
ORIGINAL ARTICLE

The Relationship of Forward Head Posture and Neck Pain in Desk Top Users among Bank Employees

Odil Beck

Department of Physiotherapy, Krupanidhi College of Physiotherapy, Bangalore, Karnataka, India

*Corresponding author's e-mail: physio.kric@krupanidhi.edu.in

ABSTRACT

Rapid technological development in the use of electronic data has affected both the employees and workplace. In recent years rapid use of computers has changed the work environment drastically. Various factors like personal factors, work related factors (WRF), psycho-social factors (PSF) can result in many health hazards like musculoskeletal disorder (MSD). From the literature review it is observed that the musculoskeletal disorder is very common among computer user's bank office employees, who spend a substantial amount of time using computers. Neck pain is one of the commonest problems faced among bank employees. This chronic overload and tightening of soft tissues may eventually result in decreased blood flow and oxygen to soft tissues, ultimately causing pain. To evaluate the correlation between forward head posture and neck pain in desk top users among bank employees. A total of 243 participants were taken who have NPRS in 5 or more than 5 depending on the inclusion criteria. Neck pain was measured using NPRS scale and forward head posture was measured through measuring CVA angle. The Cross-sectional correlation study design was used to evaluate the correlation between head posture and neck pain among bank employees. The results of the study are highly significant with positive correlation (0.66). In the present study out of 243 participants 119 were with neck pain and 124 were without neck pain. Among 119 participants with neck pain 76 (64%) have forward head posture and 43 (36%) have no forward head posture. Among 124 participants without neck pain 21 (16.9%) participants have forward head posture and 103 (83.1%) are without forward head posture. It is evident that among neck pain participants some are without forward head posture in spite of having neck pain and among without neck pain some participants have forward head posture though they are asymptomatic which means postural problem is possible in asymptomatic participants as well. This study shows that participants with neck pain are more prone to forward head posture which shows more disability and that the participants without neck pain are more prone to postural problem.

Keywords: Neck pain, Head posture, CVA angle, Bank employees.

Received 10.04.2022

Revised 26.07.2021

Accepted 23.09.2022

How to cite this article:

S Ajmal, L Ajmal, M Ajmal, and G Nawaz. Quality and Utilization of Antenatal Care Services by Pregnant Women in Pakistan. Adv. Biores. Vol 13 [5] September 2022. 96-101

INTRODUCTION

Neck pain is a sensation of discomfort in the neck area, and it has been stated as the most common occupational health problem, commonly affecting up to 67% of the general population at some time during their life [1,2,3]. Neck pain has been found to be a major health problem for bank workers and it is reported that there is 47% prevalence for office related neck pain in India [2,4,5]. The aetiology of work related to neck disorder is multidimensional which is linked with, and impacted by, a complex array of individuals, physical and psychosocial factors [4].

Neck posture is defined as the alignment of cervical spine at a particular time. It is examined in different positions, the most common being standing and sitting [6]. Overtime the muscles and other soft tissues tighten up due to the excessive workload required to hold the head in position. This chronic overload and tightening of soft tissues may eventually result in decreased blood flow and oxygen to soft tissues, ultimately causing pain [7].

Forward head posture is the forward structural positioning of head away from the centre of the body, leading to rounded shoulder and neck pain due to an imbalance between the curvature of the spine and muscles that are attached to the neck bone [5]. Often holding the neck in forward posture and working in the same position for prolonged time is strongly associated with neck pain. There is a positive relation

between forward bending neck and neck pain, suggesting an increased risk of neck pain for those who spent a high percentage of the working time with the neck at a minimum of 20° of flexion [8].

Forward head posture is an epidemic that has become more prevalent in modern times. As the head moves forward the shoulder slumps forward so that the head is placed anterior to the trunk [9,5]. It is caused by several factors including: sleeping with head elevated too high, extended use of computer, lack of the developed back muscle strength etc. The widespread use of computers in offices in recent decade results in accompanied by a poor posture and the resultant neck pain. The relation between FHP and neck pain is still debatable. In literature, the forward head posture has not always been associated with neck pain [10], even though some evidence claims a significant difference in head posture between the patients and pain-free participants [11].

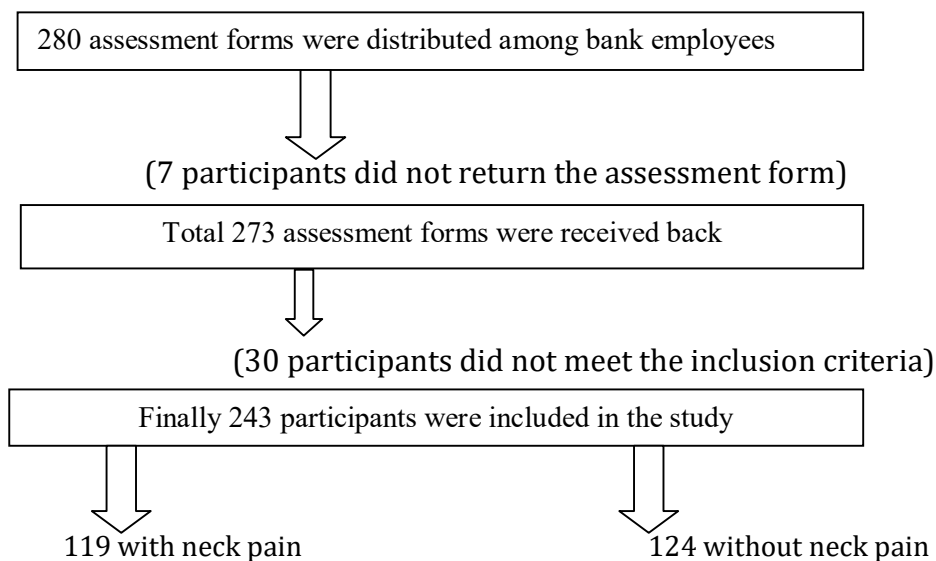
Several cross-sectional studies have described the prevalence of neck pain among bank workers [12,13,14,4]. There are many studies done on the correlation between scapular asymmetry, neck pain and head posture among different population. In one of the study it identified that scapular asymmetry, visual analogue scale (VAS) and neck disability index (NDI) showed a moderate linear relationship. However, the small sample size, limitation to females with slight neck pain and the outcome measure used to check the scapular asymmetry were less reliable [15]. Szeto et al., showed that there were trends for increased head tilt and neck flexion posture in the symptomatic subjects presenting with neck and shoulder discomfort when compared to the asymptomatic subjects. Subject selection, precise relationship between discomfort and posture became basis for future study [16]. According to Jyoti et al., it was found that scapular position is altered in computer professional with neck pain as compared to those who are not having neck pain. Establishment whether neck pain leads to altered scapular position or altered scapular position is responsible for neck pain became a debatable sense [17].

From previous studies it is clear that prevention of musculoskeletal problems like neck pain would be great benefit. As neck pain could become a chronic and disabling symptom, discovering and controlling risk factors seems to be a reasonable prevention strategy. Improper posture could be improved by education and proper reminders to decrease the prevalence of neck pain and increase the quality of life among office employees. To fulfil the drawbacks from previous study and since there is hardly any study identifying the relationship between forward head posture and neck pain among bank employees the present study aimed to find out whether neck pain is correlated with head posture among bank employees specifically who spend prolonged hours in computer desktop users.

MATERIAL AND METHODS

This cross-sectional correlation study was designed to evaluate the relationship between head posture, scapular position and neck pain in desk top users among bank employees. The study was approved by the ethical committee of Krupanidhi College of Physiotherapy affiliated to the Rajiv Gandhi University Bangalore. A written informed consent was obtained from all the subjects. All the bank employees with age group 35 - 50 years, both male and female, NPRS score more than 5, working hours 5 or more than 5 hours per day text- typing duties, working experience more than 1 year employees were included in the study. Participant with tumor, infection, or other non - mechanical cause of neck pain, spinal fractures, recent cervical surgery, congenital deformation of scapula, cervical radiculopathy, and also the employees who did not want to have their pictures taken were excluded from the study. Therefore, the study finally included 243 employees (119 with neck pain and 124 without neck pain). Postural assessment was performed for each employee individually in his/her office by a researcher. Demographic data such as gender, age, height, weight, body mass index (BMI), location and duration of pain (if any), working day per hours, history of previous treatments and history of physical activity were recorded. In this study, the researchers attempted to keep the subject's privacy during postural assessment. All the measurements were performed in the bank. The participants were asked to expose their neck.

The spinous process of C7 and tragus of ear were palpated and adhesive markers were attached over the midpoint of the most prominent parts of C7 another tragus of ear. Two prominent markers were stuck in order to help the researchers find the points in the photos during analysis. Before taking the photograph, the participant was asked to completely flex, extend the neck 3 times and put the head in a quite comfortable position. To measure forward head posture a picture of lateral view of each subject was taken. The base of the camera was set at the height of subject's shoulder. Once the picture was obtained, it was used to measure the craniovertebral angle. The angle between the horizontal line passing through the C7 and a line extending from the tragus of the ear to C7. The craniovertebral angle less than 51 degree indicate FHP, a greater FHP has a smaller CVA [18,19]. All the photos were taken using the SONY (14.1 Mpx) camera by the researcher.



Data Analysis

Data analysis was performed by SPSS (version 20) for windows. Alpha value was set as 0.05. Descriptive statistics was performed to find out frequency, percent, valid percent, cumulative percent for the demographic variable such as age and outcome variables such as neck pain (NPRS), neck posture (CVA). Pearson correlation test was used to find out the relationship between neck pain (NPRS), neck posture (CVA).

RESULT AND DISCUSSION

Table 1: Descriptive statistics for demographic Age

Age	Frequency	Percent	Valid percent	Cumulative percent
Valid 35- 39	181	74.4	74.4	74.6
40- 45	32	13.16	13.16	13.1
46-50	30	12.34	12.34	12.2
Total	243	100.0	100.0	100

Table 1 explains about the age group included in the study which is between 35 to 50 years of age both male and female. The frequency distribution is high in the age group of 35 to 39 years of age with frequency of 181 and the percentage is 74.4 while the frequency distribution is less in age group between 40- 45 and 46- 50 with frequency distribution of 32 and 30 , percentage of 13.16 and 12.34 respectively. The result shows that out of 243 participants maximum participants were between the age group of 35-39 years of age.

Table 2: Gender distribution

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	189	77.8	77.8	77.8
Female	54	22.2	22.2	100.0
Total	243	100.0	100.0	

Table 2 explains about the frequency distribution among of male and female participants in the study. In this study out of 243 participants 189 were male (77.8 %) and only 54 female (22.2%). The result shows that the frequency distribution is higher in male than the female in this study.

Table 3: CVA angle

	Frequency	Percent	Valid Percent	Cumulative Percent
With forward head posture	97	39.9	39.9	39.9
Without Forward Head Posture	146	60.1	60.1	100.0
Total	243	100.0	100.0	

Table 3 shows that out of 243 participants 97 participants (40%) had forward head posture, and 146 participants (60%) had no forward head posture. According to this table frequency distribution is more in participants with without forward head posture than with forward head posture.

Table 4: Neck pain

	Frequency	Percent	Valid Percent	Cumulative Percent
Without pain	124	51.0	51.0	51.0
With pain	119	49.0	49.0	100.0
Total	243	100.0	100.0	

Table 4 shows that out of 243 participants 124 participants (51%) were without neck pain and 119 participants (49%) were with pain. In this table it shows that frequency distribution is more in without neck participants than with pain participants.

Table 5: Correlation between neck pain and CVA angle (cross-tabulation)

		CVA ANGLE		Total	
		With Forward Head Posture	Without Forward Head Posture		
NECK PAIN	N	Count	21	103	124
		% within NECK PAIN	16.9%	83.1%	100.0%
	Y	Count	76	43	119
		% within NECK PAIN	63.9%	36.1%	100.0%
Total	Count	97	146	243	
	% within NECK PAIN	39.9%	60.1%	100.0%	

Table 5 explains about the correlation between neck pain CVA angle. This table shows that out of 243 participants 124 are without neck pain and 119 are with neck pain. Among without neck pain participants 21 (16.9%) participants have forward head posture and 103 (83.1%) are without forward head posture. Among neck pain participants 76 (64%) have forward head posture and 43 (36%) are without forward head posture. The result of this study shows that participants with neck pain are more prone to forward head posture which shows more disability, this study also shows that though some participants without neck pain can also have postural problem.

Table 6: Correlation between FHP and Neck pain

		NPRS SCORE	CVA CODE
NPRS SCORE	Pearson Correlation	1	
CVA CODE	Pearson Correlation	0.657**	1
	Number	119	119

** Correlation is significant at the 0.01 level (2- tailed).

Table 6 represents the correlation between FHP and Neck pain among 119 Neck pain participants, the correlation is significant at the 0.01 level. The results of the study are highly significant (i.e) 0.66 with positive correlation.

It is well known that Bank employees working in computer for long hours use to adapt poor posture most commonly altered head posture which causes various musculoskeletal disorders [20]. Overtime the muscles and other soft tissues tighten up due to the excessive workload required to hold the head in position. This chronic overload and tightening of soft tissues may eventually result in decreased blood flow and oxygen to soft tissues, ultimately causing pain [12]. Szeto et al. showed that there were trends for increased head tilt and neck flexion posture in the symptomatic subjects presenting with neck and shoulder discomfort when compared to the asymptomatic subjects. However, the subjects in their study were limited to female clerical staff with small sample size and the precise relationship between discomfort and posture is required for future study [17].

The purpose of this study was to find the correlation between head posture and neck pain among bank employees. 243 Bank employees (119 with neck pain and 124 without neck pain) satisfying the inclusion criteria were recruited for the study. An informed consent was obtained from the participants. Neck pain was measured using NPRS scale and forward head posture was measured through measuring CVA angle. The relation between FHP and neck pain is still debatable. In literature, the forward head posture has not always been associated with neck pain, [7] even though some evidence claims a significant difference in head posture between the patients and pain free participant [21]. There are many studies done on the correlation between scapular asymmetry, neck pain and head posture among different population. Su-Rim et al. identified that scapular asymmetry, visual analogue scale (VAS) and neck disability index (NDI) showed a moderate linear relationship. However, the sample size was small and limited to female with

slight neck pain. Moreover, they did not establish the correlation between scapular position, head posture and neck pain [16]. Present study was done to find the correlation between head posture and neck pain among bank employees. The result of the present study shows that the head posture had a positive correlation with neck pain which was statistically significant. Means less CVA angle (forward head posture) participants have more pain score or vice versa. According to Joyti et al, it was found that head posture is altered in computer professional with neck pain as compared to those who are not having neck pain. However, they did not establish whether neck pain lead to altered head posture or its altered head posture is responsible for neck pain [18].

Present study is supported according to the results of Chris Ho et al. study it has been found CV angle in subjects with neck pain is significantly smaller than that in normal subjects. Patients with small CV angle have a greater forward head posture, and the greater the forward head posture, the greater the disability [8]. The present study was done on symptomatic and asymptomatic group there was positive correlation between CV angle and neck pain which was statistically significant.

The frequency distribution is high in the age group of 35 to 39 years of age with frequency of 181 and the percentage is 74.4. The result shows that out of 243 participants maximum participants were between the age group of 35- 39 years of age. The frequency distribution is higher in male than the female. According to present study frequency distribution is more in participants with without forward head posture than with forward head posture. This study explains about the correlation between neck pain and CVA angle. Among neck pain participants 76 (64%) have forward head posture and 43 (36%) are without forward head posture. The result of this study shows that participants with neck pain are more prone to forward head posture which shows more disability, this study also shows that though some participants are without neck pain can also have postural problem. The results of present study represents the correlation between FHP and Neck pain among 119 Neck pain participants, the correlation is significant at the 0.01 level. In the present study neck posture had a positive correlation with pain which was highly statistically significant.

CONCLUSION

The study concludes and establishes that the link between head posture and neck pain has a wide impact on cranio-vertebro index and the alignment. Lack of awareness of posture while working among employees is important in causing improper posture of head and neck; so paying attention to head and neck posture during work might be a good way to decrease the poor posture. It can be introduced into the office environment by feedback methods, mirror or alarming instruments.

REFERENCES

1. Islam, S. (2012). *Prevalence of neck pain among the bank workers* (Doctoral dissertation, Bangladesh Health Professions Institute, Faculty of Medicine, the University of Dhaka, Bangladesh).
2. Louw, S., Makwela, S., Manas, L., Meyer, L., Terblanche, D., & Brink, Y. (2017). Effectiveness of exercise in office workers with neck pain: A systematic review and meta-analysis. *The South African Journal of Physiotherapy*, 73(1): 392
3. Côté, P., Cassidy, J. D., Carroll, L. J., & Kristman, V. (2004). The annual incidence and course of neck pain in the general population: a population-based cohort study. *Pain*, 112(3), 267-273.
4. Chiu, T. T. W., Ku, W. Y., Lee, M. H., Sum, W. K., Wan, M. P., Wong, C. Y., & Yuen, C. K. (2002). A study on the prevalence of and risk factors for neck pain among university academic staff in Hong Kong. *Journal of Occupational Rehabilitation*, 12, 77-91.
5. Jensen, C., Finsen, L., Sjøgaard, K., & Christensen, H. (2002). Musculoskeletal symptoms and duration of computer and mouse use. *International Journal of Industrial Ergonomics*, 30(4-5), 265-275.
6. Fernandez-de-Las-Penas, C., Alonso-Blanco, C., Cuadrado, M. L., & Pareja, J. A. (2006). Forward head posture and neck mobility in chronic tension-type headache: a blinded, controlled study. *Cephalgia*, 26(3), 314-319.
7. Magee, D. J. (2013). *Orthopedic Physical Assessment-E-Book*. Elsevier Health Sciences.
8. Yip, C. H. T., Chiu, T. T. W., & Poon, A. T. K. (2008). The relationship between head posture and severity and disability of patients with neck pain. *Manual Therapy*, 13(2), 148-154.
9. Côté, P., van der Velde, G., Cassidy, J. D., Carroll, L. J., Hogg-Johnson, S., Holm, L. W., ... & Peloso, P. M. (2009). The burden and determinants of neck pain in workers: results of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. *Journal of Manipulative and Physiological Therapeutics*, 32(2), S70-S86.
10. Kang, J. H., Park, R. Y., Lee, S. J., Kim, J. Y., Yoon, S. R., & Jung, K. I. (2012). The effect of the forward head posture on postural balance in long time computer based worker. *Annals of Rehabilitation Medicine*, 36(1), 98-104.
11. Silva, A. G., Punt, T. D., Sharples, P., Vilas-Boas, J. P., & Johnson, M. I. (2009). Head posture assessment for patients with neck pain: Is it useful?. *International Journal of Therapy and Rehabilitation*, 16(1), 43-53.
12. Green, B. N. (2008). A literature review of neck pain associated with computer use: public health

- implications. *The Journal of the Canadian Chiropractic Association*, 52(3), 161.
13. Matias, M. L., & Longen, W. C. (2018). Ergonomic risk and functional health condition of bank tellers. *Rev Bras Promocao Saude*, 31(1), 1-9.
 14. Shabbir, M., Rashid, S., Umar, B., Ahmad, A., & Ehsan, S. (2016). Frequency of neck and shoulder pain and use of adjustable computer workstation among bankers. *Pakistan Journal of Medical Sciences*, 32(2), 423.
 15. Moom, R. K., Sing, L. P., & Moom, N. (2015). Prevalence of musculoskeletal disorder among computer bank office employees in Punjab (India): a case study. *Procedia Manufacturing*, 3, 6624-6631.
 16. Kim, S. R., Kang, M. H., Bahng, S. Y., An, J. K., Lee, J. Y., Park, S. Y., & Kim, S. G. (2016). Correlation among scapular asymmetry, neck pain, and neck disability index (NDI) in young women with slight neck pain. *Journal of Physical Therapy Science*, 28(5), 1508-1510.
 17. Szeto, G. P., Straker, L., & Raine, S. (2002). A field comparison of neck and shoulder postures in symptomatic and asymptomatic office workers. *Applied Ergonomics*, 33(1), 75-84.
 18. Dahiya, J., & Ravindra, S. (2013). Effect of scapular position in computer professionals with neck pain. *International Journal of Science and Research*, 4(5), 2075-80.
 19. Vincent, J. D., & Yamuna, K. (2017). Correlation of the scapular position and neck pain in auto drivers. *J Physiother Res*, 2(1), 12.
 20. Alexopoulos, E. C., Tanagra, D., Konstantinou, E., & Burdorf, A. (2006). Musculoskeletal disorders in shipyard industry: prevalence, health care use, and absenteeism. *BMC Musculoskeletal Disorders*, 7(1), 1-10.
 21. Janwantanakul, P., Pensri, P., Jiamjarasrangsi, W., & Sinsongsook, T. (2010). The relationship between upper extremity musculoskeletal symptoms attributed to work and risk factors in office workers. *International Archives of Occupational and Environmental Health*, 83, 273-281.

Copyright: © 2022 Society of Education. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.