



Trampoline In Physical Activity: Systematic Literature Review

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Abstrak

Penelitian ini bertujuan untuk menganalisis penggunaan trampolin sebagai salah satu bentuk aktivitas fisik, dengan fokus pada manfaat kesehatan, peran rehabilitasi, dan potensi risikonya. Metode yang digunakan adalah tinjauan literatur sistematis (SLR) dengan pendekatan PRISMA, mengumpulkan dan menganalisis penelitian dari database terpercaya seperti Scopus yang diterbitkan dalam 5-10 tahun terakhir. Hasil review menunjukkan bahwa olahraga menggunakan trampolin memberikan manfaat yang signifikan dalam meningkatkan fungsi fisik, seperti keseimbangan, mobilitas, kekuatan otot, dan fungsi kardiopulmoner, terutama pada anak-anak, lansia, dan kelompok berkebutuhan khusus seperti anak dengan Down Syndrome. Selain itu, trampolin juga berperan dalam optimalisasi performa atlet dan pencegahan cedera melalui peningkatan propriosepsi dan pengurangan asimetri otot. Namun, efektivitas latihan trampolin sangat bergantung pada penerapan teknik yang tepat dan pengawasan profesional untuk mengurangi risiko cedera. Kesimpulannya, trampolin adalah alat olahraga yang aman, efektif dan inklusif untuk berbagai kelompok usia dan kondisi fisik, dengan potensi besar untuk digunakan dalam program kebugaran, rehabilitasi, dan pengembangan kinerja olahraga.

Abstract

This study aims to analyze the use of trampolines as a form of physical activity, focusing on its health benefits, rehabilitation role, and potential risks. The method used was a systematic literature review (SLR) with a PRISMA approach, collecting and analyzing studies from trusted databases such as Scopus published in the last 5-10 years. The results of the review showed that exercise using trampolines provides significant benefits in improving physical functions, such as balance, mobility, muscle strength, and cardiopulmonary function, especially in children, the elderly, and groups with special needs such as children with Down Syndrome. In addition, trampolines also play a role in athlete performance optimization and injury prevention through improved proprioception and reduced muscle asymmetry. However, the effectiveness of trampoline training largely depends on the application of proper technique and professional supervision to reduce the risk of injury. In conclusion, trampolines are safe, effective and inclusive exercise tools for a wide range of age groups and physical conditions, with great potential for use in fitness, rehabilitation and sports performance development programs.

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INTRODUCTION

Sports are physical activities that contain games and contain struggles with oneself or struggles with others and confrontations with natural elements (Adi S et al., 2023; S et al., 2021; Adi et al., 2024). Through sports, individuals not only hone their physical abilities, but also their mental, disciplinary and social skills (Juhanis et al., 2024; Firmansyah et al., 2022; Adi S et al., 2023). As part of physical activity, sport not only plays a role in improving physical abilities, but also contributes significantly to an individual's overall health and well-being (Aliriad et al., 2023). Sport is a form of physical activity that is structured and planned, aiming to improve a person's physical fitness and physical capacity.

Physical activity plays a crucial role in improving the health and well-being of individuals (Adi & Soenyoto, 2020; Adi et al., 2025). The World Health Organization (WHO) recommends that adults do at least 150-300 minutes of moderate-intensity aerobic physical activity or 75-150 minutes of high-intensity aerobic physical activity each week for optimal health benefits (World Health Organization, 2020). In recent decades, various forms of exercise have been developed to increase people's participation in physical activity, one of which is exercise with trampolines. Trampolines are sports equipment that allow individuals to perform repetitive jumps with varying bounce styles, which can provide benefits for cardiovascular health, balance, and body coordination (Farinatti et al., 2018). The dynamic nature of trampoline training engages multiple muscle groups simultaneously, improving overall muscular endurance and core stability.

The popularity of trampolines as a form of physical activity is increasing, both among children and adults. Trampolines are not only used for recreation, but have also been applied in various contexts, such as fitness, rehabilitation and professional sports. For example, in the world of sports, trampolines have become part of athletes' training to improve agility, endurance and body control (Bressel et al., 2019). In the field of rehabilitation, several studies have shown that trampoline training can help improve balance and muscle strength in the elderly as well as individuals with neuromuscular disorders (Lehman & Saadat, 2017). In addition, the use of trampolines has also attracted attention in the fitness world as it is considered an effective alternative to cardiovascular exercise that has a lower impact on joints compared to conventional running or jumping exercises (Schöffl et al., 2021). Thus, trampolines can be an inclusive and effective training tool in fitness and rehabilitation programs.

Although various benefits of trampoline exercise have been reported, there are still challenges in understanding its long-term impact and the factors that influence its effectiveness. Some studies have shown that trampoline training can improve aerobic capacity and balance, but studies on its impact on other physiological parameters, such as muscle strength, bone density and energy metabolism, are limited (Azab et al., 2022). In addition, there are concerns regarding the risk of injury, especially in children using trampolines unsupervised or without adequate safety protection (Park et al., 2023). Therefore, an in-depth analysis of the various studies that have been conducted is needed to understand the

effectiveness, safety, and limitations of trampoline training as a form of physical activity.

The urgency of this study lies in the need for a more comprehensive understanding of the benefits and potential risks of trampoline exercise in the context of health and rehabilitation. Given the increasing use of trampolines across different age groups and needs, it is important to evaluate the existing scientific evidence and identify gaps in knowledge that remain unfilled. Previous studies, such as the one conducted by Azab et al. (2022), emphasized the effectiveness of trampolines in improving postural control and muscle strength in children with Down Syndrome, whereas Fricke et al. (2023) showed that trampoline training can improve functional ability and reduce the risk of falls in the elderly. However, these results are limited to specific population groups and do not cover a wide range of other physiological aspects. Therefore, an in-depth analysis of the various studies that have been conducted is needed to understand the effectiveness, safety, and limitations of trampoline training as a potential form of physical activity.

This study aimed to conduct a literature review of studies addressing the use of trampolines in physical activity. The main focus of this review includes the health benefits offered by trampoline exercise, its role in rehabilitation, as well as its potential risks. By synthesizing existing research, this article hopes to provide a more comprehensive insight into the effectiveness of trampolines as a physical exercise method as well as recommendations for future developments in research and practice.

METHODS

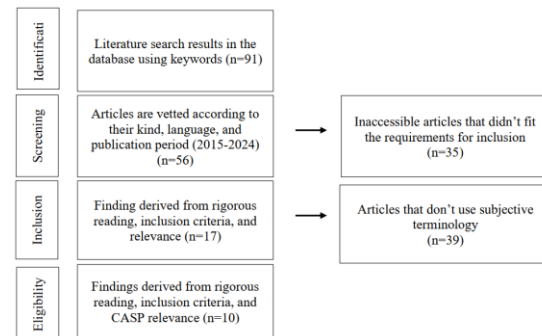


Figure 1. PRISMA scheme in the literature selection process

This study uses a literature review approach, which aims to analyze and synthesize findings from various previous studies related to the use of trampolines in physical activity. This study was conducted through a systematic search of journal articles relevant to the topic under review. The literature sources used came from trusted databases such as Scopus journals published within the last five to ten years to ensure the relevance and validity of the data analyzed.

The literature selection process was conducted using keywords including “**physical activity**” and “**trampoline**” in both English and Indonesian. Articles were selected that addressed the relationship between trampoline use and various aspects of physical activity, such as health benefits, improved balance, influence on cardiovascular fitness, and potential injury risks. In addition, only articles with research methods and results relevant to the focus of this study were included in the analysis.

After the selection process, this study used a descriptive-qualitative analysis method to identify patterns of findings, research gaps, and factors that influence the effectiveness of trampolines in physical activity based on theoretical and empirical perspectives. To

enhance the credibility of the analysis, this study also applied the Systematic Literature Review (SLR) technique with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to ensure that the literature used had high academic validity. The article search and selection process was documented in the form of a PRISMA Flowchart, which describes the stages of systematic literature screening.

RESULTS AND DISCUSSION

Results

Articles that have been selected are numbered, then included in a table that can

explain about: article title, author, year published, research objectives, research methods, and research results (Peters et al., 2015). The charting data is explained in the following table:

Table 1. The number of publication at year

Year of Publication	Number of Article
2015	1
2016	1
2017	2
2018	2
2019	4
2020	1
2021	3
2022	1
2023	2
2024	0

Table 2. Selected Articles

No.	Author Name (Year)	Sample	Research Methods	Research Results
1	(Schöffl et al., 2021)	10 boys and 5 girls	Experiment Method	Improve cardiopulmonary function in children.
2	(Posch et al., 2019)	Participants (range: 56–83 years)	Experiment Method	Improve balance and functional mobility, strength, gait performance and fear of falling
3	(Eynur, 2024)	15 female athletes in the experimental group and 16 female athletes in the control group	Experiment Method	Improved body mass index and balance in women
4	(Fricke et al., 2023)	50 postmenopausal women aged 50-69 years old	Experiment Method	Improve functional ability and reduce specific risk factors in elderly women.
5	(Azab et al., 2022)	32 children with DS aged 7-9 years	Experiment Method	Improving muscle strength and postural control in children with DS
6	(Park et al., 2023)	7 patients (one male and six female)	Experiment Method	Improper use or performed without education on proper posture and technique can pose a risk of serious injury.
7	(Bahrami Sabbagh & Langeroudi, 2023)	36 female volleyball players	Experiment Method	The exercise program had a significant impact on static balance, dynamic balance, and proprioception of the ankle in dorsiflexion and plantarflexion.
8	(De Maio et al., 2023)	37 participants	Experiment Method	Trampolines can minimize imbalance between limbs by reducing asymmetry and the relative risk of sports or physical-related injuries.
9	(Di Rocco et al., 2023)	20 participants consisting of 11 females (age: 24.4 ± 1.0 years) and 9 males (age: 27.3 ± 2.9 years).	Experiment Method	prevent the acute decline that usually occurs with other training methods.

10	(Yang et al., 2022)	15 trampoline gymnasts	Experiment Method	Improving lower body strength and power in pre-teen trampoline gymnasts.
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Discussion

Trampoline training has been shown to effectively enhance physical functions such as balance, mobility, strength, and cardiopulmonary health across various age groups including children, the elderly, and individuals with special needs while also supporting athletic performance and injury prevention, provided it is performed with proper technique and professional supervision to ensure safety.

Research shows that trampoline training has a positive effect on improving basic physical abilities such as balance, mobility, strength, and cardiopulmonary health, especially in children and the elderly. Schöffl et al. (2021) showed trampoline jumping can be an effective exercise method to improve cardiopulmonary function in children. These results are important given that physical activity at an early age is strongly associated with the development of vital organ capacity and the prevention of obesity.

The study by Azab et al. (2022) Effective for improving muscle strength and postural control in children with DS. Furthermore, research by Fricke et al. (2023) which examined improve functional ability and reduce specific risk factors in elderly women. These findings suggest that exercise programs or structured physical interventions can have a positive impact on the quality of life of individuals across a wide range of ages and conditions, from children with special needs to the elderly. Therefore, implementing interventions that are tailored to the characteristics of each target group is essential to optimize the outcomes achieved.

Meanwhile, research by Posch et al. (2019) improve balance and functional mobility, strength, gait performance and fear of falling. This is particularly relevant in the context of maintaining the independence of older adults. In line with this, Eynur (2024) showed that mini trampoline training significantly improved body mass index and balance in women aged 18 years and older. This indicates that the benefits of trampolining are not limited to children and the elderly, but are also relevant for adult groups in order to maintain health and fitness.

Trampoline training contributes to improved sports performance and injury prevention, particularly in groups of athletes and active individuals. Research by Bahrami & Sabbagh Langeroudi (2023) stated that the exercise program had a significant impact on static balance, dynamic balance, and proprioception of the ankle in dorsiflexion and plantarflexion. This demonstrates the potential of trampolines as a preventive rehabilitation tool De Maio et al. (2023) also revealed Trampolines can minimize imbalance between limbs by reducing asymmetry and the relative risk of sports or physical-related injuries. This reduction in muscle imbalance is crucial in sports that demand symmetry of movement.

Furthermore, a study by Di Rocco et al. (2023) found that can help prevent the acute decline that usually occurs with other training methods. This suggests that trampolines can be utilized in the active recovery phase to maintain physical performance. Yang et al. (2022) examined the Implementing LL-BFRE instead of

HL-RE as a conditioning activity in a contrast training sequence may be equally effective in improving lower body strength and power in pre-teen trampoline gymnasts. However, it is important to take note of the findings from Park et al. (2023) which shows that improper use or performed without education on proper posture and technique can pose a risk of serious injury. This emphasizes that training should be conducted with adequate supervision and safety procedures.

CONCLUSION

Based on a review of various studies, trampoline training has been shown to provide significant benefits in improving physical function and health in both children and the elderly, such as improved balance, mobility, muscle strength, and cardiopulmonary function, including in groups with special needs such as children with Down Syndrome. In addition, trampolines also play an important role in athletic performance optimization and injury prevention through improved proprioception, reduced muscle asymmetry, and maintenance of post-training performance. However, the effectiveness of these exercises relies heavily on the application of proper technique and professional supervision to minimize the risk of injury, making trampolines a safe, effective and applicable training tool for various age groups and physical activity levels.

Given the various benefits offered by exercise using trampolines, future research is recommended to further explore the effectiveness of trampolines in more specific contexts, such as in populations with specific medical conditions (e.g., children with autism, post-stroke patients,

or elderly with advanced balance disorders). In addition, longitudinal studies assessing the long-term effects of trampoline exercise on quality of life and cognitive function are also needed. Experimental studies with more rigorous methods, including control groups and standardized professional supervision, can provide a deeper understanding of the most effective exercise protocols and optimal duration and frequency. Last but not least, an analysis of injury risk by age and fitness level is also warranted to improve the safety aspects of widespread trampoline exercise

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