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THE COMPARISON OF TOTAL NASAL SYMPTOM SCORES IN INDIVIDUALS WITH ALLERGIC RHINITIS BASED ON INTENSITY OF PHYSICAL ACTIVITY

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Abstract

Allergic rhinitis (RA) is one of the most common health problems caused by nasal mucosal inflammation. Physical activity is all movements during leisure time. The Total Nasal Symptoms Score (TNSS) was used to assess the severity of allergic rhinitis, while the Global Physical Activity Questionnaire (GPAQ) was to assess the intensity of physical activity. This study aims to compare the total nasal symptom scores in individuals with RA based on physical activity intensity. This is a cross-sectional study with proportional stratified random sampling from the medical student population of Lambung Mangkurat University year 2018, 2019, and 2020 who have undergone nasal endoscopy examinations to rule out exclusion criteria, were clinically diagnosed with allergic rhinitis and met the diagnostic criteria based on symptoms according to the SFAR score ≥ 7 . The predetermined sample was then asked to fill out the GPAQ questionnaire for measuring the intensity of physical activity and the SGHT questionnaire. The results showed the group with moderate-severe physical activity had mild symptoms of allergic rhinitis. However, the relationship between the intensity of physical activity and the Total Nasal Symptom Score was not statistically significant ($P = 0.79$). But it cannot be denied that moderate-intensity exercise can reduce the Total Nasal Symptom Score compared to those who do not exercise.

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Introduction

Allergic rhinitis (RA) is one of the most common health disorders worldwide.¹ RA is an inflammatory disease that occurs in the nasal mucosa and is mediated by immunoglobulin E after exposure to allergens in the nasal mucosa. Allergic rhinitis is a condition characterized by sneezing, nasal congestion, anterior or posterior rhinorrhea, and nose itching.² Symptoms of allergic rhinitis can cause depression, sleep disorders, and exhaustion, which can impair quality of life and

productivity.³

World Health Organization data in 2011 showed about 400 million people in the world suffer from allergic rhinitis.⁴ The prevalence of RA reaches 20-25% in western countries as the most common allergic manifestation in respiratory organs.⁵ The International Study of Asthma and Allergies in Childhood (ISAAC) has conducted data collection on the prevalence of allergic rhinitis in several countries around the world in children. The prevalence of children

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5.5–44.2%.⁶ Rhinitis in general ranks second of all diseases in Indonesia.⁷ Meanwhile, the prevalence of allergic rhinitis reached 24.3%.⁸ Various kinds of factors influence the course of the disease, such as genetic factors, daily habits, and environmental conditions. The developmental factors also have an effect, for example, the increase in air pollution rates, such as dust pollution, keeping animals in confined areas, smoking habits, consuming alcohol, and intranasal substances (cocaine), which also play a major role in increasing nasal complaints.⁹

The rhinorrhea that appears in allergic rhinitis can be prevented by avoiding trigger factors such as cold weather and dust pollution, wearing a mask, and always maintaining a clean environment. Aside from that, it can also be prevented by maintaining body health, getting enough sleep, and eating a regular diet. One of the things that are not noticed and can affect these symptoms is physical activity and exercising regularly.²

The WHO defined physical activity as any movement in the body originating from skeletal muscles that require energy expenditure. This refers to all movements, even including those during leisure time, movements that are part of work, and transportation from one place to another. WHO data shows that in the world, 1 in 4 adults does not meet the recommended level of physical activity. In a year, there are 5 million deaths that could be prevented by adequate physical activity. Less active people have a 20%–30% greater risk of death than more active people. More than 80% of the world's youth population is still physically inactive. If physical activity is carried out at a moderate level regularly for approximately 150 minutes per week,¹⁰ it can reduce the risk of various infectious and metabolic diseases, one of which is infectious diseases of the respiratory tract.¹¹ Adequate physical activity stimulates hypothalamus-pituitary-adrenal axis but it does not permanently caused the hypercortisolism.¹²

The Total Nasal Symptom Score (TNSS) is an assessment based on the severity of allergic rhinitis symptoms. Each symptom has a certain degree of severity with a maximum total nasal symptom score of 12.^{13,14}

Physical activity is often recommended for improving health, but in some cases, it can cause a poor and irregular inflammatory response. In a study conducted by the International Journal of Environmental Research and Public Health in 2020, it was noted that physical activity was associated with allergic rhinitis depending on the type of physical activity and the classification of allergic rhinitis. The study also stated that there needs to be consideration of physical activity, which is one of the potential risk factors for aggravating allergic rhinitis symptoms, which still needs to be validated by further studies.⁹

There's still no research on the relationship between allergic rhinitis and physical activity and various other activities. The study found that the risk of rhinitis increased by 1.61 times in the group that did not do physical exercise.¹⁵ Meanwhile, research on the relationship between physical exercise and the prevalence of rhinitis at the age of 18-24 years stated that the risk of rhinitis increased by 1.61 times in the group that did not do physical exercise.⁷

Research on this matter is still lacking and is still developing. Therefore, researchers are interested in comparing the total nasal symptom scores in individuals with allergic rhinitis based on the intensity of physical activity.

Methods

The research design used was an analytic observation using a cross-sectional method. The population of this study was students of the Medical Study Program, Undergraduate Program, Faculty of Medicine, LambungMangkurat University year 2018, 2019, and 2020. The research sample was part of the population that met the inclusion criteria: willing to take part in the study; understanding and signing the informed consent form; and meeting the diagnostic criteria based on symptoms according to the SFAR questionnaire (SFAR score 7).

The implementation began with sampling based on the results of the screening of the score accuracy questionnaire for allergic rhinitis (SFAR) for students of the Medical Study Program of the LambungMangkurat University Class of 2018, 2019, and 2020 who had undergone a nasal endoscopy examination



to rule out exclusion criteria, were clinically diagnosed with allergic rhinitis and met the diagnostic criteria based on symptoms according to the SFAR questionnaire (SFAR score 7). The predetermined sample was then asked to fill out the GPAQ questionnaire for measuring the intensity of physical activity and the SGHT questionnaire.

Primary data (name, age, gender, address, telephone number, and the results of the history using the SFAR and SGHT questionnaires) were recapitulated and analyzed using SPSS software. A normality test was performed using Kolmogorov-Smirnov, then analyzed by the Chi-Square test as a non-parametric comparative test of two categorical variables.

Results and Discussion

Based on the screening results, it was found that individuals with allergic rhinitis with an SFAR ≥ 7 were 93 people, dominated by 61 women (65.6%) and only 32 men (34.4%). Women have a higher prevalence because female hormones such as estrogen and progesterone play an active role in the tendency to suffer from allergic diseases in women because they support allergic responses such as Th2 polarization, trigger mast cells, and basophil degranulation, and increase Th2 cell production.¹⁶

The sample size in this study was 52 of 93 people population by a proportional stratified random sampling technique and having met the inclusion and exclusion criteria. Measurement of the intensity of physical activity using the GPAQ (Global Physical Activity Questionnaire) questionnaire showed that the research subjects with the most intensity of physical activity were moderate to high intensity found in 33 people (63.5%) and the low intensity of physical activity found in 19 people (36.5%). This shows that the respondents have a fairly active level of physical activity. It can be due to the age range of the respondent who is still in the productive age range of 18–24 years. A study by Wicker P and Frick B stated that 88% of 18–64-year-olds people walked at least every day and could spend an average of 40 minutes doing moderate-intensity of physical activity.¹⁷

The majority of research subjects had a mild category of Total Nose Symptoms Score (SGHT) and they did exercise (42.30%).

Research subjects with a Total Nose Symptoms Score (SGHT) in the moderate-to-severe category did exercise (21.16%), while those who did not exercise were also 21.16%, and the research subjects with a Total Nose Symptom Score (SGHT) in the moderate-to-severe category who did not exercise were 15.38%. Noorhasanah and Evy in their research state that doing exercise regularly with a certain intensity will help to increase immunity. The low-moderate intensity of exercise can activate TNF- α and lead to an increase in adaptive immunity and maximum innate efficiency.¹⁸

In addition, Yasirin and Ahmad in their research showed that there can be an increase in CD4 lymphocyte levels, which can keep the condition normal and thus reduce the risk of various diseases.¹⁹ Moderate-intensity exercise is associated with cellular immunity and can reduce infection risk.²⁰ In this study, moderate-intensity exercise was considered a leisure activity that caused respondents to breathe slightly harder than usual, such as cycling, jogging, yoga, and dancing. This result is certainly in line with the results of the study that the majority of research subjects with a mild category of Total Nose Symptom Score (TNSS) did moderate-intensity exercise. Then they calculated TNSS in individuals with allergic rhinitis based on the intensity of the respondent's physical activity.

The majority of individuals with a mild total nasal symptom score (SGHT) mostly do moderate-intensity exercise. Individuals with a history of allergic rhinitis with mild activity obtained SGHT in the low category as much as 23% and in the moderate-severe category as much as 14%, while individuals with moderate to high-intensity exercise obtained SGHT in the mild category as much as 40% and in the moderate to the high category as much as 23%. These results indicate that individuals with moderate to heavy activity with mild SGHT are the most common. This is in line with the results of a recent study by Djohan et al., that stated doing moderate levels of physical activity lower the prevalence of allergic rhinitis. The similarity that occurs can be caused by the same age range in the research sample used, 18–24 years, and physical activity that tends to be similar. However, in contrast to the results of the study obtained by Barret et al., which stated that there was a relationship



between allergic rhinitis and the intensity of physical activity. This may occur due to differences in the age of the research subject. In Barrett's study, the sample used was >50 years old and had a much different sample size, so the findings were also different.²¹ The results of statistical tests with chi-square showed that there was no difference in the TNSS in individuals with allergic rhinitis based on mild, moderate, and high intensity of physical activity. The results of statistical analysis in this study have similarities with research conducted by Djohan et al. who found that there was no statistically significant relationship between the intensity of physical activity and the prevalence of allergic rhinitis with PR values = 1.61 and P = 0.14.⁷ Insignificant statistical results can be caused by various factors including the amount of study sample. However, this has been minimized by using the right method to determine the size of the research sample. In addition, it can also be caused by limitations in its implementation, such as unable to measure the area of residence, economic and social status, as well as other risk factors such as the use of drugs, nasal washing, and the event of disturbances that can aggravate but cannot be controlled, such as night sleep disorder because they can increase the release of various cytokines such as IL-4 and IL- β . However, this is minimized by using inclusion and exclusion criteria and supervision by researchers during filling out the questionnaire to ensure the validity of the data.

Conclusion

Although statistically considered insignificant, it cannot be denied that moderate-intensity exercise can reduce the Total Nasal Symptom Score (TNSS) compared to those who do not exercise.

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