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Effectiveness Of Range Of Motion (Rom) On Improving Physical Mobility Of Stroke Patients Non Hemaragic: Literature Review

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ABSTRACT

Asthma is a chronic inflammatory disease of the airway that often causes respiratory distress such as shortness of breath, wheezing, and coughing. Slow Deep Breathing (SDB) therapy has been identified as a potential non-pharmacological intervention to improve asthma control, breathing pattern, as well as oxygen saturation in asthma patients. This study aims to evaluate the effectiveness of Slow Deep Breathing therapy in improving breathing patterns, asthma control, as well as other clinical parameters based on literature analysis. The literature review was conducted using the PRISMA method by reviewing scientific articles in the last 10 years from databases such as PubMed, ScienceDirect, and Google Scholar. Inclusion criteria included studies with quasi-experimental or experimental designs that addressed the effects of SDBs on asthma patients. Data were analyzed based on the effectiveness of SDB on asthma control, breathing pattern, peak expiratory flow (APE), oxygen saturation, and asthma severity. Most studies showed that SDB was effective in improving asthma control scores, breathing patterns, APE, and oxygen saturation.

Keyword: Non pharmacological therapy; slow deep breathing; therapy, asthma

INTRODUCTION

Asthma is a chronic inflammatory disease of the respiratory tract characterized by bronchial hyperresponsiveness to various stimuli, causing reversible narrowing of the airways. This condition is characterized by episodic symptoms such as shortness of breath, wheezing, chest tightness, and coughing, which often occur at night or in the early morning.

Asthma is one of the most common chronic diseases worldwide. According to a WHO report, more than 300 million people worldwide suffer from asthma, with varying prevalence rates in different countries. In Indonesia, the prevalence of asthma is around 4.5% of the population, with higher rates among children and adolescents.

The main symptoms of asthma include shortness of breath, wheezing, coughing, and a heavy feeling in the chest. These symptoms often occur episodically and can be triggered by various factors such as physical activity, allergens, or irritants. In some cases, asthma symptoms may be mild, but during acute attacks, they can cause severe breathing difficulties and require immediate medical intervention.

Asthma is a condition caused by multifactorial factors. Genetically, a family history of asthma or allergies increases a person's risk of developing asthma. Environmental factors such as exposure to allergens (dust, pollen, pet dander), air pollution, or cigarette smoke also significantly contribute. Additionally, respiratory viral infections in childhood, an unhealthy lifestyle, and obesity are known to worsen asthma conditions.

Various factors can influence the frequency and intensity of asthma symptoms. Exposure to allergens such as dust, pollen, and animal dander are often the main triggers. Environmental irritants such as cigarette smoke and air pollution also exacerbate asthma symptoms. Strenuous physical activity can trigger exercise-induced asthma. Weather changes, stress, anxiety, and respiratory infections are other factors that can affect the severity of symptoms in asthma patients. Non-pharmacological therapy is a treatment approach that does not use medications but employs other methods to reduce symptoms and improve the patient's quality of life. This approach includes relaxation techniques, breathing exercises, physical therapy, and lifestyle changes. In the context of asthma, non-pharmacological therapy is often used as a complement to support the effectiveness of pharmacological treatment and prevent exacerbations of symptoms

Slow Deep Breathing (SDB) therapy is a breathing technique that involves taking slow, deep breaths through the nose, followed by slow exhalation through the mouth. This technique aims to improve respiratory efficiency, reduce bronchial hyperresponsiveness, and enhance oxygen and carbon dioxide exchange. In asthma patients, this therapy helps alleviate shortness of breath, reduce the use of accessory breathing muscles, and manage anxiety, which often exacerbates symptoms. SDB therapy is a simple yet effective approach in supporting asthma management as a complement to pharmacological treatment.

Slow deep breathing therapy has demonstrated effectiveness in managing respiratory issues and fatigue across various conditions. For asthma patients, it can reduce symptom severity and improve respiratory rate (Kusno Ferianto, 2019; Aulia Yora Rianisa et al., 2024). This therapy helps stabilize breathing frequency and reduce breathing rate in asthma patients, with positive responses observed after several sessions (Putra Agina Widyaswara Suwaryo et al., 2021). Slow deep breathing has also been found to improve oxygen saturation in patients with dyspnea (Aulia Yora Rianisa et al., 2024). Beyond respiratory conditions, this technique has shown benefits in reducing fatigue in chronic kidney disease patients undergoing hemodialysis, with improvements observed after three days of therapy (R. Pertiwi & Dyah Restuning Prihati, 2020). These studies suggest that slow deep breathing can be an effective complementary therapy for managing respiratory symptoms and fatigue in various medical conditions.

Asthma is a chronic disease whose prevalence continues to rise globally and has a significant impact on patients' quality of life. Asthma management often focuses on pharmacological therapies such as the use of bronchodilators and inhaled corticosteroids. However, the side effects of long-term medication are a major concern, necessitating non-pharmacological approaches as alternatives or complements. Slow Deep Breathing (SDB) therapy has been introduced as an effective breathing technique to reduce asthma symptoms, particularly in addressing irregular breathing patterns. While some studies have demonstrated the benefits of SDB, there remain limitations in understanding the underlying mechanisms and the consistency of its effectiveness across various patient populations. Additionally, there has been no comprehensive literature review integrating scientific evidence on SDB as part of asthma management.

The objective of this literature review is to analyze and synthesize existing scientific evidence on the effectiveness of Slow Deep Breathing (SDB) therapy in managing breathing patterns in asthma patients. This review aims to provide a deeper understanding of how this therapy affects asthma symptoms, particularly breathing patterns and patients' quality of life.

Through this literature review, it is hoped that relevant and up-to-date information can be provided to healthcare practitioners, researchers, and policymakers regarding the benefits of Slow Deep Breathing therapy in asthma management.

METHOD

In this literature review, the methods used include a systematic approach using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. This process involves identifying, screening, assessing the eligibility, and including relevant studies that examine the effectiveness of Slow Deep Breathing (SDB) therapy on breathing patterns in asthma patients. The search strategy was conducted using keywords such as: "Non-Pharmacological Therapy," "Slow Deep Breathing Therapy," and "Asthma." The search was conducted in various leading scientific databases, including PubMed, ScienceDirect, Scopus, and Google Scholar. The studies included were those published in the last 10 years (2014–2024) to ensure the relevance and timeliness of the data.

Table 1.1 PRISMA Chart

Identification	Search for articles through databases: Pubmed, Scopus, and Google Scholar: 460 articles
Screening	Screening articles based on titles and abstracts: 165 articles
Eligibility	Articles based on inclusion and exclusion criteria: 90 articles
Inclusion	Articles used in this literature review: 8 articles

Table 1.2 Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Studies focusing on Slow Deep Breathing therapy in asthma patients.	Articles that do not contain relevant results or data.
Research articles that include experimental, quasi-experimental, or meta-analysis designs.	Studies involving other breathing therapies without a primary focus on SDB.
Studies that include information on the impact of SDB on breathing patterns, asthma symptoms, or patient quality of life.	Literature in the form of opinions, editorials, or comments without empirical data.
Articles in English or Indonesian.	Articles that are not available in full text.

RESULT

Table 1.3 Journal Analysis Results

No.	Title	Author	Method	Research Results
1.	The Effectiveness of Slow Deep Breathing (SDB) Therapy on Asthma Control Levels	Nurul Dwi Astuti,et.al, 2017	This study is a quasi-experimental design with a nonequivalent control group design	The results of the analysis showed significant differences between the pretest and posttest ACT scores (p=0.001), APE values (p=0.004), daily APE variation (p=0.005), medication side effects (p=0.010), and emergency department visits (p=0.038) between the experimental and control groups. The conclusion of this study is that slow deep breathing therapy is effective in improving asthma control in patients with moderate persistent bronchial asthma.
2.	The Effect of Slow Deep Breathing on Breathing Patterns in Asthma Patients at the Surakarta City Hospital Outpatient Clinic.	Rizka Adila Wardani, 2016	This study was a pre-experimental study with a pre-test and post-test without a control group. The sample size was 33 people, selected using incidental sampling.	The results showed that the average breathing pattern before slow deep breathing therapy in asthma patients was 1.97 with a standard deviation of 0.810. The average breathing pattern after slow deep breathing therapy in asthma patients was 2.61 with a standard deviation of 1.059.
3.	Slow Deep Breathing (SDB) Therapy On Asthma Control Levels	Mahalul Azam, 2017	This study was a quasi-experimental study with a nonequivalent control group design. The sampling technique used was purposive sampling with 15 participants in each of the experimental and control groups.	The results of the Mc.Nemar test between the pretest and posttest ACT in the experimental and control groups yielded p=0.008 (p<0.05) and control p=1.00 (p>0.05), respectively. Thus, it can be concluded that there is a significant difference between the pretest and posttest ACT scores in the experimental group, but no difference in ACT scores in the control group. The hypothesis test used was the Mann-Whitney test between the differences in ACT (Asthma Control Test) scores in the experimental and control groups. The result or p-value was 0.001 (p<0.05), so the null hypothesis (Ho) was rejected and the alternative hypothesis (Ha) was accepted. This means that there is a significant difference between the pretest and posttest ACT scores in patients with bronchial asthma between the experimental group and the control group
4.	The Effectiveness of Slow Deep Breathing Therapy on the Severity of Asthma in the Mawar Ward of the Regional General Hospital. Dr. R. Koesma Tuban	Kusno Ferianto,2020	This study is a quasi-experimental design with a pretest-posttest with control group. The sample was selected using systematic random sampling with a total of 28 respondents, including 14 respondents in the experimental group and 14 respondents in the control group.	The Mann-Whitney test yielded a result of Asymp. Sig. (2-tailed) = 0.002, where 0.002 < 0.05, so H1 is accepted and H0 is rejected. Therefore, it can be concluded that slow deep breathing therapy has an effect on the severity of asthma in asthma patients. It can be concluded that slow deep breathing therapy has an effect on reducing the severity of asthma in asthma patients. Thus, slow deep breathing therapy can be used as an

				effective adjunct therapy to reduce the severity of asthma in addition to pharmacological therapy.
5.	The Effectiveness of Deep Breathing Exercise Intervention on Oxygen Saturation in Asthma Patients.	Khalid Mustofa, 2022	This study is a quasi-experimental study with a randomized pre- and post-test group design.	The results showed a median (minimum-maximum) change in oxygen saturation of 1.00 (1-3) in the slow deep breathing exercise intervention group and 2.00 (1-4) in the deep breathing exercise intervention group ($p = 0.031 < 0.05$). The change in oxygen saturation using the deep breathing exercise intervention was more effective than the slow deep breathing exercise intervention.
6.	The Effectiveness of Asthma Exercise and Slow Deep Breathing Exercise on Peak Expiratory Flow in Asthma Patients in Two Jakarta Public Health Center Work Areas.	Pangkey, Ballsy C. A. (2019)	The study design was a pre-post test quasi-experimental design with a control group. A total of 25 subjects were selected for the intervention group and the control group using purposive sampling. Subjects' PEF was measured using a peak flow meter before and at the end of the study.	The results showed that the characteristics of asthma subjects in the intervention group were not different from those in the control group, except that there were more obese subjects in the intervention group (68% vs. 24%, p=0.002). After four weeks of the study, there was an increase in APE in the intervention group, with subjects moving from the yellow zone (50%–<80%) to the green zone (80%–100%), while in the control group, most subjects remained in the yellow zone (50%–<80%). The results of the paired sample t-test in the intervention group showed a significant difference in APE before and after the intervention (66.0% vs. 82.6%, p=0.000, <0.05). Thus, a significant difference in APE was found between the intervention group and the control group at the end of the study (82.6% vs. 64.6%, p=0.000). The results of the ordinal logistic regression test showed that asthma exercises and slow deep breathing exercises partially influenced APE, but simultaneously, subject characteristics, asthma exercises, and slow deep breathing exercises did not influence APE (p=0.812). This study recommends implementing asthma exercises and slow deep breathing exercises for >4 weeks as a rehabilitation measure and to improve the quality of life of asthma subjects.
7.	The Effectiveness of Slow Deep Breathing and Blowing Balloons on Improving Peak Expiratory Flow (PEF) in Asthma Patients at the Makassar Community Lung Health Center (BBKPM)	RANDA, ERPIN, 2022	The study design used was a quasi-experimental design with a two-group pre-test-post-test method on 44 respondents aged between 17 and 60 years.	The observation results were analyzed using the Wilcoxon test with a significance level of $\alpha = 0.05$. The results showed a ρ value of SDB = 0.001 and Blowing Balloons = 0.000. This indicates a significant effect of APE values before and after SDB and Blowing Balloons exercises. The Mann-Whitney test yielded mean ranks of SDB = 18.41 and Blowing Balloons = 26.59 ($\rho = 0.008$), indicating a significant difference. Based on the study

				results, it can be concluded that the highest mean value indicates that Blowing Balloons exercise is more effective than SDB exercise in improving APE in asthma patients.
8.	The Effect of Breathing Exercises on Changes in Shortness of Breath in Asthma Patients Receiving Nebulizer Therapy at PKU Muhammadiyah Kutowinangun Hospital	Nunung Azizah Ratnafuri , 2024	This study used a quasi-experimental design with a pretest-posttest control group approach.	The results showed significant changes in the respiratory condition of asthma patients in the treatment group ($p<0.05$), including improvements in RR, SpO2, use of accessory breathing muscles, nasal flaring, oxygen use, and lung sounds. The results showed that only RR and use of accessory breathing muscles improved significantly after the intervention ($p<0.00$), while SpO2, nasal flaring, oxygen use, and lung sounds did not show significant changes ($p>0.05$). The study results showed that breathing exercises had an effect on changes in dyspnea in asthma patients receiving nebulizer therapy. The intervention group experienced a greater improvement in dyspnea symptoms compared to the control group ($p<0.05$), but there was no significant difference in nasal flaring between the control and intervention groups ($p>0.05$).

From various studies analyzed, Slow Deep Breathing (SDB) has been proven to have significant benefits in asthma management, both in terms of improving asthma control, breathing patterns, and reducing the severity of symptoms. The following discussion analyzes the research results to highlight the advantages and relevance of this therapy.

1. The Effect of SDB on Asthma Control

Research by Nurul Dwi Astuti et al. (2017) and Mahalul Azam (2017) shows that SDB significantly improves asthma control as measured by the Asthma Control Test (ACT). Statistical test results indicate a p-value <0.05, indicating a significant difference between the experimental and control groups. This is supported by Kusno Ferianto's (2020) study, which found that SDB effectively reduces the severity of asthma in patients, demonstrating the potential of this therapy as a complement to pharmacological therapy.

2. Changes in Breathing Patterns through SDB

A study by Rizka Adila Wardani (2016) showed an improvement in breathing patterns following SDB intervention. Patients' breathing patterns improved from an average of 1.97 to 2.61 with a smaller standard deviation, reflecting better respiratory stability. This change indicates that SDB helps asthma patients regulate breathing frequency and depth, which can reduce shortness of breath symptoms and improve lung functionu.

3. Effects of SDB on Peak Expiratory Flow (PEF)

Several studies, such as those by Pangkey et al. (2019) and Randa ERPIN (2022), highlight the influence of SDB on increasing PEF. This exercise helps improve peak expiratory flow from the yellow zone (50%-<80%) to the green zone (80%-100%), reflecting improved lung capacity. However, compared to the Blowing Balloons exercise, Randa's study shows that Blowing Balloons is more effective in increasing PEF.

4. Effect on Oxygen Saturation

Khalid Mustofa's (2022) study showed that SDB has an effect on oxygen saturation, although compared to deep breathing exercises, the resulting changes in oxygen saturation are lower. These results indicate that SDB may be more effective in regulating breathing patterns than in directly increasing oxygen saturation.

5. The Effect of SDB on Clinical Symptoms of Asthma

Research by Nunung Azizah Ratnafuri (2024) shows that SDB can help reduce shortness of breath symptoms, such as decreased breathing frequency, use of accessory breathing muscles, and improved lung sounds. However, for indicators such as oxygen use and nasal flaring, the results were less significant, indicating that this therapy is more effective in certain aspects.

6. Integration of SDB into Asthma Rehabilitation Programs

Pangkey et al. (2019) recommend incorporating SDB exercises alongside asthma exercises as part of asthma rehabilitation programs. These exercises not only improve lung function but also enhance patients' quality of life. However, the study highlights the need for long-term implementation (>4 weeks) to achieve optimal results.

DISCUSSION

1. Asthma: Definition and Pathophysiology

Asthma is a chronic inflammatory disease of the airways characterized by reversible airway narrowing, bronchial hyperresponsiveness, and excessive mucus production. This chronic inflammation causes typical symptoms such as shortness of breath, coughing, wheezing, and chest tightness. Pathophysiologically, exposure to allergens or asthma triggers (such as dust, smoke, or physical activity) triggers an inflammatory response involving the release of inflammatory mediators like histamine and leukotrienes. This leads to bronchoconstriction, mucosal edema, and airway obstruction, which increases respiratory resistance.

2. The Role of Breathing Techniques in Asthma Management

Breathing techniques such as Slow Deep Breathing (SDB) aim to address airway hyperresponsiveness, improve ventilation efficiency, and reduce respiratory effort. Slow and deep breathing helps reduce sympathetic nervous system activity, improve tissue oxygenation, and maximize lung expansion. This technique can also stimulate the parasympathetic nervous system, which helps calm the body and reduce the severity of asthma attacks.

3. Mechanism of Slow Deep Breathing in Asthma
Slow Deep Breathing is a breathing relaxation method that involves deep breathing through the diaphragm at a slow and controlled rhythm. The mechanism of SDB includes:

a. Reduction in Airway Resistance: SDB helps improve airflow by maximizing airway expansion and increasing lung volume.
b. b. Decrease in Sympathetic Nervous System Activity: SDB stimulates the parasympathetic nervous system, which helps relax the smooth muscles of the bronchi and reduce bronchoconstriction.
c. c. Improved Oxygen Saturation: SDB improves gas exchange efficiency in the alveoli by reducing ineffective ventilation.
d. d. Breathing Pattern Control: SDB helps patients control their breathing patterns, which are often disrupted during asthma attacks due to hyperventilation

4. The Relationship Between Breathing Techniques and Clinical Symptoms of Asthma
Asthma symptoms such as shortness of breath and the use of accessory breathing muscles are often triggered by rapid, inefficient breathing. SDB helps address this issue by:

a. Improving Lung Elasticity: Deep breathing increases vital capacity and reduces airflow resistance.
b. b. Reducing Shortness of Breath: By slowing the breathing rate and prolonging exhalation, SDB helps reduce respiratory effort and muscle fatigue.
c. c. Stabilizing Cardiovascular Function: This technique helps lower blood pressure and heart rate, which often increase during asthma attacks due to physiological stress.

5. Supporting Theories for the Benefits of Slow Deep Breathing

a. Relaxation Theory: Deep breathing calms the body's stress response, which can worsen asthma symptoms through neuroendocrine mechanisms.
b. b. Improved Alveolar Ventilation Theory: SDB improves air distribution in the alveoli, thereby enhancing lung ventilation and perfusion.
c. c. Breathing Pattern Control Theory: By training patients to breathe efficiently, SDB can reduce hyperventilation and normalize CO2 levels in the blood, which are often disrupted during asthma attacks.

6. Relevance of Slow Deep Breathing as a Non-Pharmacological
Therapy As a non-pharmacological therapy, SDB offers a safe, cost-effective, and easy-to-implement approach. While it does not replace pharmacological therapies such as bronchodilators or corticosteroids, SDB can be used as an adjunct therapy to optimize asthma management. This is particularly relevant for patients seeking additional methods to improve quality of life and reduce reliance on medications.

CONCLUSION

Based on the analysis, Slow Deep Breathing has various benefits in improving asthma control, improving breathing patterns, and reducing asthma symptoms. However, its effectiveness may vary depending on the intensity, duration of therapy, and combination with other interventions such as asthma exercises or pharmacological therapy. Further studies involving larger samples and longer intervention durations are needed to strengthen the evidence on the effectiveness of SDB.

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