Exploration of Ergonomic Aspect in Nursing Care through Participatory Ergonomic Approach

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Abstract. The participatory ergonomics approach is a process that involves people who aim to explore in depth the aspects that influence the problems faced in a group. Nurses are a professional group of health workers who have a high potential for experiencing musculoskeletal disorders as a result of manual activities. Nurse activities such as lifting, pushing and moving patients in an effort to provide nursing care require great energy. This research is an *explorative* study with a *cross-sectional* study design that aims to explore problems and conduct studies based on eight ergonomic aspects of providing nursing care. The research was conducted at RSU (General Hospital) Bangli with 30 respondents as implementing nurses who worked in services. Focus Group Discussion (FGD) is a method used to obtain information about ergonomic aspects that have the potential to cause complaints to nurses in providing nursing care. The instrument used in this research is the steps of the workshop implementation from Manuaba. Problem analysis is carried out then prioritized based on *Urgent*, *Important* and *essential*. Six (6) issues were raised in the discussion, including; work attitudes, work facilities, workload, nutrition, work environment, information conditions and social conditions. Based on the priority scale, the improvement of work attitudes is the top priority to be addressed and improvement suggestions in the form of socializing ergonomic work postures to nurses at RSUD (General Hospital) Bangli. This research was carried out up to the proposed improvement stage, so that in further research the implementation stage could be carried out in order that an evaluation of the effectiveness of the proposed improvements could be carried out. Further research can be focused on proposed improvements for aspects that still have potential hazards apart from aspects of work attitude that have been discussed in this study.

***Index Terms*— Nursing Care, Participatory Ergonomics, Focus Group Discussion**

I. INTRODUCTION

Ergonomics is a multi- and interdisciplinary approach that seeks to harmonize work with employees. The application of ergonomics in various sectors has been proven not only to increase work efficiency and productivity, but also to prevent negative impacts such as fatigue, musculoskeletal complaints, work accidents and occupational diseases [1]. However, the application of ergonomics in the nursing field is not optimal, even though it is known that nurses have a high risk of experiencing health problems due to manual activities when providing nursing care to patients.

Nursing care is a nurse's independent activity based on the patient's needs in fulfilling daily life activities. The provision of nursing care is carried out comprehensively, focusing on the fulfilment of basic human needs with nurses as the main instrument. This causes nurses to have a very large risk of exposure to injury or work-related injuries, both directly and indirectly, physically and psychologically. However, the description of the problems that have the potential to cause a negative impact on nurses is not fully known and realized. Using a participatory ergonomics approach by exploring problems based on eight ergonomic aspects, it is expected to see an overview of the problems faced by nurses in providing nursing services.

The participatory ergonomics approach is part of macro ergonomics which emphasizes active participation from related parties [2]. These related parties join the ergonomics team with active participation in identifying problems which are manifested in the form of *Focus Group Discussion* (FGD). Problem identification was carried out based on

eight ergonomic problems that are often faced in nursing services, namely use of muscle, nutrition regulation, work attitude, time conditions, environmental conditions, information conditions, socio-cultural conditions and human-machine interaction. In *Focus Group Discussion* (FGD) all parties describe problems and jointly look for ideas and concepts of solving problems. This participatory ergonomics concept has been proven to be effective in the process of solving problems in a particular community.

Research found that participatory ergonomics interventions generally decreased fatigue by 12.91% and the most dominant decrease was in the physical aspect by 16.36% [3]. The decrease in fatigue in the physical aspect shows that the interventions carried out are able to decrease unnatural work attitudes, are more efficient and comfortable using new interventions. Other researcher found that activity fatigue and physical fatigue among metal painters decreased significantly, but there was not such a large decrease in motivation fatigue. This is because the tasks performed cause physical fatigue, while employee's motivation does not show a decrease in fatigue because their wages are calculated based on the number of products produced. Sutajaya in his research concluded that learning using the SHIP approach can increase activity by 64.0%; increased motivation by 45.8% and decreased physical fatigue by 39.9% [4]. Therefore, it can be concluded that the participatory ergonomics approach is effectively used as an instrument in solving problems.

Prevention and handling of a problem can be conducted if the size of the problem is known and the potential for this problem can be overcome using the resources that are owned. Therefore, accurate data is needed that comes from and is felt directly by the nurse, so that the identification of the causes of the problem can be identified, preventive and treatment measures are appropriate and on target. Through a participatory approach, it is expected that problem identification can be carried out and solution concepts can be agreed upon to achieve optimal nursing care and nurses to avoid the risk of occupational diseases.

Based on the description above, the researcher is interested in identifying the problems faced by nurses in providing nursing care. Through identifying this problem, a priority scale will be obtained that is truly felt by nurses so that improvement suggestions can refer to the condition of existing resources without causing new problems and can be sustainably carried out.

This study aims to explore the problems felt by nurses in providing nursing care based on eight aspects of ergonomics using a participatory ergonomics approach so that an overview of the problems is obtained to then intervene according to the priority scale.

II. METHOD

This research is a *descriptive explorative* study using a *cross-sectional* study design that aims to explore problems and conduct studies based on eight aspects of ergonomics in providing nursing care. The participatory approach was used to collect data using the Focus Group Discussion (FGD) method. A total of 30 respondents were involved in this study and were divided into three small groups consisting of 10 participants each. Manuaba's workshop implementation work steps were used as instruments in this study. The research data was presented descriptively and analyzed by determining the theme of the problem that was conveyed by the participants during the FGD. After obtaining several themes, it is followed by determining priority scales and preparing improvement plans that can be implemented in the work system [5]. Researchers have received approval and ethical feasibility from the research and development department of RSU (*General Hospital*) Bangli.

III. RESULT

In this study, the exploration of ergonomic aspects in nursing actions refers to the steps of the workshop according to the stages of the total ergonomics approach. Problem identification was carried out in each SGD group through *brainstorming* guided by a facilitator, followed by priority issues based on *Urgent*, *Importance* and *essential* then changed into positive sentences (table 1).

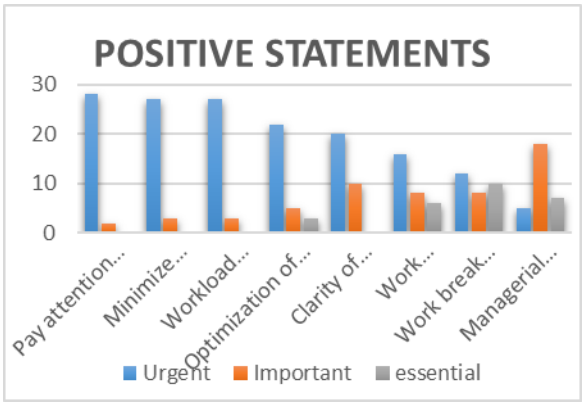

Fig. 1 . Problem Priority Level

Table 1 shows that the majority of FGD participants experienced problems with work attitude, use of muscle power, work facilities and workload.

After identifying the causes of the problem, the next step is to determine the priority of the problem. The process of selecting the priority of problem is a stage that is carried out after conducting an assessment of the working conditions that are currently taking place at RSU (*General Hospital*) Bangli. The process of selecting priority issues is carried out to focus proposed improvements on some of the most important issues to be resolved immediately. Time, cost and manpower limitations make it necessary to determine the order of priority of problem so that the problems that are considered the most important and most urgent can be followed up first.

Prioritization of problem is carried out through a discussion process in workshops with all the disciplines

involved, such as ergonomics experts, practicing nurses, academic nurses, and managerial staff. Priority determination is based on three categories, namely *Urgent*, *Essential*, and *Important*. The priority of the *Urgent* problem on each table is then analyzed and searched for similarities in meaning so that the priority problem is obtained in positive sentences. The full results are in Table 2.

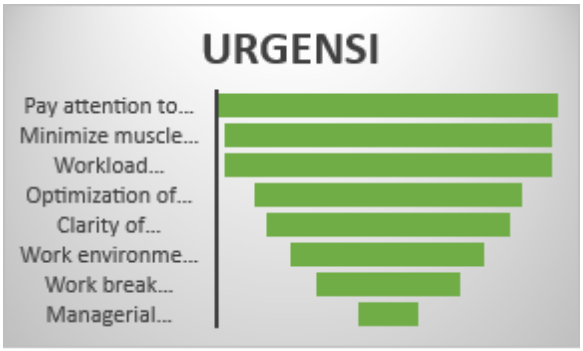

Fig. 2. Problem Priority Level

Table 2 shows that work posture, the use of muscle power, and adjustment of workload are the three main things that are a priority to be overcome.

IV. Discussion

The results showed that the majority of FGD participants experienced problems with work attitude, use of muscle power, work facilities and workload. Work attitude is one of the external factors that influence the presence of musculoskeletal complaints. Nurses are medical personnel who are near patients 24 hours a day, the basic needs of patients must be attended to by a nurse. The high activity carried out by nurses, so that nurses do not pay attention to good body position when carrying out actions [6]. Wrong posture, unnatural and out of the ordinary will increase the risk of injury to the musculoskeletal. Postures that occur when providing nursing care to patients include bending, turning, reaching, and tilting. Excessive use of muscles and unnatural working positions during interventions can cause pain in certain body parts [7], the decrease of work productivity and efficiency [8].

An unnatural working attitude is a working attitude that causes the position of the body parts to move away from their natural position, for example the movement of the hand raise, the back is too bent and so on. The farther the position of the body part is from the body's center of gravity, the higher the risk of developing skeletal muscle complaints[9]. Ergonomic considerations related to work attitudes are very important to be noticed, such as; not being in one working position for too long, not slouching, ergonomic design of work facilities in accordance with anthropometric data, not using a reach that is too far to cause hyperextension of the bones[10].

Work posture is closely related to ergonomics which aims to improve physical and mental well-being through efforts of injury preventions due to non-ergonomic work postures[11]. Work posture is a determining point for analyzing the effectiveness of an intervention. Interventions carried out with non-ergonomic work postures will accelerate the fatigue to come up so that the results are not as expected. Ergonomic work posture aims to improve physical and mental well-being through efforts of injury preventions due to un-ergonomic work postures[12]. The bent work posture causes the spinal muscles to stretch, the discs get strong pressure and put pressure on the spine including the nerves. Twisting the waist, reaching and tilting are unnatural working postures and trigger excessive the use of muscles, causing pain in certain body parts. Extreme postures for long periods and repetitive movements contribute to musculoskeletal complaints[13].

Monotonous, repetitive and static working conditions cause a decrease in blood flow to muscle cells. Static work postures for a long time can cause continuous muscle contractions and pressure on the limbs[14]. In this condition, the muscles need rest to break down the lactic acid that has been formed. The body will try to adapt to this situation and if it is not able to adapt, it can cause (1) an increase in pulse frequency, (2) an increase in musculoskeletal complaints, (3) fatigue and (4) a decrease in work pleasure.

V. Conclusion

The results of the study found that based on eight ergonomic aspects, the problems felt by nurses are spread across all aspects and may be related to one another. Problems that arise in one aspect can also be caused by other aspects that become triggers. as is the case in complaints that are felt by most of them is pain in several parts of the body. This happens due to the use of excessive muscle power caused by inadequate facilities so that nurses work manually. Based on the level of urgency, work attitude, use of muscle power, work facilities and workload are problems that are experienced by many nurses working at the RSUD (*General Hospital*) Bangli. Therefore, work attitude improvement is the top priority to be addressed and improvement suggestions that can be made in the form of socializing ergonomic work postures to nurses at RSUD (*General Hospital*) Bangli. This research was carried out up to the proposed improvement stage, so that in further research the implementation stage could be carried out so that an evaluation of the effectiveness of the proposed improvements could be carried out. Further research can be focused on proposed improvements for aspects that still have potential hazards apart from aspects of work attitude that have been discussed in this study.

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