RELATIONSHIP BETWEEN NECK PAIN, FUNCTIONAL DISABILITY AND WORKSTATION FACTORS AMONG COMPUTER USERS IN FAISALABAD, PAKISTAN

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HIGHLIGHTS:

- An analytical observational study on 216 computer users was done within four months, from February 2022 to June 2022.
- The result showed that 18.5% of computer users had rated mild pain, 27.8% had rated moderate pain, and 37.5% had rated severe pain.

ABSTRACT

Background: Neck discomfort is frequent among people in developed countries and a common cause of economic burden for sick leaves. Neck difficulties at work are widespread among office employees, especially those who spend much time on the computer. **Objective:** To find the relationship between neck pain & neck disability with workstation factors, including the type of computer, type of office chair, duration of computer usage, and effect of a break during work. **Methodology:** A cross-sectional study was conducted on 216 office workers (computer users) in Faisalabad from February 2022 to June 2022. Data were collected through a non-probability convenient sampling technique. The study equipment consisted of a standardized questionnaire with demographic variables, the number of computer use hours per day, type of computer, chair, VAS and NDI questionnaires. **Results:** Out of the 216 participants (the mean age 30.42±6.962years), 115 (53.2%) were females, and 101 (46.8%) were males. The result showed that 18.5% of computer users rated their pain as mild, 27.8% rated moderate, and 37.5% were severe. A positive relationship among the duration of computer use and taking a break during work with VAS and NDI was found. At the same time, there was a negative relationship between the type of chair and system use with VAS and NDI. **Conclusion:** A substantial positive relationship between neck pain & functional disability with the duration of computer use. As the duration of work increases, neck pain and functional disability increase. **Keywords:** Computer users, Neck pain, Functional disability, Office workers, Visual analog scale, Neck disability index

INTRODUCTION

During the last several decades, musculoskeletal problems have become more prevalent worldwide. It is a dominant reason for work-related ailment, increasing workers' financial burden. Neck discomfort is one of the most common health issues in today's society. Due to additional strain & pressure on the cervical and thoracic region, its intensity, frequency, and severity are also rising.[1]Pain is an unpleasant and unwelcome sensation that the body experiences under specific conditions. The physical aspect of pain is chiefly due to Nerve stimulation. Like fibromyalgia, either pain can be dispersed in surrounding regions, or it can be locally present to the point of origin.[2,3]It is considered that the discomfort in the cervical spine segment is complex, involves multiple parts, and can be caused by numerous predisposing factors. The predominant risk factors comprised improper posture,

prolonged but persistent stress on the musculoskeletal system, poor ergonomics[4], human behaviour, psychological factors, life participation in society, and work-related factors, including workstation ergonomics.[5]

Neck discomfort is frequent among people in developed countries and a common cause of economic burden for sick leaves. Work-related neck ailments are frequent among office employees, particularly those who use computers extensively. Because of rising computer-based tasks at work and leisure activities, individuals are using computers for more extraordinary lengths of time every day throughout the world. The introduction of computers into the workplace has resulted in changes in job organization and a different utilization of workers' physical and mental capability.[6] Neck problems have been coupled to inappropriate computer screen height with eye level, strains at the shoulder & elbows regarding unsuitable computer screen height, poor ergonomics to use a computer mouse by raising or lowering the shoulders,[7]and key-board station at the wrong angle & height.[8] Technical advancements induce multiple of these conditions and damages (e.g., faster and more powerful computers), more significant usage of repetitive movements, competitive work situations, inflexible workstation design, and a lack of education/training on good workstation design.[9]

A perfectly positioned neck has a slight lordotic curvature. Prolonged computer usage, as well as sitting with rounded shoulders and poor neck posture, disrupts the typical lordotic curve of the neck, resulting in muscle imbalance and, ultimately, neck discomfort.[10] Awkward posture, extended sitting, working in the computer industry for more than six years, and increased screen-timing of five hours regularly are considered the predominant provocative factors for symptoms in the muscular and skeletal systems. Proper postures are thought to be a condition of musculoskeletal equilibrium with minimum stress and strain on the body. Even though proper posture is desired, many people do not demonstrate it. When the external auditory meats are aligned with the vertical postural line, this is considered a good posture. Proper posture helps to keep the musculoskeletal balance in balance. Forward head position is the most typical result of improper posture in computer workers (FHP). The C3-C7 spinal vertebras are forwardly bent; simultaneously, the C1 and C2 segments are backwardly bent. Protracted shoulders are frequently seen. [11] Therefore, this investigation aimed to determine the association between neckache, activity limitation of the cervical spine and workstation factors among computer users in Faisalabad.

MATERIALS AND METHODS

It was an analytical observationalresearch design, finished within four months after the acceptance of the synopsis from February 2022 to June 2022. Data were collected from office workers (computer users) of Faisalabad through a non-probability convenient sampling technique. A sample size of 196 was calculated through this formula;

$$n = \frac{Z2 \times P\ (1 - P)}{e2}$$

In which, P= 0.522[11]
e= 0.07
Confidence interval (CI) = 95% or (0.95)
Z= 1.96
Nevertheless, for the accuracy of the results, a total of 216 office workers participated in this study after fulfilling the eligibility criteria and taking informed consent. Research ethics were

strictly obeyed under the authorization of the Research Committee of The University of Faisalabad. Eligibility criteria were; all participants with age 20-45 years[12], both male and female computer users and mainly participants computer usage more than 3 hours/day, and computer users whose cervical spine was affected by any distinct medical issue (such as cancer, RA, ankylosing spondylitis, and infection) were not the part of this study. The study equipment consisted of a standardized questionnaire with demographic variables (age, gender), the number of computer use hours per day, type of computer, chair, the Visual Analogue Scale (to assess pain), and Neck Disability Index (NDI) to measure functional disability. Both scales are valid and reliable, with r=0.77[13] and r=0.979[14], respectively. There are ten items in NDI, each score 0-5, and the highest score is 50.[15]Visual Analogue scale (VAS) is a measuring instrument to measure pain. The scale consists of 0-10 numerical. "0" means "no pain," and "10" means "Extreme pain".[16,17] SPSS version 21 was used to analyze data. Percentages and frequencies were briefed for categorical variables, and mean ±SD was portrayed for continuous data. Person correlation was applied to find the relationship between VAS & NDI and type of system in use, number of computer usage hours, type of chair, and break between working hours. P = <0.05 was regard edas influential.

RESULTS

Out of the 216 participants (the mean age30.42±6.962years). The minimum and maximum ages for computer users were 20 and 45, respectively. Out of 216 computer users, 71 (32.9%) participants were banker, 31 (14.4%) were receptionist, 59 (27.3%) were computer operators and 55 (25.5%) were students. On asking about the type of system used, 85 (35.9%) computer users used desktops, 111 (51.4%) used laptops, and 20 (9.3%) used notebooks. Of 216 computer users, 137 (63.4%) were back-supported, and 79 (36.6%) used back-supported and head-supported chairs.(Table 1)

Table 1: Descriptive statistics of Demographic Data

Age	
Mean±Standard Deviation	30.42±6.962years
Gender	**Frequency and Percentage**
Male	101(46.8%)
Female	115 (53.2%)
Occupation	**Frequency and Percentage**
Banker	71(32.9%)
Receptionist	31(14.4%)
Computer operator	59(27.3%)
Student	55(25.5%)
Type of system in use	**Frequency and Percentage**
Desktop	85 (39.4%)
Laptop	111 (51.4%)
Notebook	20(9.3%)
Type of chair use	**Frequency and Percentage**
Back supported	137 (63.4%)
Back supported + head supported	79 (36.6%)

On asking about the duration of computer use per day, 35 (16.2%) spent 3-4hours, 40 (18.5%) spent 5-6 hours, 60 (27.8%) spent 7-8 hours, and 81 (37.5%) spent 9-10 hours per day. Of 216 computer users, 181 (83.8%) experienced pain, and only 35 (16.2%) computer users have not experienced any pain. On asked to rate their pain on VAS, 40 (18.5%) computer users rated their pain as 1-3, which means mild pain, 60 (27.8%) rated their pain as 4-6 means mild pain, and 81 (37.5%) were rate pain as 7-10 means severe pain. Only 35 (16.2%) computer users rated the pain as 0 means no pain**.** In the final Scoring of Neck Disability Index, 60(27.8%) of computer users had mild disability, 51(23.6%) had moderate disability, and 30(13.9%) had a severe disability in the study.(Table 2)

Table 2: Descriptive statistics of VAS and NDI

Variable	Construct	F	%
No. of hours of daily computer use	3-4 hours	35	16.2%
	5-6 hours	40	18.5%
	7-8 hours	60	27.8%
	9-10 hours	81	37.5%
Experience neck pain	Yes	181	83.8%
	No	35	16.2%
Do you take break during work	Yes	40	18.5%
	No	176	81.5%
Rate your pain on VAS	No pain	35	16.2%
	Mild pain	40	18.5%
	Moderate pain	60	27.8%
	Severe pain	81	37.5%
Neck disability index (NDI)	No disability	75	34.7%
	Mild disability	60	27.8%
	Moderate disability	51	23.6%
	Severe disability	30	13.9%

In the present study, there was a significant positive relationship between no. of hours of daily computer use, taking breaks during work, and the visual analog scale (VAS) with the valuesof (r=.761) and (r=1.000). There was a negative relationship between system type, chair type, and pain on the visual analog scale (VAS) with the values of (r= -.322), (r= -.876) and the P-Value <0.01. Furthermore, there was a significant positive relationship between no. of hours of daily computer use, taking breaks during work, and neck disability index (NDI) with the values of (r=.909) and (r=.528). There was a negative relationship between the type of system, type of chair, and pain on neck disability index (NDI) with the values of (r= -.260), (r= -.804) and the P-Value was <0.01.(Table 3)

Table 3: Cross-tabulation of VAS and NDI with type of chair, system, hours of computer use and breaks during work

		Type of System is in Use	No. of Hours of Daily Computer Use	Type of chair in use during work	Do you take breaks during work?
Rate you pain on VAS	Pearson Correlation	-.322**	1.000**	-.876**	.761**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	216	216	216	216
Functional disability (NDI)	Pearson Correlation	-.260**	.909**	-.804**	.528**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	216	216	216	216

DISCUSSION

Neck discomfort is thought to have a multivariate origin, which means that a variety of risk factors may be involved in its onset. The most significant contributing factors to neck pain are thought to be long-term, poor posture, and moderate - intensity strain [4], participant (history of musculoskeletal pain, age, genetic material, and body mass index), behavioural (smoking and the amount of physical activity), and psychosocial (stress level, fear, and depressed mood, and job satisfaction).[5]

In this study, 216 computer users participated with a mean age of 30.42±6.962years. The minimum and maximum ages for computer users were 20 and 45, respectively. In this current study, the association between neck pain and functional disability with the type of computer, type of chair, duration of computer use, and effect of a break during work. Occupation, Total duration of computer users per day, and type of chair use, used were noted. They were also asked about taking breaks during work. The computer users were also asked about the pain intensity and disability.

The results demonstrated that 71 (32.9%) participants were bankers, 31 (14.4%) were receptionists, 59 (27.3%) were computer operators, and 55 (25.5%) were students. About 85 (35.9%) computer users used desktops, 111 (51.4%) used the laptop, and 20 (9.3%) used notebooks. The result portrayed that 18.5% of

computer users rated their pain as mild pain, 27.8% rated their pain as moderate pain, and 37.5% as severe pain. In this study, there was a negative relationship between the type of system, neck pain, and neck functional disability as the value of (r= -.260 to -.322). There was no pain from using the notebook, mild to moderate functional disability associated with the desktop, and moderate to severe pain associated with using a laptop, as the p-value is less than 0.01. Another study by F Sabeen et al. in 2013 stated that 76% utilized desktop computers, while 24% used laptops and other devices. There was no association between neck discomfort and computer system type (p = 0.076).[10,18]

The result revealed that 35 (16.2%) were spending 3-4hours, 40 (18.5%) spent 5-6 hours, 60 (27.8%) spent 7-8 hours, and 81 (37.5%) spent 9-10 hours per day. There was a significant positive relationship between duration of computer use, pain, and functional disability as the value of (r= .909 to 1.00) with the p-value <0.01. A study by F Sabeen et al. in 2013 articulated that out of 50 participants, 58 percent operated a computer for more than 5 hours, with 27.7 percent experiencing radiating discomfort and 72.3 percent experiencing localized pain in the neck. A notable association was found between prolonged computer use and neck pain.[10]A study by S Kumar et al. in 2013 determined a significant relationship between impairment, pain severity, and working hours among computer workers with neck and back pain.[7] The result exhibited that 137 (63.4%) used back-supported and 79 (36.6%) used back-supported and head-supported chairs. In the study, there was a negative relationship between the type of chair, neck pain, and neck functional disability (r= -.876 to -.804) with a p-value <0.05. A study by Vora T et al. explored that Ninety-two percent of computer users sat in a chair with back support, while the remaining eight percent sat in a chair with extra head support. There was no significant link between the kind of chair used in prolonged sitting and the occurrence of neck discomfort (p = 0.889).[10,19]

The result depicted that 181 (83.8%) experienced pain working without taking intervals during computer use. There was a substantial positive relationship between taking breaks during computer use, pain, and functional disability (r= .761 to .528) with the p-value <0.01. F Sabeen et al. expressed that 52% of computer operators worked without taking breaks. Neck discomfort was shown to have a significant relationship with not taking any breaks at work (p = 0.001).[10]Shah M et al. have indicated that taking regular pauses when using a computer for an extended period might aid in freeing stress on the cervical and lumbar spines.[20] Environmental changeover and preventive actions might also be included in the investigation. Additional aspects like sleep disruptions and tension can also contribute to neck pain in computer users. Those factors should be assessed in future research.

CONCLUSION

There was a significant relationship between neck pain and functional disability with the workstation factors. There was a significant positive association between no. of hours of daily computer use, taking breaks during work, and pain & functional disability. At the same time, there was a negative relationship between system type, chair type, and pain & Functional disability.

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