

ADDING ASSISTIVE WORK DESK AND WORK PLACE STRETCHING EXERCISE ON INCREASE JOB SATISFACTION AND PRODUCTIVITY OF SEWING WORKERS

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ORIGINAL ARTICLE

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ABSTRACT

Background: The sewing process have demands for workers which are usually quite high, which makes workers have to experience a state of rigid posture, static muscle loads and repetitive work coupled with different and quite thick rope material loads. The process of working in a sitting position for a long time causes complaints and discomfort to workers. The purpose of this research is to increase the satisfaction and productivity of sewing workers. **Method:** The research design used was a true experimental with the same subject design (treatment by subject design involving 18 workers. The sample in this study was determined as a control subject and treatment subject in different time periods. In period I, workers worked as usual while in period II worked using assistive work desks and doing workplace stretching exercises. Job satisfaction was measured using a Minnesota job satisfaction questionnaire containing 20 statements. Productivity was measured by the amount of time workers completed 100 ropes per day. using statistical paired sample t test with a value of α 0.05 for normally distributed data and Wilcoxon test for data that is not normally distributed. **Result:** The results of the study showed significant differences $p < 0.05$ on job satisfaction and productivity, in period II that is 12.06 points or experienced a difference of 19.80%. The addition of assistive work desks and the provision of Workplace Stretching Exercise increased productivity by 0.17 points or experienced a difference of 38.63%. **Conclusion:** It can be concluded that the intervention of adding assistive work desks and offering Workplace Stretching Exercise increase job satisfaction and productivity of sewing workers at Span Set Indonesia factory.

Keywords: Job satisfaction; Work Productivity; Workplace Stretching Exercise

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INTRODUCTION

The sewing process begins with getting a goods' supply from the warehouse, then each worker sews according to what product to make or what material that has been cut and is ready for sewing. Male workers often do larger rope stitches with lifting capacities over ten tons, but all workers, including female workers, are expected to do so. Working in the sewing process has quite high job seriousness demands, which makes them experience a stiff posture, static muscle load, and repetitive work, all while carrying a different and quite thick load of rope material. This workload might lead to worker complaints and possible injury¹. As a result, a good workstation design can help workers perform more optimally and safely².

In combination with workstation intervention, workplace stretching exercise is expected to increase Sewing workers' job satisfaction and productivity. Electronically controlled sewing machines are used to assure the best quality, consistency, and reliability of load bearing on fastened heavy duty linings, fastened utilities, and flat web slings. Tight manufacturing and sewing standards are maintained for eye-shaping and the installation of buckles, ratchets, hooks, and other components.

Due to the awareness of the importance of creating a comfortable and safe work environment because of workers' complaints about uncomfortable work attitudes when sewing, a discussion with several sewing workers and production managers is held. Then, through a participatory approach, results were obtained regarding alternative problem-solving options, such as adding a assistive work desk to put on objects. This is needed during the sewing process so that workers do not

need to bend and twist their backs to pick up objects that were previously placed on the floor. Besides adding workstations, workplace stretching exercises are carried out by doing physical exercises or stretching to increase elasticity, flex muscles, and gain muscular comfort³. Workplace Stretching Exercise is believed to prevent ischemia in spasm muscles, improve blood circulation in muscles, and followed by nutrient renewal for metabolism in muscle cells and the transport of metabolic remains.

Stretching will also increase muscle flexibility, provide an opportunity for muscles to return to a long-resting condition, break the spasm-pain-spasm circle, improve physical fitness, and increase Range of Motion (ROM), as well as reducing muscle fatigue⁴. Previous research conducted by⁵ shows that giving Workplace Stretching Exercise (WSE) can reduce musculo-skeletal by 15.7%. In combination with workstation intervention, workplace stretching exercise is expected to increase job satisfaction and productivity of SpanSet Indonesia's Sewing workers.

METHOD

This research used treatment design by subject design. This research was conducted at SpanSet Indonesia factory located in Marunda Center Area, Bekasi, West Java. This research was carried out from October 2019 to April 2020. There were 18 respondents. The job satisfaction variable was measured through the Minnesota job satisfaction questionnaire (MSQ), while productivity was measured through a comparison from the output and input per unit of time. The data obtained were then processed and analyzed with SPSS program version 16.0 to test the hypotheses

that have been established with the following stages: 1) subject characteristics data were analyzed descriptively by looking for the mean and standard deviation, 2) Shapiro wilk test for normality test, 3) Comparable test of data differences between period 1 and period II at the significance level $\alpha = 0.05$.

The criteria set for the research sample are as follows:

Inclusion criteria

1. Working in the sewing rope-making
2. Willing to become a subject of research by filling out informed consent
3. A minimum of six months of work experience

Exclusion Criteria

1. Subjects with a history of post-op
2. Subjects received other interventions outside of the study

The respondents ranged in age from 21 to 41, with an average age of $30,50 \pm 5,31$. The average age is still considered a productive age for working (Ministry of Health, RI 2015). Yusuf (2015) used a productive age range of 31 to 44 with an average age of 37.11 years in his ergonomics research, yielding an average age of 34.89 years⁶. In this study, the age range is

still considered to be productive and has sufficient muscle strength to work optimally.

The average subject weight was $58,72 \pm 2,49$ kg in the range of 56 – 65 kg, and the average height was 160.9 ± 2.77 cm in the range of 157 – 165 cm, according to the results of the measurement of body weight and height data of workers. Based on the results of the body mass index (BMI) calculation of the sewing workers of SpanSet Indonesia factory, an average IMT value of $22,69 \pm 1,34$ kg/m² was obtained, with the average IMT value ranging from 20,9 – 26,00. This data indicates that the workers are in the healthy and normal physical condition category during the study.

In this study, the average workers' working-time is $5,83 \pm 1,97$ years over a period of 3 to 9 years. Workers with a longer working hours are characterized as skilled and reliable because they can adapt to their work. Working hours can also have an impact on productivity because the longer the working hours, the more experienced the workforce is in performing their responsibilities. Working environment conditions include temperature, humidity, lighting intensity and noise.

Variable	Period I		Period II		P Value
	Average	SD	Average	SD	
Temperature (°C)	27,55	0,46	27,61	0,35	0,782
Humidity (%)	55,01	0,58	56,48	0,67	0,099
Light Intensity (Lux)	209,1	2,36	206,1	2,82	1,000
Noise (dBA)	63,11	1,32	63,13	1,24	0,942

Table 1: Environmental Conditions of the Workplace, SD = Standard Deviation

From the measurement results, the temperature in period I was obtained with an average of $27.55 \pm 0.46^{\circ}\text{C}$, and the average in period II was $27.11 \pm 0.23^{\circ}\text{C}$. This condition is the perfect condition for working. According to Manuaba (2004), a comfortable temperature for tropic area is a temperature between 22 to 28°C ⁷. The quality standards of work temperature criteria in the work industry were met by the findings of work temperature measurements produced, specifically at a temperature of 18°C - 30°C at light to heavy labor levels⁸. The results of humidity value were obtained in period I with an average of $55.01 \pm 0.58\%$ and an average in period II of $56.48 \pm 0.67\%$. The average of humidity value, according to the Regulation of the Minister of Manpower of the Republic of Indonesia No. 05 of 2018 concerning Occupational Safety and Health Environment on Wet and Bulb Globe Temperature Index, which is allowed to humidity of 50% - 75% with a temperature range of 26°C to 30°C ⁹.

The results of the lighting intensity value of the working environment in period I have an average of 209.1 ± 2.36 lux and the average during period II is 206.1 ± 2.82 lux. The source of illumination of sewing workplaces comes from artificial lighting (lamps installation). These

results have met the applicable standards in work environment lighting requirements by sewing the 200 (LUX) lighting intensity category in accordance with the Regulation of the Minister of Manpower of the Republic of Indonesia No. 05 of 2018 concerning Occupational Safety and Health Environment⁹ Measurement of work environment noise in period I has an average of 63.11 ± 1.32 dBA and the average during period II is 63.13 ± 1.24 dBA. This noise level corresponds to the highest threshold that can still be accepted by individuals without resulting in a permanent hearing loss for 8 hours of work a day which is 85 dBA¹⁰. Table 1 shows that the results of the average difference test on all work environment variables did not have a significant difference in both periods I and II. This indicates that they have the same work environment.

All job satisfaction variables in workers are distributed with the value of $p > 0.05$. It will be continued by performing a static parametric analysis of the differences in the mean using the t-paired test. The data of the analysis of the average difference in job satisfaction are presented in the table below.

Variable	Period I		Period II		P Value
	Average	SD	Average	SD	
Job Satisfaction	60,88	2,13	72,94	4,75	0,000

Tabel 2: T-Paired Analysis of Job Satisfaction Data, SD = Standard Deviation

From Table 2, the comparability test was carried out and resulting the analysis of the different meaning of job satisfaction. Period II

has increased the average value and obtained a value of $p < 0.05$, this indicates that there is a significant difference between the two periods.

Based on the analysis above, it can be said that the improvement occurred solely because of the intervention that has been given. There was a difference in average points between period I and period II which was 12.06 or a difference of 19.80%. Difference in job satisfaction value between period I and period II. The effect of increasing job satisfaction differences in sewingworkers occurs due to interventions that have been given by adding assistive work desks and providing Workplace Stretching Exercise. This intervention has an impact on comfort where workers no longer need to bend to take goods and the distance of workers with sewing needs becomes closer. Job satisfaction is the result of interaction between individuals and their environment. A concept that describes how people think about work, based on Goal Setting Theory¹¹.

In this study, SpanSet Indonesia factory sewingworkers felt the benefits of adding assistive work desks. Workers felt their

workload was reduced and their work became lighter because they do not need to bend their body anymore when picking up objects while sewing. In line with research by Purbaningrat Yo & Surya, which stated that workload has a negative effect on job satisfaction, if the workload increases, job satisfaction decreases and vice versa¹².

Work productivity was analyzed by performing different significance tests in both periods I and II. Because productivity data is not normally distributed, this average significance test was carried out using non-parametric tests using the wilcoxon test, to see if there were differences in work productivity values in periods I and II. The results of the analysis of the different meanings of work productivity can be seen in Table 3 below.

Variable	Period I		Period II		P Value
	Average	SD	Average	SD	
Work Productivity	0,44	0,10	0,61	0,24	0,014

Table 3: Wilcoxon Test Analysis of Work Productivity Data, SB = Standard Deviation

According to the table above, based on parametric test for work productivity data, p = 0.014 (p<0.05), this shows that there is a significant difference between period I and period II, where the average work productivity score in period II is higher than the average work productivity in period I. There was a difference in average points between period I

and period II which was 0.17 or a difference of 38.63%. The difference in the value of work productivity between period I and period II can be said to occur solely because of the interventions that have been given.

This productivity increase can be caused by the presence of auxiliary workstation that makes

sewing workers easier to pick up and place objects when sewing, such as rings or hooks. Workers do not need to bend again during the sewing process, allowing for a faster work process. Workers can complete the sewing process faster. This increase also occurred due to the provision of Workplace Stretching Exercise in the middle of the work process. By this, workers may feel more relaxed. The results of this study are supported by previous studies by Harwanti, Ulfah, & Aji, They stated that there is a significant effect on the decreasing of Musculoskeletal Disorder s complaints after performing Workplace Stretching Exercise for 10 days in written batik workers¹³.

In line with a research by Rusni, there is a significant increase in work productivity of 66.67% by providing Workplace Stretching Exercise intervention for workers in the garment industry in Muding, Badung Regency³. Stretching can help muscles recover to their resting length and improve blood circulation, allowing workers to improve their physiological response by reducing musculoskeletal complaints and fatigue. According to Kleiner, one of the expected types of productivity gain is the increasing of products, both in quantity and quality, which in this study, there was an increase in the speed of rope production¹⁴.

CONCLUSION

The intervention of adding assistive work desks and offering Workplace Stretching Exercise increased job satisfaction by 19.80% and productivity by 38.63%. Thus the intervention of adding workstation and offering Workplace Stretching Exercise is able to reduce musculoskeletal complaints. Furthermore, it

also increase the job satisfaction and productivity in sewing workers.

Ethical Clearance: This research was approved by Udayana University with reference number 36/UN.14.3.III.1/PD/2019.

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Conflicts of Interest: There is no conflict of interest, has been declared by the researcher to conduct or publish this study.

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