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Implementation of Ergonomics to Improve Health Quality

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Abstract

Purpose: This research discusses the implementation of ergonomics in everyday life, both in the fields of education, manufacturing, and services. Various health complaints can be addressed through ergonomics. Ergonomics-related solutions include product, facility, and work position design, as well as health activities. The purpose of this study was to investigate the implementation of ergonomics in improving health.
Methodology: This research uses a literature review with the PRISMA framework. The tools used in this research are Publish or Perish 8, Zotero, and Vosviewer. Of the 54 articles, 15 met the requirements for further analysis.
Results: 4 articles proposed ergonomic improvements to reduce musculoskeletal disorders (MSDs), including stretching. There are 3 articles proposing to improve health quality by integrating with the Occupational Health and Safety System, including the use of Personal Protective Equipment (PPE).
Applications/Originality/Value: A total of 3 articles proposed improving health in education, including the use of ergonomic bags and ergonomic facility improvements.

Introduction Section

Innovation and developments in work systems affect work and lifestyle. The focus on productivity levels often overlooks aspects of comfort and occupational health. As a result, conditions arise that endanger the health and comfort of both workers and the general public. One method for addressing workplace health and safety issues is ergonomics. Ergonomics is a science that analyzes work systems in accordance with human capabilities and limitations. The function of ergonomics is to improve the effectiveness, comfort, safety, health, and efficiency (ENASE) of humans in their daily activities and in industrial work.

The implementation of ergonomics provides benefits from a health perspective, such as a reduction in complaints of musculoskeletal disorders (MSDs), a reduction in fatigue, and a reduction in stress (Yosineba et al., 2020). The design of ergonomic facilities and work environments can improve health quality (Yusuf et al., 2020). A literature study is needed to identify the detailed results of ergonomics implementation for improving health quality. This literature study aims to analyze research on the implementation of ergonomics to improve health quality. This literature study is expected to analyze the effectiveness of ergonomics for improving health quality and provide suggestions for further ergonomics research.

Activities that involve lifting, lowering, pushing, pulling, and carrying loads, such as in the catering business, can cause injury. The solution is to improve material handling ergonomically(Agustin et al., 2020). Ergonomic implementation can be integrated with the Occupational Health and Safety System (SMK3) to address workplace accidents, for example, by appointing an SMK3 representative from each department, installing turbine ventilation, redesigning ergonomic work tables, and using personal protective equipment (PPE) (Agustina et al., 2022). Ergonomics and SMK3 integration is implemented in schools by identifying non-ergonomic work positions and health and safety risks, thereby implementing health and safety programs aimed at improving health and productivity (Handayani et al., 2024). Ergonomics and SMK3 integration are utilized in identifying potential hazards, namely work positions, physical work environments, and floor conditions (Mindhayani, 2020).

Improved health quality was achieved through ergonomic exercise activities for the elderly. (Andari et al., 2020). Ergonomic exercises have a positive effect on improving health and reducing the risk of musculoskeletal disorders among homemakers when doing activities at home (Aswin et al., 2024). Ergonomic exercises can correct poor posture and reduce pain caused by prolonged inactivity. Ergonomic exercises can maintain muscle elasticity, reduce nerve pressure, increase joint flexibility, and increase oxygen and nutrient supply (Eliyana, 2023). Ergonomic exercises affect blood pressure reduction in the elderly (Madidi et al., 2023). Improving knowledge and awareness about health is done to provide education on ergonomic positions to prevent lower abdominal pain (Anggarani et al., 2022).

Education on identifying and managing musculoskeletal disorders (MSDs) has led employees to begin stretching after work (Andarini, 2023). Recommendations for improving health quality in the production area include designing

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ergonomic work tables and using PPE (Dewi et al., 2024). Ergonomic improvements in the workplace to reduce the risk of MSDs and improve well-being include, for example, stretching while sewing clothes (Mf & Ikhwan, 2024).

Ergonomics in educational settings is achieved by arranging shelves and library layouts to support ergonomic use (Anggana & Suryati, 2024). In MSMEs, ergonomics is utilized in the design of work systems (Naim, 2024). Health and safety awareness in schools includes choosing ergonomic bags for elementary school students (Maharani & Utari, 2021). Implementing ergonomics in higher education institutions includes redesigning chairs to accommodate appropriate anthropometric measurements (Kalsum et al., 2020). The implementation of ergonomics has a significant impact not only on individuals but also on communities and society as a whole (Sartono et al., 2024). Ergonomics is utilized in classroom design (Rohimah et al., 2024). Ergonomics is an approach that encourages the creation of a learning and living environment that supports health (Sulistyo et al., 2024), small bussiness (Istiyono et al., 2023) and spiritual well-being (Rohimah et al., 2025) . Ergonomics is closely related to productivity (Isma Wahyu Yunian et al., 2024). The purpose of this study is to determine how ergonomics implementation improves health quality.

Methods

In this literature study, the PRISMA method was used, with the help of Publish or Perish 8, VOSviewer, and Zotero. The steps in the PRISMA method are as follows:

- Determining the article index
- Finding articles
- Selecting according to criteria

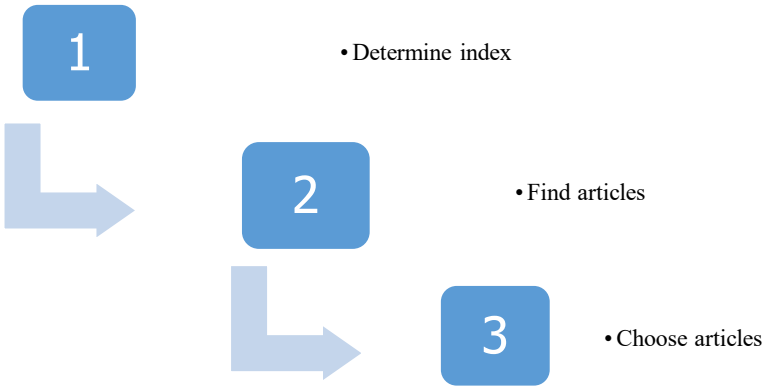

Figure 1. PRISMA Method

The first step was to determine the article index, which involved selecting only articles published in Sinta-accredited journals. Then, articles were found using Publish or Perish 8. Next, several articles that met the criteria of containing ergonomic implementation were selected.

Result and Discussion

At the beginning of the research, references were searched using the Publish or Perish 8 tool. The selected articles were indexed in Sinta and Google Scholar. The selected references were published between 2020 and 2024. From this search, 54 articles were found. These references were then stored in the Zotero library. Next, the research keywords were further analyzed using VOSviewer.

The VOSviewer analysis showed that, among the 54 references, the dominant keywords were ergonomics and work. The research clusters were divided into five (5) categories, namely blue, purple, green, yellow, and red. Blue was related to ergonomics in general, yellow was related to injury or pain, red was related to complaints, green was related to potential hazards, and purple was related to personal issues. The results of the VOSviewer analysis are shown in Figure 1.

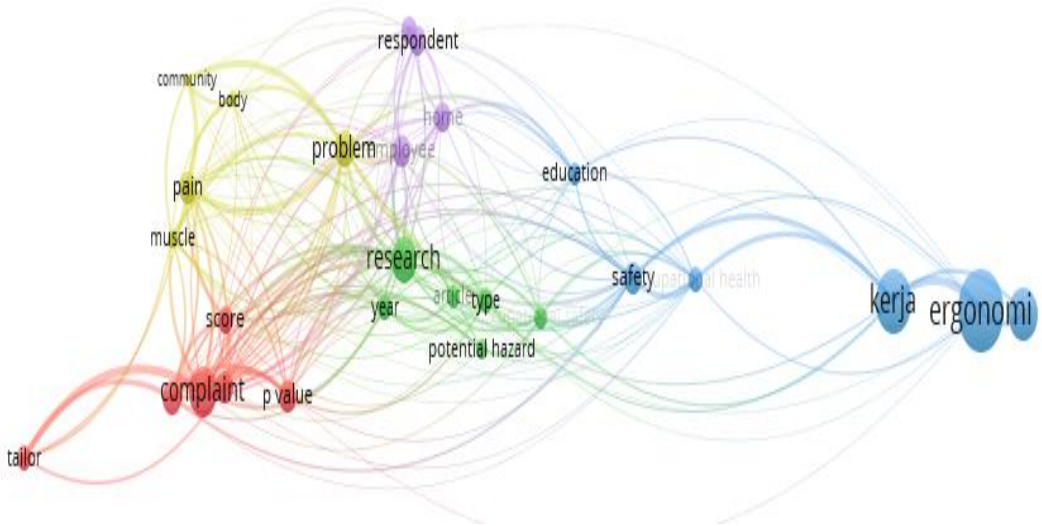

Figure 2. VOSviewer Analysis

The next step is to sort the references by keywords: ergonomic exercises, integration of occupational safety and health and ergonomics systems, improvement of MSD complaints, and implementation of ergonomics in the education sector. The results of the analysis are shown in Table 1 below. The details of the journal articles are shown in Table 2.

Table 1. Keywords Classification

Keywords	Article Number
Ergonomic exercises	5
Integration of occupational safety and health systems and ergonomics	4
Improvement of MSD complaints	3
Implementation of ergonomics in education	3

Table 2. Reference Detail

Articles	Authors	Year	Insight
Ergonomic exercises	Andari FN, Vioneery D, Panzilion P, Nurhayati N, Padila P.	2020	Ergonomic exercises improve the health of older adults
	Aswin B, Sari RE, Hubaybah H, Ibnu IN, Arsa D.	2024	Ergonomic exercises reduce the risk of MSDs.
	Eliyana E.	2024	Ergonomic exercises reduce pain.
	Madidi IR, Febriona R, Damansyah H.	2023	Ergonomic exercises control blood pressure.
	Anggarani APM, Djoar RK, Claudia M, Rade A	2023	Ergonomic exercises reduce pain.
Integration of occupational safety and security systems and ergonomics	Agustin H, Arianto M, Idrus S	2020	Improving material handling
	Agustina F, Nachnul Ansori, Herwina Lusitania	2024	Facility redesign
	Handayani R, Apriani BK, Sudirman S	2024	Ergonomics improves productivity
	Mindhayani	2024	Risk reduction
Improvement of MSDs complaints	Andarini D	2023	Stretching at work
	Dewi RS, Rizkiyah E, Istighfarin R, Sudiarno A, Rahman A, Dewi DS, et al	2023	Ergonomic desk redesign
	Mf MY, Ikhwan Z	2024	Stretching during work breaks
Implementation of ergonomics in educational areas	Anggana AA, Suryati A	2024	Ergonomic facility design
	Maharani FT, Utari D	2021	Ergonomic bags
	Kalsum U, Karnefi A, Hendriani B, Nurfath L	2020	Redesign of classroom chairs

Conclusion

The articles reviewed show that research clusters include general ergonomics, injuries or pain, complaints, potential hazards, and personal issues. Improvements in health quality through integration with the Occupational Health and Safety System, including the use of Personal Protective Equipment (PPE). Improvements in health quality in education include the use of ergonomic bags and ergonomic facility improvements.

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