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ORIGINAL ARTICLE

Prevalence and Radiological Evaluation of Work Related Musculoskeletal Disorder in Upper Extremity: Anatomical Insight and Public Health Implications of Wrist Pain

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ABSTRACT

Background: In modern world, use of computer has become increasing day by day. Prolonged use of computer in different offices may cause wrist pain or discomfort. Wrist pain occur in 50-60% of computer users who spent many hours working on computer either use of keyboard or mouse.

Objective: To find the frequency of wrist pain in computer workers in different offices of Sheikh Zayed Hospital/Medical College Rahim Yar Khan.

Methodology: Study Design was cross-sectional, Study setting area was different offices of Sheikh Zayed hospital/Medical College Rahim Yar Khan. Total 139 workers were selected as sample size through convenient sampling technique. Inclusion Criteria was; all computer workers who gave verbal consent and Exclusion criteria was; who didn't give verbal consent and not willing to participate in study. Data Collection was carried out using a questionnaire which was developed and distributed among study subjects. Variables of questionnaire include age, computer usage hours, pain frequency and severity, breaks from work, pain type, pain occurrence time and effect of pain on daily activities, etc. Data and variables were analyzed in SPSS V23.

Results: Out of 139 study subjects 73 subjects (52.5%) reported complain of wrist pain and out of all study subjects 61.9% of study subjects work on computer 7-8 hours daily and 36% works on computer 5-6 hours daily. Out of all study subjects 28.1% experience wrist pain during work, 6% experience wrist pain after work and 18% experience wrist pain both during and after work.

Conclusions: Wrist pain in computer workers was very common. Almost half of the computer workers had complaint of wrist pain. Among the computer workers who had wrist pain, most of them spend 7-8 hours working on computer daily.

Keywords: Frequency, Wrist pain, Computer use

INTRODUCTION

In the modern digital age, computers are integral to daily life, facilitating a wide range of activities from professional work to leisure pursuits. As the use of computers has become predominant in the modern workplace, concerns about musculoskeletal disorders, particularly wrist pain have gained significant attention[1]. Conditions such as carpal tunnel syndrome, tendinitis, and tenosynovitis are frequently reported among computer users[2]. Ergonomic factors, including keyboard design, desk height, and mouse usage patterns, play a crucial role in the development of wrist pain. Moreover, demographic factors such gas age, gender, and the presence of pre-existing health conditions can influence an individual's susceptibility to wrist pain[3]. For example, studies have shown that women are often at higher risk for developing carpal tunnel syndrome, while older adults may experience increased vulnerability due to degenerative changes in the musculoskeletal system. The increasing prevalence of wrist pain among computer workers poses a serious public health issue. In today's digital age, a significant portion of the workforce relies heavily on computer-based tasks, making wrist pain an increasingly prevalent issue among computer workers[4,5]. Repetitive strain injuries, particularly those affecting the wrist, can severely impact productivity and quality of life. Despite advancements in ergonomic designs and workplace policies many computer users still experience wrist pain which may result from poor posture or inadequate workstation setup. Wrist pain is a common complain affecting individuals of various age groups and posing significant challenges to both patient and healthcare provider. It encompasses from mild discomfort to debilitating chronic pain, often resulting in significant functional impairment. The impact of wrist pain extends beyond the physical realm; it can lead to decreased work performance, increased absenteeism, and a higher likelihood of seeking medical intervention[6]. Consequently, addressing this issue is critical for both individual well-being and organizational efficiency. Employers are increasingly recognizing the importance of ergonomic interventions and workplace modifications to prevent wrist pain and promote a healthier work environment. Prolonged use of keyboards and mouse can result in repetitive strain injuries, which affect not only the wrist but also the surrounding muscles, tendons, and ligaments. Understanding the anatomy of the wrist and the common causes of pain is crucial in addressing this prevalent issue. This research aims to explore the prevalence, causes, and effects of wrist pain among computer users, with a focus on identifying effective prevention and management strategies. By understanding the multifaceted nature of this issue, we can contribute to the development of comprehensive approaches that prioritize both the health of computer users and the sustainability of their work practices. Through this investigation, we hope to raise awareness and promote a proactive stance toward ergonomic health in the digital workplace. While studying Anatomy, the wrist is a complex joint comprising eight carpal bones, ligaments, tendons, and muscles that allow fine motor control but also render it vulnerable to strain and injury. It forms the junction between the distal radius and ulna and the proximal carpal bones. Due to its delicate structure small bones, thin cartilage, and ligaments it is not ideal for bearing weight, making it especially prone to overuse injuries.

Computer users frequently perform repetitive tasks such as typing and mouse use, increasing the risk of wrist-related conditions like carpal tunnel syndrome, tendinitis, and general musculoskeletal discomfort. Poor ergonomics, prolonged static posture, and lack of breaks further contribute to these disorders, which are collectively termed Repetitive Strain Injuries (RSIs). The growing dependence on digital technology in workplaces, especially with the rise of remote work, has amplified this concern.

Demographic variables such as age, gender, and pre-existing health conditions affect wrist pain prevalence—women

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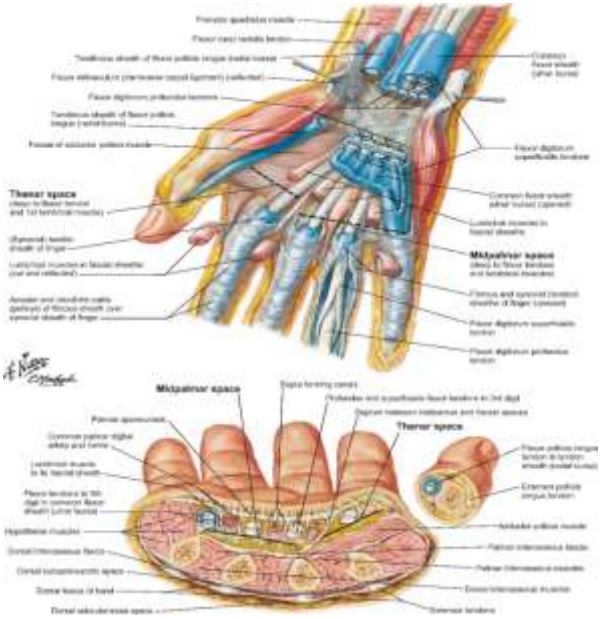
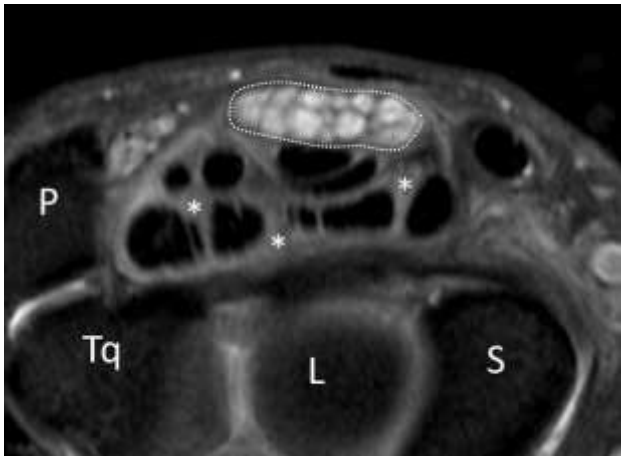
and older adults being particularly at risk. Similarly, occupational roles that involve repetitive hand motions or poor posture—common in office settings—intensify the likelihood of chronic wrist conditions.

Radiological imaging, including ultrasound, X-ray, and MRI, plays a crucial role in diagnosing underlying structural or soft tissue abnormalities, particularly in persistent or severe cases. These tools help identify issues like nerve compression in CTS, inflammation in Tenosynovitis, and degenerative changes in osteoarthritis, guiding appropriate treatment.





Axial proton density MRI image with fat suppression of a 51-year-old patient with CTS for 4 years. The median nerve (outlined by dotted line) immediately proximal to the tunnel inlet is severely swollen (40 mm2) with swollen and distinct fascicles. The nerve is hyperintense suggestive of oedematous change. Mild tenosynovial thickening is present between the tendons within the carpal tunnel (asterisks). P, pisiform; Tq, triquetral; L, lunate; S, scaphoid.

Early diagnosis and management—ranging from ergonomic interventions and physical therapy to NSAIDs or surgical options—are essential to prevent long-term disability. This study aims to determine the frequency of wrist pain among computer workers in various offices of Sheikh Zayed Hospital/Medical College Rahim Yar Khan and emphasize the importance of ergonomic awareness, preventive strategies, and timely medical evaluation, including radiological assessment, to safeguard wrist health in the digital workspace.

Hypothesis: The frequency of wrist pain in computer users is significantly higher among individuals who engage in prolonged computer use without regular breaks and ergonomic setup.

This hypothesis can be tested by collecting data on wrist pain frequency in different computer user groups and analyzing the correlation with ergonomic practices and usage duration.

Literature Review: Wrist pain is one of the most frequently reported musculoskeletal complaints among computer users. Wong et al. (2020) conducted a cross-sectional survey among office workers and found that nearly 38% of participants reported experiencing wrist pain or discomfort, especially those engaged in activities requiring prolonged keyboard and mouse use. This aligns with findings from Ali et al. (2022), who reported that around 40% of office-based computer users experienced wrist pain within the last year, with the frequency significantly higher among those using computers for more than six hours daily. In a longitudinal study, investigated the impact of extended computer usage on wrist pain among university students and employees. They found that 29% of participants reported wrist pain during a 12-month period, highlighting that prolonged computer use without adequate breaks and ergonomic adjustments contributed significantly to this outcome. Similarly, Kumar and Gupta (2021) found a marked increase in wrist pain complaints among workers who used computers for over 8 hours a day, suggesting a direct correlation between working hours and pain prevalence. Wrist or hand pain is one of the most common symptoms and reasons for admission in rheumatology. It may difficult to identify the cause because of extensive differential diagnosis and similar clinical manifestations[7].Complex regional pain syndrome (CRPS) is a poorly understood, trauma related condition and is difficult to separate it from pain due to repetitive work or strain on wrist. Repeated and excessive use of wrist and hand with awkward postures as well as personal predictors such as gender, obesity, age can cause various problems including carpal tunnel syndrome[9,10]. Various physical, biomechanical, psycosocial, organizational and genetic factors have been linked to development of work related musculoskeletal disorder[11]. Wrist and Hand musculoskeletal issues impacted more than 10% of various occupational sectors including computer professional[12]. With the proliferation of computer based work environment, incidence of wrist pain has generated increasing attention, particularly among individuals engaged in repetitive and prolonged keyboard and mouse use[10,13]. Overuse can result in reduce strength and diminished hand functionality. Thereby collectively contributing to diminished quality of life[14,15].As the technology advances, the prevalence of musculoskeletal diseases is increasing rapid[16].Many studies have elucidated the biomechanical mechanisms underlying computer-related wrist pain , highlighting the role of prolonged typing and mouse usage in promoting muscle fatigue and overuse injuries. A systematic review conducted by Smith et al. (2021) estimated that around 30% to 40% of computer workers report experiencing some form of wrist pain, particularly those who work for more than six hours a day[17,18]. A cross-sectional study by Lee et al. (2020) found that 36% of office workers in South Korea suffered from wrist discomfort, with typing and mouse usage identified as the primary risk factors[19]. Work related musculoskeletal disorders among computer workers are of interest to researchers because of increasing incidence [12,20].The previous few studies mainly focused on neck or back pain, leaving a gap of knowledge concerning wrist and hand symptoms[21] Ergonomic interventions lead to a notable decrease in reported wrist pain among computer users, highlighting the importance of an ergonomic approach in office environments[22]. Preventive strategies are effective in managing wrist pain in computer workers. Regular breaks, stretching exercises and use of ergonomic tools like wrist supports, keyboard trays are recommended[23]. A study found that approximately 60% of office

workers reported wrist discomfort related to computer use[24]. Incorporating regular breaks and varying tasks can help mitigate the risk of wrist pain[25].Physical therapy is another effective intervention for wrist pain. Targeted exercises play a crucial role in enhancing wrist strength and flexibility, which can significantly contribute to pain relief. Various techniques, including stretching, strengthening exercises, and manual therapy, have been proven effective in alleviating discomfort. By incorporating these methods into a regular routine, individuals may experience improved mobility and reduced pain in the wrist, highlighting the importance of an active approach to managing wrist issues[26]. Many studies emphasize the effectiveness of these ergonomic and physical therapy interventions in reducing the incidence of wrist pain in computer users[27]. The influence of work habits, such as extended periods without breaks and inadequate stretching, has been emphasized as a risk factor[28].chronic pain resulting from untreated MSDs can lead to long-term disability and reduced quality of life[29]. psychological factors, including stress and job dissatisfaction, can exacerbate the perception of pain. To manage or alleviate wrist pain, ergonomic interventions and education are essential. Implementing workstation adjustments, such as the use of ergonomic keyboards, mouse devices and posture correction can significantly reduce discomfort[31].

Objective: To find the frequency of wrist pain in computer workers, in different offices of Sheikh Zayed Hospital/Medical College,Rahim Yar Khan.

METHODOLOGY

Study Design: Cross sectional study

Study Setting: Computer Workers in different Offices of Sheikh Zayed Hospital/Medical College, Rahim Yar Khan.

Duration of Study: 15th August 2022 to 15th January 2023

Sample Size: 139

Sample Technique: Convenient sampling technique

Data Collection Instruments: Data was collected by self-structured questionnaire Sample Collection.

Inclusion Criteria

- Age 25-45 year
- Both male and female computer workers
- Computer workers who gave informed consent
- Computer worker of any field in different offices

Exclusion Criteria

- All the persons not fulfilling the above criteria
- Age below 25 Year
- Age above 45 Year
- Computer workers who do not agree to participate in study

Data Collection Method: Data was collected by a self-structured questionnaire, answered by computer workers of different offices of Sheikh Zayed Hospital/Medical College,Rahim Yar Khan.

Data Analysis Procedure: Appropriate statistical data analysis technique by using SPSS Version 23 (statistical package for social science) was applied.

RESULTS

139 computer workers were selected.

The results are given below:

Table: 1 Descriptive statistics of age of study subjects

Statistics	Age (Years)
Mean	31.1
Median	30
Mode	26
Std. Deviation	5.4
Minimum Age	25
Maximum Age	45

Table 1 showed that mean age of study subjects was 31.11 years with standard deviation of 5.4 years.

Table 2: Showing distribution of study subjects according to Gender

Gender	Frequency	Percentage %
Male	52	37.4
Female	87	62.6

Table 3: Distribution of study subjects according to Wrist Pain

Pain	Frequency	Percentage %
Yes	66	47.5
No	73	52.5

Table 4: showing the distribution of study subjects according to computer working hours

Hours	Frequency	Percentage %
3-4	3	2.1
5-6	50	36.0
7-8	86	61.9

Table 4 showed that 61.9% of study subjects use computer 7-8 hours daily and 36% of study subjects use computer 5-6 hours daily and 2.2 % of study subjects use computer 3-4 hours daily

Table 5: showing distribution of study subjects according to pain occurrence time

Pain occurs	Frequency	Percentage %
During work	39	28.1
After work	9	6
Both	25	18
None	66	47.5

Table 5 showed that 28.1% of study subjects had wrist pain during work, 6% of study subjects had pain after work and 18% of study subjects had pain both during and after work

DISCUSSION

The current study was conducted to see the frequency of wrist pain in computer workers in offices of Sheikh Zayed Hospital/Medical College,Rahim Yar Khan.Sample size was 139 computer workers. A self-designed performa was used to elicit information. Results were compared to determine the frequency of wrist pain in computer workers in different offices.The ages of study subjects were from 25 to 45 years. Mean age was 31.1 year with standard deviation of 5.4 years. Results showed that out of all study subjects 52.5 % study subjects have wrist pain due to computer use. A study by Smith et al. In 2021 estimated that around 40% of computer workers report experiencing some form of wrist pain[18]. which is somewhat similar to my study which shows that wrist pain is a common complaint in computer workers. A study by Lee et al. in 2020 in South Korea estimated that around 36% of computer users have complain of wrist discomfort with typing and mouse usage as primary risk factors[19].This study is similar to my study in the way that primary and major risk factor for wrist discomfort or pain in computer workers are prolonged use of keyboard or mouse. A study by Schneider E. et al in 2019 found that approximately 60% of office workers reported wrist discomfort related to computer use[24]. According to my study, Improper ergonomic setups, such as poorly positioned keyboards and mouse, can lead to abnormal wrist postures, improper desk ergonomics, such as using a non adjustable chair or keyboard that was too high or low, were more likely to report wrist pain. And ergonomic adjustments along with proper breaks during work and stretching can alleviate the complain of wrist pain. A similar study by Bourquin J et.al. in 2020 found that ergonomic interventions have led to a notable decrease in reported wrist pain and regular breaks and stretching exercises can improve symptoms. This study revealed that the self-reported pain severity was generally moderate. Lastly the findings of this study emphasize the need for proactive measures to mitigate wrist pain in computer users. Ergonomic interventions, such as the use of adjustable chairs, ergonomic keyboards, and frequent breaks, are crucial in reducing the risk of developing musculoskeletal discomfort. Additionally, raising awareness about the importance of proper posture, early

detection, and the benefits of seeking medical advice at the onset of symptoms can help reduce the prevalence of wrist pain among computer users. Future research should focus on longitudinal studies to better understand the long-term effects of computer use on wrist health and explore more effective prevention and intervention strategies

CONCLUSION

Wrist pain is common complain among computer users. According to my results 52.5 % of computer workers have wrist pain complain. Among computer users who have wrist pain most of them use computer for long period of time of 7-8 hours. Most of them have pain during work, some have experience pain after work and some have experience pain both during and after work. Common contributing factors are prolonged usage of mouse or keyboard and infrequent breaks during their work.

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