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Assessment of postural discomfort experienced by computer users

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Abstract

In the modern digital environment, prolonged computer use has become routine for work, study and communication, but it often results in static postures and repetitive movements that increase the risk of postural discomfort and musculoskeletal disorders (MSDs). This descriptive study aimed to assess the prevalence, severity, and impact of postural discomfort and to identify key risk factors among computer users. Data were collected from 30 purposively sampled participants through a structured online questionnaire covering demographic details, computer usage patterns, sitting postures, musculoskeletal symptoms, and ergonomic practices. Results showed that the majority of respondents were young adults with bachelor's or master's degrees and five to ten years of regular computer usage experience. The findings revealed high prevalence of neck pain, back pain, shoulder pain, wrist/hand pain, eye strain, and headaches, with eye pain and headaches reported as severe by over 80% of participants. Poor sitting postures, such as slouching and forward leaning, were frequently adopted and rated poorly for comfort, whereas the neutral posture was rated more positively. The study also found a strong positive correlation ($r = 0.91$) between the severity of musculoskeletal symptoms and their impact on work performance, demonstrating that increased discomfort directly reduces productivity. Encouragingly, most users showed awareness of basic ergonomic principles, with many adjusting monitor and chair heights to elbow level and using keyboard trays to maintain neutral postures. This study concludes that while awareness of ergonomic practices exists, further practical interventions and training are essential to reduce the risk of chronic discomfort and long-term MSDs. The findings provide evidence to inform employers, occupational health professionals, and computer users about the importance of improving workstation ergonomics and promoting healthy postural habits to safeguard well-being in increasingly digital work environments.

Keywords: Postural discomfort, musculoskeletal disorders, ergonomics, computer users, workstation design, occupational health

Introduction

In the modern digital workplace, computers are indispensable tools for tasks ranging from data processing and online communication to design and education. However, prolonged computer use often requires static postures and repetitive movements, which are strongly associated with postural discomfort and musculoskeletal disorders (MSDs). Numerous studies have shown that computer users commonly experience discomfort in the neck, shoulders, lower back, and wrists due to poorly designed workstations, improper monitor heights, non-adjustable chairs, and lack of ergonomic awareness (Waersted *et al.*, 2010; Choobineh *et al.*, 2011) ^[1, 5].

These ergonomic risks can lead to chronic pain, reduced productivity, absenteeism, and even long-term disability if left unaddressed. As remote and hybrid work models become more common, understanding and mitigating postural discomfort is increasingly important for safeguarding workers' health and well-being. Ergonomic interventions, such as adjustable chairs, correct monitor placement, keyboard trays, and regular breaks, have been shown to

reduce discomfort and prevent MSDs when properly implemented (Ismail *et al.*, 2010) ^[2].

This study seeks to investigate the prevalence and nature of postural discomfort among computer users and to identify key ergonomic risk factors in their workstation setups. Using a structured questionnaire, it will assess sitting postures, furniture design, monitor and keyboard placement, and users' awareness of good ergonomic practices. The insights gained will help develop recommendations for practical interventions to create healthier, more comfortable work environments.

Objectives

1. To assess the prevalence, severity, and work-related impact of postural discomfort and musculoskeletal symptoms among computer users.
2. To identify key ergonomic risk factors in workstation design and to develop practical ergonomic recommendations to reduce discomfort and prevent musculoskeletal disorders.

Methodology

The present study, titled "Assessment of Postural Discomfort Experienced by Computer Users," used a descriptive research design to systematically examine computer usage patterns, the prevalence of postural discomfort, and related ergonomic factors among computer users. A descriptive approach was appropriate because it enabled the collection and analysis of information from a defined group without manipulating any variables. The study did not focus on a specific geographic area but targeted a broad group of computer users accessible online. Study was conducted in the year 2025 with purposive sampling technique was employed to select participants who use computers regularly for work, study, or leisure activities. The sample included male and female respondents aged 18 years and above from different professions and backgrounds, ensuring varied perspectives on computer-related postural discomfort. Data were collected using a structured questionnaire created in Google Forms. The tool was developed after reviewing relevant literature and ergonomic standards. It included four main sections Basic Information, Usage Patterns, Ergonomic and Postural Factors, Postural Discomfort. Likert scales and closed-ended questions were used to gather quantitative and qualitative data. Responses were compiled automatically and analyzed using descriptive statistics, including frequency, percentage, mean, standard deviation and correlation to identify patterns in computer use, ergonomic factors, and the extent of postural discomfort.

Table 1. Showed that majority of respondents were belonged to young age group (Below 30 years) 22 (73.33%) followed by middle age (30-50 years). Majority of respondents were male 20(66.67%) followed by Female 10(33.33%). Most of the respondent's education level Bachelore's degree 18 (60.00%) followed by Master's degree 12 (40.00%). With respect to Marital status, majority respondents were Unmarried (Single) 18 (60%) followed by Married 12(40.00%). Regarding occupation most of the respondents were having non govt job 12(40.00) followed by Govt job 10 (33.33%). Regarding years of computer usage, Most of the respondents were used 5-10 years (76.67%). Followed by less than 5 years 7 (23.33%)

Fig 1. Revealed that usage of various types of computers and hours spend on a computer per day. With respect to Desktop usage, most of respondents 10 (33.33%) were spent >6 hours followed by 2-4 hours 8 (26.67%), less than 2 hours 7 (23.33%) and 4-6 hours 5 (16.67%). Regarding Laptop usage, majority of respondents spent 4-6 hours 10 (33.33%) followed by >6 hours 8(26.67%), 2-4 hours 7(23.33%) and least of them <2 hours 5 (16.67%). Regarding usage of tablet, most of them spent <2 hours 26 (86.67%) followed by 2-4 hours 3 (10.00%) and least of them spent 4-6 hours 1(3.33%). Table 2. Represented that Primary computer activities and hours spend on a computer regarding work related tasks, most of respondents were 12 (40.00%) spent 4-6 hours followed by 2-4 hours i.e 7 (23.33%), less than 6 hours i.e 6 (20.00%) and < 2 hours i.e 5 (16.67%) for email activity, majority of respondents 15 (50.00%) were spent 2-4 hours followed by < 2 hours 6(20.00%), 4-6 hours 5(16.67%) and least of them >6 hours i.e 4 (13.33%). Regarding Social media activity most of them 18 (60.00%) were spent >6 hours followed by 4-6 hours 6 (20.00%), 2-4 hours 4 (13.33%) and least 2(6.67%) of them were spent < 2 hours. Regarding Gaming activity most of respondents 13 (43.33%) were spent 4-6 hours followed by

2-4 hours 8(26.67%), >6 hours 6(20.00%) and less than 2 hours 3 (10.00%).

Table 3 Illustrated that rating of sitting posture while working on a computer, Regarding Slouching posture Most of the respondents 12 (40%) were given very poor rating followed by poor 6 (20%), Excellent 5(16.67%), Good 4(13.33%) least rating was given to Fair 3(10.00%) for Forward lean posture most of the respondents were given 8 (26.67%) followed by same number of respondents 6 (20.00%) were given Poor, Good and Excellent rating and less number of the them 4 (13.33%) given to fair rating. Most of the respondents were given poor score to Crossed legs Sitting type followed by fair 9 (30.00%), Very poor 7 (23.33%) least of them were given same rating to good and excellent 3(10.00%). With regard Twisted sitting posture, majority of the respondents were given very poor score 9(30.00%) followed by fair 6(20.00%), good 4(13.33%) and Excellent 3(10.00%) next for neutral sitting posture more number of the respondents were given good 8(26.67%) rating followed by same ratings like Very good, fair and Excellent 6(20.00%). With respect to reclined sitting posture more number of respondents were given fair score 11(36.67%) followed by poor 9(30.00%), very poor 8 (26.67%) next to the lap laptop sitting posture majority of the respondents were given very poor score 14 (46.67%) followed by poor 6(20.00%), good & excellent 4 (13.33%) least of them were given fair rating 2(6.67%) with respect to Pillow Prop sitting posture, most them given very poor score 11(36.67%) followed by fair 7(23.33%), poor 5(16.67%), excellent 4 (13.33%) least of them were given good 3(10.00%) scoring for pillow prop.

Table 4 revealed that Experience among the 30 computer users surveyed for musculoskeletal symptoms experienced over the past 12 months, neck pain emerged as a moderate level with 22(73.33%) followed by each reporting mild and severe levels 4(13.33%). Back pain emerged as a mild level 18(60.00%) followed by moderate 9(30.00%), severe 3(10.00%) Notably, shoulder pain was reported by 24(80.00) as mild followed by moderate 6 (20.00%). Pain affected in Wrist/hand with) moderately level 16(53.33%) followed by mild 8(26.67%), severe 6(20.00%) severely, highlighting its significant impact on computer users. Elbow pain showed a relatively mixed Severity distribution, with mild 13(43.33%) mild 10(33.33%) and 7(23.33) severe. In contrast, eye pain and Headaches showed the highest severity levels 27(90.00) reported severe eye pain 24(80.00%) reported severe headaches with only a small proportion experiencing these symptoms at moderate levels (10% for eye pain and 20% for headaches).

Table 5 shows how different musculoskeletal symptoms affected the work performance of 30 computer users over the past 12 months. Neck pain had a considerable affected their work frequently 21 (70.00%) followed by rarely 4(13.33%), occasionally 3(10.00%) almost always is the least impacting factor to the work 2(6.67%). Back pain was reported it never impacted on their work or less disruptive 11(36.67%) followed by rarely 6 (20.00%), occasionally 5 (16.67%) and less proportion 4(13.33) each stated that it frequently or almost always impacted on their work. Shoulder pain also showed never affected their work, with 12(40.00%) followed by rarely 8(26.67%), occasionally 5 (16.67%), only 3(10.00%) said it was frequent and 2(6.67%) almost always. Wrist/hand pain was more problematic and impacted on work

occasionally 16(53.33%) followed by rarely 8(26.67%), never 6(20.00%). Elbow pain was never impacted 12(40.00%) followed by rarely 9(30.00%), occasionally 5(16.67) and frequently 4(13.33%). Notably, Cent per cent of respondents experienced eye pain was more impact on the work almost always. Headaches also had a severe impact: on work 25 (83.33%) almost always followed by frequently 5(16.67%).

Table 6 shows Correlation between Musculoskeletal Symptom Severity and Impact on Work “A Pearson correlation was computed to assess the relationship between the severity level and impact on work for musculoskeletal symptoms. The results show a strong positive correlation, $r = 0.91$, indicating that higher severity levels are associated with greater impact on work.”

Fig 2. revealed that summarizes how 30 computer users rated specific ergonomic adjustments at their workstations in relation to elbow height a key factor in maintaining neutral working postures. For monitor height adjustment 22(73.33%) reported setting the monitor at elbow height, followed by above elbow height 8(26.67%). Regarding chair height adjustment, cent per cent of respondents indicated they adjust their chair to keep working posture at or below elbow height, confirming the universal recognition of proper seat positioning to support comfortable arm angles and back posture. The use of a keyboard tray was strongly favoured to align input devices correctly: 28(93.33%) preferred positioning their keyboard tray at elbow height, while a small proportion 2(6.67) placed it above elbow height.

Figure 3 presents the weighted mean analysis of musculoskeletal symptoms experienced by 30 computer users. The weighted mean values were 2.00 for neck pain, 2.50 for back pain, 2.80 for shoulder pain, 2.067 for wrist/hand pain, 2.20 for elbow pain, 1.10 for eye pain and 1.20 for headache. The symptoms were coded as 3 = mild, 2 = moderate and 1 = severe; hence, a lower weighted mean indicates greater severity. Eye pain recorded the lowest weighted mean of 1.10, followed by headache at 1.20, indicating that these were the most severe symptoms. This was supported by 90.00 per cent of respondents reporting severe eye pain and 80.00 per cent reporting severe

headaches. In contrast, shoulder pain had the highest weighted mean of 2.80, indicating comparatively lower severity, while back pain had a weighted mean of 2.50. Neck pain recorded a weighted mean of 2.00, indicating moderate severity. Overall, the findings show that eye pain and headache were the major concerns among computer users, highlighting the need for proper workstation adjustment, suitable posture and regular breaks to reduce discomfort.

Discussion

The present study demonstrates that computer users commonly experience significant postural discomfort and musculoskeletal symptoms, corroborating earlier findings that prolonged computer use is strongly linked to musculoskeletal disorders (MSDs) (Waersted *et al.*, 2010)^[5]. The high prevalence of neck pain, back pain, shoulder pain, wrist/hand pain, and severe headaches observed among participants aligns with Choobineh *et al.*, (2011)^[1], who reported that static postures and repetitive movements substantially increase the risk of discomfort in the neck, shoulders, and lower back. Notably, the correlation analysis revealed a strong positive relationship ($r = 0.91$) between the severity of musculoskeletal symptoms and their impact on work performance, indicating that increased discomfort directly contributes to reduced productivity and greater work disruption. The poor posture ratings particularly for slouching, forward leaning, and the use of a laptop on the lap further emphasize the critical role of workstation ergonomics. As Ismail *et al.*, (2010)^[2] highlighted, implementing ergonomic interventions such as adjustable chairs, correct monitor placement, and keyboard trays can substantially alleviate discomfort and mitigate the risk of long-term MSDs. Encouragingly, the study shows that many respondents are aware of the benefits of proper ergonomic setups, with the majority adjusting monitor and chair heights to maintain elbow-level positioning and using keyboard trays correctly. These findings underscore the urgent need for ongoing ergonomic education and practical improvements in workstation design to prevent chronic discomfort and safeguard the well-being of computer users in both traditional office and remote work environments.

Table 1: Basic Information N-30

Sl no.	Age	Respondance
1.	Young (below 30 years)	22(73.33)
2.	Middle (30-50 Years)	8(26.67)
3.	Old(Above 50 years)	-
Gender		
1.	Male	20(66.67)
2.	Female	10(33.33)
Education		
1.	Primary school	-
2.	Secondary school	-
3.	Diploma degree	-
4.	Bachelor's degree	18(60.00)
5.	Master's degree	12(40.00)
Marital status		
1.	Married	12(40.00)
2.	Unmarried (Single)	18(60.00)
3.	Widow	-
Occupation		
1.	Govt	10(33.33)
2.	Non govt	12(40.00)

3.	Student	8(26.67)
Years of computer usage		
1.	>5 years	7(23.33)
2.	5 - 10 years	23(76.67)
3.	>10 Years	-

Figure in parenthesis indicates percentage

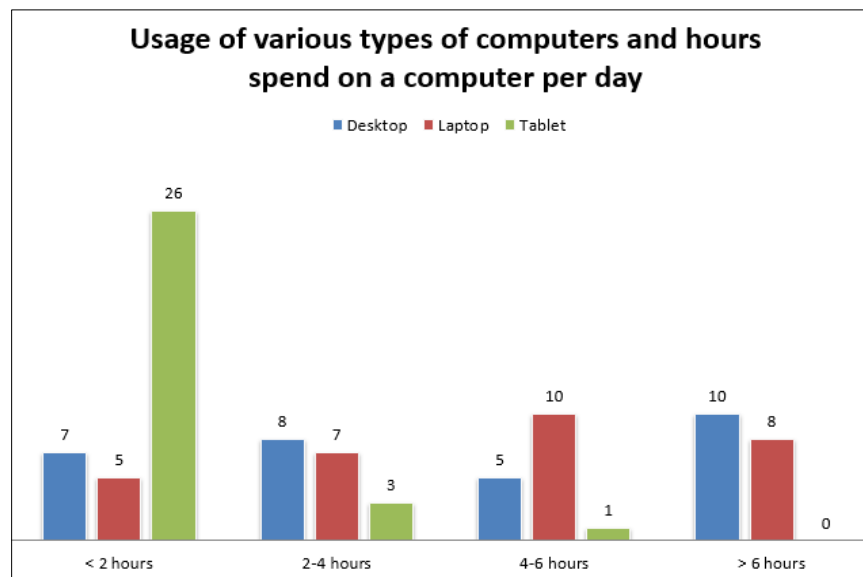


Fig 1: Usage of various types of computers and hours spend on a computer per day N-30

Table 2: Primary computer activities N-30

Sl no.	Computer activities	Hours spend on a computer			
		Work-related tasks	Email	Social media	Gaming
1	< 2 hours	5 (16.66)	6 (20.00)	2(6.67)	3(10.00)
2	2-4 hours	7 (23.33)	15(50.00)	4(13.33)	8(26.67)
3	4-6 hours	12(40.00)	5(16.67)	6 (20.00)	13(43.33)
4	> 6 hours	6 (20.00)	4(13.33)	18(60.00)	6 (20.00)
	Total	30 (100.00)	30(100.00)	30(100.00)	30(100.00)

Figure in parenthesis indicates percentage

Table 3: Rating of sitting posture while working on a computer N-30

Sl no.	Sitting postures	Very Poor	Poor	Fair	Good	Excellent	Total
1	Slouching	12 (40.00)	6 (20.00)	3(10.00)	4 (13.33)	5 (16.67)	30 (100.00)
2	Forward Lean	8(26.67)	6 (20.00)	4 (13.33)	6 (20.00)	6 (20.00)	30 (100.00)
3	Crossed Legs	7(23.33)	8(26.67)	9(30.00)	3(10.00)	3(10.00)	30 (100.00)
4	Twisted	9(30.00)	8(26.67)	6 (20.00)	4 (13.33)	3(10.00)	30 (100.00)
5	Neutral	6 (20.00)	4 (13.33)	6 (20.00)	8(26.67)	6 (20.00)	30 (100.00)
6	Reclined	8(26.67)	9(30.00)	11(36.67)	1 (3.33)	1(3.33)	30 (100.00)
7	Lap Laptop	14(46.67)	6 (20.00)	2(6.67)	4 (13.33)	4 (13.33)	30 (100.00)
8	Pillow Prop	11(36.67)	5(16.67)	7(23.33)	3(10.00)	4 (13.33)	30 (100.00)

Figure in parenthesis indicates percentage

Table 4: Experience of the following musculoskeletal symptoms on work in the past 12 months N-30

Sl no.	Musculoskeletal symptoms	Severity level (1-3) *			
		Mild	Moderate	Severe	Total
1	Neck pain	4(13.33)	22(73.33)	4(13.33)	30 (100.00)
2	Back pain	18(60.00)	9(30.00)	3(10.00)	30 (100.00)
3	Shoulder pain	24(80.00)	6(20.00)	-	30 (100.00)
4	Wrist/hand pain	8(26.67)	16(53.33)	6(20.00)	30 (100.00)
5	Elbow pain	13(43.33)	10(33.33)	7(23.33)	30 (100.00)
6	Eye pain	-	3(10.00)	27(90.00)	30 (100.00)
7	Headache	-	6(20.00)	24(80.00)	30 (100.00)

Figure in parenthesis indicates percentage

***Severity level: 3- Mild, 2-Moderate, 1-Severe**

Table 5: Experience of the following musculoskeletal symptoms and its impact on work in the past 12 months N-30

Sl no.	Musculoskeletal symptoms	Impact on work (1-5) *					Total
		Never	Rarely	Occasionally	Frequently	Almost always	
1	Neck pain	-	4(13.33)	3(10.00)	21(70.00)	2(6.67)	30 (100.00)
2	Back pain	11(36.67)	6(20.00)	5(16.67)	4(13.33)	4(13.33)	30 (100.00)
3	Shoulder pain	12(40.00)	8(26.67)	5(16.67)	3(10.00)	2(6.67)	30 (100.00)
4	Wrist/hand pain	6(20.00)	8(26.67)	16(53.33)	-	-	30 (100.00)
5	Elbow pain	12(40.00)	9(30.00)	5(16.67)	4(13.33)	-	30 (100.00)
6	Eye pain	-	-	-	-	30(100.00)	30 (100.00)
7	Headache	-	-	-	5(16.67)	25(83.33)	30 (100.00)

Figure in parenthesis indicates percentage

***Impact on work: 5- Never, 4-Rarely, 3-Occasionally, 2-Frequently, 1-Almost always**

Table 6: Correlation between Musculoskeletal Symptom Severity and Impact on Work

Sl. No.	Variable	Severity	Impact
1	Neck pain	2.00	3.70
2	Back pain	1.50	2.50
3	Shoulder pain	1.20	2.17
4	Wrist/hand pain	1.93	2.67
5	Elbow pain	1.80	2.03
6	Eye pain	2.80	5.00
7	Headache	2.60	4.67
Pearson Correlation (r)			0.91

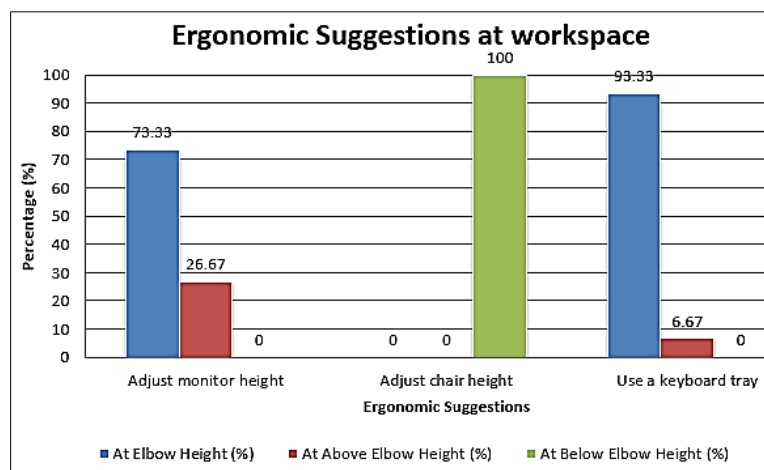


Fig 2: Ergonomic suggestions at workspace N-30

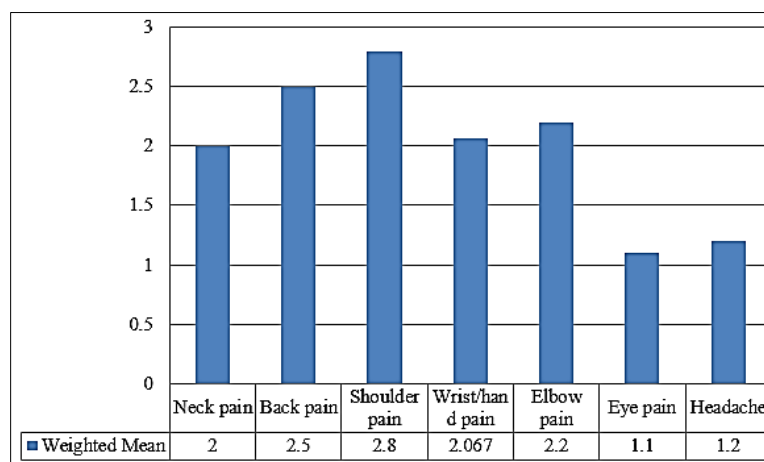


Fig 3: Weighted Mean Analysis of Musculoskeletal Symptoms

Source coding: 3 = Mild, 2 = Moderate, 1 = Severe. Therefore, a lower weighted mean indicates greater severity.

Conclusion

In conclusion, this study clearly highlights that computer users are at significant risk of experiencing postural discomfort and musculoskeletal disorders, especially when poor sitting postures and inadequate workstation ergonomics are prevalent. The findings reveal that symptoms such as neck pain, back pain, and severe headaches are widespread, with a strong positive correlation ($r = 0.91$) showing that higher symptom severity is closely linked to greater disruption in work performance. These results underline the urgent need for practical ergonomic interventions, including proper adjustment of monitor and chair heights and the use of keyboard trays at elbow level, to promote neutral postures and reduce physical strain. Moreover, the study emphasizes the importance of raising awareness about good ergonomic practices among computer users, as increased knowledge and simple adjustments can help prevent chronic discomfort and long-term musculoskeletal issues. As digital work continues to expand, these insights can inform the development of healthier, more supportive work environments that protect users' well-being and productivity.

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