IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Self-Evaluation Of Ergonomics And Musculoskeletal Pain Among Computer Desk Job Workers

Dr. Shruti Wani [1] , Dr.Gira Thakrar[2]

1. Masters of Physiotherapy Student, JG College of Physiotherapy, Ahmedabad, 2. PhD, Senior lecturer , JG College of Physiotherapy, Ahmedabad, Gujarat

Abstract:

Background: Nowadays, Computer users are increasingly facing Musculoskeletal Pain due to prolonged use of computer devices, which cause adverse health effects. Prolonged sitting in inappropriate, awkward, and static postures at the Computer workstation can lead to musculoskeletal pain. However, this can be Mitigated by setting up computer workstations according to ergonomic principles.

Objective: To evaluate ergonomics and musculoskeletal pain through a self-filled questionnaire among computer desk job workers.

Method: This cross-sectional observational study was conducted on 100 computer desk job workers of age group 22-55 years selected through random sampling. The Computer Workstation Ergonomics: Self-Assessment Checklist evaluated workstation ergonomics, while the Cornell Musculoskeletal Discomfort Questionnaire assessed pain. Both tools were administered via Google Forms, and data was analyzed to determine ergonomic practices and the prevalence of pain among the workers.

Results: 64% of ergonomic deficiencies in Computer Desk Job Workers were identified. Adjustable chair height, proper keyboard positioning, adequate back support, postural and eye breaks had most documented deficits. Most affected body parts were the Neck (54%), Shoulder (49%), Upper back (47%), Lower back (45%), Elbow (20%) and Wrist (12%).

Conclusion: Prevalence of deficits in computer workstation ergonomics and Pain are seen. Appropriate strategies, work practices, and preventive measures are needed to eliminate ergonomic deficits and pain associated with computer workstations.

Index Terms - Computer Workstation Ergonomics: Self-Assessment Checklist, Cornell Musculoskeletal Discomfort Question, Pain and Computer desk job.

INTRODUCTION

Computers have become an essential tool for employees across different fields, making daily tasks easier and improving efficiency. They help enhance accuracy and productivity in the workplace. However, spending long hours on a computer, especially in uncomfortable positions, can lead to musculoskeletal pain[1].

Musculoskeletal pain, as described by the National Institute for Occupational Safety and Health, are conditions that affect the body's muscles, bones, and joints. They can impact various parts of the musculoskeletal system, including the spine, tendons, ligaments, nerves, cartilage, and even blood vessels, often leading to discomfort and mobility issues[2] . Office workers are at high risk for musculoskeletal disorders due to prolonged computer use and extended hours of sitting. Research shows a clear link between computer usage and these disorders, with many office workers experiencing related issues[3] .

Spending long hours working on a computer can be harmful because it puts constant strain on the muscles and promotes poor posture, increasing the risk of discomfort and long-term health issues.[4] Musculoskeletal pain refer to injuries or conditions that impact musculoskeletal system often causing pain and discomfort[5] Working on a computer for long periods can cause muscle strain, repetitive stress injuries, and other workplace-related issues, often leading to pain and discomfort for employees. [6,7]

Poor ergonomics in computer workstations can lead to musculoskeletal pain for users. Factors like improper chair height, desk height, and monitor placement play a major role in discomfort. Hence, good workplace ergonomics is important for preventing both short-term pain and long-term health issues.[8] Due to repeated movement and awkward posture with time it can lead to stiffness of joints , weakness swelling numbness etc in future, although sitting requires less efforts compared to standing but sitting for long periods holds your body part steady causing reduced circulation, increased stiffness, pain and more stress on joints and muscles.[9,10] Encouraging individuals to assess their own posture and workstation setup is a simple yet effective way to reduce discomfort and prevent musculoskeletal disorders (MSDs). Many ergonomic issues, like an incorrectly positioned screen, an uncomfortable chair height, or a poorly placed keyboard, often go unnoticed until they cause pain. By promoting self-assessment, workers can become more aware of these problems and make adjustments before they lead to serious health issues. This study highlights the importance of ergonomic awareness in preventing MSDs among computer users.[11,12]

This paper aims to evaluate ergonomics and musculoskeletal pain through a self-filled questionnaire among computer desk job workers. This study aims to check prevalence of ergonomic deficiences and musculoskeletal pain among computer desk job workers.

MATERIALS & METHODS

Ethical clearence was taken from ethical committee this cross-sectional observational study aimed to explore how computer desk workers perceive their ergonomic practices and the prevalence of musculoskeletal pain they experience. A survey was conducted among 100 participants aged between 22 and 55, all of whom were working in desk based computer jobs such as administrative, technical, or clerical roles. Informed consent was obtained from all participants, and their responses were kept anonymous and confidential.

Inclusion criteria comprised individuals who worked at a computer desk for 3 or more hours daily, had at least one year of work experience, and were willing to participate in the study. Participants were excluded if they had a history of recent cervical trauma, had undergone surgery of the neck, face, or head, or had any systemic illnesses or degenerative diseases of the spine.

To get the data, we used two main tools: the Computer Workstation Ergonomics: Self-Assessment Checklist and the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ). Both surveys were administered electronically through Google Forms, making them easily accessible and convenient for the participants.The participants filled out the surveys in a single session, and the data collection took place over two weeks.

By combining results obtained from self-reported ergonomic assessment tool an musculoskeletal discomfort questionnaire data was collected regarding working conditions and pain levels experienced by computer desk workers. By the findings aim is to give insights on how work place ergonomics can be improved to reduce the risk of musculoskeletal disorders in this group workers

Outcome measures:

1. **Computer Workstation Ergonomics: Self-Assessment Checklist**

   The Computer Workstation Ergonomics: Self-Assessment Checklist was employed to evaluate the ergonomic practices and workstation setup of the participants. This checklist consisted of items related to key ergonomic factors, such as chair height, desk arrangement, screen alignment, and the positioning of the keyboard and mouse. Participants were asked to reflect on their workstation setup and rate whether their workplace met ergonomic standards (e.g., whether the chair was adjustable, the monitor was at eye level, and the keyboard was placed correctly). Responses were scored on a Likert scale (e.g., "Always," "Sometimes," "Never") to evaluate how often participants adhered to ergonomic guidelines. Higher scores reflected better ergonomic practices.The validity of the checklist is supported by its alignment with recognized ergonomic guidelines, making it relevant and accurate for assessing workstation design. A similar tool, such as the Ergonomic Workplace Assessment, has been shown to validly predict musculoskeletal discomfort based on ergonomic practices [13,14]

2. **Cornell Musculoskeletal Discomfort Questionnaire (CMDQ)**

   The Cornell Musculoskeletal Discomfort Questionnaire (CMDQ) was used to assess the prevalence, intensity, and location of musculoskeletal discomfort among participants. This questionnaire includes sections that ask participants to rate the intensity of discomfort on a scale from 0 (no pain) to 10 (severe pain) for various body regions (e.g., neck, shoulders, back, wrists). The CMDQ is widely used in occupational health research for its ability to quantify musculoskeletal discomfort and its effectiveness in identifying pain patterns among workers.The CMDQ has questionnaire has been assessed using Cronbach's alpha, yielding values of 0.91, indicating high reliability [15].

Statistical Analysis

SPSS Statistics was used to analyze the collected data. Statistical analysis was done to determine the prevalence of ergonomic deficiencies and level of musculoskeletal discomfort experienced by participants, using self filled The Computer Workstation Ergonomics: Self-Assessment Checklist. Data distribution was observed and percentages were calculated to analyze responses from the Self-Assessment Checklist, which focused on ergonomic practices in participants workstations.

The responses from the Cornell Musculoskeletal Discomfort Questionnaire were then calculated to describe the frequency and severity of discomfort at specific body sites, including the neck, back, shoulders, and wrists.

RESULT

The study was conducted among 100 employees across Ahmedabad city. Responses obtained were analyzed for Cornell Musculoskeletal Discomfort Questionnaire, Fig 1. Depicts prevalence of "Percentage subjects experiencing pain during work " in which 64% people had pain 24% had occasional pain and 12% had no pain.

Figure 1: Percentage of subjects experiencing pain during work

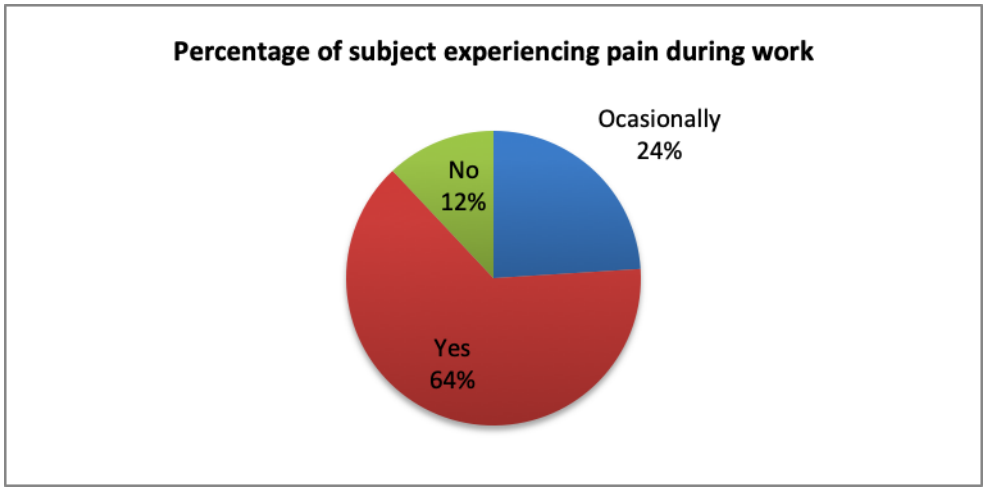

Figure 2 Represents percentage of subject experiencing pain in particular areas like Neck(54%),shoulder (49%), upper back(47%),lower back (45%),elbow (20%) and wrist (12%) .

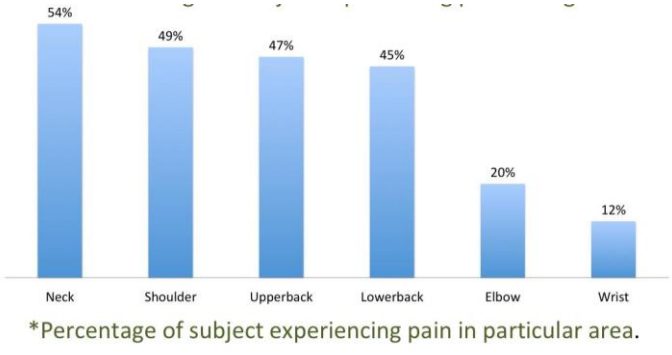

Figure 2:

Ergonomic deficiencies in computer desk job workers according to Computer Workstation Ergonomics: Self-Assessment Checklist

Table 1 showed evident from result that 63.89% of computer desk job workers experienced ergonomic deficiencies. The most common ergonomic issues were related to the seating arrangement, positioning of the keyboard and input devices, monitor setup, accessory placement, and the overall workstation layout. Table 1 presents the ergonomic deficiencies of the workstation as reported by the participants. A significant 73% of them indicated a lack of proper low back support. Additionally, 75% reported that their armrests were not positioned in a way that allowed them to comfortably approach the workstation, and 73% noted that their elbow height did not align with that of the keyboard, mouse, and workstation. Furthermore, 74% of participants reported that their monitor was positioned above eye level.

Moreover, 75% of subjects did not take a postural break every 30 minutes, and 73% failed to take regular eye breaks from the monitor. A notable 76% of respondents lacked a sloped desk surface or angle board for reading and writing. Additionally, 67% of them had the keyboard positioned too close to the workstation edge, leaving their wrists unsupported on the desk. Furthermore, 63% of participants did not maintain a neutral wrist position or keep their upper arms relaxed while working with the mouse and keyboard. Lastly, 68% of subjects did not have their monitor positioned at an arm's length away.

Table 1 percentage of people replied no in questionnaire

No.	Questions	Percentage of people replied NO
1	Can the height, seat and back of the chair be adjusted to achieve the posture outlined below?	63
2	Are your feet fully supported by the floor when you are seated?	56
3	Does your chair provide support for your lower back?	73
4	When your back is supported, you able to sit without feeling pressure from the chair seat on the back of your knees?	57
5	Do your armrests allow you to get close to your workstation	75
6	Are your keyboard, mouse and work surface at your elbow height?	73
7	Are frequently used items within easy reach?	66
8	Is the keyboard close to the front edge of the desk allowing space for the wrist to rest on the desk surface?	67
9	When using your keyboard and mouse, are your wrists straight and your upper arms relaxed?	63
10	Is your mouse at the same level and as close as possible to your keyboard?	58
11	Is the mouse comfortable to use?	54
12	Is your monitor positioned directly in front of you?	48
13	Is your monitor positioned at least an arm's length away?	68
14	Is your monitor height slightly below eye level?	74
15	Is your monitor and work surface free from glare?	46
16	Do you have appropriate light for reading or writing documents?	38
17	Are frequently used items located within the usual work area and items, which are only used occasionally in the occasional work area?	85
18	Do you take postural breaks every 30 minutes?	75
19	Do you take regular eye breaks from looking at your monitor?	73
20	Is there a sloped desk surface or angle board for reading and writing tasks if required?	76
21	Is there a document holder either beside the screen or between the screen and keyboard if required?	56

22	Are you using a headset or speakerphone if you are writing or keying while talking on the phone?	67
23	In the event of using a laptop computer for prolonged periods of time use of; • A full sized external keyboard and mouse• Docking station with full sized monitor or a laptop stand	58

DISCUSSION

This study was carried out among computer desk job employees to check prevalence of the deficiencies in work and musculoskeletal pain during work by using self filled Computer Workstation Ergonomics: Self-Assessment Checklist and Cornell Musculoskeletal Discomfort Questionnaire to check prevalence of pain. Data was collected from 100 respondents, with the age groups of 22-55 years working for 3 hours or more. Alarmingly, a significant 63.89% of respondents reported to experience ergonomic deficiencies and 64% had muskuloskeletal pain and 12% had occasional pain in one or more body regions, highlighting the widespread nature of this health issue among computer desk job workers.

Similar findings were reported by Kibria et al. (2023) found that many computer users at a Bangladeshi university experienced neck, back, and wrist pain due to poorly set up workstations—like chairs and monitors at the wrong height. Their study highlights how simple ergonomic issues can lead to real discomfort, reinforcing the need for better awareness and early action, which also supports the focus of this research.

Ardahan and Şimşek (2016) reported that Musculoskeletal symptoms are common in Turkish office workers and indicated the need for more attention to musculoskeletal disorders and designing effective preventive interventions. And participants reported musculoskeletal symptoms in the neck (67.85%), back (66.33%), lower back (59.49%), right shoulder (45.32%) and left shoulder (43.54%) during the past week and work interference was 33.6%, 28.5%, 30.6%, 31.3% and 31.9%, respectively. Musculoskeletal discomfort risks were being male, increasing daily computer usage, feeling computer-usage discomfort, hours working at desk and having knowledge about ergonomic exercises.

Zhang et al. (2017) reviewed several studies on work-related musculoskeletal disorders (WMSDs) among office workers and found that these issues are extremely common. More than 60% of workers reported some form of discomfort, with the neck (42–69%), shoulders (40–60%), and lower back (34–59%) being the most affected areas. The review pointed to long hours at a computer, poor posture, and badly arranged workstations as the main causes. These findings highlight just how widespread and preventable these problems are, supporting the focus of this study on early ergonomic awareness and self-care to reduce long-term pain and complications.

Robertson et al. (2016) looked at how a new ergonomic approach could help reduce musculoskeletal discomfort among workers—and the results were promising. After making simple changes to workstations and providing basic posture training and self-assessment tools, participants reported a 25–40% drop in pain, especially in the neck, shoulders, and lower back. This shows that even small adjustments, when paired with awareness and education, can make a big difference in how people feel at work. These findings strongly support the idea behind this study—that early self-assessment and ergonomic awareness can play a key role in preventing long-term discomfort.

CONCLUSION

Prevalence of deficits in computer workstation ergonomics and Pain are seen. Appropriate strategies, work practices, and preventive measures are needed to eliminate ergonomic deficits and pain associated with computer workstations. The findings reveal that 63.89% of participants exhibited poor ergonomic practices, particularly in areas such as chair height adjustment, keyboard placement, and back support.Participants reported discomfort in key body regions like neck (54%), shoulders (49%), upper back (47%), and lower back (45%). Based on the research findings, making simple ergonomic changes and being more aware of

our posture and workspace setup can not only boost how well we work but also help prevent pain and injuries down the line.

Limitation

Limitation of this study is that it focused exclusively on computer desk job workers and did not consider other factors that may also contribute to musculoskeletal pain. This limits the ability to fully understand all possible contributors to musculoskeletal pain and ergonomic deficiency beyond the computer workstation environment.

Future recomendations

Conduct regular follow-up evaluations after providing ergonomic advice to monitor changes in posture, workstation setup, and the prevalence of musculoskeletal symptoms over time.
Include a larger and more diverse group of computer-based desk job workers across different organizations to better understand the broader impact of poor ergonomics.
Track the long-term effects of ergonomic interventions by observing participants over several months to assess whether improvements are sustained and whether discomfort is reduced.
Implement awareness sessions and hands-on training to help individuals self-assess and adjust their workstations effectively.
Incorporate mobile or web-based tools for self-reporting ergonomic setups and symptoms, which could allow for easier data collection and real-time tracking.
Compare groups with and without ergonomic interventions to measure the effectiveness of education and adjustments in reducing discomfort and preventing MSDs.

Declaration by Authors
Ethical Approval: Approved
Acknowledgement: The authors sincerely thank all the computer desk job workers who participated in this study. Their time, support, and active involvement were invaluable to the success of this research.
Source of Funding: None
Conflict of Interest: None

REFERENCES

1) Shahwan BS, D'emeh WM, Yacoub MI. Evaluation of computer workstations ergonomics and its relationship with reported musculoskeletal and visual symptoms among university employees in Jordan. Int J Occup Med Environ Health. 2022 Apr 11;35(2):141-156. doi: 10.13075/ijomeh.1896.01822. Epub 2021 Sep 28. PMID: 34605825; PMCID: PMC10464782.

2) European Agency for Safety and Health at Work. Work-related musculoskeletal disorders: prevalence, costs and demographics in the EU – European risk observatory report. Luxembourg: Publications Office of the European Union; 2019.
.
3) Ardahan M, Simsek H. Analyzing musculoskeletal system discomforts and risk factors in computer-using office workers. Pak J Med Sci. 2016 Nov-Dec;32(6):1425-1429. doi: 10.12669/pjms.326.11436. PMID: 28083038; PMCID: PMC5216294.
4) Griffiths KL, Mackey MG, Adamson BJ. The impact of a computerized work environment on professional occupational groups and behavioural and physiological risk factors for musculoskeletal symptoms: a literature review. J Occup Rehabil. 2007 Dec;17(4):743-65. doi: 10.1007/s10926-007-9108-x. PMID: 17987369.
5) Bairwa, Ram & Meena, M.L. & Dangayach, G. & Jain, Rahul. (2022). Prevalence of Musculoskeletal Disorders Among the Agricultural Workers: A Review. 10.1007/978-3-030-94277-9_38.
6) Griffiths KL, Mackey MG, Adamson BJ. The impact of a computerized work environment on professional occupational groups and behavioural and physiological risk factors for musculoskeletal symptoms: a literature review. J Occup Rehabil. 2007;17(4):743–765. doi: 10.1007/s10926-007-9108-x.

7). Basakci Calik, B., Yagci, N., Oztop, M., & Caglar, D. (2020). Effects of risk factors related to computer use on musculoskeletal pain in office workers. International Journal of Occupational Safety and Ergonomics, 28(1), 269–274. https://doi.org/10.1080/10803548.2020.1765112

8) Kibria MG, Parvez MS, Saha P, Talapatra S. Evaluating the ergonomic deficiencies in computer workstations and investigating their correlation with reported musculoskeletal disorders and visual symptoms among computer users in Bangladeshi university. Heliyon. 2023 Nov 10;9(11):e22179. doi: 10.1016/j.heliyon.2023.e22179. PMID: 38045124; PMCID: PMC10692799.

9) Kett, Alexander & Sichting, Freddy & Milani, Thomas. (2021). The Effect of Sitting Posture and Postural Activity on Low Back Muscle Stiffness. Biomechanics. 1. 10.3390/biomechanics1020018.

10) Daneshmandi, Hadi et al. "Adverse Effects of Prolonged Sitting Behavior on the General Health of Office Workers." Journal of lifestyle medicine vol. 7,2 (2017): 69-75. doi:10.15280/jlm.2017.7.2.69
11) Mahmud N, Al Qaraghuli A, Munir F. Ergonomic training reduces musculoskeletal disorders among office workers: a randomized controlled trial. Int J Occup Saf Ergon. 2011;17(2):247-56.

12) Ağar, Ali & Yeginoğlu, Gülay & Kızıltan, Belkız. (2025). The effect of ergonomics training given to office workers on musculoskeletal disorders and working postures. International journal of occupational safety and ergonomics : JOSE. 31. 1-8. 10.1080/10803548.2025.2457186

13) Baker NA, Livengood H, Jacobs K. Reliability and concurrent validity of the Computer Workstation Checklist (CWC). Work. 2013;45(2):213-21. doi:10.3233/WOR-131603.
14) National Institutes of Health, Office of Research Services, Division of Occupational Health and Safety. Computer Workstation Ergonomics: Self-Assessment Checklist [Internet]. Bethesda (MD): NIH; [cited 2025 Nov 12]. Available from: https://ors.od.nih.gov/sr/dohs/Documents/checklist-ergonomics-computer-workstation-self-assessment.pdf

15) Jansen, Kristjan & Luik, Matis & Reinvee, Märt & Viljasoo, Viljo & Ereline, Jaan & Gapeyeva, Helena & Pääsuke, Mati. (2012). Musculoskeletal discomfort in production assembly workers. Acta Kinesiologiae Universitatis Tartuensis. 18. 102. 10.12697/akut.2012.18.11.