International Journal of Psychosocial Rehabilitation, Vol.24, Issue 09, 2020
ISSN: 1475-7192

Gymnastics Asthma Affects the Respiratory Pattern of Asthma Sufferers

Arif Helmi Setiawan, Chilyatiz Zahroh, Lilik Eviana, R. Khairiyatul Afiyah, Khamida

Abstract--- *Asthmatic sufferers have a respiratory abnormalation causing shortness of breath. So that asthma sufferers can have difficulty in breathing. To improve the respiratory pattern in asthma sufferers, it is necessary to prepare asthma gymnastics in daily life. Purpose of this research to know the influence of asthma to breathing patterns in asthma sufferers in Posyandu Reksowerdo III Wonokromo Surabaya. The design of this research was Quasy-Experiment (pre posttest control design.) Population of 50 people and sample of 46 respondents with simple random sampling technique . The independent variable of this study was asthma gymnastics and the dependent variable was the breathing pattern. The research instrument used questionnaires and observation sheets. Data analysis using test Wilcoxon and Mann Whitney with significance value α = 0,05. The results showed that after the statistical tests Wilcoxon and Mann Whitney obtained ρ = 0.000 <α = 0.05 indicates there is influence between asthma and asthma exercises on asthma patients in Posyandu Reksowerdo III Wonokromo Surabaya. There are differences in respiratory pattern in patients with intervention group asthma before and after asthma gymnastic performed at Posyandu Reksowerdo III Wonokromo Surabaya. Therefore, it is expected that people can apply asthma gymnastics in daily life in order to improve respiratory pattern and improve asthma control.*

Keywords--- *Gymnastic asthma, breathing pattern, asthma.*

I. INTRODUCTION

Asthma sufferers have abnormal breathing patterns that can improve the symptoms of shortness of breath. Asthma attacks, clients have difficulty breathing and need to breathe effort [1]. Asthma is a ranking of three in Posyandu Reksowerdo III Wonokromo Surabaya. There was no non-pharmacological treatment such as doing asthma gymnastics to improve the respiratory pattern, causes of recurrence of disease such asthma could be caused by pollution that greatly increased one of the allergies in the dust.

Based on the World Health Organization (WHO), around 235 million people are living with asthma. The number of asthma sufferers in the world is estimated at 300 million people and is expected to increase up to 400 million in 2025 [2] . Indonesia by Riskesdas (2018) increased to 4.5%. Proportion of the highest asthma recurrence in elderly [3].

Arif Helmi Setiawan, Medical Surgical Department, Universitas Nahdlatul Ulama Surabaya, Indonesia
Chilyatiz Zahroh, Geriatric Nursing Department, Universitas Nahdlatul Ulama Surabaya, Indonesia, E-mail: chilyatiz@unusa.ac.id
Lilik Eviana, Nursing and Midwifery Faculty, Universitas Nahdlatul Ulama Surabaya, Indonesia
R. Khairiyatul Afiyah, Maternity Nursing Department, Universitas Nahdlatul Ulama Surabaya, Indonesia

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

Khamida, Psychiatric Nursing Department, Universitas Nahdlatul Ulama Surabaya, Indonesia
Lono Wijayanti, Medical Surgical Department, Universitas Nahdlatul Ulama Surabaya, Indonesia

Asthma affects disability and premature death especially in children aged 10-14 years and older people aged 75-79 years [4]. Over 80% of asthma-related deaths occur in low-and lower-middle income countries [1]. Ministry of Health, estimated asthma disease including 10 major causes of pain and death in Dr. Soetomo Hospital Surabaya and estimated 10% of 25 million people suffer from asthma [4].

Factors that can affect asthma attacks include risk factors associated with the occurrence of asthma is an interaction between the host factor and environmental factors. Factors of the herb here include genetic predisposition that affects for the development of asthma, namely genetic asthma, allergies (Atopi), hypereactivity bronchus, gender and race. Environmental factors affect individuals with the tendency or predisposition of asthma to develop into asthma, causing exacerbation and or causing asthma symptoms to settle down. Included in environmental factors, namely allergens sensitization of working environment, cigarette smoke, air pollution, respiratory infections, diet, socio-economic status. The interaction of genetic factors or a hosts with the environment is estimated through the possibility: environmental exposure only increases the risk of asthma against individuals with genetic asthma, both environmental and genetic increasing the risk of disease Asthma. Environmental factors are more instrumental in triggering asthma recurrence. Some of them are allergens, infections, medications or ingredients sensitizers, cigarette smoke and air pollution, both indoors and outdoors. In addition, there are other factors that can increase the severity of asthma. Some of these factors are untreated rhinitis or sinusitis, gastroesofagal reflux disorder, aspirin sensitivity, exposure to sulfite compounds or beta-type drug blockers and influenza, mechanical factors and factors Psychic [5]. Causative factors that trigger bronchial asthma such as cigarette smoke, house dust mites, air pollution, weather changes, and food types. Cigarette smoke can cause asthma, both on smokers themselves and those affected by cigarette smoke. Dysfunctional breathing is common in diffcult asthma and associate with worse asthma status (symptom control, quality of life, and exacerbation rate) [6].

Asthma is a common lung condition that causes sporadic breathing difficulties. There is currently no cure, but treatment can help control the symptoms. Patients can live full and rewarding lives with the right treatment and management [2]. Consider non-pharmacological strategies and interventions to assist with symptom control and risk reduction [7], such us breathing exercise [8]. Efforts to prevent and control complications in the treatment of bronchial asthma is an asthma gymnastics that is useful to maintain and or restore health in specialize in asthma sufferers. When building sessions followed a certain sequence purpose of physical training, which consisted of three parts: introduction, main and final [9]. Asthma gymnastics that is done regularly increases the maximum oxygen volume, in addition it can strengthen the respiratory muscles so that the working power of the heart muscle and other muscles so better that it is expected to improve the quality of life of the sufferer Asthma, and also exercise breathing muscles can improve the function of muscle respiration, reduce the severity of respiratory distress, increase tolerance to activity and decrease symptoms of dypsnea. Asthma Gymnastics is a type of exercise group that involves the activity of body movements or is an activity that assists the process of respiratory rehabilitation in asthma sufferers. The aim of increasing the capabilities of muscles related to respiratory mechanisms, increases capacity and efficiency in the respiratory process. Asthma Gymnastics with effectiveness

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

1 week 3 times with a duration of approximately 45 minutes. Exercise causes a higher brain center stimulation to the Vasomotor center in the brainstem that causes increased arterial pressure and pulmonary ventilation. The movements of the body especially the arms and limbs are considered to improve pulmonary ventilation by stimulating the propioseptor of the joints and muscles, which then propagate implus excitation to the respiratory center. The hypokisa occurs in the muscles during exercise, resulting in a nerve afferent signal to the respiratory center to stimulate breathing. This is also because the muscles that work will form carbon dioxide (CO2) and oxygen (O2) change significantly between the cycle of inspiration and the cycle of expiration on breathing [10] [11].

II. METHODOLOGY

This research was Quasy-Exsperiment research with pre post test control design approach, so by comparing pre-test in experimental group with control group, as well as post-test in experimental group and Control group. The population in this sufferer is 50 people. A large sample of research were 46 respondents which are taken in probability sampling with simple rondom sampling techniques. Data in further analysis with Wilcoxon test in the intervention group with the level of the significance of $\alpha = 0.05$ obtained $\rho = 0.000$ means $\rho < \alpha$, then H0 rejected which means there is an influence of asthma gymnastics on breathing patterns in asthma sufferers.

The purpose of the work is to consider the influence of asthma to breathing patterns in asthma sufferers in Posyandu Reksowerdo III Wonokromo Surabaya.

III. RESULTS

The results showed that before asthma gymnastics was obtained from 23 respondents of the total intervention group (100%) Have an ineffective respiratory pattern. While the control group of 23 respondents was almost entirely (91.3%) Have an ineffective respiratory pattern. Based on the results of the recapitulation of 5 of the respiratory pattern examination Number 1 and 2 where almost all asthma sufferers have a rapid respiratory frequency and almost entirely also has an irregular breathing rhythm of asthma sufferers experience An ineffective respiratory pattern caused by the narrowing of the airway is reversible and characterized by the presence of inflammation and increased airway reaction to various stimulants.

The presence of respiratory tract narrowing causes the occurrence of pulmonary hyperinflation which causes O2 and CO2 exchanges to be obstructed due to ventilation barriers. Lower O2 input to the lungs causing an increase in CO2 in alveoli (hyperventilation) that will cause the occurrence of respiratoric alkalosis and decreased CO2 in capillaries (hypoventilation) causing respiratory acidosis and breathing patterns of sufferers become ineffective [12]

Treatment of asthma in general consists of two types, namely treatment with reliever or treatment of a relief. Commonly used to treat asthma attacks that are mild and temporary, while the type of treatment with this controller should be administered daily to achieve and maintain a state of controlled asthma and to make breathing patterns The sufferer becomes effective [12] [13] and manage life style [14]

There are several factors that affect asthma attacks and have an impact on respiratory patterns, such as allergens, respiratory tract, mental stress, heavy physical exercise/activities, air pollution, medicines, working environment, age, gender, and Habit of smoking [5]. This corresponds to the data obtained in the table 1 indicating that of the 23 respondents in the most intervention group (52.2%) is a female gender. Likewise, 23 respondents in

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

the control group mostly (52.2%) is the female gender of a younger woman who is stressed if experiencing problems compared to men who tend to be more resilient, it can trigger the occurrence of asthma in women.

Gender is the risk factor of asthma. Before the age of 14 years the prevalence of asthma in boys is 1.5 to 2 times compared to girls, in adult women is easier to be absorbed by asthma in addition to the hormonal problems of women also have a stress [3]. Stress should be well managed so that the body's response is also good [15] [16]. The most characteristic of respondents can be seen in table 1 where the research results show that out of 23 respondents in the most age-intervention group are 56-65 years (82.6%) Likewise, of 23 respondents in the most age control group is > 65 years (52.2%) The more The age of aging occurs which will affect human self change both anatomically and physiologically so that one will easily experience a decrease in body endurance [17].

According to table 1, results from 23 respondents of the intervention group of most asthma sufferers (73.9,%) Not smoked likewise in the control group mostly (78.3%) Asthma sufferers smoked. Many people are aware that smoking can cause heart attack, stroke, lung, and some other diseases but the smokers do not care about the threat.

The pathologically smoking is associated with the hyperplasia of the mucus gland, bronchus, and metaplasia of the respiratory tract epithelium. The concentric irritation from smoking will result in an increase in the number of neutrophils and increased proteolytic enzymes derived from leukocytes. This enzyme can cause damage to the respiratory distal in patients with asthma conditions will decrease the quality of life and inflict death especially in active smokers therefore, the recommended asthma sufferers do not smoke, asthma sufferers Who are already smoking are warned to stop the habit because it can worsened diseases [18] .

Control Group

According to the table 1, the results that of 23 respondents in the control group obtained the pre test value almost entirely (91.3%) has an ineffective respiratory pattern as well as the post test value obtained almost entirely (87.0%) Have an ineffective respiratory pattern. Further analysis with the Wilcoxon test in the control group with the level of efficacy of $\alpha = 0.05$ obtained $\rho = 0564$ means $\rho < \alpha$, then Ho is acceptable which means there is no influence on the respiratory pattern of control group because it is not given asthma gymnastics.

Patients with asthma control group still have an ineffective respiratory pattern because it is not given asthma gymnastics, so there is no attempt to change the habit of excessive gymnastics movements, this condition can cause the body to lose CO2 levels will result in hyperventilation. Furthermore, this condition causes respiratoric alkalosis and it can cause various clinical manifestations such as increased pulmonary prisoners so that the respiratory business increases in the end the influence of breathing patterns sufferers Asthma [19] . Asthma Gymnastics aims to train true breathing, flex and strengthen respiratory muscles, train effective expectorations, improve circulation, accelerate controlled asthma, maintain controlled asthma, quality of life better [6] .

For three times a week, respondents in the control group underwent a pharmacological treatment that had become routine. In the control group only conducted respiratory pattern examination on the first day as a pre test report and research only give elderly gymnastics that is in Posyandu Reksowerdo III. From 5.3 indicates that from 46 respondents to the total intervention group (100%) has been diagnosed with asthma for > 5 years and from 46 respondents in the control group almost entirely (95,75%) Diagnosed with asthma for > 5 years. In addition, distribution of respondents to the intervention and control groups based on asthma handling and asthma

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

classification is the same. Not a difference in the pre and post breathing patterns in the control group is due to the control group being not carried out asthma at all, even if the average characteristic is almost the same as the intervention group.

Based on the results of observations and interviews of researchers with respondents acquired that almost all patients are not obedient to the treatment of asthma. Asthma sufferers tend to only consume the drug at the time of the subsequent attack after asthma attacks improve asthma sufferers no longer consume the drug and control the health condition to the hospital for a fee. This condition that makes no controlled asthma in the control group asthma sufferers and will have an impact on the breathing patterns of people who become ineffective. In fact, proper treatment of asthma requires appropriate and precise medication. The appropriate management to control asthma is to provide an inhalation combination of anti-inflammatory (controller) and long-range sympathomimetic (relievers), which remain administered at stable times (not in the The attack). Type controller treatment is a long-term asthma medication to control asthma, administered daily to achieve and maintain a state of controlled asthma. If the treatment is done according to the rules of the disease, the sufferer can achieve controlled asthma and will certainly affect the respiratory pattern of the sufferer [7].

Intervention Gorup

In the table 1 shows that the results of 23 respondents in the Total intervention group (100%) has an ineffective respiratory pattern before the exercise of asthma and after the exercise of asthma almost entirely (82.6%) Have an effective breathing pattern. After knowing the difference of pre and post asthma gymnastics in Intevensi group then further analysis with Wilcoxon test in the intervention group with the level of the significance of $\alpha = 0.05$ obtained $\rho = 0.000$ means $\rho < \alpha$, then H0 rejected which means there is influence Exercise of asthma in the respiratory pattern in asthma sufferers in Posyandu Reksowerdo III Wonokromo Surabaya. Research conducted by researchers is to provide an asthma gymnastics exercise at the asthma sufferrer approximately 15 minutes and performed for a week three times in Posyandu Recsowerdo III. Asthma gymnastics exercises consist of warming, this A movement, the movement is B, aerobic movement, cooling [20], and upper lower body exercise increase cardio-pulmonary function [21].

The effect of asthma gymnastics in the respiratory pattern of asthma sufferers in Posyandu Recsowerdo III can be seen in table 1 showing that of 23 respondents in the intervention group almost entirely (82.6%) Have an effective breathing pattern after the exercise of asthma and from 23 respondents in the control group almost entirely (87.0%) have effective breathing patterns. Based on the conclusion, it can be concluded that there is an asthma effect on breathing patterns. Gymnastics techniques including asthma gymnastics are highly recommended for asthma sufferers as it can improve the lung ventilation of asthma patients, as well as may decrease asthma symptoms. In addition, to reach the level of controlled asthma is not solely dependent on the available drugs, various other alternatives are carried out with simpler movements, no difficult or heavy movements, no cost and no side effects. Asthma gymnastics effective in reducing the use of anti-asthma drugs [22]. Indonesian Asthma Gymnastics (IAG) exercise has been associated with reducing asthmatic symptoms and increase lung function in asthmatic patient [20].

Control and Intervention

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

Table 1 shows that the result of 23 respondents in the control group obtained a pre-test value almost entirely (91.3%) Has an ineffective respiratory pattern as well as the post test value obtained almost entirely (87.0%) Have an ineffective respiratory pattern. Further analysis with the Wilcoxon test in the control group with the level of efficacy of $\alpha = 0.05$ obtained $\rho = 0564$ means $\rho < \alpha$, then H0 is acceptable which means there is no influence on the respiratory pattern of control group because it is not given asthma gymnastics.

Table 1 shows that the results of 23 respondents in the Total intervention group (100%) Has an ineffective respiratory pattern before the exercise of asthma and after the exercise of asthma almost entirely (82.6%) Have an effective breathing pattern. After knowing the difference of pre and post asthma gymnastics in Intevensi group then further analysis with Wilcoxon test in the intervention group with the level of the significance of $\alpha = 0.05$ obtained $\rho = 0.000$ means $\rho < \alpha$, then H0 rejected which means there is influence Exercise of asthma in the respiratory pattern in asthma sufferers in Posyandu Reksowerdo III village Wonokromo Surabaya.

Patients with asthma control group still have an ineffective respiratory pattern because it is not given asthma gymnastics, so there is no attempt to change the habit of excessive gymnastics movements, this condition can cause the body to lose CO2 levels will result in hyperventilation. Furthermore, this condition causes respiratory alkalosis and it can cause various clinical manifestations such as increased pulmonary prisoners so that the respiratory increases in the end the influence of breathing patterns sufferers Asthma [23] . Asthma Gymnastics aims to train true breathing, flex and strengthen respiratory muscles, train effective expectorations, improve circulation, accelerate controlled asthma, maintain controlled asthma, quality of life better. Based on the conclusion, it can be concluded that there is an asthma effect on breathing patterns. The rehabilitation system for bronchial asthma is most often justified in the form of physiotherapy exercises [24] . Gymnastics techniques including asthma gymnastics are highly recommended for asthma sufferers as it can improve the lung ventilation of asthma patients, as well as may decrease asthma symptoms. In addition, to reach the level of controlled asthma is not solely dependent on the available drugs, various other alternatives are carried out with simpler movements, no difficult or heavy movements, no cost and no side effects [6] . Although the exercises are highly repentant in asthma management, the asthma sufferers avoid high intensity training [25].

IV. CONCLUSION

Gymnastics asthma can improve breathing patterns asthma patients. Asthma Gymnastics is an effort to improve the breathing patterns of asthma sufferers that can be done independently. Although the exercises are highly repentant in asthma management, the asthma sufferers avoid high intensity training/exercise.

I. REFERENCES

[1] M. Black and J. Hawks, Medical Surgical Nursing, Singapura: Elsivier, 2014.

[2] WHO, "Asthma," WHO, Genewa, 2019.

[3] M. o. Health, "Hasil Utama Riskesdas 2018," Ministry of Helath of Republic Indonesia, Jakarta, 2018.

[4] M. o. Health, "Asma penting diwaspadai (never too early, never too late)," Ministry of Health of Republic Indonesia, Jakarta, 2018.

[5] G. Connett and M. Thomas, "Dysfunctional Breathing in Children and Adults With Asthma," *Front*

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

Pediatr, vol. 6, no. 1, p. 406, 2018.

[6] E. Denton, J. Bondarenko, T. Tay, B. O'Hehir, E. Dabscheck and M. Hew, "Factors Associated with Dysfunctional Breathing in Patients with Difficult to Treat Asthma," *The Journal of Allergy and Clinical Immunology,* vol. 7, no. 5, pp. 1471-1476, 2018.

[7] G. I. f. Asthma, " Global Strategy for Asthma Management and Prevention," Available from: www.ginasthma.org, 2020.

[8] T. Santino, G. F. D. Chaves and G. M. K. Fregonezi, Breathing exercises for adults with asthma., USA: John Wiley & Sons, Ltd., 2020.

[9] I. Grygus, "The Role of Physical Activity in the Rehabilitation of Patients Suffering From Mild Persistent Bronchial Asthma," *Therapeutic physical training, sports medicine and physical rehabilitation ,* vol. 2, no. 38, pp. 140-150, 2017.

[10] Yunani, A. Widiati and M. Jamaluddin, "Respiratory Muscle Stretching Toward Pulmonary Vital Capacity for Asthma Patient," *Health Nation,* vol. 1, no. 4, pp. 308-310, 2017.

[11] C. Zahroh, S. Nurjanah and K. N. Widyarti S, "Abdominal breathing affects blood pressure in hypertension sufferers," *Journal of Public Health in Africa,* vol. 10, no. 1, 2019.

[12] M. V. Clark, Asma: Panduam Penatalaksanaan Klinis, Jakarta: EGC, 2013.

[13] J. Sankar and R. R. Das, "Asthma-A Disease of How We Breathe: Role of Breathing Exercises and Pranayama," *The Indian Journal of Pediatrics,* vol. 85, pp. 905-910, 2018.

[14] I. Stoodley, L. Williams, C. Thompson, H. Scott and L. Wood, "Evidence for lifestyle interventions in asthma," *Breath,* vol. 15, no. 2, pp. 51-59, 2019.

[15] C. Zahroh, K. Khamida and N. Saleh, "Pengaruh Islamic Progressive Muscle Relaxation (IPMR) terhadap Penurunan Kadar Kortisol Pasien Pre Operasi Di Ruang Azzahra 2 RSI Jemursari Surabaya," *Journal of Health Sciences,* vol. 11, no. 1, 2018.

[16] C. Zahroh, A. Yusuf, I. Sudiana and S. Putra, "Effect of Nursing Terapeutic Communication (Spiritual Approach) Onperception, Cortisol and HSP70 Family Members with High Risk of TB Infection," *Journal of Engineering and Applied Sciences,* vol. 15, no. 1, pp. 279-282, 2020.

[17] L. M. Azizah, Keperawatan Lanjut Usia, Yogyakarta: Graha Ilmu, 2011.

[18] P. J. Barnes and J. M. Drazwn, "Pathophysiology of Asthma," in *Asthma and COPD: Basic Mechanisms and Clinical Management*, UK, Elsevier, 2009, pp. 401-423.

[19] N. Sudrajat and B. Kharunnisa, "Efektifitas Senam Asma untuk Meningkatkan Fungsi Paru Penderita Asma," *Medical Journal of Lampung University,* vol. 5, no. 4, pp. 112-116, 2016.

[20] I. Pribadi, F. Yunus, E. Syahruddin and F. Nurwidya, "The correlation between duration of Indonesian Asthma Gymnastics and Asthma Control Test Score among Persahabatan Hospital Asthma Club Members in Indonesia," *Pak J Chest Med,* vol. 25, no. 2, pp. 48-54, 2019.

[21] C. Zahroh, PENGARUH REHABILITASI PARU DENGAN LATIHAN JALAN KAKI DAN UPPER-LOWER BODY'EXERCISE TERHADAP PENINGKATAN FUNGSI KARDIOPULMONAL PADA PENDERITA PPOK STABIL DI POLI ASMA DAN PPOK, Surabaya: Univeritas Airlangga, 2006.

[22] A. Wiwik, "Gymnastic Asthma as an Effective Alternative Therapy to Reduce The Frequency of Using Anti Astma Drugs," in *The 7th International Nursing Conference: Global Nursing Challenge in The Trade Era*, Surabaya, 2016.

[23] K. E. Barret, H. Brooks, S. Boitano and S. Barman, Ganong's Review of Medical Physiology, New York: McGraw-Hill, 2010.

[24] M. Eremin, V. KArpov, N. Marinina, O. Rysakova, S. Zavalishina and A. Zhalilov, "The Problem of

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

Rehabilitation of Patients with Bronchial Asthma," *Biomedical & Pharmacology Journal,* vol. 12, no. 2, pp. 713-722, 2019.

[25] C. Winn, K. Mackintosh, W. Eddols, G. Stratton, A. Wilson, J. Rance, I. Doul, M. McNarry and G. Davies, "Perceptions of asthma and exercise in adolescents with and without asthma," *Journal Asthma,* vol. 55, no. 8, pp. 868-876, 2018.

Table 1. Research data and analysis results

Item	Experiment group		Control group		Total
	Frequency	Persentage	Frequency	Persentage	
Age (Years old)					
56-65	19	82,4	11	47,8	
>65	4	17,6	12	52,2	
Sex					
Male	12	52,2	12	52,2	
Female	11	47,8	11	47,8	
Smoker					
Yes	6	26,1	5	21,7	
No	17	73,9	18	78,3	
Asthma clasification					
Intermitten mild	4	17,4	3	13,0	
Persistent mild	5	21,7	6	26,1	
Persistent moderate	11	47,8	8	34,8	
Persistent weight	3	13,0	6	26,1	
Breathing pattern					Mann
Effective	19	82,6	3	13,0	Withney
Ineffective	4	17,4	20	87,0	
					P= 0,000

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019