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Research Article

The Relationship Between Physical Activity and Asthma Control in the Elderly

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Abstract

Background of study: Asthma is a chronic respiratory disease often experienced by the elderly, characterized by inflammation and narrowing of the airways. Good asthma control is important to prevent recurrence. Physical activity contributes to improving lung function and reducing inflammation, thus helping to better control asthma.
Aims and scope: identify the relationship between physical activity and asthma control in the elderly.
Method: This research is quantitative using descriptive correlation and cross-sectional approaches. The sample of this study had 58 respondents at Puskesmas Rawat Inap Simpang Tiga and Puskesmas Rejosari who used purposive sampling technique. Data were collected using two questionnaires, the Physical Activity Scale for the Elderly (PASE) to assess physical activity levels and the Asthma Control Test (ACT) to evaluate asthma control. Data were analyzed by univariate and bivariate analysis using Chi-square test.
Results: The majority of respondents had heavy physical activity as many as 39 people (67.2%), and light physical activity as many as 19 people (32.8%), and uncontrolled asthma as many as 40 people (69%) and partially controlled asthma as many as 18 people (31%). The results of statistical tests showed a relationship between physical activity and asthma control in the elderly with a p-value of 0.029 < 0.05.
Conclusion: The heavier the intensity of physical activity, such as intense exercise, heavy physical labor, or fast running, the more difficult it is for the elderly to control asthma. In contrast, light physical activity is more recommended as it has the potential to support better asthma control.

Keywords: Asthma, Asthma Control, Elderly, Physical Activity

1. INTRODUCTION

Elderly is a biological process experienced by everyone inevitably (Ratnawati, 2021). This is based on the Minister of Health Regulation on the Implementation of Elderly Health Services regulated in Health Center Number 67 of 2015, elderly is defined as a condition of continuous age after adulthood, which is more than 60 years (Central Bureau of Statistics [BPS], 2020).

The elderly population in the Southeast Asia region was recorded at around 8% or around 142,000,000 individuals in 2020. It is estimated that by 2050, the number of elderly people will triple compared to the 2020 figure. According to a BPS report published in 2023, the percentage of the elderly population in Indonesia is estimated to reach 11.75%, an increase of 1.27% compared to 10.48% in the previous year. The results of the 2020 population census in Riau Province recorded a total elderly population of 236,992 people (6.16%). Pekanbaru City has the highest percentage of elderly people, namely 7.35% of the total population in Pekanbaru city.

Elderly people who step into old age face various health problems. These problems begin with damage to the body's cells, which leads to a decrease in the body's ability to function and resilience, as well as a high risk of disease. Among the diseases often experienced by the elderly are dementia, hypertension, osteoporosis, hearing and vision impairment, gout, diabetes mellitus, and asthma. This decline in body function can lead to various health complications, such as metabolic disorders, limited mobility, and increased risk of infection. One disease that requires special attention is asthma. Physiological changes in the lungs and respiratory tract can make asthma attacks more frequent and more difficult to control (Ekasari et al., 2018).

Asthma is an inflammatory condition of the airways, characterized by symptoms such as chest tightness, wheezing, shortness of breath, and coughing, which generally occurs in the early morning or at night.Asthma

attacks are generally caused by widespread obstruction of the airways in the lungs, although the severity can vary. These blockages are often reversible, either naturally or with medication. However, airway obstruction can lead to respiratory failure, caused by increased breathing effort, impaired gas exchange efficiency, and fatigue in the muscles used for breathing (Rai & Artana, 2016).

According to the World Health Organization (WHO, 2024) asthma is among the top five leading causes of death globally, with a rate of 17.4%. Worldwide, around 100-150 million people suffer from asthma, and each year an additional 18,000 people are diagnosed with asthma. It is estimated that by 2025, the number of people suffering from asthma could rise to 300 million, of which 225,000 are at risk of death. In Indonesia, the prevalence rate of asthma is in the range of 5-7%. The 2019 Riskesdas report recorded the prevalence of asthma in Indonesia at 2.4%, with Riau Province reporting a prevalence of 2.19%, and Pekanbaru City recording a prevalence rate of 2.41% (Riskesdas, 2019).

According to the Asthma and Allergy Foundation of America (AAFA, 2024) most people with asthma experience their first symptoms at a young age, but asthma can affect anyone at any age. It is not uncommon for adults aged 70 years and over to experience asthma symptoms for the first time. Symptoms of asthma in the elderly are the same as those experienced by other asthmatics. The most common causes of asthma flare-ups include respiratory or viral infections, allergens, air pollution (irritants) and physical activity.

Physical activity refers to any type of body movement that increases energy expenditure, such as gardening, sweeping, cleaning the house, or playing with grandchildren. Physical activity in daily routines can be done in various ways, including work-related tasks, sports, and household chores. Moderate-intensity activities include brisk walking, cycling on flat terrain, swimming, and dancing, while vigorous activities include jogging, cycling on uphill roads, and carrying heavy loads (Kusumo, 2020).

In the elderly, physical activity can affect asthma control through physiological changes that occur due to the aging process, such as decreased lung elasticity, weakened respiratory muscles, and decreased overall lung capacity. Light to moderate activity can improve respiratory function and reduce airway inflammation through anti-inflammatory mechanisms, while vigorous activity can trigger bronchoconstriction and worsen asthma symptoms. Therefore, choosing the right intensity of physical activity is very important in supporting asthma control in the elderly.

Inappropriate physical activity often triggers asthma symptoms that reflect poor asthma control. As a result, people with asthma often intuitively or deliberately avoid exercise, which leads to a sedentary lifestyle. People with asthma are often considered as individuals with chronic weakness who need to be protected and encouraged to avoid physical activity to prevent severe asthma attacks (Panagiotou et al., 2020). Asthma attacks caused by physical activity are also known as exercise-induced bronchoconstriction. Therefore, controlling physical activity is important in the elderly as part of efforts to control asthma relapses (Dandan et al., 2022).

Asthma control refers to a patient's efforts to manage asthma clinical symptoms that affect their daily lives (Yahya & Kartikasari, 2023). Asthma control can be assessed using various parameters, one of which is the Asthma Control Test (ACT), a validated screening tool consisting of a clinical questionnaire designed to determine whether a patient's asthma is well controlled (Nur et al., 2019). According to the Global Initiative for Asthma (GINA) 2024, asthma is said to be controlled when daily symptoms are minimal or nonexistent, there are no attacks at night, and there are no obstacles to performing daily activities such as exercise, and little or no need for bronchodilators. Coughing, wheezing and difficulty breathing at night are signs of poor asthma control in people with asthma (Bhaskara et al., 2018).

Previous research by Pascual et al. (2022) examining the relationship between physical activity and asthma in individuals with mild to moderate persistent asthma, found that higher levels of physical activity were significantly associated with improved clinical asthma control. This finding indicates a link between physical activity and clinical outcomes in asthma patients.

Referring to previous research conducted by researchers in April 2024 at the Puskesmas Rawat Inap Simpang Tiga through the interview method, it was found that 4 out of 5 elderly people experienced interference with their asthma control when doing heavy physical activity. They said that when doing activities up and down stairs, walking long distances, busy activities and when health conditions are unstable often trigger asthma recurrence which results in difficulty in controlling asthma. This suggests an association between physical activity and the level of asthma control in the elderly.

Although there have been a number of studies addressing the relationship between physical activity and asthma control, most of these studies have focused on children, adolescents or young adults. Research specifically addressing the elderly population is very limited. This limitation is significant given that older adults have different physiological characteristics, such as decreased lung elasticity, weakened respiratory muscle strength and a high prevalence of comorbidities, which could potentially affect both the response to physical activity and the effectiveness of asthma control.

In addition, the elderly are an age group that is susceptible to a reduced quality of life due to uncontrolled asthma. In practice, many older adults avoid physical activity for fear of triggering an asthma attack, which in turn contributes to a sedentary lifestyle and a general decline in physical fitness. Therefore, studies that specifically examine the relationship between physical activity and asthma control in the elderly are very important to provide a scientific basis for formulating asthma prevention and management strategies in this age group.

Based on the observed phenomenon, it can be concluded that there is a relationship between asthma in the elderly and the level of physical activity they engage in. Furthermore, research specifically examining the connection between physical activity and asthma control in the elderly remains limited. For this reason, the researchers are motivated to investigate "The Relationship Between Physical Activity and Asthma Control in the Elderly."

2. MATERIAL AND METHOD

This research is a quantitative study employing a descriptive correlational design with a cross-sectional approach. The study population consisted of individuals diagnosed with asthma residing in the service areas of Puskesmas Rawat Inap Simpang Tiga and Puskesmas Rejosari. There were 58 respondents who were sampled and taken through purposive sampling technique, based on predetermined inclusion and exclusion criteria. These criteria include specific inclusion and exclusion requirements. Inclusion criteria included pre-elderly or elderly with a history and diagnosis of asthma, aged 45 years or older, willing and cooperative as respondents, and able to communicate well. Meanwhile, the exclusion criteria included pre-elderly or elderly who had hearing loss.

Data were collected using a questionnaire, with instruments including the Physical Activity Scale for Elderly (PASE) and Asthma Control Test (ACT). PASE consists of eight questions designed to assess physical activity in the elderly. The physical activity score is categorized as heavy physical activity if the measurement result is ≥ 12 and is categorized as light physical activity if the measurement result is <12. While ACT contains five questions to assess asthma control. The asthma control score is categorized as uncontrolled if the measurement result is ≤19, partially controlled if the measurement result is between 20-24, and fully controlled is 25. The validity and reliability of the instruments have been tested in previous studies with results that meet the standards.

Puskesmas Rawat Inap Simpang Tiga and Puskesmas Rejosari became the research sites conducted on September 14, 2024-15 January 2025 after obtaining research ethics permission from the Ethics Committee of the Faculty of Nursing, Riau University with number 1344/UN19.5.1.8/KEPK.FKp/2024. Data collection was carried out by explaining the purpose of the study, the rights of respondents and providing informed consent to respondents who would be signed by respondents if they were willing to be involved in the study. In addition, researchers uphold research ethics related to name confidentiality, data confidentiality only for research purposes and being fair to each respondent.

After the data is collected, the next step is to analyze the data. Univariate analysis was conducted to describe the general characteristics of the respondents and the variables studied. Bivariate analysis was then used to examine the relationship between two variables. The statistical method applied was the Chi-square test, with a significance level set at 5% (α = 0.05). The decision is taken based on the p value, where if p is smaller than α (0.05), it can be concluded that there is a significant relationship between the variables tested, so the null hypothesis (H0) is rejected.

3. RESULT AND DISCUSSION

3.1 Results

Table 1 Frequency and percentage distribution of respondent characteristics, physical activity and asthma control in the elderly (n=58)

No	Characteristics	f	(%)
1	**Age**		
	a. Middle Age/Pre-elderly (45-59 years)	36	62,1
	b. Elderly (60-74 years)	19	32,8
	c. Old age (75-90 years)	3	5,2
2	**Gender**		
	a. Male	17	29,3
	b. Female	41	70,7
3	**Work**		
	a. Not Working	18	31
	b. Laborer	2	3,4
	c. Self-employed	4	6,9
	d. Private Employee	1	1,7
	e. Civil Servant	2	3,4
	f. Housewife	30	51,7
	g. Driver	1	1,7
4	**Physical Activity**		
	a. Heavy	39	67,2
	b. Light	19	32,8
5	**Asthma Control**		
	a. Not Controlled	40	69
	b. Partially Controlled	18	31
	Total	58	100

The table above shows that the majority are aged 45-59 years with 36 people (62.1%), for gender the majority are women with 41 respondents (70.7%), followed by housewives with 30 respondents (51.7%). Then the table above shows that the majority of pre-elderly and elderly individuals do heavy physical activity totaling 39 people (67.2%), while 19 people (32.8%) do light physical activity. Regarding asthma control, the majority of pre-elderly and elderly individuals had uncontrolled asthma totaling 40 people (69%), and partially controlled asthma was found in 18 people (31%).

Table 2. Relationship between physical activity and asthma control in the elderly (n=58)

Physical Activity	Asthma Control				Total		P *value*
	Uncontrolled Asthma		Asthma Partially controlled				
	N	%	N	%	N	%	
Heavy	31	79,5	8	20,5	39	100	
Light	9	47,4	10	52,6	19	100	0,029
Total	40	69,0	18	31,0	58	100	

The table above presents the analysis of the relationship between physical activity and asthma control in the elderly. It indicates that as the intensity of physical activity increases, asthma control becomes more challenging for older adults. Conversely, lighter physical activity is associated with better asthma management. Statistical analysis using the Chi-square test yielded a p-value of 0.029 < 0.05. This result indicates a statistically significant relationship between the level of physical activity and asthma control in the elderly.

3.2 Discussion

Implications

Most of the respondents in this study were aged 45-59 years with a total of 36 people. This is in line with the findings of Anwar et al. (2017), which revealed that respondents aged 45-59 years were the largest age group, where this age enters the early to late elderly period, when there is a decrease in organ function which can increase the risk of asthma attacks. As we age, our bodies undergo various changes, including a decrease in lung capacity and respiratory function due to degenerative processes.

The majority of respondents were female, which amounted to 41 people. From the interview results, it was found that 15 men were active smokers and 2 people had a history of smoking. This is in line with the findings of Yahya and Kartikasari (2023) stating that the majority of respondents are women. Increased estrogen levels in women, the use of hormonal contraceptives, and hormone therapy after menopause can trigger the recurrence of asthma symptoms. Women have a higher risk of developing asthma than men because men generally have a larger airway diameter and better lung function. Airway resistance is inversely related to the fourth power of the airway diameter, meaning that even a slight narrowing of the airway leads to a substantial increase in resistance. Additionally, female hormones significantly contribute to the development and onset of asthma.

The majority of respondents had housewife jobs (IRT), with a total of 30 people. Kamilah et al. (2023) stated that the high rate of asthma among housewives is thought to be related to the high level of allergen exposure in the home environment. Daily activities such as cleaning, washing, and cooking increase the risk of inhalation of dust particles, mites, and other irritants that can trigger allergic reactions and worsen asthma conditions.

Physical Activity

The majority of respondents had heavy activities as many as 39 people (67.2%). This is in line with research conducted by Mailita and Helmanis (2024) which revealed that most respondents were included in the good or heavy physical category, namely (63.8%). In general, asthmatics tend to experience attacks when doing excessive physical activity or exercise that is too intense. One of the activities that most easily triggers an asthma attack is sprinting. Asthma symptoms due to physical activity usually appear immediately after the activity is completed, which is characterized by shortness of breath, coughing, or wheezing. Strenuous activities such as intense exercise and draining physical work are often the main factors that lead to the appearance of asthma symptoms, as sufferers are unable to tolerate the increased workload on their respiratory system. When the body feels tired due to excessive physical activity, the respiratory system will adapt by increasing the breathing rate to meet the body's oxygen needs. This condition can trigger airway narrowing and cause an asthma attack (Hanifah et al., 2020).

Although excessive physical activity is a potential trigger for asthma, several studies have shown that a controlled increase in physical activity can actually help in the management of asthma. Panagiotou et al., (2020) stated that physical activity done in the right way can provide benefits for people with asthma, especially in reducing disease exacerbations, improving overall asthma control, and reducing the frequency of visits to health services. Targeted and not excessive physical activity can help increase lung capacity, strengthen respiratory muscles, and increase the body's resistance to asthma triggering factors.

Asthma

The majority of respondents had uncontrolled asthma as many as 42 people (72.4%). This is in line with research by Yahya and Kartikasari (2023) that the level of asthma control that is not controlled is 29 people (65.9%). The factors that affect the level of asthma control include a lack of knowledge about asthma itself, so that patients do not understand how to avoid asthma triggers that can cause relapse. In addition, lack of awareness of the importance of adherence to asthma treatment or therapy as well as poor lifestyle habits, such as smoking and rarely doing exercise.

A person with asthma is considered controlled if they fulfill six categories, namely first, no or rarely experiencing asthma symptoms. Second, they never wake up at night due to asthma. Third, never or rarely use relief medication. Fourth, they can perform normal activities and exercises. Fifth, lung function test results are normal or close to normal. Sixth, never or rarely experience asthma attacks (GINA, 2024). There are several factors that affect the level of asthma control in asthma patients, which can be bad, including age,

gender, education level, allergen factors, obesity, and exposure to cigarette smoke (Yahya & Kartikasari, 2023).

The relationship between physical activity and asthma control in the elderly

The results of data analysis show that there is a relationship between physical activity and asthma control in the elderly. According to Pascual et al. (2022), a marked increase in physical activity levels is closely associated with a significant improvement in asthma clinical control among patients with mild to moderate forms of persistent conditions. Physical activity has benefits in controlling asthma, but if done excessively, it can actually worsen asthma conditions. Exercise-induced bronchoconstriction (EIB) can occur when exercise is done excessively or without adequate warm-up, especially in cold, dry or polluted environments. Too high an intensity of activity also risks causing fatigue in the respiratory muscles and increasing oxidative stress, which can aggravate asthma symptoms.

Physical activity has great benefits for people with asthma, including the elderly. However, strenuous activities such as intense exercise and draining physical work can actually aggravate asthma conditions and make symptoms more difficult to control. In people with asthma, strenuous physical activity can trigger narrowing of the respiratory tract as the body requires greater airflow to the lungs, which can lead to symptoms such as shortness of breath, wheezing, coughing, or even more severe asthma attacks (Morris, 2020). As a person ages, their lung capacity decreases, which can lead to asthma symptoms due to their limited ability to perform activities. However, light physical activities such as walking, swimming or yoga are highly recommended as they can increase lung capacity without causing asthma attacks. In addition, these activities also help to strengthen respiratory muscles, reduce airway inflammation and improve overall endurance, all of which play a role in supporting more effective asthma control (Huda et al., 2024).

Asthma symptoms arising from physical activity often occur under certain conditions, such as cold air, night or early morning. Usually, the symptoms begin with a mild cough which then progresses to shortness of breath and a feeling of pressure in the chest. Asthma attacks can last for varying durations, from a few minutes to several hours. If asthma is not controlled, the frequency of attacks increases, which can increase the risk of serious complications, even death. In addition, frequent asthma attacks also have an impact on daily productivity, such as difficulty working, sleep disturbances, and limitations in social and physical activities (Juwita & Sary, 2019).

Based on these findings, it can be assumed, physical activity has an important role in the management of asthma in pre-elderly and elderly people, but it can also be a trigger factor if it is not adapted to individual conditions. Physical activities such as exercising, running fast, and climbing and descending stairs, risk interfering with asthma control if done without considering the lung capacity and physical condition of the patient. Pre-elderly and older adults with asthma face challenges due to decreased lung function as they age, which can limit their ability to perform physical activities. In addition, the increasing prevalence of asthma shows that the disease is still a global health problem that impacts productivity and quality of life. However, studies have shown that well-managed physical activity can help control asthma, reduce exacerbations and improve respiratory function. Therefore, a proper approach is needed to tailor the type and intensity of physical activity to help older asthma patients stay active without worsening their symptoms.

This research is expected to be used as reading material related to gerontic nursing so that it can increase knowledge, especially about the relationship between physical activity and asthma control in the elderly. It is hoped that this research can be used as a basis for developing nursing interventions related to asthma control problems in the elderly so as to improve the quality of elderly care.

Research contribution

This study contributes to expanding the understanding of the relationship between physical activity and asthma control in the elderly, which can be a reference for health workers in designing more effective nursing intervention programs to improve the quality of life of the elderly with asthma.

Limitations

The limitation of this study is in obtaining data because there are discrepancies between the data received from the Health Office and the Health Center. These discrepancies require more in-depth data validation to ensure an accurate number of respondents. In addition, at the time of the study there were several respondents who refused to participate due to asthma relapses.

Suggestions

It is recommended for future researchers to conduct research related to other variables, such as looking at the relationship of asthma control with other precipitating factors, such as consumption of foods that can worsen asthma symptoms and exposure to cigarette smoke.

4. CONCLUSION

There is a significant relationship between physical activity and asthma control in the elderly. Thus, this study can be used as a resource for future researchers, such as looking at the relationship between asthma control and other precipitating factors such as consumption of foods that can worsen asthma symptoms and exposure to cigarette smoke

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properly. We hope that the results of this study can provide broad benefits for the development of science and pave the way for further research that is more innovative and useful.

AUTHOR CONTRIBUTION STATEMENT

AAH, H, and FS together contribute to writing this research. each other gives input and responses, so there is an explanation of the results that are considered important.

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