

Correlation of Forward Head Posture with Perceived Stress and its Impact on Activity of Daily Living Among Adults: A Cross-Sectional Study

Sheenam Popli^{1*}, Dharmita Yogeshwar², Rahul Kumar³, Janvhi Singh⁴, Sonam Verma⁵, Vikas Kumar Lamba⁶

¹Assistant professor, Department of Physiotherapy at Suresh Gyan Vihar University, Jaipur, Rajasthan, India

²Assistant professor, NIMS College of Physiotherapy and Occupational Therapy, Jaipur, Rajasthan, India

³Clinical physiotherapist, Saksham Divyang Sewa Kendra, Jaipur, Rajasthan, India

⁴Assistant Professor, NIMS College of Physiotherapy and Occupational Therapy, Jaipur Rajasthan, India

⁵Associate professor, Department of Physiotherapy at Suresh Gyan Vihar University, Jaipur, Rajasthan, India

⁶Associate professor, Department of Physiotherapy, Tania University, Sri Ganganagar, Rajasthan, India

DOI: <https://doi.org/10.36348/jaspe.2024.v07i08.002>

| Received: 05.07.2024 | Accepted: 12.08.2024 | Published: 16.08.2024

*Corresponding author: Sheenam Popli

Assistant professor, Department of Physiotherapy at Suresh Gyan Vihar University, Jaipur, Rajasthan, India

Abstract

Background and Objectives: Our study aims to discover the relationship between forward head posture and to see the impact of increased levels of stress on performing activities of daily living. **Material & Methods:** 273 participants from Suresh Gyan Vihar University aged 20-45 years were included in this study using a convenient sampling method for data collection. Three Outcome measures were used: the ON protractor Smartphone Application to determine craniocervical angle, Perceived stress scale for stress level and Northwick pain rating questionnaire for activities of daily living. **Result:** In this present study we have found that 86% of young adults both females and males are affected by forward positions working more than 3 hours on electronic gadgets or continuously working in a posture. Our analysis shows a significant relationship between forward head posture and perceived stress with a p-value of ($P < 0.001$). **Conclusion:** Our study confirms the relationship of Forward head posture with perceived stress and activity of daily living by promoting postural awareness we can prevent further postural deformities and improve their quality of life.

Keywords: Activity of daily living, craniocervical angle, Forward head posture, Perceived stress.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Good working posture is defined as a person or individual choosing a posture in that people feel the freedom to perform a particular task (Cortett 1983). The good working posture preferred to consider angle is 10"-15" below the horizontal (Grandjean 1988). Sitting position is a comfortable position for joint angles (Rebiffé 1967). It is very complex to brief a posture in a word or in a definition (Rohmert and Mainzer 1986). Posture is the layout of head, trunk and limb space [3].

Dynamic Posture is directed by the central nervous system (CNS) or Stomatognathic system. It's a functional unit and is led by various skeletal components such as the maxilla and mandible, dental arches, salivary glands, vascular supplies, whereas the Central nervous system directs muscle activation that leads to posture control in the human body [3].

Postural adjustments manage orthostatic and postural control and exert influence on the activity of daily living. These adjustments are ensured by complex systems and mechanisms [1].

The muscular imbalance will lead to many cervical deformities of the neck such as torticollis, and kyphosis (increased curvature of the cervical spine) where cervical vertebrae fail to remain in the cervical region in a manner condition known as forward head posture [3]. Forward head posture is specified with the upper cervical spine going along by flexion of the lower cervical spine (C4-C7) [4]. Anterior lolling of the cervical spine puts additional 10 pounds of weight on the cervical region which causes the neck to roll forward on the cervical region. This is a major cause of forward head posture, Edmondston S *et al.*, (2007). Solomonow M, (1998). Restak RM, (1979) [5, 6].

The craniovertebral angle is the angle between the head and neck the mean age of CVA is 22-46 years 47° is considered a normal angle for this age.

Forward Head Posture (FHP) is a postural deformity characterised by the anterior positioning of the head relative to the vertical line of the body's centre of gravity. In this condition, the head protrudes forward, deviating from its normal alignment with the cervical spine. This misalignment often results in a curvature of the upper spine and compensatory adjustments in the lower spine and pelvis. FHP is increasingly common in modern society, attributed to lifestyle factors such as prolonged use of computers, smartphones, and other electronic devices, as well as sedentary behaviour.

Bad postural habits or being in inappropriate posture for a long time increase stress on muscles, ligaments, and joints which will put a greater impact on permanently and temporarily disabling a huge population from carrying out their professional activities [14].

Stress is defined as the normal rejoinder of the body towards emotions, and physical or mental state whereas perceived stress is dissimilar to stress it's a response towards a particular thought that a person is going through from how much stress due to activity, working stress. Perceived stress is the cause of emotional disorders, eating disorders, musculoskeletal disorders, and anxiety. Nowadays health problems have multifactorial theories where psychological stress plays a prime role in increasing stress levels and stressful exposure at the workplace (European Survey on Working Conditions 1999) most work-related disorders are generally seen as musculoskeletal disorders, anxiety, and fatigue [1].

Work-related upper extremity disorders and musculoskeletal disorders are more commonly seen in females than males in detail mechanism increased force work or bad ergonomic conditions, cognitive factors increased electromyographic activity of muscle and directly related with musculoskeletal disorders [1, 2].

Repetitive tasks at the workplace or increased work timings, and continuous exposure to electronic gadgets (TV, Laptops, Smartphones) are responsible for a greater risk of musculoskeletal disorders repetitive tasks or bad postural habits put extra pressure which can cause wear and tear of muscle and tendons in the forearm, wrist and affect back and neck [12].

It is hypothesized that Forward head posture raises stress levels which can be the cause of disturbing in performing daily activities. The relationship between forward head posture, perceived stress, and its effect on daily activities has not been previously studied. The current study was conducted to determine the relationship between forward head posture, level of stress, and its impact on adults' everyday activities to

promote good posture awareness. The impact of an individual's posture on their general health and well-being has been shown in numerous research. A forward-leaning head posture is associated with psychological stress and day-to-day activities that interrupt daily tasks. To better understand how forward head posture stress levels and activities of daily living, research into this relationship may be very helpful in the prevention and management of various disorders. Promoting health and well-being can largely be achieved by implementing an effective approach to assist sustained functional capacities.

MATERIAL AND METHODS

Study design and sample size

273 adults from Suresh Gyan Vihar University both male and female, between the ages of 20 and 45 years participated in this cross-sectional survey. The study included the participants who met the inclusion criteria and voluntarily participated in the investigation. Each participant received signed consent after being briefed about the assessment procedure. The study was approved by the institutional ethical committee of Suresh Gyan Vihar University (Code SGVU/PD/PI/227/b). The sample size was determined with EPI software version 7 with 95% power 50% Expected frequency and a 5% confidence limit using a non-probability convenient sampling method.

Selection Criteria

Professionals who work more than 3 hours per day aged 20-45 years were included in the study however, individuals with a history of cervical fractures, idiopathic scoliosis, torticollis, neurological motion disorders, or hearing impairments were excluded from the study.

Data Collection

Demographic data (age, gender, weight, height) were initially recorded by enrolled participants. All the participants were briefed on the procedure before the assessment. To determine the forward head position ON Protractor smartphone application was used. The app is available on the Google App Store freely the participants were instructed to sit on the stool and focus on a fixed point on the wall and an angle drawn by touching the surface reference point and taking a picture of it. Angle was measured from three marks cervical seven, Tragus, and Canthus. A craniovertebral angle less than 44° was considered as a forward head position

To evaluate the correlation of FHP with stress A Google form was created with the help of 2 outcome measures perceived stress scale and a Northwick pain questionnaire Then the form was circulated with all the participants who had CVA (craniovertebral angle) less than 44° through the mail. PSS is a Five-point Likert type of scale consisting of 10 questions each question responded as 0 never, 1 rarely, 2 sometimes, 3 fairly often, and 4 very often the score for each item summed

and obtained a total score ranges from 0-40, score obtain between 0-13 considered as low level of stress, score range between 14-26 consider as moderate stress, score range from 27-40 consider as perceived stress.

The Northwick pain rating scale was used to determine the performing activities of all the participants affected by forward head posture. The Northwick pain rating scale is designed for activities of every day affected by Neck pain. It consists of 9 questionnaires including the following components:

- Pain intensity
- Pain and sleeping
- Pins, needles, and numbness
- Duration of symptoms
- Carrying
- Reading and watching TV
- Working/housework, etc.
- Social activities
- Driving [13].

Statistical Analysis

Data analysis was done by SPSS version 20 all the recorded data was entered into the software. The Kolmogorov- Smirnov test was used to check the normal distribution of data it was found that data was not normally distributed after the non-parametric test Spearman rank correlation was used to check the relationship between all the variables.

RESULT

The cross-sectional study was conducted among 273 participants both males and females to determine the relationship between Forward head posture and stress level and its impact on day-to-day activity for data analysis all the recorded data entered in software and to check the correlation between all the variables Spearman Rank test was used to determine the relationship between all the variables with expected “p-value” (P 0.000). Descriptive analysis is described in the tabulated form below.

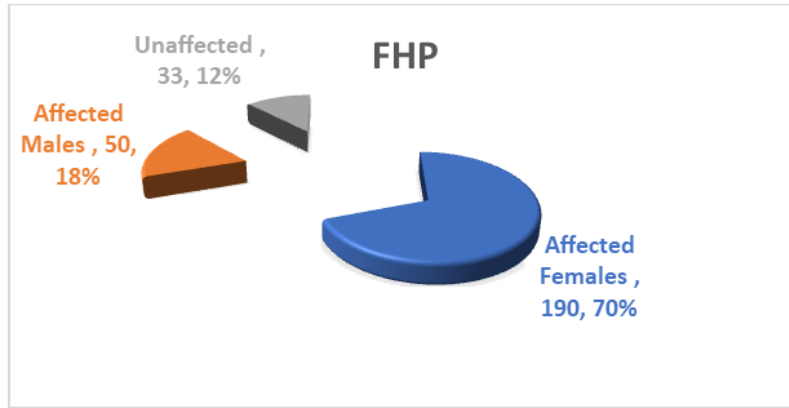
Table 1: Characteristics of population

Characteristics		Frequency	Mean \pm SD
Age	20-30 years	123	29.59 \pm 3.839
	31-45 years	150	
Gender	Females	180	1.49 \pm .501
	Males	93	
Working hours	3-5 hours	100	1.43 \pm .753
	More than 5 hours	173	
BMI	Normal weight	270	1.16 \pm .365
	Overweight	3	
FHP	Affected	240	1.24 \pm .429
	Females	190	
	Males	50	
	Unaffected	33	
PSS	Severely affected	175	1.59 \pm .653
	Moderate affected	32	
	Unaffected	25	
NPN	Severely affected	127	1.48 \pm .670
	Moderate affected	55	
	Unaffected	25	

Forward Head Posture

A total number of 240 participants including 190 (70%) Females and 50 (16%) however 33 (12%) were not affected by FHP with a mean and SD value of (1.24 \pm .429). Whereas A study was conducted among young adults to see the prevalence of Forward head

posture (FHP) They highlighted in their study that 60.0% of women and 40.0% of men are affected by Forward Head posture [2]. With this study, we shed light on the perspective that long exposure to electronic gadgets can be a possible cause of forward head posture in adults.

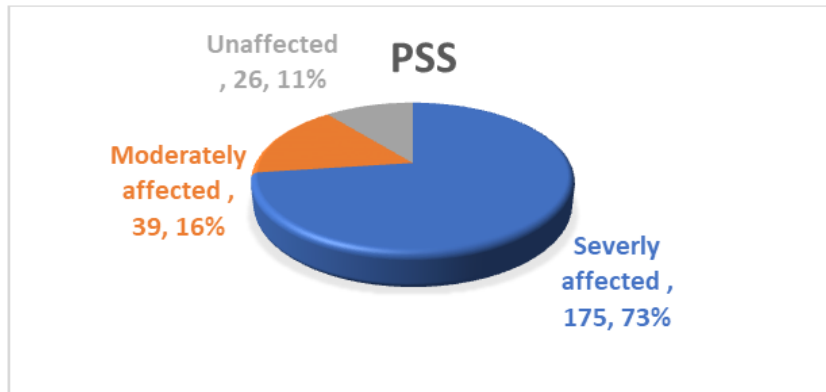


Characteristics of the population affected by FHP

Forward Head Posture and Perceived Stress

According to data analysis, 86% of the participants were affected by the Forward head position. In this current study participants 175 (73%) are severely affected by perceived stress whereas 39 participants

(16%) are moderately affected 26 participants (11%) are unaffected by perceived stress (PSS) it shows a positive significant correlation between FHP and PSS with “P-value” ($P 0.0001$) the mean & SD score of PSS is (1.59 ± 0.653).

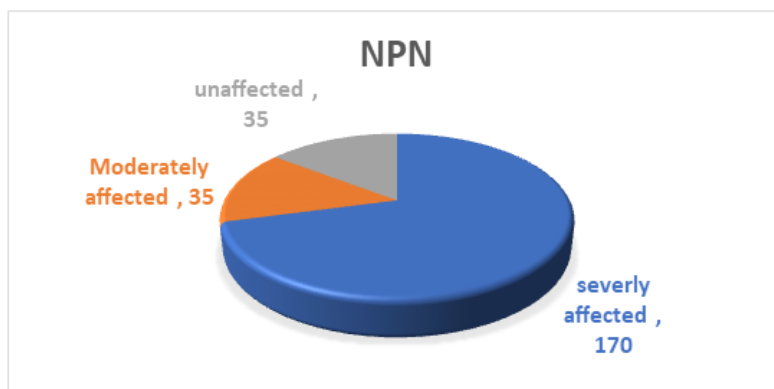


Characteristics of the population affected by Perceived stress

Forward Head Posture and Activity of Daily Living

We have found that 170 participants (70%) are strongly affected 35 participants (14.32%) are moderately affected whereas 35 participants (14.32%) are unaffected by NPN (Northwick pain rating scale) with a “p-value” ($P 0.003$). The mean and SD score of

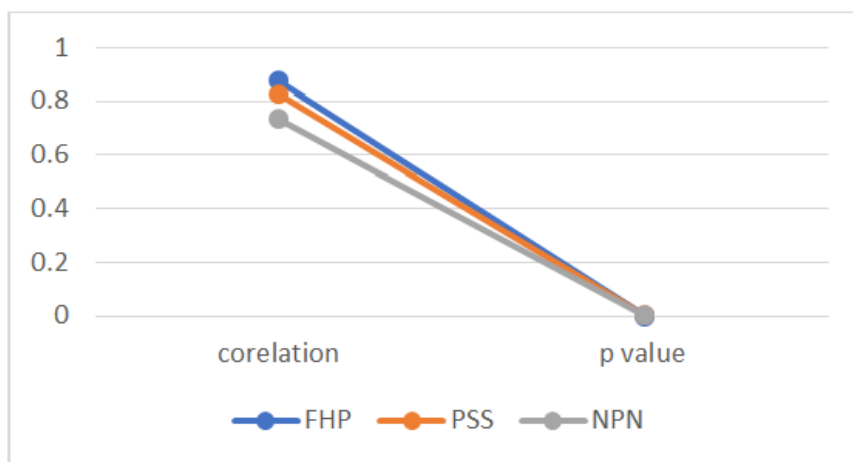
NPN is (1.48 ± 0.670). A Study was conducted on the prevalence of Forward Head posture and its relation with activities of daily living the study was conducted among physiotherapy students they have shown a positive relationship between both variables.



Characteristics of Populations Those activities of Daily Living are Affected

Table 2: Correlation between all the variables

Characteristics	Correlation coefficient	FHP	PSS	NPN
FHP	Correlation coefficient	0.73	0.729	0.876
	Sig (2 tailed)	0.000	0.001	.000
	N	240	240	240
PSS	Correlation coefficient	0.729	0.733	0.826
	Sig (2 tailed)	0.001	0.003	0.001
	N	240	240	240
NPN	Correlation coefficient	0.876	0.826	0.733
	Sig (2 tailed)	0.000	0.001	0.003
	N	240	240	240

**Correlation between all the components**

DISCUSSION

This study evaluated the relationship between Forward head posture and perceived stress and its impact on day-to-day activities. We found in this study, 86% of young adults both males and females are affected by Forward head posture. For this study, 273 adults were chosen to evaluate the craniovertebral angle data analysis showed that 240 participants were affected by forward head position with a p-value of (P 0.000).

The study indicates individuals who are working in offices for more than 3 hours on laptops, computers or any other electronic gadgets their chances of getting affected by FHP will get an increase.

This study enlightened the facts that excessive use of electronic gadgets would be one of the reasons for forward head position and it will lead to postural deformities.

A study was conducted on university students to see the prevalence of forward head posture they supported or study they are shown in their study that students who are using computers for more than 6 hours per day chance of forward head position will increase [15].

Sutantar Singh (Sutantar Singh *et al.*, (2020) they found 76% prevalence of Forward head position

among university students those who used neck flexion position during study [8].

Mamania and Ananp *et al.*, (2018) did a cross-sectional study to determine the prevalence of forward head posture among physiotherapy students they concluded that students who were using laptops, and smartphones to read books online are more prone to get affected by forward head positions [16].

Forward head position and perceived stress

A total number of 240 participants who had CVA less than 44° were given Google form to see the perceived stress among all of them and asked to read all questions carefully and answer according to symptoms of what disabilities they have felt during functional tasks we have found in our study that 73% participants (175) were severely affected by perceived stress and 16% (39) were moderately affected 11% (26) were unaffected with perceived stress. This study shed light on the fact that individuals affected with forward head position might have chances of increased perceived stress.

A study conducted among university students to evaluate the relationship between forward head position, neck disability and level of stress concluded in their study that students who spent more time on laptops, and smartphones their chances of getting affected by FHP and perceived stress [17].

Forward head position and activity of daily living

The total number of participants recruited to determine the number of individuals whose activities of daily living were affected was 240 according to data analysis in this study we have found that 71% (170) participants were severely affected 14.32% (35) moderately and 14.32% (35) unaffected by forward head posture.

The study elucidates that working stress increases due to greater exposure to gadgets and continuous sitting in a particular position or adopting bad postural habits might be the cause of increased muscle tension which will affect day-to-day activities.

Bad postural habits or being in inappropriate posture for a long time increase stress on muscles, ligaments, and joints which will put a greater impact on permanently and temporarily disabling a huge population from carrying out their professional activities [14].

Sutantar Singh *et al.*, (2018) supported our study they have shown 76% of students affected by FHP and their activity of living were affected to some extent [8].

A study was conducted among adults to see the prevalence of forward head posture and its effect on activities of daily living supported our study they concluded their study that people who are affected by FHP chances of performing day to day difficulties in performing day-to-day activities [18].

Limitations of the study

The current study was conducted on individuals who are employed in professional capacities, and there is a possibility that their working hours may have been amplified, consequently influencing the significant values obtained. To ensure a greater impactful result, it is recommended that future studies be conducted on different populations with large sample size.

CONCLUSION

Numerous studies have investigated the prevalence of forward head posture (FHP) and its associated deformities. However, none have emphasised that FHP can lead to increased muscle tension. In our present study, we concluded that FHP significantly contributes to heightened muscle tension and also affects activity of daily living this finding underscores the importance of maintaining good postural habits. Our study also provides valuable resources for posture assessment and correction, aiming to prevent further complications such as postural deformities and to improve individuals' quality of life.

Abbreviations: Forward head posture (FHP), craniovertebral angle (CVA), Perceived stress scale (PSS)

Acknowledgement: The Authors would like to thank the participants for their time

Funding Resource: NO Funding was received for this study

Conflict of Interest: All authors have no conflict of interest to declare

REFERENCES

- Lundberg, U. (2002). Psychophysiology of work: Stress, gender, endocrine response, and work-related upper extremity disorders. *American journal of industrial medicine*, 41(5), 383-392.
- Hansraj, K. K. (2014). Assessment of stresses in the cervical spine caused by posture and position of the head. *Surg Technol Int*, 25(25), 277-279.
- Cuccia, A., & Caradonna, C. (2009). The relationship between the stomatognathic system and body posture. *Clinics*, 64(1), 61-66.
- Haslegrave, C. M. (1994). What do we mean by a 'working posture'?. *Ergonomics*, 37(4), 781-799.
- Solomonow, M. (1998). The short term effects of joint mobilization on acute mechanical low back pain dysfunction in collegiate athletes. *Spine*, 23(23), 2552-2562.
- Gonzalez, H. E., & Manns, A. (1996). Forward Head Posture: Its Structural and Functional Influence on the Stomatognathic System, a Conceptual Study. *CRANIO®*, 14(1), 71-80. <https://doi.org/10.1080/08869634.1996.11745952>
- Kage, V., Patel, N. Y., & Pai, M. P. (2016). To compare the effects of Deep Neck Flexors strengthening exercise and McKenzie Neck exercise in subjects with forward neck posture: A randomised clinical trial. *Int J Physiother Res*, 4(2), 1451-1458.
- Singh, S., Kaushal, K., & Jasrotia, S. (2020). Prevalence of forward head posture and its impact on the activity of daily living among students of Adesh University—A cross-sectional study. *Adesh University Journal of Medical Sciences & Research*, 2(2), 99-102.
- Edmondston, S. J., Chan, H. Y., Ngai, G. C. W., Warren, M. L. R., Williams, J. M., Glennon, S., & Netto, K. (2007). Postural neck pain: an investigation of habitual sitting posture, perception of 'good' posture and cervicothoracic kinaesthesia. *Manual therapy*, 12(4), 363-371.
- Solomonow, M. (1998). The short term effects of joint mobilization on acute mechanical low back pain dysfunction in collegiate athletes. *Spine*, 23(23), 2552-2562.
- Nejati, P., Lotfian, S., Moezy, A., & Nejati, M. (2014). The relationship of forward head posture and rounded shoulders with neck pain in Iranian office workers. *Medical journal of the Islamic Republic of Iran*, 28, 26.
- Kaushik, V., & Charpe, N. A. (2008). Effect of body posture on stress experienced by worker. *Studies on Home and Community Science*, 2(1), 1-5.

13. Leak, A. M., Cooper, J., Dyer, S., Williams, K. A., Turner-Stokes, L., & Frank, A. O. (1994). The Northwick Park Neck Pain Questionnaire, devised to measure neck pain and disability. *Rheumatology*, 33(5), 469-474.
14. Pacheco, M. P., Carvalho, P. J., Cavalheiro, L., & Sousa, F. M. (2023). Prevalence of Postural Changes and Musculoskeletal Disorders in Young Adults. *International Journal of Environmental Research and Public Health*, 20(24), 7191.
15. Ramalingam, V., & Subramaniam, A. (2019). Prevalence and associated risk factors of forward head posture among university students. *Scopus IJPHRD Citation Score*, 10(7), 775.
16. Mamania, J. A., & Anap, D. B. (2019). Prevalence of forward head posture amongst physiotherapy students: A cross-sectional study. *International Journal of Education and Research in Health Sciences*, 1(4), 125-127.
17. Shahid, S. (2018). Effect of Forward Head Posture on Neck Disability and Level of Stress Among Undergraduate Students.
18. Yaduvanshi, P., Kholiya, K., Chauhan, M., Kawat, P., Nagar, A., & Joshi, N. (2022). Screening of Forward Head Posture And Its Impact On The Activity of Daily Living Among Collegiate Adults of Career Point University.
19. Ashfaq, H. B., Sharif, F., Arooj, A., & Ahmad, A. (2021). Association between sitting time and neck-shoulder pain among office workers: a cross-sectional study. *Pakistan Journal of Physiology*, 17(1), 37-40.
20. Cortese, S., Mondello, A., Galarza, R., & Biondi, A. (2017). Postural alterations as a risk factor for temporomandibular disorders. *Acta odontol latinoam*, 30(2), 57-61.
21. Rantala, L., & Sala, E, editors. (2019). Voice ergonomics: Occupational and professional voice care. Cambridge Scholars Publishing; 2019 Feb 15.
22. Kolhatkar, A., & Rayjade, A. (2020). A Study of Relation between Myopia and Head Posture in Young Adult Population. *Indian Journal of Public Health Research & Development*, 11(5), 49-54.
23. Naz, A., Bashir, M. S., & Noor, R. (2018). Prevalance of forward head posture among university students. *Rawal Med J*, 43(2), 260-262.
24. Shahid, S. (2018). Effect of Forward Head Posture on Neck Disability and Level of Stress Among Undergraduate Students.
25. Verma, S., Shaikh, J., Mahato, R. K., & Sheth, M. S. (2018). Prevalence of forward head posture among 12–16-year-old school going students—A cross-sectional study. *Applied Medical Research*, 4(2), 18-21.
26. Tariq, I., Riaz, H., Anwar, M., & Ahmed, A. (2022). Correlation Between Forward Head Posture and neck pain in IT Professionals by using Postural Screen Mobile App: Forward Head Posture and neck pain in IT Professionals. *Pakistan BioMedical Journal*, 190-194.
27. Bibi, K., Arzoo, U., Sakina, Q., Zahoor, I., Suleman, R., & Shaukat, A. (2024). Prevalence and Association of Neck Disability Index (NDI) with Forward Head Posture (FHP) among Pharm D Students. *Journal of Health and Rehabilitation Research*, 4(1), 938-942.