

Ergonomics Knowledge and Work Posture of Nurses in The Prevention of Musculoskeletal Disorders in The Emergency Room: A Case Study

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INTRODUCTION

The Emergency Room (ER) is a critical health service unit designed to provide immediate care to patients experiencing severe and life-threatening conditions that require rapid and accurate treatment (Zenida, 2021). Due to the unpredictable nature of emergencies and the diversity in patient conditions, nurses working in this environment are often under intense pressure and high workloads. This demanding context frequently results in the neglect of

Abstract

Objective: This study aimed to explore nurses' understanding of ergonomics and assess their work postures in relation to the prevention of musculoskeletal disorders (MSDs) in the emergency room setting.

Method: A qualitative research design was adopted, specifically a single case study approach, to conduct an in-depth exploration of emergency room nurses' knowledge about ergonomics. Data collection was carried out through semi-structured interviews, allowing for detailed responses and insights. The study focused on gathering rich qualitative data to understand how nurses perceive and apply ergonomic principles in their daily practice to prevent MSDs.

Results: Interviews with three emergency room nurses revealed that all participants had a basic understanding of ergonomic principles, including musculoskeletal disorders, proper posture, and injury prevention. They emphasized the importance of correct body mechanics during tasks like lifting patients or prolonged standing. Nurses also recognized the link between poor posture and conditions such as low back pain and neck strain.

Conclusion: The study concludes that nurses' understanding of ergonomics is vital in minimizing musculoskeletal injury risks in emergency settings. Enhancing ergonomic awareness and promoting proper work practices support nurses' health and safety. Integrating ergonomic education into workplace policies is recommended to strengthen injury prevention and improve long-term occupational well-being.

Keywords: Knowledge, Ergonomics, Work posture, Musculoskeletal disorders, Nurses, Emergency department

occupational health aspects, particularly those related to ergonomics. One of the most common and often unrecognized work-related injuries among healthcare professionals is low back pain. Studies report that approximately 50% to 80% of healthcare workers experience low back pain, making it the most prevalent musculoskeletal disorder (Dewi et al., 2019). This condition accounts for about 30% to 40% of all work-related injuries, largely due to prolonged standing, repetitive bending (more

than 10 times per hour), and poor body mechanics during patient handling. Contributing factors also include the use of imported medical and non-medical equipment that may not be ergonomically suited to local anthropometric standards.

Nurses are among the most at-risk healthcare professionals due to their constant interaction with patients and medical equipment. Their workload is influenced by both internal and external factors. External or environmental factors include the layout and accessibility of medical tools, inadequate lighting, suboptimal arrangement of patient beds, excessive noise, and other physical conditions that increase the risk of musculoskeletal disorders (Ketut et al., 2018). Internal factors may involve physical fitness, knowledge of ergonomics, and stress levels. In Indonesia, the prevalence of musculoskeletal disorders among workers, particularly nurses, is alarmingly high, ranging from 40% to 78% (Yulian et al., 2021). This highlights the urgent need for workplace interventions focusing on ergonomic practices and preventative measures to protect nurses from long-term physical harm.

The causes of musculoskeletal disorders are generally caused by standing too long, maintaining static body positions, repetitive movements, lifting heavy patient loads, hunched postures, frequent forced movements, twisting, and non-ergonomic body positions. (Balaputra & Sutomo, 2019). Ergonomics is a pillar of health and an indicator of well-being, because ergonomics is an effort to prevent physical risks, such as neck pain, low back pain, stiffness, and others. Ergonomic hazard control can be started from understanding standard operating procedures and implementing them properly, this is done to improve work safety, work efficiency and reduce risk factors due to work. (Novita & Aruan, 2020). Based on research conducted by Dewi et al., (2019) The results of the risk assessment of Musculoskeletal Diseases conducted on emergency room nurses found that nurses are at risk of Musculoskeletal Diseases, this is due to activities carried out

using awkward and repetitive postures. Lack of knowledge about ergonomics is also one of the factors increasing Musculoskeletal Diseases in emergency room nurses.

METHODS

Study Design

This study uses a qualitative case study research design, the focus of the case study in this study is a single case study that focuses on an in-depth assessment of emergency room nurses' knowledge of ergonomics.

Population and Sample

The population of this study consisted of nurses working at emergency room, Dr. Hasan Sadikin Hospital, Bandung, Indonesia. Purposive sampling was used to select the respondents. Nurses who were unwell during the data collection period were excluded from the study. The total sample of the study was 3 nurses.

Instruments

To collect data, the researcher employed a structured interview guideline designed to explore nurses' knowledge of ergonomics and their work posture practices. The guideline ensured consistency across interviews while allowing flexibility for probing deeper into participants' responses. Questions focused on ergonomic awareness, risk prevention, and daily work routines. Interviews were conducted in a private setting, recorded with consent, and transcribed verbatim to facilitate accurate and detailed qualitative analysis.

Data Collection

Before conducting the research, researchers made time contracts with respondents who were willing to be interviewed. The researcher determines the time and place to conduct the interview, after getting a mutual agreement with the respondent, the interview is conducted according to the agreement. Data collection was carried out by interview to nurses on duty in the emergency room (IGD), and at least D3 and NERS education

graduates. During the interview, it was recorded using a cellphone. The time needed for the interview is about 10-15 minutes in 1 meeting. After the interview is complete, the researcher will inform the respondent that the recording will be kept confidential and the recording will be deleted after the research is complete.

Data Analysis

Thematic analysis was employed to analyze the data, focusing on identifying, examining, and reporting recurring patterns or themes within participants’ responses. This method allowed the researcher to systematically interpret the qualitative data by organizing it into

meaningful categories that reflected key aspects of nurses’ knowledge, experiences, and perceptions related to ergonomics and musculoskeletal disorder prevention in the emergency room setting.

RESULTS

The participants in this research were 3 nurses at the Emergency Room of Dr. Hasan Sadikin Hospital Bandung. The description of ergonomic knowledge and work posture of nurses in preventing musculoskeletal disorders, the results obtained were 4 coding, 4 categories, and 4 themes.

Table 1. Thema Analysis

Coding	Category	Theme
Carry out work according to Standard Operating Procedures Proper position when working Correct position when performing actions	Knowledge	Knowledge of Ergonomics
Bones/Body aches Neck muscle tension Impaired function of the bolea Multiple patients Disorders in the extremities Spinal disorders	Occupationalrisk factors	Musculoskeletal Disorders
Proper working position Sitting should be upright Fix foot support Fix position	Body position	Work Posture
Stretching, massage Exercise Socialize the dangers of non-ergonomic positions Pay attention to the environment first Take action according to ergonomics Nurse awareness	Handling work risk factors	Risk Prevention of Musculoskeletal Disorders

Based on the results of interviews regarding the description of ergonomic knowledge and work postures of nurses in preventing musculoskeletal disorders in the emergency room, namely knowledge of ergonomics, musculoskeletal disorders, work postures, and prevention of the risk of musculoskeletal disorders.

DISCUSSION

Knowledge of Ergonomics

According to the results of the interview, it was explained that the nurse knew about ergonomics. According to Balaputra & Sutomo (2019) the risk of injury is lower if workers understand the principles of ergonomics, this can be improved through education, training, to better understand the environment and work tools so that they can adjust and also prevent the risk of work-related injuries. This is in line with the results of research interviews that explain the definition of ergonomics, namely the right work position at work that does not pose a risk of physical injury. Nurses who have knowledge about ergonomics can improve safety at work, minimize the risks that can cause musculoskeletal disorders and can influence the right work attitude when performing actions. Nurses who do not have knowledge about ergonomics are at risk of developing musculoskeletal disorders. This statement was in line with Ulva (2022) that some nurses have never received education about ergonomics so that they often complain of back pain, neck stiffness, and others due to repetitive actions such as installing catheters, moving patients, installing IVs and other activities without paying attention to ergonomics.

Musculoskeletal Disorders

Based on the results of the interview, it was explained that the description of the nurse's ergonomic knowledge is knowing musculoskeletal disorders. Described in the interview above, namely musculoskeletal disorders that are often experienced by nurses of aching bones / bodies, back pain, sciatica

and muscle tension as well as impaired function of the olecranon. This is in line with research according to (Balaputra & Sutomo, 2019), namely by understanding the impact of ergonomics, namely musculoskeletal disorders, nurses can avoid certain risk factors and improve safety and health in the workplace. Another factor that affects complaints of musculoskeletal disorders is the working period because the working period causes a continuous static load if workers do not pay attention to ergonomic factors, it will be easier to cause low back pain complaints (Balaputra & Sutomo, 2019). Even though they have long experience, they take more actions that do not pay attention to ergonomics, this is because nurses feel more comfortable and save time (Nurhafizhoh, 2019).

Work Posture

Based on the results of the interview, it is explained that the description of the nurse's ergonomic knowledge is knowing work postures that do not pose a risk of injury. This is supported by research (Sianipar, 2019), namely efforts that can be made to maintain safety at work are adjusting the workspace to be comfortable, adjusting light and humidity, also paying attention to positions when performing actions, including when lifting weights, walking attitudes, and standing attitudes. However, in reality, if there are many patients, sometimes nurses forget to apply the principles of ergonomics, such as when dealing with accident patients with severe wounds it takes a long time for nurses to carry out wound care actions, and when installing IVs in dehydrated patients it will be difficult to find the right blood vessels to install IVs so that nurses have to bend for a long time for that. Nurses who perform work by bending to form a back arch angle $>45^\circ$ have a 4.5 times risk of experiencing low back pain compared to nurses who bend with a back arch angle $<45^\circ$. Work attitudes such as raised hand movements, too bent back, raised head, and so on result in the position of body

parts moving away from the natural position so that the risk of injury is higher (Balaputra & Sutomo, 2019).

Risk Prevention of Musculoskeletal Disorders

Based on the results of the interview, it was explained that the description of the nurse's ergonomic knowledge was knowing the prevention of the risk of musculoskeletal disorders. Prevention obtained from the results of the interview is to stretch before starting work, then diligently exercise, and socialize to colleagues, namely the dangers of non-ergonomic positions. This is in line with research (Enta & Masfuri, 2024) which states that ergonomic education programs have succeeded in reducing the prevalence and risk of musculoskeletal disorders in nursing staff working in hospitals. Some factors that cause skeletal muscle complaints are excessive muscle stretching, repetitive activities and unnatural work attitudes, all of which are influenced by pressure, age, working period, physical fitness and physical strength. To maintain the body's physical abilities, it needs to be trained regularly, structured and programmed, because if it is not trained, the body condition will be prone to injury or physical complaints (Enta & Masfuri, 2024)

CONCLUSIONS

Knowledge of ergonomics in nurses is very important to reduce the risk of physical injury at work such as low back pain and other musculoskeletal disorders. The description of ergonomic knowledge and work posture of nurses found in the interview above is knowledge of ergonomics, musculoskeletal disorders, proper work position, and prevention of the risk of musculoskeletal disorders. Knowledge of ergonomic principles at work is very important, especially when performing actions such as positions at work, because nurses can avoid certain risk factors and improve safety and health in the workplace, such as nape or backbone pain due to prolonged bending, body aches, and muscle

tension.

Suggestions in this study to improve safety at work are as follows: Nurses must improve the application of ergonomic principles in the workplace. Nurses must increase their knowledge of ergonomics and nurses' work posture so that nurses can pay more attention to the position at work.

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Conflict of Interest

The author declares no conflict of interest in relation to the conduct and publication of this research.

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