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Work in a Sitting Position at an Ergonomic Workstation to Reduce Complaints and Fatigue to Increase Work Productivity

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A R T I C L E I N F O

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A B S T R A C T

This article discusses the egonomic position of sitting in a work station chair, because many workers still experience complaints and fatigue when working in a sitting position at a work station. Thus, it is hoped that the sitting position at an ergonomic work station can increase work productivity. This article is written descriptively. Then, all the data that will be processed and discussed is obtained from various opinions or what is called literature study. The analysis used is also descriptive, then concluded. Conclusion: 1) when making chairs and work tables, you must pay attention to the user's anthropometric dimensions. Thus, when working in a sitting position, the legs must be able to lean back (legrests must be provided on chairs and tables), the vertebrae, especially the lumbar spine, must be able to lean against the back of the chair, the angle of the knees can be adjusted at the elbows, a strong chair does not collapse easily for chairs with wheels. chair with five-wheeled legs, when sitting on the knees it must fit under the chair freely, on the work table there must be an area used for work (usual area) and an area sometimes used (occasional area) all of this is made according to the size of the user's hand reach and can also be increased in size table for the outer reach zone area. Then, the work station environment is adjusted to the threshold values, including lighting, climate (temperature, wind speed, humidity), noise, vibration and ultraviolet exposure. 2) that ergonomic work desk chairs and work stations will reduce musculoskeletal complaints and worker fatigue which in the end can increase work productivity

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INTRODUCTION

Working sitting positions in workstations need to be made ergonomically. This is so that work productivity can increase. In this article, it is considered very necessary to discuss the egonomic position of sitting in a work station chair, because many people still experience complaints and fatigue when working in a sitting position. Thus, work productivity can increase.

In general, in offices, workers work in sitting positions for long periods of time. Working in a sitting position experiences various effects and complaints. As the results of research by Hadi Daneshmandi et al (2017) show that working in a sitting position shows symptoms of the neck (53.5%), lower back (53.2%) and shoulders (51.6%) which are the most common problems in office workers. ".

In the same vein, the results of Rina Ramahdani's research (2017) stated that "the working attitude of sitting on a work chair that is not ergonomic causes skeletal muscle complaints for female workers in the Printing Textile cutting machine in Surakarta, the dominant parts of the skeletal muscles experiencing complaints. "Skeletal muscle complaints due to unergonomic sitting work postures are dominant in the back (88%), waist (84%), buttocks (80%), buttocks (68%) and shoulders (56%)."

Likewise, operators who work in a sitting position at a workstation need to be arranged ergonomically for optimal performance. As Susana Ayu Handayani et al (2022) say, "for operators, operators at work stations can carry out their daily work more comfortably. Efforts can be made, among other things, to adjust the size of the workplace to the dimensions of the body so that it is not tiring, to regulate temperature, light and humidity according to the needs of the human body."

Working in a sitting position in the long term still has many negative impacts. As stated by Hadi Daneshmandi et al (2017), "Prolonged sitting is associated with fatigue during the working day, decreased job satisfaction, hypertension, and symptoms of musculoskeletal disorders in the shoulders, lower back, thighs and knees in office workers." Then, sitting in an unergonomic chair without a backrest for a long time risks back pain. This is as stated by Jum Natosba et al (2016) in their research results that "there is a significant difference between back pain before and after being given an ergonomic position, namely a backrest chair in songket weaving."

Therefore, a work station and the availability of an ergonomic chair are required. This is so that workers who work in sitting positions at work stations do not experience many complaints or fatigue, so that work productivity can increase.

THEORETICAL REVIEW

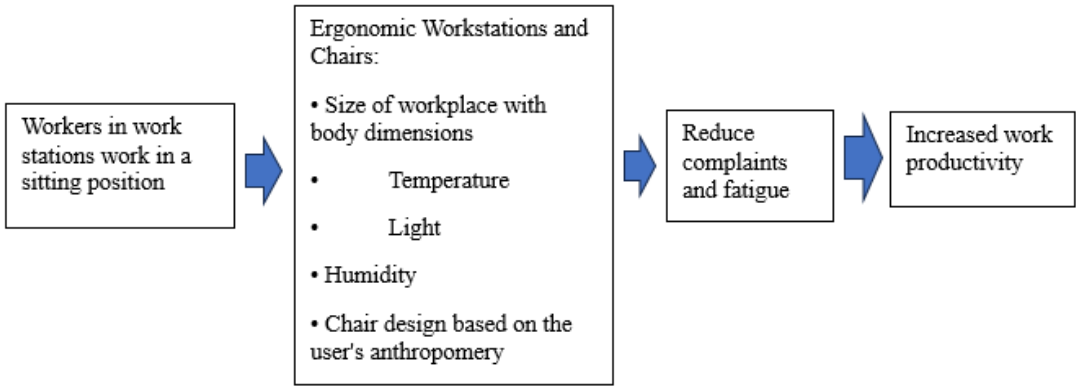

Figure 1. Theoretical Framework

METHODOLOGY

Work stations where many workers sit need to be designed ergonomically. This is so that workers do not experience many complaints or fatigue so that work productivity increases. This article is written descriptively. Then, all the data that will be processed and discussed is obtained from various opinions or what is called literature study. The analysis used is also descriptive, then concluded.

RESULTS AND DISCUSSION

1. Ergonomic Work Desk and Chairs

Some people work in a sitting position at a desk. Even though you work in a sitting position, you should not sit statically all the time. But working in a sitting position sometimes requires standing for a while to relax.

The work desk does not need to be too large beyond arm's reach. Just measure the width of the table according to the length of your hand, and the length of the table is just an inch long. On the table there is quite an area at some distance where the work equipment is placed within arm's reach. Work equipment that is occasionally used is placed in the area that is occasionally used (occasional area). Then the work equipment that is always used (usual area) is placed close to the body (see figure 1). The height of the table is just as high as the length of the legs. The bottom center of the table base should be empty. So when sitting, don't let your knees look at the table. The distance between the top of the thigh when sitting and the table base is around 2 cm to 5 cm. You can put a small drawer at the bottom of the table.

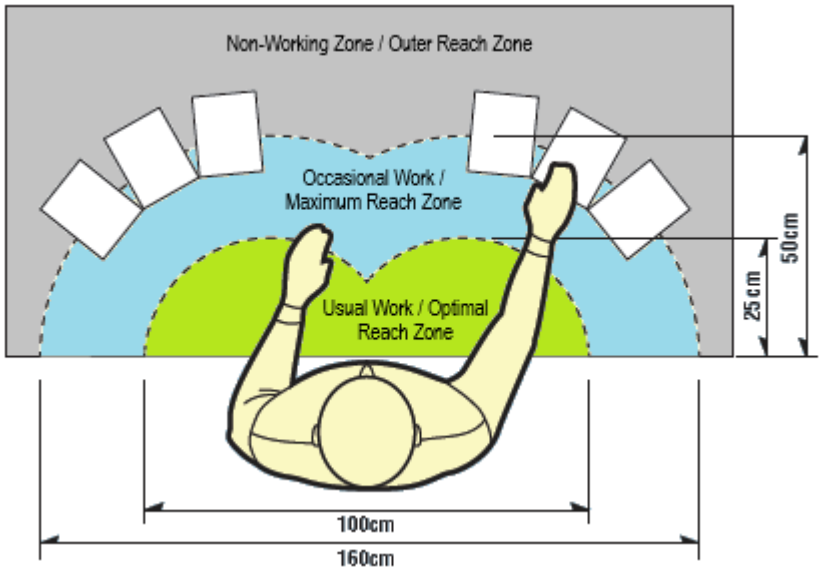

Figure 2. Usual Work or Optimal Reach Zone, and Occasional Work, and Non-Working Zone or Outer Reach Zone (Ormond, 2021)

Then, all parts of the table should not have sharp corners, but should have a radius shape. Because if it is sharp, it is possible to cause an accident (scratch or painful impact). The table is given a color that is not bright, just a dark color that can reflect 40% light, so it doesn't glare. Apart from that, the table base should not be covered with a flammable material (glare), such as glass. Colors that reflect light are quite dark/not bright colors for furniture such as tables, as according to Pexio (2022) that "choose the right furniture design and color. Examples include cream, light brown and gray."

When sitting in a work chair. The initial (justable) setting, the legs must create a right angle at the knees (90°). The backrest of the main chair must be able to support the lumbar spine (entire waist) and other ailments. According to Jum Natosba et al (2016) that "weavers (workers) use an ergonomic position, namely a reclining chair, because not only will it increase productivity in weaving, but the risk of health problems, especially low back pain, can be avoided. Weavers use an ergonomic position, namely a reclining chair, because not only will it increase productivity in weaving, but the risk of health problems, especially low back pain, can be avoided.

The soles of the feet must rest on the floor and have a footrest on the chair. It's for relaxing the feet. If using a chair that has wheels, use a chair that has 5 legs. So that the chair doesn't collapse easily, and is easy to move around.

When working in a sitting position, the entire body remains free to move. It doesn't feel cramped. Feels comfortable, working in a sitting position, sometimes not just for a day or two, but for years and long terms. Sit for the long term if the work station is made erginomic as above, hopefully there will be no changes in body shape (body deformation).

Then, you need to design the work station. As Susana Ayu Handayani et al (2022) stated that "Seeing the importance of designing work stations for operators in supporting their performance, in this case an optimal work station was designed for operators so that operators can carry out their daily work more comfortably.

"Efforts that can be made include adjusting the size of the workplace to body dimensions so that it is not tiring, regulating temperature, light and humidity according to the needs of the human body." For the purposes of an ergonomic environment in the workplace including work stations, according to Safety Sign Indonesia (2021) that "Lighting (threshold value to read carefully is at least 200 lux). Temperature and humidity (climate) (work 75% rest 25%, light work 8 hours/day indoors, ISBB threshold value = 30.6°). Noise (threshold value 85 dB for working 8 hours/day). Vibration level (exposure to vibration on feet and hands approximately 4 hours and 4 hours, threshold value = 4 m/sec2)". Then, Minister of Manpower Regulation no.51/Men/1999, stated that "the UV threshold value is 0.1 µWcm2 for working 8 hours/day with a Standard Deviation t of 0.2281".

Based on some of the opinions above, the working sitting position that has an ergonomic posture really depends on the shape and size of the chair and work desk it occupies. Therefore, when making chairs and work tables, you must pay attention to the anthropometric dimensions of the user. Thus, when working in a sitting position, the legs must be able to lean back (on a chair and at the table there must be a footrest), the vertebrae, especially the lumbar, must be able to lean against the back of the chair, the angle of the knees can be adjusted at the elbows, a strong chair does not easily collapse for chairs with wheels. 5-wheeled chair, when sitting on the knees it must fit under the chair freely, on the work table there must be an area used for work (usual area) and an area sometimes used (occasional area) all of this is made according to the size of the user's hand reach and the size of the table can also be increased for the outer reach zone area. Then, the work station environment is adjusted to the threshold values, including lighting, climate (temperature, wind speed, humidity), noise, vibration and ultraviolet exposure.

2. Complaints and Fatigue Due to Sitting at Desks at Work Stations and Work Productivity

Working using unergonomic chairs and desks will result in fatigue. This is as per the results of Febri Hidayat's research, Febri Hidayat et al (2021) stated that "before the implementation of ergonomic chairs and tables, people experienced fatigue. After the implementation of ergonomic chairs and tables, the level of work fatigue decreased."

Work stations must also be made with ergonomics in mind so that workers do not experience work fatigue. This is as Dani Nasirul Haqi (2024) stated that "Work station design must be improved to achieve an effective, safe and comfortable learning process. This can be done by including ergonomic factors to reduce complaints from laboratory staff. "Ergonomic factors are expected to increase the comfort of the public or laboratory staff when using the laboratory for practical work, so that their focus increases and their complaints of stiffness are reduced."

Ergonomic design of desk chairs at work stations will increase work productivity. This is as stated by Agung Kristanto et al (2011) "Results of research on the design of work tables and chairs at cutting stations. Based on the implementation, a comparison of initial and final conditions was produced as follows: conditions before design, standard time and standard output were 9.068 seconds/unit and 396 units/hour. After design, the standard time and standard

output are 7.377 seconds/unit and 468 units/hour. There was an increase in productivity of 18.18%".

In line with the opinion above, as Moch. Rofieq et al (2013) said that "an ergonomic model of a souvenir making work station was designed through the design of a TL/fluorescent lamp recycling tool using a worker anthropometric approach. The resulting model is able to increase work productivity." Likewise, as stated by Herta Meisatama et al (2018) that "work station improvements can reduce musculoskeletal complaints, workload and increase work productivity among tomato sorting workers".

Therefore, based on the opinions above, it can be concluded that ergonomic work desk chairs and work stations will reduce musculoskeletal complaints and worker fatigue which in the end can increase work productivity.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

a. When making chairs and work tables, you must pay attention to the anthropometric dimensions of the user. Thus, when working in a sitting position, the legs must be able to lean back (legrests must be provided on chairs and tables), the vertebrae, especially the lumbar spine, must be able to lean against the back of the chair, the angle of the knees can be adjusted at the elbows, a strong chair does not collapse easily for chairs with wheels. chair with five-wheeled legs, when sitting on the knees it must fit under the chair freely, on the work table there must be an area used for work (usual area) and an area sometimes used (occasional area) all of this is made according to the size of the user's hand reach and can also be increased in size table for the outer reach zone area. Then, the work station environment is adjusted to the threshold values, including lighting, climate (temperature, wind speed, humidity), noise, vibration and ultraviolet exposure.

b. That ergonomic work desk chairs and work stations will reduce musculoskeletal complaints and worker fatigue which in the end can increase work productivity.

Recommendation

Companies should provide ergonomic desk chairs and work stations, so that workers do not complain and do not experience fatigue, so that work productivity increases.

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