

## Level of Discomfort in Sitting Posture Among Computer Users

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### ABSTRACT

This study aimed at identifying the most uncomfortable areas of the body from the perspective of university employees, as well as the potential damages that can result from improper sitting postures. The study was conducted on a sample of 100 male and female employees at El-Oued University. Besides, the descriptive exploratory approach was used due to its suitability to the nature of the study. Furthermore, the Bishop and Crollette (1970) method was used to determine the level of discomfort in sitting postures. The results were analyzed using central tendency measures. The study found that university employees experience discomfort in various areas of the body during sitting, including the lower back, mid-back, neck, shoulders, and buttocks.

### Keywords

Discomfort, sitting postures, University employees, Working postures.

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### Introduction :

People are always forced to work fulfill their psychological, social, and biological desires, which have become their primary concern and constant thinking. People spend long hours at work to achieve their goals and satisfy their needs, as this makes them feel tired and bored. However, to avoid all of this, people always seek to improve their work methods, invent new machines to help them work, and adopt more flexible and comfortable body postures. Hence came the idea of ergonomics (human engineering) to bring about a qualitative leap in the field of work. As it has facilitated many aspects for workers, improved the work environment, and created a high level of harmony between humans and machines.

Undoubtedly, various work postures depend on the type of activity, the nature of the job, and the equipment used, including computers, which have become ubiquitous in workplaces due to the many improvements and services they provide. This requires a specific sitting posture to use and control the computer. However, adopting this posture permanently for long periods can lead to various musculoskeletal disorders and other psychological problems.

### Problematic:

The use of laptops has become widespread in various settings, including workplaces, schools, universities, and other places. The demand for access to information technology is steadily growing day by day, and the convenience of portability, lightweight, and compact size has made laptops more popular than desktop computers. Nonetheless, prolonged sitting and repetitive movements involved in computer work can lead to musculoskeletal problems. Proper workplace arrangement, suitable furniture, taking regular breaks, and performing stretching exercises can improve muscle flexibility, minimize injury risks, and alleviate muscle imbalances.

However, when proper attention is not given to the workstation and a poor sitting posture is adopted for long hours in front of the computer, it is predictable that computer users may experience discomfort and other problems while using it. Hence, this study raises the question: What are the most uncomfortable areas of the body that workers feel?

**Study objectives:**

- Identifying the body areas in which employees feel discomfort.
- Attempting to determine the risks posed by sitting posture.

**Study importance:**

- Occupational diseases are among the fastest spreading ones in the world and require intensive studies to identify their causes and attempt to reduce them.
- Work postures are important topics in the field of ergonomics that require further analysis.
- This research can contribute to making the use of laptops easier and more comfortable and improving the quality of tasks and activities on the laptop.
- The information from this study can also benefit ergonomics specialists, physical therapists, occupational physicians, bone specialists, ergonomics and health research associations, consumer associations, computer-dependent institutions, computer hardware, and accessory suppliers.

**Procedural concepts:**

**- Discomfort:**

is the feeling of stiffness, fatigue, spasm, tingling, formication, numbness, inadequacy, tiredness, discomfort, and pain.

**- Sitting posture:**

is a static position with a chair that is most common in office work, studying, or driving a car.

**- Computer users:**

are the sample individuals for this study who are university employees working in a sitting posture in front of a computer for long periods.

**Theoretical part:**

**The concept of posture:**

Posture refers to the position of the body or its parts. An incorrect posture is one that deviates from standard reference postures, such as an upright trunk position and hands positioned within the horizontal range of the shoulders and the abdominal belt. A working posture is the various body postures a person assumes while performing a task. This posture may be either natural or intentional if chosen by the worker and may be awkward in the opposite case.

Work posture can be defined as the position of the body adopted by the worker or imposed upon him during the performance of their duties. Posture is translated through the immobilization of the skeletal system in a balanced state, however, maintaining balance is primarily achieved through the contraction of postural muscles that work together whenever the body's center of gravity deviates from the surface of support due to gravity. (Djilali, 2019, p. 80).

**The sitting posture definition:**

is a position that helps to reduce physical stress and failure, and leads to appropriate stiffness of the spine during the process of thinking and concentration. In addition, it alleviates muscular effort and can hinder blood flow throughout the body. (Vielm esnault,1999, p34)

**Sitting posture advantages:**

Sitting position is very suitable for tasks that require accuracy and skill, and those that do not require a lot of movement or physical effort to provide great body stability and help monitor manual movement. It is also appropriate for assignments that necessitate the use of both feet to operate certain types of control tools. In addition, the employee who works in a sitting posture benefit from

the advantages of getting rid of the weight that the feet used to bear and reducing expenses by consuming less energy. Therefore, sitting is beneficial in alleviating static fatigue by bringing the joints of the feet, knees, pelvis, and spine together. Moreover, it enables workers to sustain a steady and appropriate body position during activities that demand precise movements, focus, and concentration, while minimizing static muscle exertion.

#### **Sitting posture disadvantages:**

include discomfort during work, as well as the relaxation of abdominal muscles and the distribution of excess weight on the sitter, which can lead to pressure on the circulatory system. Scientifically, the disadvantages of the sitting position are as follows:

- The movement of the sitter is limited and becomes restricted.
- The strength of the hands or arms to move some controls becomes very limited.
- The sitting posture may include an element of vibration, which negatively affects work performance and increases the sensation of irritation and discomfort. (Boudrifa, 1996, pp. 44-45).

#### **Discomfort definition:**

Discomfort can be defined in a few different ways, according to various researchers. Some view it as “the absence of awareness by the individual of their surroundings, during which the person is focused on some of the activities they are doing”.

Others view it as “A state of feeling and sensory response related to the individual and the environment in which he exists.

As for Crollette & Bishop (1976), they defined it as “a renewed experience through what is called the voluntary filtering of the nervous impulses coming into the body.” (Boudrifa, 1996, p. 133)

#### **The impact of work postures on discomfort:**

The work postures adopted by laptop users are adapted according to the ergonomic design, dimensions, and location, whether on the desk, on the user's thighs, or in other non-desk positions. Additionally, working on a laptop requires uncomfortable and constrained work postures during writing and processing data and information due to its design. Furthermore, prolonged periods of staying in these postures can lead to musculoskeletal problems similar to those experienced by desktop computer users, as found in the study by Harris and Straker.

#### **Disorders associated with excessive computer use:**

Kroemer et al. (2002) identified four musculoskeletal disorders associated with excessive computer writing activity, as follows:

##### **Carpal Tunnel Syndrome:**

It occurs as a result of pressure on the median nerve in the carpal tunnel of the wrist. This tunnel is a space beneath the carpal ligament and is surrounded by carpal bones. The median nerve, tendons of the finger flexor muscle, and blood vessels pass through this tunnel. When the size of the tunnel decreases due to the swelling of the tendon sheaths, it compresses and irritates the median nerve, as well as the blood vessels. The tunnel also becomes smaller when the wrist is bent, stretched, or twisted. Symptoms include tingling, numbness, or pain in all fingers of the hand.

One of the factors that lead to carpal tunnel syndrome, as mentioned by Boudrifa (2008), include:

- Repeated and persistent movements, especially if accompanied by force or involve constant use of certain body parts.
- Natural tissue damage or tearing in the wrist as a result of aging.

##### **Cubital tunnel syndrome:**

It occurs when the ulnar nerve (which passes through the cubital tunnel) is compressed while leaning the elbow on a hard surface or sharp edge (such as a desk), causing numbness, tingling, and

possibly pain in the forearm and the fourth and fifth fingers. It can also cause weakness in the entire arm and fingers.

**Cervical tension syndrome:**

It is irritation of the muscular groups of the levator scapulae and trapezius, usually occurring after prolonged or repeated overhead work and excessive muscle strain. It is widespread among computer and visual display unit workers.

**Tenosynovitis:**

It occurs due to inflammation of the tendons on the thumb side of the wrist.

**De Quervain's syndrome:**

It is a special condition that occurs in the thumb when the ulnar fingers are bent. (Ehsan, 2015, pp. 15-16)

**Applied part:**

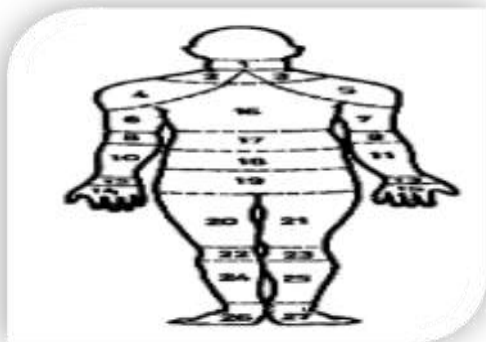
**Adopted Methodology:**

To achieve the study objectives, the current study relied on the exploratory descriptive approach, which is considered the optimal method for studying different areas of human and natural phenomena. This approach aims to provide accurate descriptions of the phenomenon to be studied in terms of its nature and degree of existence only. This type of descriptive research is carried out by questioning all members of the research community or a large sample of them, as confirmed by (Al-Assaf, 2012, p. 83).

**Study tool:**

The self-assessment method was used in this study, which mainly relies on individual evaluation of pain or discomfort sensation. This evaluation is primarily based on a sense of self. This method is a development of what was introduced by "Alan and Binat" in 1958, which was further developed by " Bishop and Crollette ". In this method, the body map is divided into 27 areas, including the right and left sides, and is accompanied by a scale of 10 levels to evaluate discomfort.

**Figure No. (01): The shape of the body areas according to the division of "Bishop and Crollette"**



**Source: Honaker, 1996**

**Study Sample :**

The Study was conducted on a Sample of 100 male and Female employees at the Faculty of Social Sciences and Humanities at El-Oued University.

**Sample features :**

<b>Table No. (01) represents the distribution of the sample according to the gender variable</b>		
Category	Frequency	Percentage
Males	65	65 %
Females	35	35 %

It is evident from the table that the proportion of females was higher than that of males, with females accounting for 64.28% of the total and males comprising only 31.64%.

**Statistical Methods:**

To achieve the research objectives and analyze the collected data, many appropriate statistical methods were used using the Statistical Package for Social Sciences (SPSS), and the researcher used central tendency measures (percentages, frequencies).

**Study results Presentation:**

**Table No. (02) represents the degrees of pain in the neck area of the sample**

Region	Pain degree	Morning period	Evening period	Total
Neck	No pain	15	20	35
	Mild pain	05	12	18
	Medium pain	10	10	20
	Severe pain	02	17	19
	Unbearable severe pain	03	05	08
	<b>Total</b>		<b>38</b>	<b>64</b>

Through table number (02), we notice that the study sample suffers from varying levels of neck pain. The total pain in the morning period was 38% and that in the evening period was 64%, which is considered a total percentage for the entire sample. This is usually due to the nature of the employee's work at the university, where most of this category occupies a very large time with one posture at the level of the neck.

**Table No. (03) represents the pain degrees in the upper back area of the sample**

Region	Pain degree	Morning period	Evening period	Total
Upper back	No pain	12	18	30
	Mild pain	10	07	17
	Medium pain	06	07	13
	Severe pain	02	20	22
	Unbearable severe pain	01	17	18
	<b>The total</b>		<b>31</b>	<b>69</b>

Through table number (03), we observe that the study sample suffers from varying levels of upper back pain. The total pain in the morning period was 31% and that in the evening period was 69%, which is considered a total percentage for the entire sample. This is usually due to the nature of the employees' work at the university, where most of them spend a lot of time in one posture affecting their upper back.

**Table No. (04) represents the pain degrees in the lower back area of the sample**

Region	Pain degree	Morning period	Evening period	Total
Lower back	No pain	10	18	28
	Mild pain	03	07	10
	Medium pain	05	11	16
	Severe pain	09	25	34
	Unbearable severe pain	01	11	12
	<b>Total</b>		<b>28</b>	<b>72</b>

Through table number (04), we notice that the study sample suffers from pain in the lower back area at varying levels. The total pain in the morning period reached 28% and that in the evening period reached 72%, and this is considered a total degree for the sample. This is usually due to the nature of the work of the employees at the university, where most of this category spends a lot of time in a single posture at the level of the lower back.

**Results discussion:**

Based on the results obtained in Table (02) which shows the most frequently affected body areas, the problem of neck pain ranked first in the evening period with a total of (64) frequencies, making it the top problem. This was followed by upper back pain in second place, where (69) individuals in the sample ranked it as their second problem and lower back problems in third place. Professional back pain problems are among the most common issues faced by employees within the organization, and are closely associated with sitting posture. The spinal column contains 26 separate vertebrae (bones) separated by soft, spongy discs that act as shock absorbers. The part located in the lower back area, known as the lumbar spine, contains five vertebrae.

Jeremy James, a specialist in spinal alignment and founder of FIT FOREVER, says, "Sitting puts the lumbar discs and other structures in your back under greater pressure than other postures like standing or lying down."

He explains that sitting for long periods leads to exacerbation of this pressure due to a condition called "creep," where ligaments and discs in the back become distorted over time while sitting. Once creep sets in, these tissues are in a vulnerable state that can lead to pain.

Most security and safety professionals agree that occupational back pain is one of the most important diseases that require financial compensation, as Rowe 1983, an expert on the subject of back pain, suggests that 56% or more of employees show symptoms related to the back during some period of their careers, about half of these employees have these symptoms due to absences from work of varying duration. Studies indicate that back diseases are continuously increasing. A study by **Palmer et al 2000** found that about half of adults in the UK (49%) experienced bouts of back pain, while 18% experienced back pain earlier in their professional careers. Another study by **El Djilali (2019)** indicated a significant correlational relationship between sitting posture and occupational back pain, estimated at 0.74.

Noticing Table 03, it is evident that the neck area was the most commonly reported area of pain among the sample, with varying degrees of severity. This indicates that neck pain is a significant issue among computer users, likely due to frequent neck movements required by the tasks, especially when interacting with other employees. Additionally, the researcher observed that most employees' chairs lack neck support, which further contributes to discomfort in this area. A study by **Hashemi Ihsan (2014)** confirmed the presence of musculoskeletal discomfort in the neck area among the sample, with a frequency of 4/5 according to the RULA method. Harris.C and Straker also pointed out that prolonged computer use can lead to the appearance of neck tension syndrome, which is irritation in the muscular groups of the levator scapulae and usually occurs after prolonged and repetitive high workloads or due to repeated and prolonged overloading of muscles, and it is widespread among computer and visual display unit workers.

- Through the table, we notice that the shoulder area or upper back ranked second in the sample's responses, and this is due to the extensive use of this area for movement, lifting, and lowering. The shoulder area carries the weight of the head and arms, and discomfort in this area can lead to discomfort in the shoulders. **Boudrifa's study in 2008** conducted on computer employees, along with the results of the current study, showed discomfort in the lower back, wrists, hands, and forearms, where it was concluded that they suffer from discomfort in their hands by 96%, followed by discomfort in the neck, back, joints, and lumbar area by 92%.

- We notice from the table that the lower back area was among the areas that most of the respondents complained about, as discomfort in it is considered one of the most common things people complain about, especially since it is related to the sitting posture, prolonged sitting on chairs, especially those not designed ergonomically, may feel a state of stiffness in this area. This is what was confirmed by a study conducted by **Boudrifa et al. 2016**, where the study found that there was tingling in the thighs with a mean of 3.06 pains, and 2.56 pains in the pelvis for students after a long time of sitting, which made the sitters suffer from some psychological problems such as (complaining, annoyance), cognitive problems such as (lack of concentration, distraction), and physical problems such as (pain, redness), which requires a reconsideration of chair design that is compatible with the body dimensions of employees. On the other hand, it is necessary to pay attention to organizing work centers and creating rest periods of 05 to 10 minutes every hour of sitting.

**Conclusion:**

Based on the researcher's findings, it can be said that employees at the university suffer from discomfort, especially in areas such as the upper back, middle back, neck, shoulders, and buttocks, due to incorrect sitting posture or prolonged sitting requirements of the task. However, it is necessary to redesign the workplace according to the requirements of the task and what the employee can bear, such as reviewing working hours and rest periods, and designing chairs and tables according to ergonomic dimensions.

This study is one of the few studies that have addressed this topic, which necessitates the need for larger and more comprehensive studies to reach the psychological, cognitive, and other dimensions caused by discomfort in sitting postures and attempt to reach results that can be used to alleviate pain and achieve maximum comfort for employees.

**Study proposals:**

- Reprogram rest periods periodically during work.
- Regular medical examinations.
- Do more studies on this topic

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