



Management Of Physiotherapy In Bronchial Asthma With Modality Infra-Red, Chest Therapy, And Respiratory Muscle Stretch Gymnastic

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ABSTRACT

Bronchial asthma is an obstruction of airflow characterized by an increase in airway sensitivity to the shape of external stimulation. Physiotherapy examination includes an examination of spasm, examination of sputum, examination of thoracic cage expansion, examination of shortness of breath, examination of pain, and examination of functional activity. In this case, the chosen technology is Infra Red (IR), Chest Therapy, and Respiratory Muscle Stretch Gymnastic (RMSG). The research aim to determine the effect of physiotherapy management in cases of bronchial asthma. The study was conducted at the Surakarta Center for Lung Health Society with analytic descriptive methods. Subjects were bronchial asthma patients with modality IR, Chest Therapy, and RMSG. The data collection method of research analysis is by auto anamnesis method, the research instruments are examination of spasm with palpation, sputum with auscultation, thoracic cage expansion with midline, shortness of breath with the Borg Scale, pain with a VAS scale and functional activity with a six-minute walk test. Results: After 3 times of therapy as follows: (1) no decrease in spasm T1 = 1 at T3 = 1 (2) Reduction of sputum T1 = 2 at T3 = 1 (3) Increase in thoracic cage expansion of T1 difference in axilla = 2, ICS 4-5 = 3, Proc. Xypoudeus = 2 becomes T3 at axilla = 2.5, ICS 4-5 = 3, Proc. Xypoudeus = 2 (4) Reduction in shortness of breath T1 = 3 at T3 = 0 (5) Reduction in pain T1 = 3 at T3 = 1 (6) Increase in functional activity T1 = 330 meters at T3 = 360 meters. Physiotherapy intervention with modality IR, Chest Therapy, and RMSG can reduce the problems that exist in the condition of Bronchial Asthma.

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INTRODUCTION

Asthma is a chronic inflammatory process of the respiratory tract that involves many cells and elements. This chronic inflammatory process causes the respiratory tract to become hyper-responsive, thus facilitating the occurrence of bronchoconstriction, edema, and hypersecretion of the glands which results in restriction of airflow in the respiratory tract with periodic clinical manifestations in the form of wheezing, shortness of breath, heavy

chest, coughing, especially at night. or early morning. These symptoms are related to the extent of inflammation, the degree of which varies and is reversible spontaneously or without treatment.(Pedersen et al., 2014)

Bronchial asthma is a long-term or chronic disease of the respiratory tract characterized by narrowing and inflammation of the airways, which causes shortness of breath. Apart from that, asthma sufferers also experience other symptoms such as chest pain, coughing, and wheezing. The prevalence of asthma at the Surakarta Community Lung Health Center (BBKPM), according to data from visits to the physiotherapy clinic in 2019, numbered around 972 people with asthma.

Bronchial asthma causes various disorders; these disorders are at the level of impairment, disability, and functional limitation. Impairment that appears: (1) There is spasm in the M. pectoralis major dextra and upper trapezius dextra; (2) There is sputum in the pulmodextra middle lobe of the anterior segment; (3) There is a decrease in expansion of the thoracic cage; (4) There is shortness of breath; (5) There is pain in the right chest. Disability in the form of the patient being able to work, but before going to work, the patient must use an inhaler. When working too hard, the patient will feel short of breath. functional limitation in the form of the patient being able to carry out daily activities such as cooking, sweeping, washing clothes, and other daily activities.

Physiotherapy modalities that can be used to solve problems in bronchial asthma patients use infrared, chest therapy, and respiratory muscle stretching gymnastics. Infrared is given to patients with bronchial asthma to relax the respiratory muscles and increase blood supply, resulting in vasodilation of blood vessels, and reducing pain. Giving chest therapy to patients with bronchial asthma to help clear the airway to reduce sputum. Meanwhile, giving respiratory muscle stretch gymnastics to patients with bronchial asthma can help increase thoracic cage expansion and reduce shortness of breath.

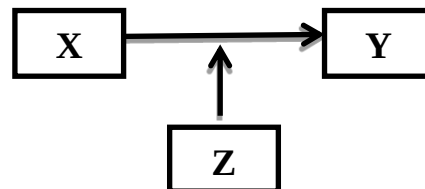
This research aims to: 1) identify that infrared can help reduce muscle spasms in bronchial asthma 2) Identify that chest therapy can help reduce sputum in bronchial asthma 3) Identify respiratory muscle stretching gymnastics to increase thoracic cage expansion 4) Identifying Respiratory Muscle Stretch Gymnastics can reduce shortness of breath in bronchial asthma. 5) Identifying that infrared can help reduce pain in bronchial asthma 6) Identifying Infra-Red, Chest Therapy, and Respiratory Muscle Stretch Gymnastics can improve the ability of functional activities in conditions of bronchial asthma.

METHOD

This research uses descriptive analytical methods to determine the assessments and changes that can be seen in this research taken at the Surakarta Community Lung Health Center (BBKPM) carried out in March 2020. The subjects of this research are informants, which means people in the research background who are used to provide information about the situation and conditions of the research. The subject of this research is someone with bronchial asthma who will be given physiotherapy intervention with Infra Red, Chest Therapy, and Respiratory Muscle Stretch Gymnastics. The design used in this research is a case study design. Variables are defined as concepts that influence variability. Meanwhile, the concept itself can simply be defined as a description of a certain phenomenon. There are two kinds of variables such as, (1) The dependent variables (which are influenced) in this study are muscle spasm, sputum, thoracic cage expansion, shortness of breath, pain, and decreased functional activity. (2) the independent variables (influencing variables) in this study are Infra-Red, Chest Therapy, and Respiratory Muscle Stretch Gymnastics.



The research design is described as follows.



Information :

X: Patient's condition before administration
physiotherapy program

Y: Patient's condition after administration
physiotherapy program

Z: Physiotherapy Program

The research instruments in this research are as follows:

Muscle Spasm

A muscle spasm occurs when there is a spontaneous reaction of a muscle due to protection against pain so that the sufferer avoids movements that cause pain and interfere with the exercise or therapy process. Spasm research can be measured using palpation with a value. This measurement of muscle spasm is categorized into 0 = No spasms, 1 = There are spasms.

Sputum

Sputum is a mucus secret produced by the lungs, bronchi, and trachea. Normal adults produce 100 ml of mucus in the airways every day. The mechanism for cleaning sputum by cilia from the epithelium that lines the respiratory tract is led to the pharynx. Excessive mucus production due to physical, chemical, or infectious disorders of the mucous membrane causes the cleaning process to not run normally so that a lot of mucus is still accumulated and cleaning the airway is ineffective so the membrane The mucosa will be stimulated and mucus will be expelled due to high intrathoracic and intra-abdominal pressure. In patients with respiratory cases, one of which is bronchial asthma, a lot of sputum buildup is found. (Soemarno, 2005)

Sputum research can be measured by auscultation with categories, 1 = No sputum, 2 = There is sputum.

Thoracic Cage Expansion

Thoracic cage expansion is the ability of the thoracic cage to expand or contract during inspiration or expiration. During inspiration, the thoracic volume increases and the chest cavity enlarges. During expiration, the thoracic volume decreases and the chest cavity narrows. Thoracic cage expansion research can be measured using the midline. The normal value for the difference in thoracic cage expansion between inspiration and expiration is > 3.

Out of breath

Shortness of breath is a feeling of difficulty breathing that an individual feels when doing physical activity. Shortness of breath is a symptom experienced by someone with a respiratory condition.

Shortness of breath research can be measured with the Borg scale

Description:

0: no shortness of breath

0.5: very mild shortness of breath

1: very mild shortness of breath

2: mild shortness of breath

3: moderate shortness of breath

4: shortness of breath is quite heavy

5: heavy shortness of breath

6-7: very heavy shortness of breath

8-9: shortness of breath very, very heavy

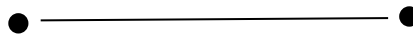
10: shortness of breath is very annoying

Painful

According to the International Association for the Study of Pain (IASP), pain is an unpleasant emotional experience resulting from actual or potential damage, or describing the condition of the damage. Pain is classified as the 5th vital sign, it can cause lasting physiological, economic, social, and emotional changes so it needs to be managed well. Pain can be divided into two, namely nociceptive pain, which is pain caused by tissue damage, disease processes, or abnormal function of muscles or internal organs, and neuropathic pain, which is pain caused by stimuli caused by nerve damage or nerve dysfunction.

Chest pain in asthma sufferers usually occurs due to musculoskeletal and pleural disorders. Chest pain in the muscles or sternum can arise from the surface closest to the bones, joints, or nerves in the chest cavity. Usually, the location of the chest and arm movements can be identified by palpation. Pleuritic chest pain is caused by inflammation of the parietal pleura and is usually described as a severe, sharp, stabbing pain that is worse on inspiration but is painless on palpation. (Webber, 1998)

Pain research can be measured using VAS (Visual Analog Scale. By asking the patient what pain they feel, namely silent pain, tender pain, and movement pain.



A score of 0 is no pain and a score of 10 is unbearable pain (very painful)

Functional Activities

Functional activity is a person's ability to carry out daily activities without limitations or complaints. In someone with asthma, functional activity decreases, and decreased functional activity in patients occurs due to shortness of breath. Activities that are quite strenuous can trigger shortness of breath, so patients limit themselves in their daily activities both at home and at work, resulting in a loss of productivity and decreased quality of life.



This research can use the six-minute walk test by asking the patient to walk for 6 minutes on a 60-meter-long track, before doing this the patient has their vital signs measured, after completion, the vital signs are also measured again, then the patient's distance is measured when walking for 6 minutes and VO₂Max is calculated using the formula:

$$VO_2\text{Max} = (\text{Jaraktempuh}-133) \times 0,172+33,3$$

Physical Examination

The physical examination aims to determine the patient's physical condition. This examination consists of vital signs, palpation, percussion, auscultation, basic movement examination, and specific examinations which include:

Asthma Control Test (ACT)

The asthma control test is a tool that can be used by patients to detect their level of asthma control. It consists of five questions that can detect the worsening of the disease based on daily symptoms, night symptoms, activity barriers, use of relievers, and self-assessment of the disease.

No.	Pertanyaan	1	2	3	4	5
1.	Dalam 4 minggu terakhir seberapa sering penyakit asma mengganggu anda dalam melakukan pekerjaan sehari-hari di kantor, di sekolah?	Selalu	Sering	Kadang-kadang	Jarang	Tidak pernah
2.	Dalam 4 minggu terakhir, seberapa sering anda mengalami sesak nafas?	>1 kali sehari	1 kali sehari	3-6 kali seminggu	1-2 kali seminggu	Tidak pernah
3.	Dalam 4 minggu terakhir, seberapa sering gejala asma (bengek, batuk-batuk, sesak nafas, nyeri dada atau rasa tertekan di dada) menyebabkan anda terbangun di malam hari atau lebih awal dari biasanya?	4 kali atau lebih seminggu	1-2 kali seminggu	1 kali seminggu	1-2 kali sebulan	Tidak pernah
4.	Dalam 4 minggu terakhir, seberapa sering anda menggunakan obat semprot darurat atau obat oral untuk melegakan pemapasan?	>3 kali sehari	1-2 kali sehari	2-3 kali seminggu	<1 kali seminggu	Tidak pernah
5.	Bagaimana penilaian anda terhadap tingkat kontrol asma anda dalam 4 minggu terakhir	Tidak terkontrol sama sekali	Kurang terkontrol	Cukup terkontrol	Terkontrol dengan baik	Terkontrol penuh
Jumlah						

Interpretation of results:

19 or less: uncontrolled asthma, 20-24: asthma partially controlled, 25: completely controlled asthma. (Harnani, 2017)

Collecting Data

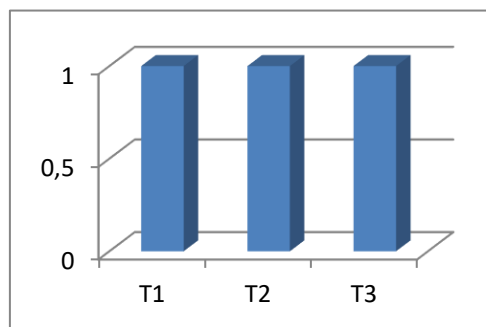
This method is used to collect data using question and answer between the physiotherapist and the patient, namely direct anamnesis with the patient (autoanamnesis). This history can also be carried out on family, friends, and other people who know the patient's condition and can be a source of data (Heteroanamnesis). In this interview, the author interviewed the patient himself. This is done to determine the patient's progress during therapy.

RESULT

Evaluate muscle spasm by palpation.

Evaluate spasms using palpation from the first therapy to the third therapy. From the graph from T1 to T3, the results showed that there was no decrease in spasms.

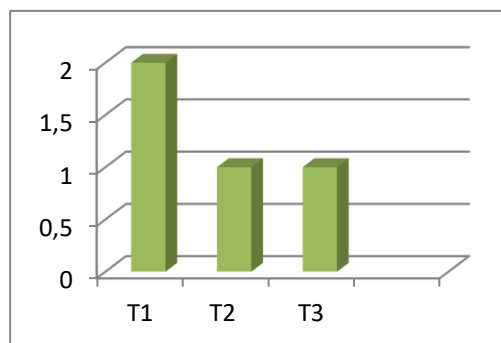
Graph 1 Evaluation of Muscle Spasm by Palpation



Sputum Evaluation by Auscultation

Evaluate sputum using auscultation from the first therapy to the third therapy

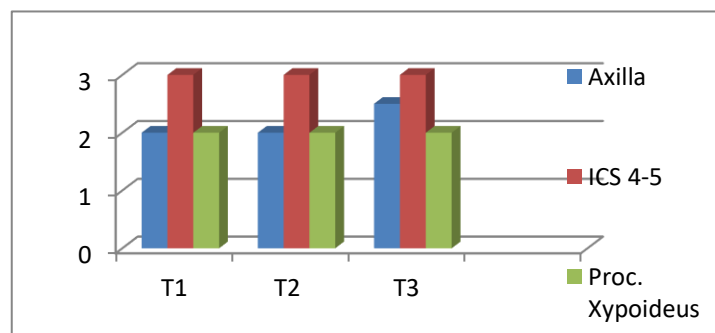
Graph 2 Evaluation of Sputum with Auscultation



Evaluate Thoracic Cage Expansion With The Midline

Evaluate Midline Thoracic Cage Expansion From First To Third Therapy

Graph 3 Evaluation of Thoracic Cage Expansion with Midline

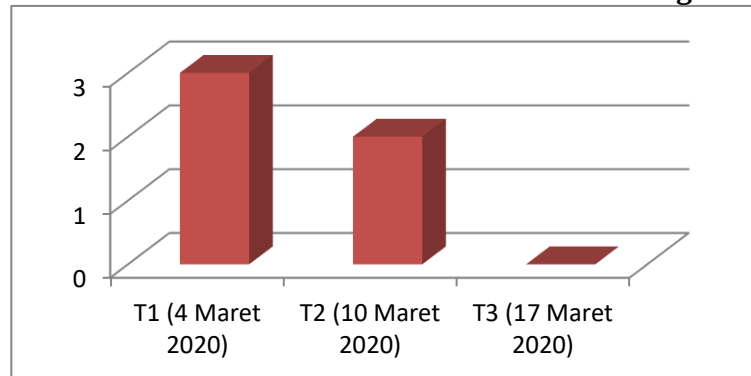




Evaluate Shortness Of Breath With The Borg Scale

Evaluate shortness of breath with the Borg scale starting from the first therapy to the third therapy

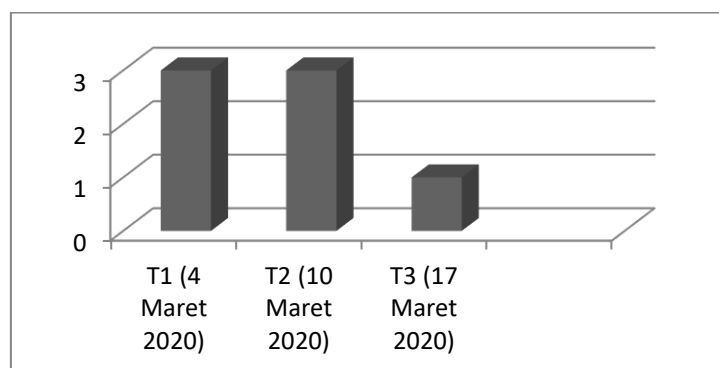
Graph 4 Evaluation of shortness of breath with the Borg Scale



Evaluate Pain with VAS

Evaluate pain with VAS from the first therapy to the third therapy

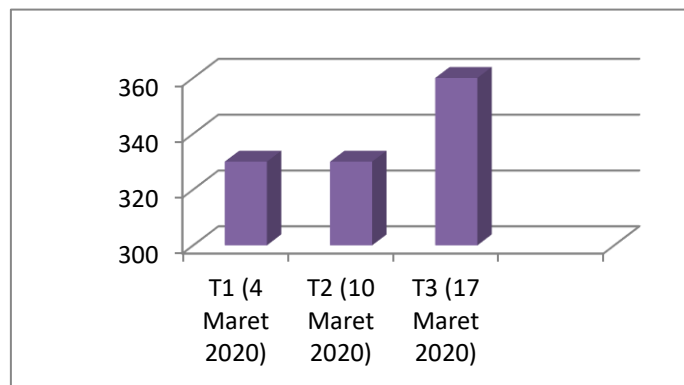
Graph 5 Pain Evaluation with VAS



Evaluate Functional Activities With The Six Minute Walk Test

Evaluate pain with the six minute walk test from the first therapy to the third therapy.

Graph 6 Evaluation of Functional Activities with the Six Minute Walk Test



DISCUSSION

Evaluate muscle spasm by palpation

In this case, infrared cannot reduce muscle spasms. Giving infrared can reduce spasms because the effect of giving infrared can have a heating effect on the tissue, causing vasodilation and improving blood circulation so that metabolism in the tissue becomes smooth and the muscles become relaxed, but this effect does not last long, with continuous muscle contractions. when a person works, this causes spasms to return. This is due to work factors. (Putra et al., 2011)

Sputum Evaluation by Auscultation

From this graph, from T1 to T3, the results show a decrease in sputum. In this case, chest therapy can help reduce sputum because postural drainage and tapotement can help release secretions attached to the respiratory tract and help drain secretions from each lung segment into the respiratory tract. (Mustafa & Ade Irma Nahdliyyah Program Studi Fisioterapi, 2019)

Evaluate Thoracic Cage Expansion With The Midline

From the graph from T1 to T3, the results show an increase in thoracic cage expansion. In this case, gymnastic respiratory muscle stretching can increase the expansion of the thoracic cage because in this exercise there is a stretch of the muscles that help with breathing, when the muscles that help with breathing are stretched to the maximum, it causes an increase in the expansion of the thoracic cage. (Fajriah, 2014)

Evaluate Shortness Of Breath With The Borg Scale

From the graph from T1 to T3, the results show a decrease in shortness of breath from T1 with a value of 3 to T3 with a value of 0. In this case, respiratory muscle stretch gymnastics can reduce shortness of breath. Giving respiratory muscle stretch gymnastics can increase the expansion of the thoracic cage by stretching the accessory muscles for breathing. When the expansion of the thoracic cage expands maximally and air entering the lungs increases, the process of inspiration and expiration becomes smoother so that shortness of breath is reduced. (YAMADA et al., 1996)

Evaluate Pain with VAS

From this graph, from T1 to T3, the results show a decrease in pain from T1 with a value of 3 to T3 with a value of 1. In this case, infrared can help reduce pain. Giving infrared causes an increase in temperature, resulting in vasodilation of blood vessels, and metabolism in the blood becomes smooth. When blood circulation is smooth, nutrients entering the tissue and oxygen entering the tissue become smooth, causing P substances (prostaglandin, bradykinin, and histamine) that cause pain to disappear with the blood flow, and the pain is reduced. (Jagmohan Singh., 2012)

Evaluate Functional Activities With The Six Minute Walk Test

From the graph from T1 to T3, the results show an increase in functional activity as measured using the six-minute walk test. In this case, the provision of infra-red, chest therapy and respiratory muscle stretching gymnastics can improve the patient's functional activity abilities because by reducing the symptoms that arise such as reducing sputum, increasing expansion of the thoracic cage, reducing shortness of breath, and reducing



pain, it causes an increase in functional activity which can be achieved. seen from the increase in the patient's distance traveled when measured using the six-minute walk test so that the VO2Max value also increases. The more oxygen that enters the body causes the muscles to work optimally so that the VO2Max is higher, which means good functional capacity. (Suryantoro et al., 2017)

CONCLUSION

The physiotherapy management given for bronchial asthma using infrared modalities, chest therapy, and respiratory muscle stretch gymnastics can be concluded as follows:

1. Infrared administration has not been able to reduce muscle spasms
2. Giving chest therapy can break down sputum
3. Giving respiratory muscle stretch gymnastics can increase the expansion of the thoracic cage
4. Giving respiratory muscle stretch gymnastics can reduce shortness of breath
5. Giving infrared can reduce pain
6. Giving infra-red, chest therapy and respiratory muscle stretching gymnastics can increase functional activities.

SUGESTION

It is necessary to provide a Home Program for patients to remain active in doing respiratory muscle stretching gymnastics which is done at home, so that the therapeutic effect given gets maximum results.

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