

ASSOCIATION OF FORWARD HEAD POSTURE WITH NECK PAIN AMONG BANKERS OF HAYATABAD PESHAWAR: A CROSS SECTIONAL SURVEY

Said Khaliq^{*1}, Ramsha Imran², Marukh Nisar³, Hafiz Yaseen Khan⁴

^{*1,2,3}Physical therapist, Peshawar Pakistan,

⁴Lecturer in Health sciences department City University of science and information technology,
Peshawar Pakistan.

^{*1}Saidkhan8007@gmail.com, ²dryaseenkhan11@gmail.com

ABSTRACT

Background: Different factors such as prolong sitting at work or abnormal posture of head during work may have great role in occurrence of neck pain among those who use computer. In literature forward head posture has not always been associated with neck pain.

Objective: To determine the association between forward head posture with neck pain among bankers of Hayatabad Peshawar, Pakistan.

Methods: It was cross sectional study to explore association between forward head posture and neck pain. 86 bankers were examine using photogrammetry method and web plot digitizer software for plotting angle on digital image. Numeric pain rating scale and neck disability index questionnaire was use to measure neck pain and intensity.

Results: Most of the participants 80.2% had forward head posture. Majority 47.7% were in age between 20-30 and having mean age 33.8±8.8. The mean score of neck disability index was 5.88±4.9. The chi square test showed no significant association ($P>0.05$) between forward head posture and neck pain.

Conclusion: This study concluded that forward head posture is quite common in bankers but there is no association between forward head posture and neck pain.

Keywords: Forward head posture, craniocervical angle, neck pain, web plot digitizer, bankers, and computer users.

INTRODUCTION

Neck pain (NP) is a common disorder of cervical region between occipital bone and 1st thoracic vertebra (T1) characterized by pain discomfort and tenseness which may or may not be referred to upper limb (1, 2). Neck pain is a musculoskeletal disorder cause by postural disturbance causing functional limitations (3). Neck pain is the 4th highest leading cause of disability (2). Neck pain is a common condition effecting people both physically and economically (4). Neck pain highly affects an absolute increase in number of patients (5). Globally, the prevalence of neck pain ranges from 16.7% to 75.1% (6). In Finland NP prevalence was 5750.3, in Norway NP prevalence was 6151.2, in Denmark NP prevalence was 5316 per 100000 population. Point prevalence of NP in United Kingdom was 14.6%, in Sweden NP prevalence was 10.4%, in Kuwait NP prevalence was 2.6% (7). In Netherland NP point prevalence varies between 6% and 22% in 1 year prevalence between 1.5 % and 75% (4). In Hong Kong NP lifetime prevalence was 65.4%, 12 month prevalence was 53.6 % (8).

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Neck pain is common among children and adults as neck symptoms are mostly associated with sustaining poor posture during work and study (9). People with poor posture complain more of headache as pain follows pattern with tightness in upper cervical vertebrae and muscles of neck rising to posterior and then anterior scalp(10). Neck pain is commonly reported health problem leading to economic burden. People face different work related problems such as absentee from work due to NP (11). NP leads to decrease in quality of life and working capacity of workers (12).

Neck pain is mostly associated with occupational categories who work >6 hour/day on a computer sitting in a non-neutral spine posture (13). Forward head posture is the most common poor posture contributing to neck pain (9). Office workers and people with sedentary lifestyle are at risk for neck pain due to prolong work time or poor postures such as unfitting neck flexion and rotation .Inappropriate placement of computer (not placed in front) contributes to NP as an important risk factor in computer users(12).

Whiplash associated injury or disorder is one of the main causes of NP in approximately 50% of cases (14). 95% people who experience mechanical injury (traumatic injury) were facing the issue of persistent NP while based on the study on 1500 patients in emergency department (15).

Non-specific neck pain is neck pain with idiopathic cause of unknown pathology and causes no or less disturbance with daily life activities (16, 17). Nonspecific neck pain is very common and concerned problem worldwide for office workers (17). This work related neck pain is persistent, long lasting and is recurrent in nature (18). Also adolescent period is very tactful period of life where NP may develop and impact daily activities and further future health (19).

Neck pain has substantial effect on people and their surroundings, including their daily activities. According to a study it was concluded that rate of occurrence of NP is higher in office workers and also people who use computers (20). Global burden of disease declared NP as the 4th main reason for prolong disability. Epidemiological studies show an annual prevalence of NP ranging from 15% to 50% (21). Almost 50-85% people who have NP experience reappearance of pain after 1-5 years without complete cure of symptoms (16).

Forward head posture is a disorder of neck which is also known as ‘text neck’, ‘tech neck’, ‘scholars neck’, ‘wearies neck’, ‘hunch’, ‘reading neck’(22-24). Most frequently observed atypical posture of cervical spine in outpatient department (OPD) is FHP. FHP is defined as head protruding forward, anterior to the trunk and plumb line or center line of the body (22, 23). It is the structural forward bending causing lower cervical spine (c4-c7) flexion and upper cervical spine (c1-c3) hyperextension (25). Adaptation of divergent posture of body is related with pain in neck region (26). Prolong computer and smart phone use have led to musculoskeletal (MSK) disorders by increasing anterior weight bearing of cervical spine causing change in biomechanics(23).

FHP affects huge number of population and causes consequential neck pain. Patients reporting neck pain for a long time were presented with FHP (27). Globally, 1 year prevalence of FHP was 16.5-75.1% in people aged 17-70 years. FHP prevalence in patients with neck pain was 37% (23). FHP prevalence in patients with neck pain who use computers was 61.3% (27). Prevalence of FHP among university students of Pakistan was 63.96% (28) while among university students of Malaysia prevalence was 67%. A study on healthy subjects showed 66% of FHP prevalence (29). In dental staff FHP prevalence was 85.5% (30). In adolescents FHP prevalence was 53.5% (31). In a study on heroin users prevalence of FHP was 36.7% of moderate FHP and 20.0% severe FHP (32).

Increase in FHP occurs due to maintaining poor posture for prolong periods of time in daily life activities. Contributing factors include age, gender, occupation, physical activities (29). FHP mainly occurs due to using high pillows which causes head elevation higher than normal, prolong use of laptops, computers and smart phones, due to nutrient deficiency and lack of back muscle strength(24).Maintaining poor posture during computer work causes even more worst neck pain that is associated with forward head posture(28).

Normal posture of neck is when the acoustic meatus is in line with the center line of body (27). Due to FHP the mass center or point of balance move forward and causes stress on muscles leading to muscle imbalance (28). FHP leads to rounded shoulders and upper cross syndrome which further causes reduction in cervical lordosis and kyphosis. If not treated it causes shortening of neck extensors leading to chronic neck pain (29).

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FHP also effects cervical range of motion, spinal curvatures like increase in thoracic kyphosis and reduction in lumbar lordosis, reduced neck flexion, extension and rotational range of motion (24).

Normal posture is the balanced position in which there is slightest stress and strain on muscles and bones. Sitting with a faulty posture for prolong period of time leads to changes in body alignment as head moves forward and weigh more and causes the supporting head and neck muscle fatigue. Weight on spine increases due to FHP leading to disturbance of normal spinal curvatures and increased stress on spine, causing deterioration and depletion of neck muscles (22). FHP weakens deep cervical flexor muscles, mid thoracic rhomboid muscles and mid and lower trapezius. FHP shortens pectoralis major and neck extension muscles. Increase in upper trapezius activity leads to increase in fatigue and stress which further cause pain in neck from muscle overuse (33).

During adolescence people are more prone to develop poor posture. Prolong use of computers and smart phones cause disorder by sitting in wrong posture for long period of time. Sitting with deviated posture exert 3.6x more force and stress on muscles than in normal posture (25). Neck pain caused by FHP has high epidemiological incidence rate by many etiological factors. Epidemiology shows that FHP occurs from puberty and is the most common neck deviation (26).

Forward head posture is increasing greatly nowadays due to abnormal posture in office workers and that abnormal posture also effects neck muscles and causes neck pain. Work has been done on forward head posture and neck pain in various foreign countries on different people of different profession. In developing country like Pakistan there was no study found on forward head posture associated with neck pain especially on bankers of Pakistan. Therefore this study is designed to find out association between forward head posture and Neck pain among bankers of Hayatabad Peshawar.

Objective

To determine the association of Forward head posture with neck pain among bankers of Hayatabad Peshawar, Pakistan.

Methods And Materials

Study design was cross sectional study, it was conducted at banks of Hayatabad Peshawar. The sample size was 86 participants with confidence interval at 95% and keeping the hypothesize 50% proportion of outcome factor in the population (p). The sample size was calculated using sample size calculator i.e Raosoft . Sample size was Non-probability convenient sampling. The study was completed within six months after approval of proposal by research committee of MMI.

The inclusion criteria for this study were as follows: participants must be bankers who have been employed in their current role for a minimum of six months. The age range of eligible participants was between 20 and 60 years, encompassing both male and female individuals. Additionally, only bankers who work an average of six hours per day were included in the study, ensuring that the sample represents individuals with consistent work schedules and relevant experience within the banking sector. This selection criteria aimed to provide a representative sample of professionals actively engaged in banking activities.

The exclusion criteria for this study included industrial workers who were either unwilling to participate or those with physical disabilities that could impact their ability to engage in the study. Additionally, workers who were diagnosed with any systemic diseases that might interfere with the study's objectives were excluded. Also, individuals working double shifts, specifically those assigned both morning and evening shifts, were not considered for participation, as their work schedules could potentially introduce variability that might affect the results. These criteria ensured that the study focused on a specific group of participants with consistent work conditions.

Results

Neck Disability Index Categories

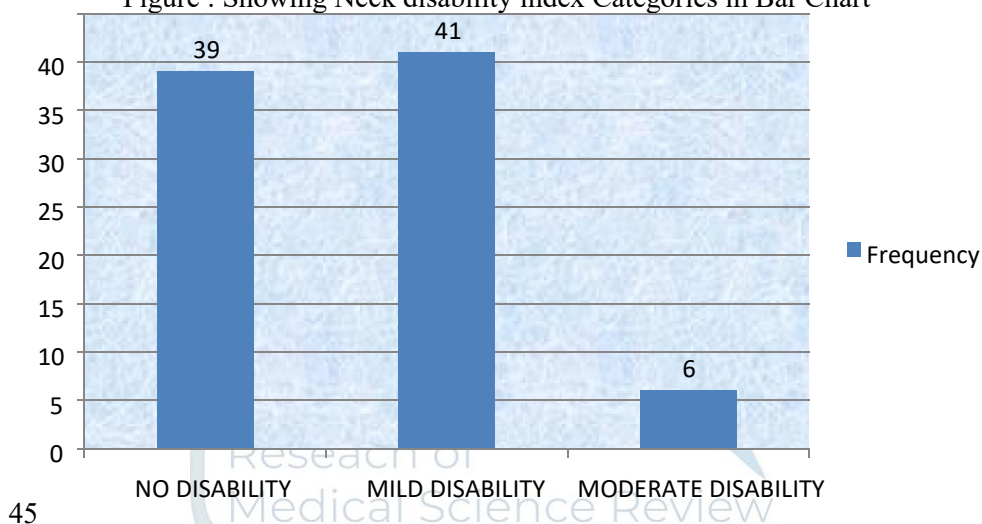
The number of participants was 86, out of which 45.3% i.e. (n=39) were with no disability, followed by 47.7% i.e. (n=41) were with mild disability, and 7% i.e. (n=6) were with moderate disability.

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Table 1: Showing the Neck disability index Categories

NDI CATEGORIES	Frequency	Percent	Cumulative Percent
NO DISABILITY	39	45.3	45.3
MILD DISABILITY	41	47.7	93.0
MODERATE DISABILITY	6	7.0	100.0
TOTAL	86	100.0	

Figure : Showing Neck disability index Categories in Bar Chart



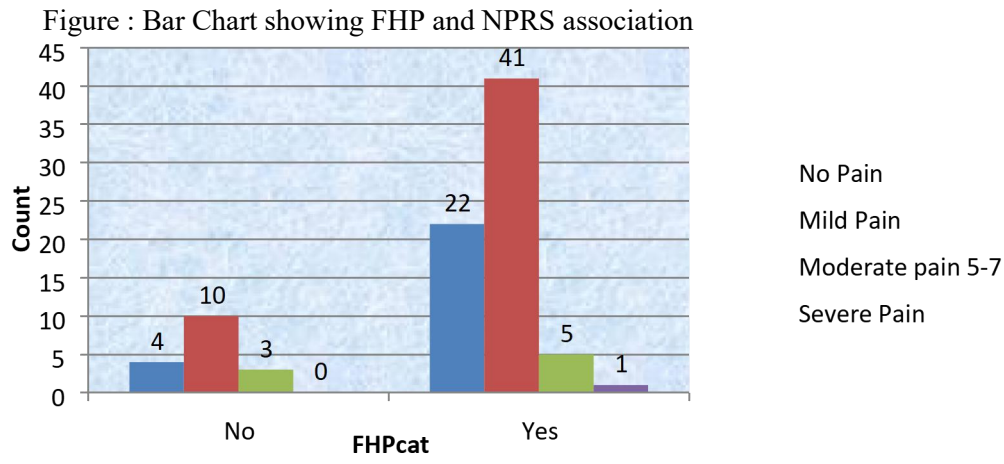
Numeric Pain Rating Scale And Forward Head Posture Association

Out of 86 participants 17(100%) were with no FHP including 23% (n=4) with no pain, 58.8% (n=10) with mild pain and 17.6% (n=3) with moderate pain. Remaining 69 (100%) participants were with FHP including 31.9% (n=22) with no pain, 59.4% (n=41) with mild pain, 7.2% (n=5) with moderate pain and 1.4% (n=1) with severe pain. P-value is 0.542 which is greater than 0.05 which shows no association.

Table : FHPcat and NPRScat Cross Tabulation

FHPcat		No Pain	Mild Pain 1-4	Moderate pain 5-7	Severe Pain 8-10	Total	Pvalue
No	Count	4	10	3	0	17	.542
	% within FHPcat	23.5%	58.8%	17.6%	0.0%	100.0%	
Yes	Count	22	41	5	1	69	
	% within FHPcat	31.9%	59.4%	7.2%	1.4%	100.0%	
Total	Count	26	51	8	1	86	
	% within FHPcat	30.2%	59.3%	9.3%	1.2%	100.0%	

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Forward Head Posture And Neck Disability Index Association

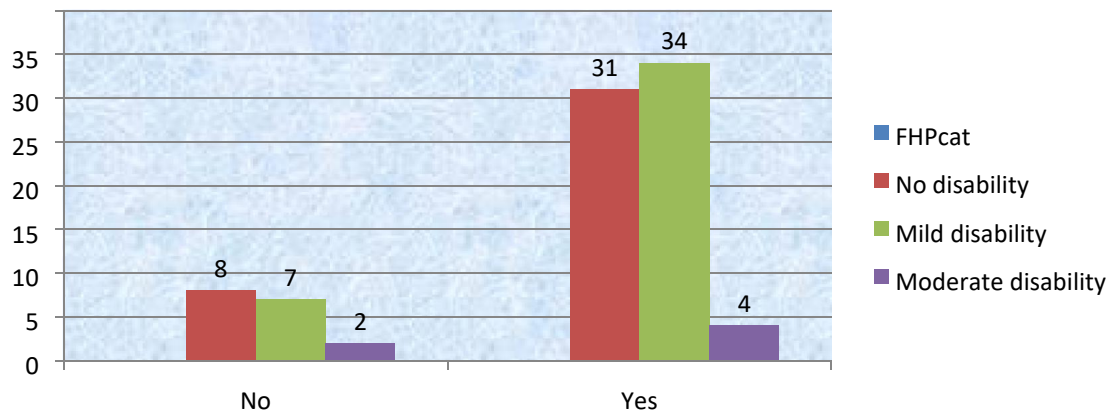
Out of 86 participants 17 (100%) were with no FHP including 47.1% (n=8) with no disability, 41.2% (n=7) with mild disability and 11.8% (n=2) with moderate disability. Remaining 69 (100%) participants were with FHP including 44.9% (n=31) with no disability, 49.3% (n=34) with mild disability, 5.8% (n=4) with moderate disability. P-value is 0.638 which is greater than 0.05 which shows no association.

Table : Forward head posture & Neck disability index Association

	FHPcat	No disability	Mild disability	Moderate disability	Total	pvalue
No	Count	8	7	2	17	.638
	% within FHPcat	47.1%	41.2%	11.8%	100.0%	
Yes	Count	31	34	4	69	
	% within FHPcat	44.9%	49.3%	5.8%	100.0%	
Total	Count	39	41	6	86	
	% within FHPcat	45.3%	47.7%	7.0%	100.0%	

Figure 6: Bar Chart Showing the FHP and NDI Association

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Numeric Pain Rating Scale And Neck Disability Index Association

Out of 86 participants 39 (100%) people were with NO DISABILITY including 61.5% (n=24) with no pain, 35.9% (n=14) with mild pain, 2.6% (n=1) with moderate pain. 41 (100%) out of 86 participants were with mild disability including 4.9% (n=2) with no pain, 85.4% (n=35) with mild pain, 9.8% (n=4) with moderate pain. 6 (100%) out of 86 participants were with moderate disability including 33.3% (n=2) with mild pain, 50% (n=3) with moderate pain, 16.7% (n=1) with severe pain. P-value is 0.000 which is smaller than 0.05 showing association.

Table 4: NDI categories and NPRScat Cross tabulation

NDI Categories		No Pain	Mild Pain 1-4	Moderate Pain 5-7	Severe Pain 8-10	Total	pvalue
No Disability 0-4	Count	24	14	1	0	39	.000
	% within NDI categories	61.5%	35.9%	2.6%	0.0%	100.0%	
Mild Disability 5-14	Count	2	35	4	0	41	
	% within NDI categories	4.9%	85.4%	9.8%	0.0%	100.0%	
Moderate Disability 15-24	Count	0	2	3	1	6	
	% within NDI categories	0.0%	33.3%	50.0%	16.7%	100.0%	
Total	Count	26	51	8	1	86	
	% within NDI categories	30.2%	59.3%	9.3%	1.2%	100.0%	

Age And Fhp Association

We recruited bankers of age 20-60, out of total 86 participants 17 reported no FHP including 10 participants of age 20-30, 5 participants of age 31-41, 2 participants of age 41-50. 69 participants reported FHP including 31 participants of age 20-30, 24 participants of age 31-40, 10 participants of age 41-50 and 4 participants of age 51-60. P-value is 0.631 which is greater than 0.05 showing no association.

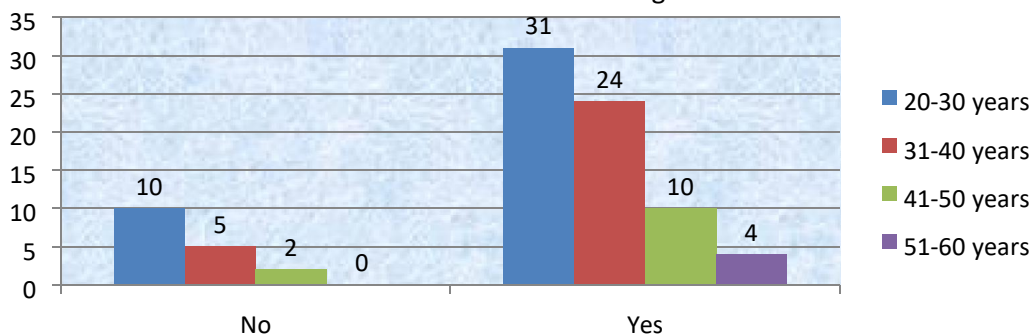
Table: FHP cat and Age categories Cross tabulation

FHPcat		20-30 years	31-40 years	41-50 years	51-60 years	Total	P value
No	Count	10	5	2	0	17	.631

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	% within FHPcat	58.8%	29.4%	11.8%	0.0%	100.0%
Yes	Count	31	24	10	4	69
	% within FHPcat	44.9%	34.8%	14.5%	5.8%	100.0%
Total	Count	41	29	12	4	86
	% within FHPcat	47.7%	33.7%	14.0%	4.7%	100.0%

Figure 7: Bar Chart Showing FHP cat and A categories Cross tabulation



DISCUSSION:

Forward head posture is the anterior translation of head to the center line of the body which results in variations in the upper and lower cervical spine(25). FHP is more frequently present in computer users as a result of prolonged sitting and improper posture. Neck pain is the pain or irritation in the cervical region caused by postural disturbance (1-3). Computer users due to their positions are at high risk for improper posture and MSK disorders(35).

In this study we assessed different variables and its association with FHP using photogrammetry method. The bankers participated in this study were 86 in total, from age 20-60 having mean age of 33.8 ± 8.8 . The bankers ranging between 20-30 years were 41(47.7%), ranging between 31-40 years were 29(33.7%), ranging between 41-50 years were 12 (14.0%) and range between 51-60 years were 4 (4.7%). In contrast other studies reported different age categories. In a study with age categories ranging from 18-28 having mean age 22.2 ± 2.48 concluded that forward head posture has no effect on neck pain (48). Another study conducted in Iran having mean age value 39 ± 8 which is somewhat relative to current study concludes that there is no relation between age and neck pain relating forward head posture (1).

Spending a lot of time in front of computer in working hours while sitting in faulty posture for extended time leads to FHP and NP (1). Total bankers participated were 86 out of which 17 (19.7%) reported no FHP and 69 (80.2%) reported FHP. The participants with no disability were 45.3%, those with mild disability were 47.7% and participants with moderate disability were 7%. A study in Portugal concluded that there is association between forward head posture and neck pain of longer duration (34). Another study in Korea also showed conflicting results concluding that participants with neck pain had a decreased Cranio vertebral angle resulting association between both the variables and suggest that FHP can be predictor of pain (3). Three combined studies on adults showed more FHP with neck pain. While another study on adults >50 reported that there was no association of FHP with NP. In adolescents there is no significant difference between FHP and people with and without neck pain which is concluded by 3 combined studies (36). A study conducted in Europe discussing work related physical factors and neck pain revealed that NP was significantly associated with computer working time while previous studies were inconsistent about it(37).The results were not significant as participants have consistent breaks and equally deal with clients as they use computer. Another study conducted in India on desktop users using computer 3-4 hours average showed contrasting results, the participants were of age 30-40 reveals that there is no significant association between FHP and NP(49). A study conducted in Iran on office workers concluded that FHP was only related to NP in working position and there was no association between NP and FHP in neutral forward looking position (1), this quietly

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relates with our study as we measured FHP in neutral position of standing rather than working position as we were not permitted by bank managers. The degree of angulation of the chair's backrest support is an important factor that should be taken into account when considering seating adjustments that are likely to influence head and neck posture (50).

In this study we checked neck disability index categories, which are no, mild, moderate, severe and complete disability. Among them the most reported category was mild disability. Furthermore FHP was correlated with age had P value of $p=0.631 >0.05$ showing no association between age and FHP. In addition we associated FHP with neck disability which also showed no association having P-value of $p=0.638 >0.05$.

Conclusion

This study concluded that forward head posture is quite common in bankers but there is no association between forward head posture and neck pain.

Limitations

This study focused on bankers in Hayatabad, Peshawar, with a small sample size due to limited access during the COVID-19 pandemic. Many female bankers declined to have their pictures taken, and several bank managers refused permission for data collection due to confidentiality concerns.

Recommendations

This study should be conducted on provincial level and longitudinal study should be performed for good inter and intra rater reliability. Population and sample size should be larger.

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