHP and round shoulders. Heavy backpacks, prolonged bad posture while studying, watching television and using mobiles, academic stress, and poor work ergonomics are the potential contributing reasons.[2]

FHP is a known cause of long-term discomfort and functional restrictions.[3] It also results in headaches, restricted shoulder motion, postural malalignment such as round shoulder posture (RSP), improper scapular mobility, misalignment of the mandible, TMJ problems and spinal asymmetry. If not addressed timely, it may lead to chronic pain, fatigue and reduced academic performance among children.[4]

To the best of the authors' knowledge, the existing literature focuses on adults and working populations, leaving a gap for insights into the demographics of children in Pakistan. Given the rapid pace of growth and developmental changes in children, early identification and intervention in postural health are crucial for preventing long-term complications among schoolchildren. Therefore, this study aims to find out the frequency of FHP in school-age children and its relationship to shoulder pain and related disability.

METHODOLOGY

This cross-sectional study was conducted at the University of Lahore from January to June 2024. The data was collected from government and private schools in Sialkot, Punjab, Pakistan. The ethical approval of the study was obtained from the Research Ethical Committee of the University of Lahore (REC-UOL-/324/08/24). The study followed the STROBE (Strengthening the reporting of observational studies in epidemiology) guidelines as shown in Figure-1.[5] A sample of 111 students was calculated using Epitool,

Correspondence: Dr Ayesha Jamil, Department of Physiotherapy, The University of Lahore Pakistan

Received: 25 Sep 2024; revision received: 25 May 2025; accepted: 29 May 2025

with a forward head posture prevalence of 63%, a precision of 0.09, and a confidence level of 0.95.[6]

Inclusion Criteria: The school-going students of 5th to 8th class, 10 to 14 years of age,[7] and both genders were included.[8]

Exclusion Criteria: Students with recent injury in the neck or shoulder region, any musculoskeletal restrictions or chronic illnesses,[10] any congenital abnormality,[11] having upper limb or spine surgeries, leg length disparity, and spinal deviation.[6]

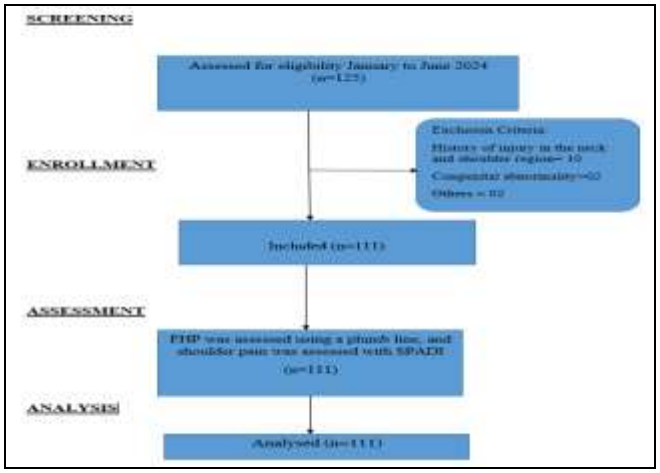

Figure-1: Strobe Flow Diagram

The shoulder pain was assessed using SPADI. It is a five-item pain subscale, and the eight-item disability subscale makes up the shoulder pain and disability index (SPADI).[12] The score is computed from the average for the eight disability items and the five pain items independently.[13] Using a plumb line, the forward head posture was evaluated. The students were instructed to stand at a spot that would be designated as being 25 cm from the plumb line. Then, the researcher measured the distance between the plumb line and the tragus of the ear from a side view using a meter scale and recorded it.[14]

The data was analyzed by Statistical Package of the Social Sciences (SPSS) version 25. Categorical data was presented using frequency and percentages. Cross-tabulation and Pearson's chi-square analysis were used to determine the association between forward head posture and shoulder pain. The *p*-value was set significant at 0.05.

RESULTS

For 111 participants, the mean age was 12.42±1.44 years, male was 56(50.5%), and females were 55(49.5%). Out of the total, 41(36.9%) participants had active participation in sports activities. A high number of participants, i.e., around 42(37.8%), presented with moderate FHP, and 39(35.1%) participants reported mild shoulder pain. The demographic details are summarized in Table-I. The analysis showed the association between forward head posture and shoulder pain (p<0.001) is shown in Table-II. The association of forward head posture and shoulder pain with gender was also computed, and the results depicted that the female participants showed a higher tendency to develop FHP (p=0.046). However, no association was found between shoulder pain and gender (p=0.239) as shown in Table-III.

Table-I: Descriptive Statistics of Study Participants (n=111)

Study Variable(s)	Age	n (%)
Age of Students	10	17(15.3%)
	11	15(13.5%)
	12	18(16.2%)
	13	26(23.4%)
	14	35(31.5%)
Gender	Male	56(50.5%)
	Female	55(49.5%)
Sports participation	No	70(63.1%)
	Yes	41(36.9%)
Forward head posture	No	47(42.3%)
	Yes	64(57.65%)
Severity of Forward head posture	No FHP/Mild FHP	47(42.3%)
	Moderate FHP	42(37.8%)
	Severe FHP	22(19.8%)
Shoulder pain	No	54(48.6%)
	Yes	57(51.4%)
Severity of Shoulder Pain-Related Disability	No pain	54(48.6%)
	Mild disability	39(35.1%)
	Moderate disability	14(12.6%)
	Severe disability	4(3.6%)

Table II: Association Between Forward Head Posture and Shoulder Pain-related Disability (n=111)

Study Variable	Categories	Forward Head Posture			*p*-value
		No /mild	Moderate	Severe	
Shoulder Pain Related Disability	No pain	34(30.6%)	12(10.8%)	8(7.2%)	<0.01
	Mild	13(11.7%)	20(18%)	6(5.4%)	
	Moderate	0(0%)	10(9%)	4(3.6%)	
	Severe	0(0%)	0(0%)	4(3.6%)	
	Total	47(42.3%)	42(37.8%)	22(19.8%)	111(100.0%)

Table-III: Association of Forward Head Posture and Shoulder Pain with Gender (n=111)

Study Variable(s)	Categories	Gender		*p*-value
		Male	Female	
Forward head posture	No /mild	30(27%)	17(15.3%)	0.05
	Moderate	16(14.4%)	26(23.4%)	
	Severe	10(9%)	12(10.8%)	
	Total	56(50.5%)	55(49.5%)	111(100%)
Shoulder Pain and Disability	No pain	32(28.8%)	22(19.8%)	0.24
	Mild disability	18(16.2%)	21(18.9%)	
	Moderate disability	5(4.5%)	9(8.1%)	
	Severe disability	1(0.9%)	3(2.7%)	
	Total	56(50.5%)	55(49.5%)	111(100%)

DISCUSSION

The result of our study showed that the majority of students had moderate FHP and mild shoulder pain and related disability, whereas female students had more FHP-related postural dysfunction.

The results of this study are consistent with the findings of a previous study conducted by Verma *et al*., in 2018 which showed that around 63% of school-going students between the ages of 12-16 had FHP. The potential associated factors were the improper usage of heavy backpacks, academic burden or stress, a lack of ergonomic school supplies, and prolonged periods spent in bad postures in front of computers and television. 2 Similarly, a study conducted by H Chandoliya *et al*., in 2021 found that school-going children were developing the FHP, due to changes in their biomechanics of the cervical spine, at a very young age. They also found a relationship between FHP and the usage of electronic media and backpacks to FHP.[6]

Another study was conducted by E. Szcygiel *et al*., in 2022 to determine the presence of FHP in children and adolescents. They used the photogrammetric method to measure FHP in sitting and standing positions and concluded that FHP is more common in children due to improper sitting positions.[14] The study conducted by NP Vaghela *et al*., in 2019, to determine the effects of carrying backpacks on FHP, and CVA in school-going children also showed an increase in forward head posture, SSP (sagittal shoulder posture), and CHA (craniohorizontal angle) in students carrying backpacks weighing 18% of body weight. External forces affect the body's normal alignment and cause pain and disability.[15]

Likewise, a study conducted by L. Torres Cusihuaman *et al*., in 2023 reported that hyperkyphosis and FHP were common issues in children and had different associated symptoms. A significant association between FHP and thoracic kyphosis was seen in children between 11-17 years of age.[16] A study conducted by NP Wiguna *et al*. in 2019 found a relationship between smartphone usage and FHP in children. More than half of the population who used smartphones had FHP, concluding that poor body posture and ergonomic positions while using smartphones are a potential risk for FHP.[17]

A study by M. Akbari *et al*. in 2019 reported a high prevalence of spinal deviations in children aged 7 to 9. The study found that Forward Head Posture (FHP) was present in 68.4% of the students, kyphosis was observed in 68.6%, and lordosis was the most prevalent condition, affecting 69.1% of the children.[18] A study conducted by S. Mandrekar *et al*. in 2022 to check for the effect of school bags on the shoulder and cervical posture in children found that the weight and position of school bags affected children's static and dynamic posture. Even a bag weighing less than 10% of body weight affected children's posture.[19]

LIMITATION OF STUDY

The study was limited to one city in Pakistan, and the data were collected from rural areas, which may affect the generalizability of the findings. The subjective nature of the SPADI questionnaire may result in students either over- or underreporting their symptoms. It is recommended that future researchers repeat the study with a bigger, more diverse population and use other methods, like a photogrammetric measurement of FHP. Moreover, the clinicians dealing with shoulder pain should consider the postural issue to prevent worsening the condition among school-going children.

CONCLUSION

The forward head posture is frequently observed in school-going children, and the majority had moderate postural dysfunction that was associated with mild shoulder pain and related disability. It is more common in female students than in their male counterparts.

ACKNOWLEDGEMENT

We would like to thank the school administration, teaching staff and students for their cooperation during this study.

Conflict of interest: None.

Funding source: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

LP & AJ: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

SA: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

REFERENCES

1. Mahmoud NF, Hassan KA, Abdelmajeed SF, Moustafa IM, Silva AG. The Relationship Between Forward Head Posture and Neck Pain: a Systematic Review and Meta-Analysis. Curr Rev Musculoskelet Med 2019; 12(4): 562–77. https://doi.org/10.1007/s12178-019-09594-y 1

2. Verma S, Shaikh J, Mahato R, Sheth M. Prevalence of forward head posture among 12-16-year-old school going students - A cross-sectional study. Appl Med Res 2018; 4(1): 1-4. https://doi.org/10.5455/amr.20180805064752
3. Lee KJ, Han HY, Cheon SH, Park SH, Yong MS. The effect of forward head posture on muscle activity during neck protraction and retraction. J Phys Ther Sci 2015; 27(3): 977–979. https://doi.org/10.1589/jpts.27.977
4. Kim HJ, Lee D. The study of the correlation between forward head posture and shoulder pain: A STROBE-compliant cross-sectional study. Phys Ther Rehabil Sci 2021; 30; 10(3): 251–256. https://doi.org/10.14474/ptrs.2021.10.3.251
5. Cuschieri SJSjoa. The STROBE guidelines. 2019; 13(Suppl 1): S31-S4.
6. Chandoliya H, Chorsiya V, Kaushik D. Prevalence and Levels of Forward Head Posture among School Going Children. Am J Epidemiol 2021; 5(1): 022–025. https://doi.org/10.37871/ajeph.id44
7. Zehra H, Tariq A, Raja AJ. Prevalence of Forward Head Posture among School Children Using Smartphones in Rawalpindi: Forward Head Posture and Smartphone Use. J Modern Health Rehabil Sci 2024; 1(2): 12.
8. Gheysvandi E, Dianat I, Heidarimoghadam R, Tapak L, Karimi-Shahanjarini A, Rezapur-Shahkolai F et al. Neck and shoulder pain among elementary school students: prevalence and its risk factors. BMC Public Health 2019; 19(1): 1299. https://doi.org/10.1186/s12889-019-7706-0
9. Karthik V, Arulpragassame S, Felix A, Parkavi K. Prevalence of forward head posture and its association with gender, BMI and neck pain among college-going students–A cross-sectional study. J Positive School Psychol 2022; 6(9): 5084-5090.
10. Glinianaia SV, McLean A, Moffat M, Shenfine R, Armaroli A, Rankin J et al. Academic achievement and needs of school-aged children born with selected congenital anomalies: A systematic review and meta-analysis. Birth Defects Res 2021; 113(20): 1431–1462. https://doi.org/10.1002/bdr2.1961
11. Anwer S, Alghadir AH, Al-Eisa ES, Iqbal ZA. The relationships between shoulder pain, range of motion, and disability in patients with shoulder dysfunction. J Back Musculoskelet Rehabil 2018; 31(1): 163–167. https://doi.org/10.3233/BMR-169762
12. Christensen KB, Thorborg K, Hölmich P, Clausen MB. Rasch validation of the Danish version of the shoulder pain and disability index (SPADI) in patients with rotator cuff-related disorders. Qual Life Res 2019; 28(3): 795–800. https://doi.org/10.1007/s11136-018-2052-8
13. Rezaei M, Salahzadeh Z, Karimipour B, Reza Azghani M, Sarbakhsh P, Adigozali H, et al. Postural Analysis of The Trunk, Pelvic Girdle and Lower Extremities in The Sagittal Plane in People with and without Forward Head Posture. Muscles Ligament Tendon J 2022; 12(02): 253-260. https://doi.org/10.32098/mltj.02.2022.21
14. Szczygieł E, Waśniowski D, Chmiel J, Golec J. Is the forward head posture a health problem affecting children and adolescents? J Kinesiol Exerc Sci 2022; 17; 32(97): 37–44. https://doi.org/10.5604/01.3001.0015.8788
15. Vaghela NP, Parekh SK, Padsala D, Patel D. Effect of backpack loading on cervical and sagittal shoulder posture in standing and after dynamic activity in school-going children. J Family Med Prim Care 2019; 8(3): 1076–1081. https://doi.org/10.4103/jfmpc.jfmpc_367_18
16. Torres-Cusihuaman L, Bravo-Cucci S. Association between Thoracic Kyphosis and Forward Head Posture in Teenagers: An Analytical Cross-Sectional Study. Middle East J Rehabil Health Stud 2023; 10(4): e134579. https://doi.org/10.5812/mejrh-134579
17. Wiguna NP, Wahyuni N, Indrayani AW, Wibawa A, Thanaya S. The relationship between smartphone addiction and forward head posture in junior high school students in North Denpasar. J Epidemiol Kesehatan Komunitas 2019; 4(2): 84-89. https://doi.org/10.14710/jekk.v4i2.5268
18. Akbari M, Zohreh Maghsoomi M. Screening of vertebral column deviations in 7 to 9-year-old students in southern Tehran: a cross-sectional study. Razi J Med Sci 2019; 26(2): 93-100.
19. Mandrekar S, Chavhan D, Shyam AK, Sancheti PK. Effects of carrying school bags on cervical and shoulder posture in static and dynamic conditions in adolescent students. Int J Adolesc Health 2022; 34(1): 20190073. https://doi.org/10.1515/ijamh-2019-0073