

The Effect of Using Elastic Lumbar Corset on Fatigue on Lifting Employee

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Abstract

Background: In everyday life, human beings cannot be separated from lifting activities, which can lead to fatigue. Lumbar corset can keep the body in an upright position thereby reducing fatigue.

Research objectives: To find out an effect of using elastic lumbar corset on fatigue levels in lifting employee at PT Budi Texindo, Jawilan District, Serang Regency, Banten.

Method: This study is quasi-experimental quantitative research using SSRT measuring instruments with a total of 20 respondents with a pre-posttest method, the normality test is using Shapiro-wilk and a hypothesis test using a paired T test.

Research results: This research shows the average fatigue in the pretest group (59.50) while the average fatigue in the post test group (54.10), with a difference (5.40). Test results statistics with Paired t-test showed a p value of 0.000 it means <0.05 so there is a significant effect of using elastic lumbar corset on fatigue level.

Conclusion: There is an effect of using Elastic Lumbar Corset on the fatigue level of lifting employees.

Keywords: Lifting employee, Elastic lumbar corset, Fatigue

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Introduction

In everyday life humans cannot be separated from lifting and transporting activities. This activity is a basic thing or can be called essential, because in almost every job there are lifting and moving activities where one of them is a worker lifting goods, because this job bears a lot of high health risks, we know that the activity of lifting and transporting goods is one of the one of the oldest activities in daily life (Raraswati et.al., 2020). When someone does lifting and carrying activities, it requires good ergonomics. Ergonomics is the science that talks about design for humans. In simple terms, this term can be interpreted as an effort to adapt the work environment to the needs of users or humans. The purpose of these adjustments is to increase productivity and reduce discomfort at work (Lubis et.al, 2021).

Unsafe work postures such as work standing, bending, squatting, lifting weights without the aid of tools or equipment other material handling within a period of time for a long time can result in complaints of wrong pain one limb or musculoskeletal problem (Wandiyanto, 2022).

Musculoskeletal problem data in Indonesia shows that workers experience muscle injuries in the lower neck (80%), shoulders (20%), back (40%), waist back (40%), hips back (20%), buttocks (20%), thighs (40%), knees (60%), and calves (80%) (ILO, 2018). Workers themselves experience 20% of complaints about fatigue which is characterized by decreased work performance, including the subjective feeling of fatigue, decreased motivation and decreased mental and physical activity (Nurmufidah and Rumita, 2021). Sometimes this fatigue can be reduced by a tool called an orthosis called a corset (Utami et.al, 2017).

According to Tarwaka (2014) fatigue is the body's mechanism for protection so that the body avoids more damage and will return to normal if the person rests. Factors that affect fatigue include age, gender, disease, and workload. Complaints in the musculoskeletal system have become the latest related disease trend with jobs around the world in both

developing and industrialized countries (Chung, 2013). Work that is too heavy and excessive results in faster body muscle contractions so that it can accelerate fatigue. In addition, the ergonomic position of employees also causes fatigue. If the application of ergonomics cannot be fulfilled, it will cause discomfort or pain in certain parts of the body (Jalajuwita and Paskarini, 2015).

One tool for treating fatigue is using an elastic lumbar corset which is a work-related personal protective equipment that prevents injury to muscle tissue during activities (Ningsih and Setyawan, 2016). The function of using a lumbar corset is support for pain relief, limiting movement or partial immobilization, controlling poor posture (Wulandari, 2017).

PT Budi Texindo is a company engaged in the field of textile spinning mills with employees carrying out goods lifting activities. Transport workers are workers who work by selling services transporting goods/materials from one place to another (Cahyani, 2016). The position when working is bending down to pick up piles of cotton or thread, then standing up and immediately throwing piles of thread or cotton that have been arranged in a container or truck.

Almost all employees complain of fatigue that quickly appears in the lumbar area when they do the job. Therefore, researchers want to conduct this research with the aim of knowing whether there is an effect of using elastic lumbar corsets on fatigue levels in employees lifting goods at PT Budi Texindo, Jawilan District, Serang Regency, Banten.

Methods

This research is a type of quasi-experimental research (quasi) using a pretest and posttest design which aims to determine the effect of using an elastic lumbar corset on the level of fatigue. With a research sample of 20 people who experienced fatigue. The instrument used in measuring fatigue is the Subjective Self Rating Test. This study was initiated by conducting a pre-test, namely measuring the degree of fatigue of the research

subjects before being given an elastic lumbar corset, then given an intervention for 2 weeks, namely using an elastic lumbar corset. After 2 weeks, a post test was carried out, which is measuring the level of fatigue after being given an intervention. The fatigue measurement results are then compared.

Results

As many as 20 freight transport employees were found to have high fatigue based on the inclusion and exclusion criteria set by the researchers. All research subjects were then given a pretest and a post-test for their level of fatigue after using an elastic lumbar corset for 2 weeks.

Table 1. Frequency Distribution of Age, Weight, Height

	N	Min	Max	Mean	Std. dev
Age	20	25	55	39.90	8.699
Weight	20	48	75	57,70	7.651
Tinggi badan	20	155	170	162.95	5.356

(Source: Primary Data, 2022)

Based on age, it shows that the majority of subjects aged 45-55 years are 9 people (45%). Based on body weight, it showed that of the total research subjects, there were 20 subjects, the majority with a body weight of 50 kg were 6 people (30%). Based on age, it showed that out of a total of 20 subjects, the majority were 160-165 cm tall, namely 10 people (50%).

Table 2. Research Characteristics Based on Gender, Sport activity, and Smoking

Frequency	N	%
Gender		
Male	20	100
Female	0	0
Sport activity		
Often	6	30
Rarely	9	45
Never	5	25
Smoking		
Yes	14	70
No	6	30

(Source: Primary Data, 2022)

Based on gender, it showed that of the total research subjects, there were 20 subjects, the majority were male, namely 20 people (100%). Based on exercise, it shows that of the total research subjects, namely as many as 20 subjects, the majority rarely exercised, namely as many as 9 people (45%). Based on smoking shows that of the total research subjects, namely as many as 20 subjects, the majority smoked, namely as many as 14 people (70%).

Then the research subjects whose initial measurements were taken were given a tool in the form of an elastic lumbar corset for 2 weeks, then their fatigue was measured again after the intervention. The data obtained from the measurement is then processed with descriptive statistics.

Table 3. Results of the Fatigue Level of Pretest and Posttest of Giving Elastic Lumbar Corset

Variable	N	Min	Max	Mean
Pre test	20	51	66	59.50
Posttest	20	47	59	54.10
total	20			

(Source: Primary Data, 2022)

The results of the descriptive statistics for measuring fatigue in the pre-test obtained an average value of (59.50) which is included in the category of frequent fatigue and the measurement of fatigue in the post-test obtained an average of (54.10) which is included in the category of rarely experiencing fatigue, with a difference of (5.4).

The data was then tested for normality of the data using the Shapiro Wilk because the number of research subjects was <50.

Table 4. Shapiro-Wilk Data Normality

	N	Sig. Shapiro-Wilk	
Pre test	20	0.316	Normal
Post test	20	0.250	Normal

(Source: Primary Data, 2022)

The results of the normality test with Shapiro Wilk on the fatigue variable before and after the intervention show that the data is normally distributed, the p value > 0.05. Then do the hypothesis test using paired t-tests.

Table 5. Paired T Test Hypothesis Test Results

Variable	Mean	T	P Value
Pre test	59.50		
Post test	54.10	7.829	0.000

(Source: Primary Data, 2022)

Fatigue in employees lifting goods at PT BudiTexindo using paired t-test showed that for the fatigue variable the pre-test obtained an average value (59.50) and the post-test obtained an average value (54.10). The magnitude of the difference in fatigue after using an elastic lumbar corset using a statistical test of 7,829 with a p value of 0,000 (<0.05) so that it can be concluded that there is a statistically significant effect of using an elastic lumbar corset on the level of fatigue in employees lifting goods at PT Budi Texindo. This means that seen from the average value of fatigue obtained a decrease.

Discussion

From the results of the study, research samples aged 25-55 years were obtained. As individuals got older, it was followed by the process of degeneration of the organs, resulting in a decrease in the ability of the organs. With a decrease in the ability of organs, this caused the workforce to experience fatigue more easily. At the age of 50-60 years, muscle strength decreased by 25%, and the physical workability of a person aged >60 years reached 50% of the age of a person who was 25 years old (A's Adi, 2014).

At the age of 40-49 years, the onset of decline becomes noticeable with the diagnosis of diseases, and by the age of 50-55 years, an individual's work capacity starts to decrease. Fatigue becomes increasingly prominent with age due to a decline in muscle endurance, leading to an increase in fatigue (Budiman et al., 2016). Aging contributes to fatigue as muscle strength decreases by 15-25% with increasing age (Putri, 2018).

As many as 20 employees lifting goods as the research sample or 100% are men, male porters are more male than female, due to the transport load which varies from 20 kg to 70 kg. This condition is in line with the theory

presented by Oktaviana et.al (2019) that male porters usually lift 70 kg of rice.

Of the 20 research samples, 14 people or 70% smoked the majority. Workers who smoke have a lower level of physical fitness than non-smokers. This happens because the oxygen supply will be reduced because hemoglobin will be more associated with carbon monoxide than with oxygen so that when doing sports smokers will get tired and out of breath quickly. 77.7% of the study sample had a normal body mass index, and 22.2% of the study sample had an abnormal body mass index. Workers who have an abnormal body mass index often experience fatigue which results in shortness of breath.

From the sample data, it was also found that 9 out of 20 employees rarely exercised, 6 samples often exercised, and 5 samples never exercised. This is in accordance with the theory presented by Nurfadli et.,al (2015) that physical fitness will be in a stable condition or increase if the physiological condition of the body is stimulated by exercising at least 3 times a week and a maximum of 5 times a week, because in terms of physiology a person who does not do sports training or rest 2 days, then the condition of physical fitness will begin to decline.

The results of the pre and post tests on the Use of Elastic Lumbar Corset Against the Level of Fatigue in Employees Lifting Goods at PT Budi Texindo showed that the pretest fatigue obtained an average value (59.50) and the posttest obtained an average value (54.10), with a difference (5.40). This means that seen from the value of the difference in the average fatigue obtained a decrease of 19.95%. Jobs that force the workforce to be in an ergonomic work posture cause the workforce to experience fatigue more quickly and indirectly provide an additional workload. The application of an ergonomic work position will reduce the workload and significantly reduce fatigue or health problems related to work postures and provide a sense of comfort to the workforce, especially for workers who are monotonous and last a long time. pain in certain parts of the body (Jalajuwita and Paskarini, 2015).

The results of the Paired T Test showed that the magnitude of the difference in fatigue after using an elastic lumbar corset was 7,829 with a p value of 0,000 (<0.05) so that it could be concluded that there was a statistically significant effect of using an elastic lumbar corset on the level of fatigue in employees lifting goods at PT. Budi Texindo pre and posttest. In accordance with the theory presented by Ningsih 2016 which states that Elastic lumbar corset is a work-related personal protective equipment that prevents injury to muscle tissue during activities.

According to Wulandari (2017), the elastic lumbar corset is made of elastic and porous material so it is not hot when used and is given support in the form of a buffer on the back in the form of an aluminum plate. This has the effect of increasing intra-abdominal pressure and reducing forward movement. This opinion is also in accordance with the biomechanical principles presented by Wulandari in 2017, where an elastic lumbar corset which has the effect of reducing movement of the spine can minimize pain, reduce the movement of loads on the lumbar spine, and changes in posture.

The design of the elastic lumbar corset is made of elastic material with a width of 25 cm on the posterior side, and the length is adjusted according to the size of the abdominal circumference. On the posterior side it is strengthened by 4 metal bars which function as support for the posterior lumbar region. The design of elastic lumbar corset orthotics prosthetic products is designed by taking into account the anatomical structure and biomechanics of the body, especially at the lumbar level, where the posterior metal/plate is designed with the aim of supporting the lumbar according to the case. However, excessive use of an elastic lumbar corset and lasting for a long time will cause muscle weakness in the lumbar area and the patient will become dependent on the use of the lumbar corset. So that patients also have to undergo therapy other than wearing a lumbar corset so that the occurrence of muscle weakness in the lumbar area can be minimized (Ningsih, 2016).

The use of an elastic lumbar corset must be in total contact with the user so that the emphasis is evenly distributed throughout the body. From the posterior there are 4 bars that function to support the lumbar and also stabilize the movement of the vertebrae. On the anterior side there is an adhesive that will press the abdomen so that the vertebrae can remain vertical. In addition, the bar also functions to support the vertebrae when carrying out the movement and against the forces that exist in the posterior. According to Ningsih & Setyawan (2016) the use of an elastic lumbar corset must be positioned correctly, namely following the abdominal pressure so that the presence of support/emphasis around the lumbar will reduce the loading area on the lumbar corpus, thereby reducing fatigue due to working in a bent position (Utami et.al, 2017).

This is reinforced by research conducted by Zubaidi (2012) entitled "Effectiveness of elastic lumbar corset on the progression of pain degrees in patients with low back pain". This research was conducted to determine the effect of giving an elastic lumbar corset to reducing the degree of pain in patients with low back pain (LBP). This study used a true experiment with a two group pre and posttest approach in low back pain patients using the Shapiro-Wilk test statistic. A total of 20 respondents were divided into 2 groups, namely group 1 as the treatment group and group II as the control group. Both groups were given treatment for 2 weeks in a row. Pain scores were measured using the VAS scale. As a result, 30 subjects who used an elastic lumbar corset obtained $p = 0.001$ ($p < 0.05$), meaning that there was a significant difference in the degree of pain at the beginning and at the end of the study.

Conclusion and Recommendation

The conclusion of this study is that there is a significant effect of using an elastic lumbar corset on the level of fatigue. Suggestions for this study are that research is carried out with a longer intervention time so that the results of the study will be seen more clearly and follow up on subjects regularly to ensure that the

elastic lumbar corset is actually used by the subject in their activities.

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