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### Improving Ergonomic Work Attitudes Reducing of Musculoskeletal Disorders, Workload and Increasing Work Productivity of *Pande Besi* in Gubug Village Tabanan, Bali-Indonesia

Ida Ayu Made Sri Arjani<sup>1\*</sup>, Ni Nengah Ariati<sup>2</sup>, Cok Dewi Widiya Hanu Sundari<sup>3</sup> & I Gusti Ayu Sri Dhyani Putri<sup>4</sup>  
<sup>1</sup>Politechnic of Health Denpasar  
<sup>2,3,4</sup>Politechnic of Health Denpasar

Corresponding Author: Ida Ayu Made Sri Arjani, E-mail: [sri\\_arjani62@yahoo.com](mailto:sri_arjani62@yahoo.com)

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#### ABSTRACT

One of the processes in the making household tools such as small knives, large knives, sickles, and machetes is a tool in the form of a gerda that weighs approximately 1.5 kg. Working on the floor with the base can cause several musculoskeletal disorders such as pain in the back, waist, neck, shoulders, buttocks, legs, and knees. The purpose of this study was to determine the effect of Ergonomic Work Attitudes in Reducing of Musculoskeletal Disorders (MSDs), Workload, and Increasing Work Productivity of *Pande Besi* in the Gubug Village of Tabanan. This study is an experimental study with treatment by subject design. The population is 40 people from 10 industries. Selection of sample using random sampling with a table of random numbers. The minimum sample size is calculated using the Colton formula so that the sample size is 16 people. Data processing and analysis: descriptive test for data on the subject's condition includes age, weight, height, and body mass index. The difference test for data work productivity was analyzed using a Wilcoxon test with  $\alpha = 0.05$ , and the data MSDs and workload were analyzed using a paired samples t-test with  $\alpha = 0.05$  in Period I and Period II. The mean age of the subjects was  $49.19 \pm 12.24$  years, body weight was  $67.25 \pm 7.10$  kg, body height was  $162.3 \pm 0.07$  cm, and the subject's body mass index was  $25.49 \pm 1.64$  kg/m<sup>2</sup>. There was a decrease in musculoskeletal disorders by 18.37%, a decrease in workload by 34.6%, an increase in productivity by 47.06%. There is a significant decrease between musculoskeletal disorders, workload before and after the redesign ( $p < 0.05$ ), and a significant increase in work productivity before and after work attitude improvement.

#### 1. Introduction

One of the occupational diseases that often arise from the incompatibility of workers with work is musculoskeletal disorders. Musculoskeletal disorders are complaints on the skeletal muscles that are felt by a person ranging from very mild to severe complaints. If the muscles receive static loads repeatedly and for a long time, it can cause complaints in damage to joints, ligaments, and tendons (Tiarwaka, 2010).

*Pande Besi* is a small industry that develops in the village of Gubug, Tabanan Regency. These blacksmith craftsmen have been doing their job for a long time and are hereditary from their ancestors. They receive an inheritance as it is and carry out this work as the responsibility of their ancestors. One of the manufacturing processes is a small knife, a large knife, a sickle, and a machete. One of the processes in making household tools is small knives, large knives, sickles, and machetes are confronted with a tool in the form of a grinder to smooth and sharpen the knife. In this process, the worker holds a vibrating grinder, weighing more than 1.5 kg using one hand, and the other hand holds the knife to be smoothed. They work on the floor with the seats as they are. The attitude of sitting with a seat and a work platform that is not ergonomic will cause musculoskeletal disorders. The habit of working with a bowed position causes a forced attitude at work. This forced attitude will cause pain in the body if done continuously for a long time, such as pain in the back, waist, neck, shoulders, and buttocks. Improving work facilities by changing work attitudes can reduce musculoskeletal disorders, work fatigue, and increase work productivity (Siswiyanti & Luthfiyanto, 2011). The best posture when working is to keep the body in a neutral position, namely: the spine is in a natural position, forming an S letter, the elbows are close to the body, and the shoulders are relaxed, and the wrists are in a neutral position (Nurkhamah, 2011).