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Non-ergonomic mouse use by administrative personnel

Uso del ratón no ergonómico en personal administrativo

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ABSTRACT

The objective of this study was to analyze the use of non-ergonomic mice by administrative personnel at the Hospital General Docente Ambato - Ecuador. The study is descriptive. 83.6% of the personnel studied maintained a seated position, well supported and with a trunk-hip angle greater than 90°. The majority of the personnel under study, 76.4%, remained seated with legs and feet well supported. 16.4% stand with their weight symmetrically distributed and space to change position. Women suffer a higher proportion of carpal tunnel syndrome. Considering that work performed in a seated position, although it does not require much physical effort, can be the cause of many musculoskeletal disorders (MSDs), especially when performed for a long time and in an incorrect position.

Descriptors: occupational diseases; occupational medicine; human machine interaction. (Source: UNESCO Thesaurus).

RESUMEN.

Se tiene por objetivo analizar el uso del ratón no ergonómico en el personal administrativo en el Hospital General Docente Ambato – Ecuador. El estudio es de tipo descriptivo. El 83.6% del personal estudiado mantiene una posición sentado, bien apoyado y con un ángulo tronco-caderas mayor a 90° La mayoría del personal en estudio el 76.4% permanece sentado con piernas y pies bien apoyados. El 16.4% de pie con el peso simétricamente distribuido y espacio para cambiar de posición. Las mujeres sufren en mayor proporción el síndrome del túnel carpiano. Teniendo en cuenta que el trabajo realizado en posición sentada, a pesar de que no requiere mucho esfuerzo físico, puede ser la causa de muchos trastornos musculoesqueléticos (TME), especialmente cuando se realiza durante mucho tiempo y en una posición incorrecta

Descriptores: enfermedad profesional; medicina del trabajo; interacción hombre-máquina. (Fuente: Tesauro UNESCO).

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Research articles section

INTRODUCTION

A person working with a computer needs to perform at least 180 clicks per minute with the mouse to write a document or answer emails. When this automated movement is performed for six to eight hours a day without the necessary precautions, it causes injuries and pain in the hand, wrist and forearm that gradually alter the normal functions of the hand (Karic-Skrijelj, *et al*. 2008).

A repetitive stress injury is caused by placing excessive stress or strain on a joint and varies in both the type and severity of the injury. When that joint is used repeatedly, the body does not have time to recover and becomes inflamed, the body reacts to the inflammation by increasing the amount of fluid in the affected area in order to reduce the stress placed on the tendon and/or muscle (Ríos-Alarcón, & Contreras-Puente, 2018).

The convenient use of ergonomic mice according to regulations and some studies have certain key points such as: that the hand rests completely on top of the mouse that is not tense and does not form an angle with the forearm, that the wrist is not bent must be completely horizontal, that the forearm is in contact with the resting table and not tense in the air, the elbow should remain immobile when moving the mouse, move the mouse with the whole hand not only with the fingers, the hand should not remain twisted with respect to the forearm, always draw a straight line, make small pauses to exercise the wrist and fingers (Lourenço, *et al*. 2022).

The use of ergonomic mice improves comfort, increases performance and prevents the appearance of pathologies such as carpal tunnel syndrome (CTS) and tendinitis. Administrative staff use a mouse three times more than a keyboard, exposure rates are high, and it is necessary to improve the postures of the upper extremities while using a non-ergonomic mouse, as this poor posture is a risk factor for injury. Previous studies have found postural benefits associated with the use of alternative mouse designs.

The objective of this study is to analyze the use of the non-ergonomic mouse in the administrative staff of the Hospital General Docente Ambato - Ecuador.

METHOD

The study was descriptive, cross-sectional, non-experimental, and was carried out among the administrative personnel of the Hospital General Docente Ambato. The study population consisted of: 55 people 15 doctors, 20 engineers and 20 secretaries, who are part of the administrative team at the Hospital General Docente Ambato, it has the verbal and written authorization of the Manager and the teaching department, due to the number of participants was not taken sample of the universe.

The RULA method was used in order to show the problems and percentages associated with wrist tendinitis.

For data collection, a questionnaire was prepared, which consists of sociodemographic, labor and health characteristics, including multiple response options depending on the questioning, and after its structuring, it was migrated to the Google Form application and sent through a link to the e-mails of the administrative staff that met the selection criteria.

Descriptive statistics were applied to describe the results of the research.

RESULTS

It is evident that the greater number of workers are female in relation to male, with 65.5% and 34.5%, respectively.

The age of the administrative workers of the institution is between 28 and 58 years of age, showing that there are more young adult personnel between 29 and 32 years of age.

An evaluation was made according to the number of years they have been working in the administrative position, and it was found that most of the personnel have been working between 1 and 3 years, corresponding to 52.7% of the population under study.

Of the 55 people studied, 100% did not use an ergonomic mouse and 20% of the personnel who used an ergonomic mouse were excluded.

Wrist pain experienced by 69.1% of the total personnel experienced wrist pain when using a non-ergonomic mouse.

In the majority of the personnel who experienced pain, it was not a cause of absence from work, comprising 85.5%, and in 14.5% it was a cause of absence from work.

Among the personnel who missed work due to pain, the longest absence was 3 days. Most of them did not miss work due to pain.

After the application of the RULA method to the subjects under study, the following graphs are detailed in each one:

40% maintain a flexion position greater than 45° and 90°, 38.2% maintain the arm in extension greater than 20° or flexion greater than 20° and less than 45° 20% maintain from 20° of extension to 20° of flexion.

The most common shape of the forearm is 78.2% in flexion between 60° and 100° and 21.8% use flexion less than 60% or less than 100°.

The usual shape of the wrist is in a neutral position, followed by flexion greater than 0° less than 15° and 6.4% keep the wrist in flexion or extension greater than 15°.

The usual position of the neck is in flexion greater than 10° and less than or equal to 20° with a total of 67.3%.

The majority of the personnel keep their neck with the head tilted laterally with 76.4%, 23.6% keep the head in rotation.

The usual position of the trunk is with flexion between 0° and 20° with a total of 47.3%, 43.6% keep the trunk in flexion greater than 20° and less than or equal to 60°, 9.1% remain seated, well supported and with a trunk-hip angle greater than 90°.

83.6% of the personnel studied maintain a seated position, well supported and with a trunk-hip angle greater than 90°.

The majority of the personnel under study, 76.4% remain seated with legs and feet well supported. 16.4% stand with their weight symmetrically distributed and space to change position, and 7.3% have their feet not supported or their weight is not symmetrically distributed.

It is found that 75% of the administrative personnel studied may require changes in their work positions, but merit further study.

DISCUSSION

The results are consistent with the research of (Currie, *et al*. 2022), who state that carpal tunnel syndrome, trigger finger, De Quervain's tenosynovitis and arthritis of the carpometacarpal joint of the thumb can be associated with significant disability; likewise, they state that it is more common in women and obese people, with diabetes and who work in occupations that involve the use of keyboards, computer mouse, heavy machinery or vibrating hand tools.

The repetitive movements performed by the administrative personnel by the fact of being at the computer and the use of the mouse together with the wrist pain when performing the same movements make us think that it is related to tendinitis, but not having the comparison of the personnel who use ergonomic mouse our study is not conclusive, in spite of this with the rula method teaches us that we must reevaluate the workplace through proposals such as the use of ergonomic mouse and improve the position of the wrist, arm and forearm. Therefore; carpal tunnel syndrome is the most common peripheral nerve entrapment worldwide. The etiology may be related to repetitive exposure to vibrations or strong angular movements, genetic predisposition, injuries and specific conditions, such as diabetes, pregnancy and morbid obesity (Osiak, *et al*. 2022).

Likewise, carpal tunnel syndrome (CTS) is the most common nerve entrapment syndrome worldwide (Shem, et al. 2020), while (Atthakomol, *et al*., 2022), explains that early postoperative anterior wrist pain and time to return to work or activities of daily living of patients who underwent carpal tunnel syndrome (CTS) release with a short incision and those who underwent minimally invasive surgery (MIS) with CTS Teams, finding in their research that there is no difference in early postoperative anterior wrist pain, time to return to work or activities of daily living between the surgical techniques. A short incision is recommended for its benefit in terms of cost-effectiveness, while MIS with tool kit might be preferred in patients concerned about cosmetic appearance among the surgical techniques.

It is important to highlight the case study, where the association of carpal tunnel syndrome with stenosing tenosynovitis of the hand is very rare, even more so if it is generated by a fibrolipoma at the level of the carpal tunnel, corresponding to the importance is in adding to the etiological repertoire tumors, which can cause compression of the median nerve and less frequent as a cause of entanglement of the flexor tendons of the hand (Hernández-Coria, *et al*. 2022), which generates mobility towards the prevention of injuries with the intention of avoiding aggravations in the patient.

On the other hand; touch screen users at Majmaah University tended to be at high risk for carpal tunnel syndrome. Wrist ROM measurements, particularly wrist flexion, could be a beneficial indicator to anticipate deviations in wrist posture after prolonged touchscreen use. It is necessary to consider the nature of work, age, BMI and duration of touch screen use as risk factors for carpal tunnel syndrome symptoms (Mohammad, 2019), this study agrees with (Currie, *et al.* 2022), in positing that women suffer in greater proportion from carpal tunnel syndrome. Taking into account that work performed in a seated position, despite the fact that it does not require much physical effort, can be the cause of many musculoskeletal disorders (MSDs), especially when performed for a long time and in an incorrect position (Malińska, 2019).

It is important to keep in mind that two different countries showed no association between computer work and new cases of CTS among workers in various jobs with different occupational exposures. CTS is much more common among workers in non-computer-related jobs; prevention efforts and work-related compensation programs should focus on workers performing vigorous manual efforts (Mediouni, *et al.* 2015).

CONCLUSION

83.6% of the personnel studied maintained a seated position, well supported and with a trunk-hip angle greater than 90° The majority of the personnel studied (76.4%) remained seated with legs and feet well supported. 16.4% stand with their weight symmetrically distributed and space to change position, and 7.3% have their feet not supported or their weight is not symmetrically distributed. It is found that 75% of the administrative personnel studied, may require changes in their jobs, but warrant further study. women suffer in greater proportion carpal tunnel syndrome. Considering that work performed in a seated position, although it does not require much physical effort, can be the cause of many musculoskeletal disorders (MSDs), especially when performed for long periods of time and in an incorrect position.

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CONFLICT OF INTEREST

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