Original Article

Allied Medical Research Journal
Vol: 4 No. 1: 28-33

Prevalence of Forward Head Posture and Its Association with Neck Pain Among Academicians: A Cross-Sectional Study

Javeria Jutt[1], Mahnoor Junaid[1], Maryam Rafique[1]

[1]*University Kuala Lumpur Royal College of Medicine Perak, Ipoh, Malaysia*

ABSTRACT

Background: Forward head posture (FHP) has been found to be increased among individuals of different occupations, specifically those engaged in desk based work. Extended period of screen time and reading among academicians may contribute to the deviations of posture linked with neck pain causing functional limitations. The aim of this study is to explore the prevalence of forward head posture and its association with neck pain among academicians.

Methods: A cross-sectional study was conducted among 385 academicians from Sindh Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi University and Indus University through non probability convenience sampling. Outcome measures were plumb line for assessing FHP, Numeric pain rating scale (NPRS) for pain and Neck disability index (NDI) for functional disability. Data was analyzed using SPSS version 26. Frequency and percentages were shown for descriptive data and associations were analyzed using the Chi-square test. P value was <0.05

Results: FHP has been reported in 76.6% of the participants. Mild neck disability was reported among 38.1%, while 9.1% presented with moderate disability. No statistically significant association was observed between FHP and pain intensity ($p = 0.184$) or neck disability ($p = 0.276$). However, NPRS and NDI were significantly associated ($p < 0.001$).

Conclusion: Results concluded that FHP has been found to be common among different faculty members though many of the individuals didn't report any pain or disability but the postural correction is still an occupational concern. Therefore, the ergonomic interventions and posture correction strategies are recommended in order to reduce long-term musculoskeletal risk.

Keywords: *Academia, Education, Cervical pain, Posture, Ergonomics, Musculoskeletal pain.*

Received: November 25, 2025**; Revised:** January 13, 2026**; Accepted:** 20 January, 2026

Corresponding Email: javeriajatt214@gmail.com

DOI: https://doi.org/10.59564/amrj/04.01/004

INTRODUCTION

Forward head posture (FHP) has emerged as one of the most frequently observed postural deviations among individuals engaged in prolonged screen exposure, sedentary workstations, and academic environments[1]. In recent years, higher education has transformed rapidly toward digital and screen-based pedagogy, with universities worldwide increasingly adopting online platforms, lecture slides, virtual classrooms, and electronic resources. This shift has amplified the duration of static seated postures and repetitive forward-leaning behaviors among the academicians especially in the universities, predisposing them to cervical strain and postural dysfunction[2].

Evidence suggests that occupational groups with extended sitting time, limited postural variability, and repetitive neck flexion demonstrate higher prevalence of FHP and associated musculoskeletal symptoms[3]. Forward head posture is identified as the anterior displacement of the head in relation to the line of shoulder sagittally. It results in the cervical spine bearing increased load also compensating the thoracic curvature thus unbalancing the muscles of deep cervical flexors and upper trapezius[4]. According to the previous literature including systematic reviews and observational studies, It has been hypothesized that FHP might have a link between neck pain and functional disability.

According to a meta-analysis conducted in 2019, the results of 15 cross sectional studies have shown significant differences. Among them, 10 studies comparing the FHP between a group od participants with no symptoms to the participants with neck main showed an overall mean difference of 4.84 (95% CI=0.14, 9.54). It was a significant group difference as in contrast to adolescent who showed the mean difference of(MD = − 1.05; 95% CI = − 4.23, 2.12) Negative correlations have been found in 8 studies between the FHP and intensity of the neck pain .i.e. (r = − 0.55; 95% CI = − 0.69, − 0.36) and disability (*r* = − 0.42; 95% CI = − 0.54, − 0.28), confirming the link of cervical posture in musculoskeletal health[3].

Similarly, many research papers demonstrates that deviation of the posture, specifically the reductions in the craniovertebral angle (CVA), which is an outcome measure to assess the forward head posture, are in association with the neck pain and altered biomechanics during the loading when working using upper back. Furthermore, in a case series by Chu and colleagues, they enlighten on the role of center of gravity in joint stability stating that forward head deviations not only shift the COG anteriorly but also play a vital role in contributing to increased mechanical demand on the upper cervical joints which is ultimately the cause of the cervical pain and dysfunction in adults showing symptoms[4].

More comparative papers support the clinical relevancy of the measures taken for the posture, as in another research paper there is a comparison of radiographic alignment which also emphasize the complex relationship between the observable posture and underlying skeletal mechanics showing the contribution of FHP in increasing load on neck[5]. Moreover, another work published recently in 2020 explored the influence of the forward head posture on the mechanosensitivity of human tissues. Author documented that forward head posture lowers the pressure pain threshold and decrease the range of motion of cervical region, which in turn reflect the intensity of the mechanical stress and sensitivity of the nociceptive receptors. Together, these findings are showing how decreased or diminished craniovertebral angles and any change is posture are correlated with the changes in the biomechanics of the cervical region[7]. Despite of this, the certainty of association between FHP and pain remains underexplored. Recent systematic and observational studies highlight that pain is not only related to the FHP but can be due to variety of parameters including ergonomics, mental stress, physical activity levels, and behavioral aspects[8-10].

In Pakistan, studies available on neck pain and posture are conducted on students, drivers and other health care professionals. A recent Pakistani study among professional drivers reported a significant link between habitual forward posture and neck pain, focusing on the occupational risk posed by sustained seated postures and vibration exposure[11]. Despite of the literature present and high risk of musculoskeletal conditions, academicians remains underexplored. Therefore, this study aimed to determine the prevalence of forward head posture and examine its association with neck pain and disability among faculty members from major universities in Karachi.

METHODOLOGY

Study Design and Setting

This descriptive cross-sectional study was conducted across six universities in Karachi. i.e. University of Karachi, Dow University of Health Sciences Main campus, Dow University of Health Sciences Ojha campus, Sindh Institute of Physical Medicine and Rehabilitation (SIPMR), Baqai Medical University.

Sample Size

Sample size of 385 was calculated using open epi 3.0. with 95% confidence and 5% margin of error, assuming 50% prevalence. Participants were selected via non-probability convenience sampling.

$$n = \frac{Z^2 \times p \times (1-p)}{d^2}$$

Selection Criteria

Academicians with aged between 25–60 years, having a seated work hour load of ≥6 hours, able to stand independently for postural assessment were recruited in the study. Those participants who mentioned history of cervical surgery or trauma, diagnosed congenital or acquired spinal deformities, diagnosed neurological or vestibular disorder, acute neck injury within 3 months or currently involved in physiotherapy sessions were excluded from the study[12-14].

Data Collection Procedure

Data had been collected after obtaining the IRB approval. Consent of the participants were taken before data collection and procedure had been explained. FHP assessment was done using plumb line method. Participants were asked to stand and an imaginary line was drawn to observe the posture[15]. Numeric Pain

Rating Scale (NPRS) was used to assess the intensity of the pain in which the participants had been asked to self-report[16]. Neck Disability Index (NDI) is another self-reported questionnaire used to check the neck disability[17]. A structured questionnaire had been used to document the demographic and occupational data. Participants were not restricted at any point and were allowed to withdraw at any point.

Statistical Analysis

Data had been analyzed using SPSS version 26. Categorical variables such as demographics and characteristics were summarized using frequencies and percentages. Association between variables was determined through Chi-square test. P value was set as $p < 0.05$.

RESULTS

A total of 385 university academicians participated in the study. The majority were male (54%), and the largest age group was 25–34 years (39.2%). The average sitting time had been found to be 60% for ≥8 hours/day as shown in Table 1.

Table 1. Demographics of the participants

Variable	Category	Frequency
Gender	Male	208 (54%)
	Female	177 (46%)
Age Group (years)	25-34	151 (39.2%)
	35-44	126 (32.7%)
	45-54	69 (17.9%)
	55-60	39 (10%)
Average sitting time	6-7 hours/day	154 (40%)
	≥8 hours/day	231 (60%)

According to NPRS 295 (76.6%) participants were categorized in two groups of Forward Head Posture (FHP Observed) and 90 (23.4%) as No FHP Observed. Neck pain was noted by using Numeric Pain Rating Scale (NPRS), indicating the scores of 56.6% mild pain (scores 1–4), 15.3% moderate pain (scores 5–7), 2.9% severe pain (scores 8–10), 25.2% no pain.

No statistically significant association was found between FHP and NPRS categories ($p > 0.05$) as shown in Table 2.

Table 2. Association Between Forward Head Posture and Neck Pain (NPRS)

NPRS category	FHP observed (n)	No FHP observed (n)	Total	χ^2 (df), p-value
No pain	67	30	97	
Mild pain	170	48	218	
Moderate pain	47	12	59	
Severe pain	11	0	11	
Total	295	90	385	4.69(3), 0.184

Neck disability, measured via the Neck Disability Index (NDI), revealed that 185 participants (48.1%) had mild disability, 35 participants (9.1%) had moderate disability, 2 participants (0.5%) had severe disability, while 163 participants (42.3%) had no disability. The association between FHP and neck disability was also statistically non-significant ($p > 0.05$) as shown in Table 3.

Table 3. Association Between Forward Head Posture and Neck Disability (NDI)

NDI category	FHP observed (n)	No FHP observed (n)	Total	χ^2 (df), p-value
No disability	122	41	163	
Mild disability	141	44	185	
Moderate disability	29	6	35	
Severe disability	3	0	3	
Total	295	90	385	3.85(3), 0.276

There was a strong and statistically significant association between neck pain intensity and neck disability levels as shown in Table 4. Participants reporting no pain were 68 out of 97. While mild pain reporting was 69 out of 218. Moderate pain has been recorded in 21 out of 59 while severe pain has been reported in 5 out of 11.

Table 4. Association Between Neck Pain (NPRS) and Neck Disability (NDI)

NPRS category	No disability	Mild Disability	Moderate and severe disability	Total	χ^2(df), p-value
No pain	68	28	1	97	
Mild Pain	69	135	14	218	
Moderate pain	21	27	11	59	
Severe pain	5	2	4	11	
Total	163	192	30	385	28.47(6), < 0.001

DISCUSSION

The present study revealed a notably high prevalence of forward head posture (76.6%) among university faculty members in Karachi, placing this occupational group among those at increased risk for postural and musculoskeletal concerns. These findings are parallel to the findings from international cohorts on sedentary workers, specifically the office professionals and content creators, where the prevalence of FHP was lying between 60% and 80%.[18-19] This shows that how prolonged screen exposure and extensive computer usage may contribute to strain in the posture.

In this current study, despite of high prevalence of FHP, no statistical significance had been found between the FHP and NPRS or FHP and NDI. This observation is also consistent with studies which discusses that pain is not just related to the posture but depends on multiple contributing factors including biomechanics, psychological conditions, sleep quality and physical stressors.[20-21] This explains as faculty members frequently experience emotional and cognitive stress due to deadlines, responsibilities, publication pressures and administrative roles which may be modulating the increase in NDI and NPRS than cervical alignment alone.

Additionally, the presence of the heterogeneity within the sample should be mention in participants of age from 25 to 60 years, representing a mix of early-career and senior faculty. These differences of age, endurance and compensatory mechanisms may have influenced the results in terms of symptoms. There are many researches which shows that pain and FHP might be associated but suppressed due to better muscular strength and flexibility, while adults who are older must be experiencing due to age-related degenerative changes[22]. The lack of association across the pooled sample may therefore reflect a complex interplay of age, muscular conditioning, and adaptive behaviors. The outcome measure to check postural alignment was plumb line that may have affected the findings as well. While Plumb line is considered reliable and valid, it may lack the accuracy of photographic or digital measurements such as the craniovertebral angle, which are documented to be more reliable in detecting the deviations in cervical alignment.[22-24]

Further future studies with the sensitive tools can enhance the precision as well. The comparison of our study with the local studies have also provided further details. A study conducted in 2022 showed that there has been a strong association between forward-leaning posture and neck pain among drivers which could be due to whole-body vibration, constrained seating, and limited mobility[25]. These findings are in contrast as university faculty generally have more autonomy in work routines, including the adjustment of posture and short breaks.

This contrast reinforces that posture-related outcomes are occupation-specific and influenced by environmental constraints. Though there is an absence of the association between FHP and pain but the high prevalence of FHP cannot be neglected as chronic FHP may contribute to postural deviation which can result in centralized body pain. Thus, the findings focus on the need for strategies to improvise ergonomics in academic settings including adjustable workstations, posture correction sessions, scheduled short breaks,

and departmental ergonomic audits. Evidence from different studies reported that the institutional ergonomics focusing on the work space modifications may notably limits the risk of musculoskeletal disorders and increasing the productivity[26].

CONCLUSION

FHP has been found to be highly prevalent among academicians in different universities. The results show no association between FHP and pain or disability. In contrast, the intensity of pain demonstrated a strong and statistically significant association with functional disability, Proving pain severity as a more influential determinant of activity limitation than postural alignment alone. The results of this research paper suggest that decreasing the intensity of pain should be kept as the first priority in the treatment protocols design for the patients with forward head posture. Postural assessment should be the integral part of the assessment as well. Furthermore, more studies are required such as longitudinal and interventional to determine if the target postural corrected can contribute to the functional improvement and eradicating the disability. There is a need for further research is still needed in order to make changes in the postural alignment.

Ethical Approval

The study received ethical approval from the Ethical Review Committee of Foundation of Medical Research and Laboratories (FMRL) under the IRB Protocol Number: FMRL-IRB/2023/010.

Author Contributions

JJ: Conception & Design, Data Collection, Data Analysis & Interpretation, Manuscript Writing
MJ: Data Collection, Data Analysis & Interpretation, Critical Revision
MR: Data Collection, Data Analysis & Interpretation, Critical Revision,
All authors approved the final version of the manuscript to be published.

Grant Support and Funding Disclosure

None.

Conflict of Interests

No conflict of interest.

REFERENCES

1. Lin G, Zhao X, Wang W, Wilkinson T. The relationship between forward head posture, postural control and gait: A systematic review. Gait Posture. 2022 Oct;98:316-329. doi: 10.1016/j.gaitpost.2022.10.008. Epub 2022 Oct 14. PMID: 36274469. https://doi.org/10.1016/j.gaitpost.2022.10.008
2. Lee H, Lee Y. Effects of Postural Changes Using a Standing Desk on the Craniovertebral Angle, Muscle Fatigue, Work Performance, and Discomfort in Individuals with a Forward Head Posture. Healthcare (Basel). 2024 Dec 4;12(23):2436. doi: 10.3390/healthcare12232436. PMID: 39685059; PMCID: PMC11641771. https://doi.org/10.3390/healthcare12232436
3. 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 Dec;12(4):562-577. doi: 10.1007/s12178-019-09594-y. PMID: 31773477; PMCID: PMC6942109. https://doi.org/10.1007/s12178-019-09594-y
4. Chu ECP, Lo FS, Bhaumik A. Plausible impact of forward head posture on upper cervical spine stability. J Family Med Prim Care. 2020 May 31;9(5):2517-2520. doi: 10.4103/jfmpc.jfmpc_95_20. PMID: 32754534; PMCID: PMC7380784. https://doi.org/10.4103/jfmpc.jfmpc_95_20
5. Oakley PA, Moustafa IM, Haas JW, Betz JW, Harrison DE. Two Methods of Forward Head Posture Assessment: Radiography vs. Posture and Their Clinical Comparison. J Clin Med. 2024 Apr 8;13(7):2149. doi: 10.3390/jcm13072149. PMID: 38610914; PMCID: PMC11012400. https://doi.org/10.3390/jcm13072149
6. Yang S, Boudier-Revéret M, Yi YG, Hong KY, Chang MC. Treatment of Chronic Neck Pain in Patients with Forward Head Posture: A Systematic Narrative Review. Healthcare (Basel). 2023 Sep 22;11(19):2604. doi: 10.3390/healthcare11192604. PMID: 37830641; PMCID: PMC10572307. https://doi.org/10.3390/healthcare11192604
7. Martinez-Merinero P, Nuñez-Nagy S, Achalandabaso-Ochoa A, Fernandez-Matias R, Pecos-Martin D, Gallego-Izquierdo T. Relationship between Forward Head Posture and Tissue Mechanosensitivity: A Cross-Sectional Study. J Clin Med. 2020 Feb 27;9(3):634. doi: 10.3390/jcm9030634. PMID: 32120895; PMCID: PMC7141123. https://doi.org/10.3390/jcm9030634
8. Aboushaar N, Serrano N. The mutually reinforcing dynamics between pain and stress: mechanisms, impacts and management strategies. Front Pain Res (Lausanne). 2024 Nov 18;5:1445280. doi: 10.3389/fpain.2024.1445280. PMID: 39624230; PMCID: PMC11609167. https://doi.org/10.3389/fpain.2024.1445280
9. Guduru RKR, Domeika A, Obcarskas L, Ylaite B. The Ergonomic Association between Shoulder, Neck/Head Disorders and Sedentary Activity: A Systematic Review. J Healthc Eng. 2022 Mar 21;2022:5178333. doi: 10.1155/2022/5178333. PMID: 35356625; PMCID: PMC8959976. https://doi.org/10.1155/2022/5178333
10. LaRowe LR, Williams DM. Activity-induced pain as a predictor of physical activity behavior among individuals with chronic pain: the role of physical activity enjoyment. J Behav Med. 2022 Aug;45(4):632-642. doi: 10.1007/s10865-022-00318-1. Epub 2022 Apr 30. PMID: 35501540; PMCID: PMC9308740. https://doi.org/10.1007/s10865-022-00318-1
11. Tariq T, Kashif M, Ayaz J, Ijaz MM, Javed A, Adeel Arshad M, Ghaffar T. Work-related neck pain and its association with postural and ergonomic factors among Pakistani professional drivers. Work. 2025 Jan;80(1):471-483. doi: 10.3233/WOR-230344. Epub 2025 Mar 18. PMID: 39240603. https://doi.org/10.3233/WOR-230344

12. Hu J, Li X, Zheng P, Li Z, Zhang Z, Zheng M, Zou J, Fan T, Li G, Yao Q, Zeng Q, Lu P, Huang G. The impact of neck pain and movement performance on the interarticular compressive force of the cervical spine: a cross-sectional study based on OpenSim. J Neuroeng Rehabil. 2025 Feb 11;22(1):26. doi: 10.1186/s12984-025-01559-2. PMID: 39934818; PMCID: PMC11817616. https://doi.org/10.1186/s12984-025-01559-2
13. Joshi S, Balthillaya G, Neelapala YVR. Thoracic Posture and Mobility in Mechanical Neck Pain Population: A Review of the Literature. Asian Spine J. 2019 Jun 3;13(5):849-860. doi: 10.31616/asj.2018.0302. PMID: 31154701; PMCID: PMC6773982. https://doi.org/10.31616/asj.2018.0302
14. Prakash N, Cleland J, Kalyan HK, Roy AK, Jose NM, Harikesavan K. Analysis of posture and balance impairments in individuals with chronic nonspecific neck pain-an observational study. Health Sci Rep. 2024 Jul 4;7(7):e2215. doi: 10.1002/hsr2.2215. PMID: 38974326; PMCID: PMC11224027. https://doi.org/10.1002/hsr2.2215
15. McAleer JP, DeCarbo WT, Santrock RD. The Plumbline: A Novel Radiographic Tool for Assessment of Metatarsus Adductus with Hallux Valgus. Foot Ankle Orthop. 2023 Dec 26;8(4):2473011423S00433. PMCID: PMC10752075. doi: https://doi.org/10.1177/2473011423S00433
16. Modarresi S, Lukacs MJ, Ghodrati M, Salim S, MacDermid JC, Walton DM; CATWAD Consortium Group. A Systematic Review and Synthesis of Psychometric Properties of the Numeric Pain Rating Scale and the Visual Analog Scale for Use in People With Neck Pain. Clin J Pain. 2021 Oct 26;38(2):132-148. doi: 10.1097/AJP.0000000000000999. PMID: 34699406. https://doi.org/10.1097/AJP.0000000000000999
17. Widbom-Kolhanen S, Pernaa KI, Saltychev M. Reliability and validity of the Neck Disability Index among patients undergoing cervical surgery. Int J Rehabil Res. 2022 Sep 1;45(3):273-278. doi: 10.1097/MRR.0000000000000540. Epub 2022 Jul 1. PMID: 35776945. https://doi.org/10.1097/mrr.0000000000000540
18. Stincel OR, Oravitan M, Pantea C, Almajan-Guta B, Mirica N, Boncu A, Avram C. Assessment of Forward Head Posture and Ergonomics in Young IT Professionals - Reasons to Worry? Med Lav. 2023 Feb 14;114(1):e2023006. PMID: 36790407; PMCID: PMC9987472. doi: https://doi.org/10.23749/mdl.v114i1.13600
19. Mahmoud NA, Abu Raddaha AH, Zaghamir DE. Impact of Digital Device Use on Neck and Low Back Pain Intensity among Nursing Students at a Saudi Government University: A Cross-Sectional Study. Healthcare (Basel). 2022 Nov 30;10(12):2424. doi: 10.3390/healthcare10122424. PMID: 36553948; PMCID: PMC9777961. https://doi.org/10.3390/healthcare10122424
20. Yurova A, Gladkov A, Kalinsky E, Lychagin A, Shipilov A, Vassilevski Y. A biomechanical model for concomitant functioning of neck and shoulder: a pilot study. Sci Rep. 2024 Dec 30;14(1):31818. https://doi.org/10.1038/s41598-024-83075-2
21. Igwesi-Chidobe CN, Effiong E, Umunnah JO, Ozumba BC. Occupational biopsychosocial factors associated with neck pain intensity, neck-disability, and sick leave: A cross-sectional study of construction labourers in an African population. PLoS One. 2024 Apr 3;19(4):e0295352. doi: https://doi.org/10.1371/journal.pone.0295352
22. Binaei F, Kahlaee AH, Bandpei MAM, Rahmani N, Delkhoush CT, Saatchi M. The Association Between Craniovertebral Angle and Neck Muscle Size Using Ultrasonography: A Systematic Review. Health Sci Rep. 2025 May 26;8(5):e70848. PMID: 40432699; PMCID: PMC12106361. doi: https://doi.org/10.1002/hsr2.70848
23. Mylonas K, Chatzis G, Makrypidi V, Chrysanthopoulos G, Gkrilias P, Tsekoura M, Billis E, Tsepis E, Tsirogiannis G, Fousekis K. Reliability of photogrammetric evaluation of the craniovertebral angle, swayback posture, and knee hyperextension in university students. J Phys Ther Sci. 2025 Apr;37(4):171-175. doi: 10.1589/jpts.37.171. Epub 2025 Apr 1. PMID: 40171184; PMCID: PMC11957747. https://doi.org/10.1589/jpts.37.171
24. Roggio F, Trovato B, Sortino M, Zanghì M, Di Brigida C, Guglielmino C, Lombardo C, Loreto C, Pavone P, Musumeci G. Intra-rater and inter-rater reliability of the fixed plumb line for postural and scoliosis assessment in the sagittal plane: a pilot study. PeerJ. 2024 Nov 13;12:e18121. doi: 10.7717/peerj.18121. PMID: 39553711; PMCID: PMC11568813. https://doi.org/10.7717/peerj.18121/supp-1
25. Shahzaib, M. M. ., Raza, H. ., Javed, A. ., Salik, S. ., Akash, N. K. A. ., ., A., & Arslan, H. R. M. . (2022). Prevalence of musculoskeletal disorders among IT professionals. Pakistan BioMedical Journal, 5(1), 197–200. https://doi.org/10.54393/pbmj.v5i1.275
26. Hosseini SM, Lahoori MA, Rasouli Kahaki Z. The Effectiveness of Ergonomic Intervention in Work-related Postures and Upper Crossed Syndrome of Metal Industry Workers. Med Lav. 2025 Aug 4;116(4):16165. doi: 10.23749/mdl.v116i4.16165. PMID: 40762180; PMCID: PMC12363419. doi: 10.23749/mdl.v116i4.16165