THE INFLUENCE OF INCENTIVE SPIROMETRY ON THE FREQUENCY OF ATTACKS FOR ASTHMA PATIENTS AT THE INPATIENT HEALTH CENTER FOR WOMEN IN RUMBAI PEKANBARU DISTRICT, RIAU

Khardina Indah[1], Sri Yanti[2], Maryulis[3]
[1,2,3]Program Studi S1 Keperawatan Institut Kesehatan Payung Negeri Pekanbaru
Email : KhardinaIndah15@gmail.com

Abstrak
Asthma has an impact on every activity, can interfere with respiratory function into complications. Therefore it is necessary to make efforts to control asthma to reduce asthma symptoms by using incentive spirometry tools. Incentive spirometry is a tool that provides exercise to the lungs by encouraging deep breathing with the movement of the diaphragm, the muscles between the lungs and the stomach. Deep breathing exercises help open air sacs in the lungs and can reduce the risk of breathing problems. The study aims to determine the effect of incentive spirometry exercise on the frequency of asthma attacks before and after exercise. This research is a quantitative research with Quasi Experiment design with the research design is pre-post test one group pre post test design. Retrieval of data from August 2019 to January 2020. Measuring instruments used in this study were respiratory incentive observation sheets by recording time and maximum volume for 12 days, carried out 3 times in one day for 5 minutes, research samples were 18 respondents. The average asthma recurrence before incentive spirometry was 3.06 times in 12 days while the average asthma recurrence after incentive spirometry was 2.06 times in 12 days. Based on the Wilcoxon alternative testobtained p value = 0.04, p value <0.05 then there is the effect of incentive spirometry on the frequency of asthma attacks in the Pekanbaru Women's Inpatient Health Center. The results of this study can be used as a guide for asthma patients that incentive spirometry can reduce asthma recurrence rates and improve asthma control in patients and can beused as a first step for patients in the first treatment of asthma without being referred to the hospital.
Key Word: *Asthma, Incentive Spirometry, Attack Frequency*

INTRODUCTION

Asthma is a condition where the airways become narrowed due to hyperactivity to certain stimuli which causes inflammation. In asthma sufferers, the narrowing of the respiratory tract is a response to stimulation of normal lungs and will not affect the respiratory tract. This narrowing can be caused by various stimuli, such as dust, animal hair, smoke or cold air (Slugroho, 2009).

Asthma sufferers generally complain of coughing, shortness of breath, feeling of pressure in the chest and wheezing. The cough you experience is difficult at first, but soon becomes stronger. The characteristics of a cough are dry, paroxysmal, irritative and non-productive,

then produces sputum that is foamy, clear and thick. A blocked airway causes shortness of breath, so that expiration is always more difficult and longer than inspiration which encourages the use of every accessory respiratory muscle. Long-term use of accessory respiratory muscles that are not trained can cause asthma sufferers to become tired when breathing during an attack or during activity (Global Initiative for Asthma, 2012).

According to the World Health Organization (WHO) (2015), more than 235 million people in the world suffer from asthma. Indonesia is ranked 20th as the country with the most deaths due to asthma. Asthma cannot be cured and the symptoms can appear at any time unexpectedly, however, asthma can be controlled in the right way so that it is not easy for it to recur. About 7% of the world's population (300 million people) suffer from asthma. In the United States about 4000 people die every year from asthma. Based on Riskesdas (2013), the highest prevalence of asthma is seen at the age of 25-34 years, namely 5.7% of the total national population, while in Riau Province there were 134 asthma sufferers from 2018-June 2019.

Karya Wanita Rumbai Inpatient Health Center is one of the health centers that has the most asthma sufferers in the Pekanbaru city area, Riau, namely around 87 patients visiting the health center, both elderly (46-65 years) and young (12-45 years). Data obtained from the elderly were 40 sufferers who came for treatment with asthma, and from teenagers and adults there were 47 sufferers who came for treatment with asthma. Based on the results of interviews with 5 asthma sufferers who visited the Karya Wanita Rumbai Inpatient Health Center, data was obtained that 5 sufferers experienced repeated acid attacks and were caused by the surrounding environment of smoke, dust and cold weather.

For asthma sufferers, physical activity or strenuous activities can trigger asthma attacks. Asthma sufferers can do sports that can train the chest muscles so that breathing becomes smoother. Exercises that can be done by asthma sufferers include breathing exercises. Respiratory therapy aims to train how to breathe correctly, flex and strengthen the respiratory muscles. Practicing effective expectoration can improve circulation, speed up controlled asthma, maintain controlled asthma and improve the quality of life for asthma sufferers (Ibnu, 2011).

Without good management, asthma will disrupt the sufferer's life and tend to get worse, which can cause complications or death. Asthma is a disease that is widely known in society but is poorly understood, so there is an opinion that asthma is a simple disease, and easy to treat, so that the habit arises of treating asthma symptoms only for symptoms of shortness of breath by using medication and not managing asthma properly (Ibnu , 2011).

Asthma has a very detrimental impact on daily activities. Asthma symptoms can cause complications, thereby reducing work productivity and quality of life (Nikmah, Purba & Defi, 2014). In asthma sufferers, acute exacerbation can occur at any time, lasting from a few minutes to hours. The more frequently asthma attacks occur, the more fatal they will be, affecting important activities such as work, school, physical activity and other aspects of life (Global Initiative for Asthma, 2012).

The aim of asthma treatment is to keep asthma under control, which is characterized by a decrease in asthma symptoms felt or none at all, so that sufferers can carry out activities without being disturbed by asthma. Controlling asthma symptoms can be done by avoiding asthma triggers, regularly consulting with a medical team for asthma, living a healthy life with good nutritional intake, avoiding stress. Asthma symptoms can be controlled with complete management, not only by providing pharmacological therapy but also using non-pharmacological therapy, namely by controlling the symptoms that arise and reducing the severity of asthma symptoms experienced during an asthma attack (Nikmah et al., 2014).

Incentive spirometry is a tool that provides exercise to the lungs. This is done by encouraging deep breaths with movements of the diaphragm, the muscle between the lungs and the stomach. Deep breathing exercises help open the air sacs in the lungs and can reduce the risk of breathing problems. Incentive spirometry training is still unknown to the general public. This exercise uses simple tools that are easy to obtain and can be used alone to prevent recurrent asthma attacks.

Asthma sufferers at the Karya Wanita Pekanbaru Inpatient Health Center are currently not familiar with incentive spirometry, patients only know about medication for asthma but do not know how to exercise to reduce the occurrence of asthma recurrence in asthma sufferers. Based on the above phenomenon, researchers are interested in conducting research on "The effect of incentive spirometry on the frequency of asthma attacks at the Karya Wanita Inpatient Health Center Pekanbaru Riau".

RESEARCH METHODS

This research is quantitative research. This research uses a quantitative type of research with a Quasi Experimental design. The research design used was a pre-post test in one group (one group pre-post test design). The sample will be given incentive spirometry training treatment by looking at the asthma recurrence rate, sufferers will be evaluated for incentive spirometry training, within a period of 12 days, the group of asthma sufferers will be assessed for the level of recurrence rate after incentive spirometry training.

The population in this study were asthma sufferers who sought treatment at the Karya Inpatient Health Center, with 40 elderly women, while 47 teenagers and adults from 2018 to June 2019. Here the researchers will take a population of around 47 teenagers and adults. The sample for this research was 18 people.

The measuring tools used in this study were an incentive respiratory observation sheet by recording the time and maximum volume for 12 days, a questionnaire sheet regarding the degree of shortness of breath 12 days before the incentive respiratory and observing the degree of shortness of breath 12 days after the incentive respiratory.

RESEARCH RESULT

1. Univariate Analysis

Univariate analysis is used to explain the characteristics of the variables to be studied. The univariate analysis can be seen in the following description:

General data

Table 1. Characteristics of Asthma Patients at Karya Wanita Pekanbaru Inpatient Health Center

Patient Characteristics	Total	Percentage
Asthma	N	%
1. Age		
a. Early adulthood	1	5.6
b. Middle adulthood	6	33.3
c. Late adulthood	11	61,1
2. Gender		
a. Man	6	33.3
b. Woman	12	66.7
3. 3. Education		
a. Junior High School	3	16.7
b. Senior High School	7	38.9
c. Diploma	3	16.7
4. Pekerjaan		
a. IRT	5	27.8
b. Swasta	6	33.3
c. Wiraswasta	4	22.2
d. PNS	1	5.6
e. Petani	2	11.1
Total	18	100

Source: Primary Data Analysis, 2019.

Table 1 shows that of the 18 respondents, the majority were in late adulthood, 11 respondents (61.1%), 12 respondents (66.7%), 12 respondents (66.7%), 7 respondents (38.9%), and 7 respondents had a job in the private sector. 6 respondents (33.3%).

Special Data

Table 2. Data Normality Test Results

Kategori	Nilai	
	Sebelum	Sesudah
N	18	18
Normal Parameters[a,b]	3,06	2,06
Mean	2.50	2.00
Median	1,259	1.110
Std. Deviation	2	1
Minimum	5	4
Maximum	0,680	0,460
Skewness	-1,279	-1.266
Kurtosis	0,000	0,001
Kolmogorov – Smirnov Z		

Source: Primary Data Analysis, 2019

Table 2 explains that the normality test for data distribution using the Kolmogorov – Smirnov test shows the value significant asymtopes of 0.000 and 0.001. The data distribution is said to be normal if the p value for Kolmogorov – Smirnov is greater than 0.05. Through this statement, the researcher concludes that the regression data in this study is

Table 3. Average Distribution of Asthma Attacks Before and After Incentive Spirometry at Karya Wanita Pekanbaru Inpatient Health Center

Frekuensi Serangan Asma	Mean	Median	Standar Deviasi	Min	Max
Sebelum	3,06	2,5	1,25	2	5
Sesudah	2,06	2	1,11	1	4

Source: Primary Data Analysis, 2019.

Table 3 shows that from 18 respondents, the frequency of asthma attacks before incentive spirometry training had a mean value of 3.06, median was 2.06, standard deviation was 1.25,

minimum was 2 and maximum was 5, while the frequency of asthma attacks after exercise incentive spirometry showed that the mean value was 2.06, the median was 2, the standard deviation was 1.11, the minimum was 1 and the maximum was 4.

2. Bivariate Analysis

Bivariate analysis is an analysis that connects independent and dependent variables. non-normal distribution. Because the data is not normally distributed, the alternative test used for bivariate analysis is the paired t test, namely the Wilcoxon test. Based on the data normality test before incentive spirometry, the mean is 3.06, the median is 2.50, the standard deviation is 1.2, the minimum is 2 and the maximum is 5. Skewness is 0.680 and kurtosis is -1.279. Meanwhile, the normality of the data after incentive spirometry is the mean, namely 2.06, the median, namely 2, the standard deviation, namely 1.110, the minimum is 1 and the maximum is 4. Skewness is 0.460 and kurtosis is -0.001.

Alternative T Test (Wilcoxon)

Table 4. Effect of Incentive Spirometry Training on the Frequency of Asthma Attacks in the Work Area of Karya Wanita Pekanbaru Inpatient Health Center

Frekuensi Serangan Asma	Mean of Ranks	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference		p value
				Lower	Upper	
Sebelum dan Sesudah Latihan *Incentive Spirometry*	1	1.749	0.412	0,13	1,87	0,040

Sumber: Analisis Data Primer, 2019.

Table 4 explains that based on the results of the T Test, the p value = 0.040, p value < 0.05, so there is an influence of incentive spirometry on the frequency of asthma attacks at the Karya Wanita Pekanbaru Inpatient Health Center.

DISCUSSION

Incentive spirometry is a tool that provides exercise to the lungs. This is done by encouraging deep breaths with movement of the diaphragm, the muscle between the lungs and the stomach. Deep breathing exercises help open the air sacs in the lungs and can reduce the risk of breathing problems. Incentive spirometry training is still unknown to the general public. This exercise

uses simple tools that are easy to obtain and can be used alone to prevent recurrent asthma attacks.

Incentive spirometry exercises are designed to help sufferers take long, slow and deep breaths. This breathing pattern results in a decrease in intra-pleural pressure, increasing lung expansion and gas exchange. Incentive spirometry causes increases lung volume and intra-alveolar pressure at the end of inspiration thereby improving total lung capacity. An increase in total lung capacity will be able to increase the amount of air that can be forcibly expelled in the first second after maximal inspiration so that the FEV value increases. Incentive spirometry training causes an increase in lung volume and intra-alveolar pressure at the end of inspiration. The increase in intra-alveolar pressure is directly proportional to the strength of contraction of the respiratory muscles, including the diaphragm and accessory respiratory muscles. This explains that incentive spirometry training can increase respiratory muscle strength because to achieve total lung capacity requires strong respiratory muscle activity (Bestari, 2018).

An increase in inspiratory ability occurs because when inhaling is long, deep and slow, the lips are tightly closed around the mouthpiece and held for 3 to 5 seconds. The increase in maximum inspiratory ability also occurs because this exercise uses weights, so that during inspiration the patient is forced to increase the strength of the inspiratory muscles to the maximum by trying to make the piston indicator move as high and as far as the patient can. In this situation, the maximum inspiratory volume will be achieved. The yellow ball indicator must be in a certain indicator position and the patient maintains the maximum inspiratory volume.

The increased strength of the inspiratory muscles affects the elasticity of lung recoil which will stimulate lung function to return to normal by increasing transpulmonary pressure and lung volume during inspiration. This process can improve breathing efficiency which will reduce the degree of shortness of breath. This tool can also provide a real visual feedback effect that will encourage sufferers to increase the inspiratory volume as much as possible. Incentive spirometry training can increase inspiratory muscle strength and lung volume, which will improving breathing efficiency and reducing the degree of shortness of breath so that it can improve daily activities which overall improves the quality of life associated with allergic bronchial asthma.

This improvement in quality is reflected in reduced symptoms of shortness of breath, reduced coughing, and also decreased asthma attacks. Apart from that, there is an increase in daily activities and the negative impact on work is reduced, symptoms, medication used and daily activities and life improve. From the research results, it turns out that the distance traveled by the 6-minute walking test is positively correlated with quality of life. With incentive spirometry training, apart from being able to increase inspiratory muscle strength to the maximum, it can

also help expel phlegm, so that breathing efficiency can be improved and also reduce shortness of breath which has an impact on improving the quality of life. This improvement will increase oxygen intake and perfusion into the blood.

Research by Heydari et al and Scherer et al concluded that incentive spirometry training can increase maximum inspiratory pressure (PImax) thereby improving inspiratory muscle performance. Respiratory muscle strength can be measured in 2 ways, namely static measurements (maximum inspiratory pressure and maximum expiratory pressure) or dynamic (MVV). The results of this study are in accordance with the research of Nurun, Purba and Defi (2014) where incentive spirometry training was more effective in increasing FEV1 when compared with diaphragmatic breathing with an independent t-test p=0.000 (6.19±2.63 vs 0.40±0 .33% prediction) based on the results of this study, because incentive spirometry training increases maximum inspiratory ability.

Researchers assume that quality of life is the most important happiness and satisfaction in human life, and is an objective indicator of material well-being and individual resources. The quality of life of a sick person will be affected health status and impact on functional status in carrying out daily activities. In sufferers of allergic bronchial asthma, quality of life is an important measure, because it is closely related to the condition of shortness of breath which greatly interferes with sufferers in carrying out daily activities (functional capacity) such as walking, caring for themselves, dressing, eating and household activities. Quality of life measurements are very important in assessing the response/effect of therapy. In the long term, the effects of exercise therapy are beneficial in reducing symptoms, increasing daily activities, and greater self-confidence.

CONCLUSION

1. The frequency of asthma before incentive spirometry was that respondents' asthma often recurred twice a month, namely 6 people (33.3%) and the most frequent recurrence was 5x a month, namely 4 people (22.22%).
2. The frequency of asthma after incentive spirometry was that respondents' asthma often recurred once a month, namely 6 people (33.3%) and the most frequent recurrence was 4x a month, namely 2 people (11.11%).
3. Based on statistical tests, the p value = 0.040, p value < 0.05, so there is an influence of incentive spirometry on the frequency of asthma attacks at the Karya Wanita Pekanbaru Inpatient Health Center

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