CASE STUDY

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Implementation of Airway Management through Oxygen Therapy in Asthma Patients with Ineffective Breathing Pattern Nursing Problems in the Pulmonary Care Unit of BLUD RSUD Kota Baubau

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ABSTRACT

Background: Asthma is a chronic inflammatory disease of the airways characterized by shortness of breath, cough, and wheezing, which can result in an ineffective breathing pattern. One of the therapies used to manage this condition is oxygen therapy. Oxygen therapy, particularly using a nasal cannula, is a non-pharmacological nursing intervention aimed at improving ventilation and patients' oxygenation status.

Objective: To determine the effectiveness of oxygen therapy (nasal cannula) in improving ineffective breathing patterns in asthma patients in the pulmonary care unit of RSUD Kota Baubau.

Methods: This study employed a descriptive case study design involving one patient. The instruments used included the standard operating procedure (SOP) for oxygen administration, a pulse oximeter, an observation sheet, and a nursing care format. The intervention was carried out for 3 × 24 hours, with oxygen therapy administered twice daily for 15 minutes at a flow rate of 2–4 liters per minute according to the procedure.

Results: After three days of therapy from May 29 to May 31, 2025, the patient's respiratory rate decreased from 28 breaths per minute to 23 breaths per minute. The patient's breathing pattern improved from irregular to regular. The use of accessory respiratory muscles decreased, wheezing was still present but with reduced frequency, and complaints of shortness of breath were reduced.

Conclusion: Oxygen therapy using a nasal cannula is effective in improving ineffective breathing patterns in asthma patients, as indicated by a decreased respiratory rate and improved breathing patterns. This intervention can be used as one of the nursing approaches in the management of asthma in healthcare facilities.

Keywords: Asthma, Nasal Cannula, Oxygen Therapy, Ineffective Breathing Pattern

INTRODUCTION

Asthma is a chronic inflammatory disease of the airways characterized by swelling, increased airway responsiveness to stimuli, and symptoms such as shortness of breath, wheezing, and coughing, particularly at night or in the early morning. Globally, asthma affects more than 260 million people and is characterized by airway inflammation, reversible airway obstruction, and ineffective breathing patterns that may trigger acute exacerbations up to status asthmaticus (Hovagimyan et al., 2025; Reddel et al., 2022). This condition may be accompanied by hyperinflammation and impaired ventilation, which can potentially reduce quality of life, decrease productivity, increase school absenteeism, raise healthcare costs, and increase the risk of hospitalization and mortality (Fitri & Kartikasari, 2021).

The World Health Organization estimates that by 2025, the global number of individuals with asthma will reach approximately 400 million, with an additional 180,000 new cases annually. Asthma prevalence varies widely across regions, and epidemiological studies indicate a continuous increase in asthma incidence, particularly in countries with large populations (Anisa Rahayu Rachmawati, 2022).

In Southeast Asia, the prevalence of asthma is estimated at 3.3%, meaning that approximately 17.5 million of the 529.3 million population suffer from asthma. Data from the Indonesian Ministry of Health (2020) and the Indonesian Society of Pulmonology (PDPI) indicate that more than 12 million people in Indonesia are estimated to have asthma. These figures confirm that asthma is a significant public health problem in Indonesia and has a substantial impact on the population's quality of life (MM et al., 2023).

Asthma can affect all age groups and genders and is influenced by genetic and environmental factors. Data from the 2023 Indonesian Health Survey show variations in asthma prevalence across provinces, with the highest number of cases in West Java (156,977 cases), followed by Banten (38,751 cases) and Jakarta (33,552 cases). In contrast, South Papua reported the lowest number of cases, with 1,684 cases. Therefore, public awareness of asthma symptoms such as wheezing, nocturnal coughing, and shortness of breath and control efforts through avoidance of triggering factors including stress, cigarette smoke, and air pollution are essential (Anisa Rahayu Rachmawati, 2022; Reddel et al., 2022).

Asthma may lead to systemic inflammation that increases the risk of downstream organ dysfunction, including cognitive decline, mood disorders such as depression and anxiety, metabolic syndrome, and cardiovascular abnormalities such as atherosclerosis due to elevated levels of IL-6 and hsCRP in patients with severe asthma or recurrent exacerbations (Tattersall et al., 2024). Literature reviews have identified long-term effects of inhaled

corticosteroids (ICS) for asthma, including pneumonia, tuberculosis, adrenal suppression, osteoporosis, ophthalmic disorders, and diabetes, resulting from systemic drug absorption (Azzahra et al., 2023). Respiratory comorbidities associated with asthma such as chronic obstructive pulmonary disease (COPD), bronchiectasis, allergic bronchopulmonary aspergillosis (ABPA), cystic fibrosis, eosinophilic bronchitis, and eosinophilic pneumonia worsen prognosis through overlap syndromes such as CF–asthma (Ledford et al., 2025). Severe asthma exacerbations are associated with risk factors such as status asthmaticus and acute complications including respiratory failure, cardiac arrest, hypoxemia, hypercapnia, respiratory alkalosis, and pneumothorax, while chronic impacts include permanent airway remodeling, impaired growth in children, and reduced quality of life (Paredes et al., 2026).

One therapy that can help reduce shortness of breath in patients with asthma is oxygen therapy. Oxygen therapy is a nursing intervention aimed at delivering oxygen to the body through assistive devices to improve ventilation and oxygen saturation. This intervention is used in managing ineffective breathing pattern nursing problems in patients with bronchial asthma, thereby helping to improve respiratory function and reduce dyspnea (Davinda Safa Felisa, 2024).

Oxygen therapy provides significant benefits in increasing oxygen saturation (SpO_2) from 93–94% to 98–99% in patients with moderate head injury through the use of a nasal cannula at 3 L/min for three days, thereby preventing cerebral tissue hypoxia. Hyperbaric oxygen therapy (HBOT) for long COVID has been shown to improve global cognitive function ($p = 0.0137$), reduce fatigue ($p = 0.0059$), and enhance executive function and attention by addressing chronic hypoxia. In diabetic foot ulcers, HBOT is effective in reducing amputation rates and accelerating wound healing through improved tissue oxygenation and enhanced patient quality of life. High-flow nasal cannula (HFNC) therapy in type 1 respiratory failure improves oxygenation and patient comfort while reducing the need for intubation without significant side effects. In chronic asthma, oxygen therapy supports the management of airway inflammation and hypoxia in more than 260 million patients worldwide (Herman et al., 2023; Hovagimyan et al., 2025; Nuswantoro et al., 2025; Robbins et al., 2021; Zhang et al., 2022).

Oxygen therapy is indicated for patients with asthma who experience clinical symptoms such as shortness of breath and chest tightness (Firdaus et al., 2019). A case study at RSUD Kota Yogyakarta demonstrated significant improvements following oxygen therapy, including decreased respiratory rate, increased oxygen saturation, and reduced adventitious breath sounds (Aini et al., 2024). These findings are consistent with research by (Frana & Kk, 2024; Octaviani et al., 2023), which reported that oxygen administration is effective in reducing dyspnea in asthma patients. Other studies have also shown that oxygenation therapy improves breathing patterns and oxygenation status in asthma patients with ineffective breathing patterns, as indicated by reduced respiratory rate, increased oxygen saturation, and decreased wheezing (Shofiyatussalamah & Waladani, 2022).

METHODS

This study employed a descriptive case study design. The study was conducted in the Pulmonary Care Unit of RSUD Kota Baubau in May 2025 for a duration of three days. The subject of the study was a patient diagnosed with bronchial asthma who experienced an ineffective breathing pattern, characterized by shortness of breath, increased respiratory rate, use of accessory muscles, adventitious breath sounds, and decreased oxygen saturation.

The nursing intervention provided was oxygen therapy administered via nasal cannula according to the patient's clinical condition to improve ventilation and oxygenation. The instruments used included a nursing assessment form, a pulse oximeter to measure oxygen saturation (SpO_2), and an observation sheet to assess respiratory rate, depth of breathing, adventitious breath sounds, and the patient's level of respiratory comfort. Data were collected through observation and physical examination before and after the administration of oxygen therapy.

Evaluation of the intervention outcomes was conducted by comparing changes in respiratory status, indicated by a decrease in respiratory rate, an increase in oxygen saturation, a reduction in adventitious breath sounds, and decreased complaints of shortness of breath. This study was conducted in accordance with nursing research ethical principles, maintaining patient confidentiality and obtaining informed consent prior to data collection.

RESULT

Assessment (Case Description)

The case study was conducted at the Pulmonary Care Unit of BLUD RSUD Kota Baubau from May 29 to May 31, 2025, using observation, interviews, physical examination, and medical record review. The patient, Mrs. D, she is a 43-year-old married woman, Muslim, of Buton ethnicity, with elementary school education, working as a housewife, and residing in Labuke, Labalawa. The primary caregiver was her husband, Mr. S, a self-employed male living at the same address.

Mrs. D was admitted with the main complaint of shortness of breath accompanied by a non-productive cough. The medical diagnosis was bronchial asthma. The patient had a previous history of hospitalization due to the same condition, with no history of surgery, allergies, smoking, alcohol consumption, or substance dependence. There was no family history of similar, hereditary, or infectious diseases.

Physical examination revealed a body temperature of 36.5°C, body weight of 62 kg, height of 154 cm (BMI 26.14 kg/m²), respiratory rate of 28 breaths/minute, and pulse rate of 86 beats/minute.

Thoracic examination showed normal chest shape and expansion, absence of chest wall retraction or tenderness, vesicular breath sounds, and wheezing on auscultation, without chest pain. The patient appeared dyspneic but did not exhibit cyanosis or orthopnea.

Assessment of oxygenation needs showed persistent dyspnea and dry cough without sputum production. Before illness, the patient reported adequate daily fluid intake (7–8 glasses), regular meals, normal elimination patterns, and sufficient rest. During illness, there was a decrease in food and fluid intake, reduced bowel movements, and disturbed sleep patterns.

Medical management included intravenous fluids, nebulized bronchodilators and corticosteroids, systemic corticosteroids, mucolytics, analgesics, antihypertensives, and supplemental oxygen therapy as indicated.

Based on the nursing assessment conducted over 3×24 hours, the primary nursing diagnosis according to the Indonesian Nursing Diagnosis Standards (SDKI) was Ineffective Breathing Pattern (D.0005). Referring to the Indonesian Nursing Intervention Standards (SIKI), oxygen therapy was selected as the primary non-pharmacological nursing intervention, implemented according to established standard operating procedures.

Nursing Diagnosis and Interventions

Table 1. Nursing Diagnosis and Interventions

Component	Description
Nursing Diagnosis (SDKI)	**Ineffective Breathing Pattern (D.0005)**
Related Factors (Etiology)	Bronchial obstruction and airway narrowing related to bronchospasm and increased airway resistance secondary to bronchial asthma
Defining Characteristics	- Verbal report of shortness of breath - Respiratory rate: 28 breaths/minute - Presence of wheezing on auscultation - Dyspnea at rest - Oxygen saturation <92% (SpO_2 85–90%) - Use of accessory respiratory muscles (initial phase)
Nursing Outcome (SLKI)	**Breathing Pattern**
Outcome Indicators	- Respiratory rate within normal limits (16–24 breaths/minute) - Reduced dyspnea - Absence or reduction of wheezing - Regular breathing pattern - Oxygen saturation ≥95%
Target Outcome	Breathing pattern improves within 3×24 hours of nursing intervention
Nursing Intervention (SIKI)	**Oxygen Therapy**
Specific Intervention	**Administration of Oxygen via Nasal Cannula**
Intervention Activities	- Assess respiratory status (rate, depth, rhythm, and breathing effort) - Monitor oxygen saturation using pulse oximetry - Assess breath sounds for wheezing or other adventitious sounds - Position the patient in semi-Fowler or Fowler position - Administer oxygen via nasal cannula according to indication (3–4 L/min)\ - Titrate oxygen flow based on clinical response and SpO_2 values - Educate the patient on effective coughing techniques to promote airway clearance
Frequency and Duration	- Monitoring every 30 minutes during the acute phase - Continued monitoring every 2–4 hours after stabilization - Implemented for 3 consecutive days (3×24 hours)
Rationale	Oxygen therapy increases alveolar oxygen concentration, improves tissue oxygenation, reduces respiratory workload, and alleviates hypoxemia associated with bronchial obstruction
Evaluation (SLKI-based)	After 3×24 hours of intervention, respiratory rate decreased from 28 to 22 breaths/minute, wheezing resolved, accessory muscle use disappeared, oxygen saturation increased to 98% without supplemental oxygen, and the breathing pattern became stable

The assessment findings indicated that the patient experienced an ineffective breathing pattern, characterized by subjective complaints of shortness of breath and objective signs including an increased respiratory rate (28 breaths/minute), wheezing on auscultation, decreased oxygen saturation (85–90%), and the use of accessory respiratory muscles during the initial phase. These findings are consistent with bronchial obstruction and increased airway resistance commonly observed in acute asthma exacerbations.

Following the implementation of oxygen therapy via nasal cannula (3–4 L/min) in combination with therapeutic positioning and continuous respiratory monitoring over three consecutive days, progressive clinical improvement was observed. Respiratory rate decreased to 22 breaths/minute, wheezing diminished and subsequently resolved, and oxygen saturation increased to 98% without supplemental oxygen. In addition, signs of increased work of breathing, including accessory muscle use and dyspnea at rest, were no longer present by the end of the intervention period.

Based on SLKI outcome indicators, the nursing outcome Breathing Pattern was considered achieved, as evidenced by normalization of respiratory parameters, stabilization of oxygenation status, and the patient's ability to maintain effective spontaneous breathing. These findings demonstrate that structured oxygen therapy is an effective nursing intervention for improving respiratory function in patients with bronchial asthma.

Implementation and Evaluation

Table 2. Respiratory Monitoring of the Patient During (Day 1)

Parameter	Initial Observation Period (06:00–09:00)	Subsequent Observation Period (11:00–23:00)
Dyspnea	Present	Present
Breathing pattern	Irregular (Tachypnea)	Irregular (Tachypnea)
Respiratory rate (breaths/min)	28	26
Additional breath sounds	Wheezing present	Wheezing present
Use of accessory muscles	Present	Present
Oxygen therapy (nasal cannula)	4 L/min	4 L/min
Oxygen saturation (SpO_2, %)	90	94

Source: Primary data, 2025

Respiratory monitoring from 06:00 to 23:00 revealed persistent dyspnea throughout the entire observation period. The breathing pattern consistently indicated tachypnea, with a respiratory rate of 28 breaths/min during the initial period (06:00–09:00), decreasing to 26 breaths/min from 11:00 until the end of monitoring, although still exceeding normal limits. Lung auscultation demonstrated continuous additional breath sounds in the form of wheezing across all observation times, accompanied by the use of accessory respiratory muscles, indicating increased work of breathing due to airway obstruction.

Oxygen therapy was administered continuously via nasal cannula at a flow rate of 4 L/min. Initial oxygen saturation remained stable at 90% until 09:00, reflecting mild hypoxemia. From 11:00 onward, oxygen saturation increased to 94% and remained stable until 23:00, indicating a positive physiological response to oxygen therapy. However, the persistence of dyspnea, wheezing, and accessory muscle use suggests that the observed improvement was partial, and the patient continued to require close monitoring and ongoing nursing interventions to achieve an effective breathing pattern.

Table 3. Respiratory Monitoring of the Patient During (Day 2)

Parameter	Initial Observation Period (01:00–11:00)	Subsequent Observation Period (13:00–23:00)
Dyspnea	Present	Absent
Breathing Pattern	Irregular	Regular
Respiratory Rate (breaths/min)	25	22
Additional Breath Sounds (Wheezing)	Present	Reduced
Use of Accessory Muscles	Present	Decreased
Oxygen Flow via Nasal Cannula (L/min)	4	3
Oxygen Saturation (SpO_2, %)	90	95

Source: Primary data, 2025

Respiratory monitoring conducted from 01:00 to 23:00 demonstrated a gradual clinical improvement compared with the first day of observation. Dyspnea was still present during the early period (01:00–11:00) but resolved completely from 13:00 onward. The breathing pattern initially remained tachypneic and irregular, with a respiratory rate of 25 breaths/min from 01:00 to 11:00; however, from 13:00 to 23:00, the respiratory rate decreased to 22 breaths/min and the breathing pattern became regular, indicating improved ventilatory control.

Additional breath sounds in the form of wheezing were consistently detected during the early monitoring hours and began to decrease from 09:00 onward, persisting only in a reduced intensity until the end of observation. Similarly, the use of accessory respiratory muscles was evident during the early period but showed a progressive decline starting at 09:00, suggesting a reduction in the work of breathing. Oxygen therapy via nasal cannula was maintained throughout the monitoring period, with oxygen saturation remaining at 90% during the early phase and increasing to 95% from 13:00 onward, where it remained stable until 23:00.

Overall, these findings indicate a positive response to nursing interventions and oxygen therapy, reflected by the resolution of dyspnea, decreased respiratory rate, reduced wheezing, diminished use of accessory muscles, and improved oxygen saturation. Although mild respiratory alterations persisted, the outcomes suggest partial achievement of the SLKI outcome *Breathing Pattern Effectiveness*, with continued monitoring required to ensure sustained stabilization.

Table 4. Respiratory Monitoring of the Patient During (Day 3)

Parameter	Initial Observation Period (01:00–09:00)	Subsequent Observation Period (10:00–21:00)
Dyspnea	Absent	Absent
Breathing Pattern	Regular	Regular
Respiratory Rate (breaths/min)	22	22

Additional Breath Sounds (Wheezing)	Reduced	Absent
Use of Accessory Muscles	Decreased	Absent
Oxygen Flow via Nasal Cannula (L/min)	3	Discontinued
Oxygen Saturation (SpO_2, %)	95–96	97–98

Source: Primary data, 2025

On Day 3, respiratory monitoring demonstrated marked clinical stabilization. During the initial observation period (01:00–09:00), the patient showed no signs of dyspnea, maintained a regular breathing pattern, and exhibited a stable respiratory rate of 22 breaths/min. Residual wheezing and mild use of accessory muscles were still present but showed a decreasing trend. Oxygen therapy was continued at 3 L/min via nasal cannula, resulting in adequate oxygen saturation levels ranging from 95% to 96%.

In the subsequent observation period (10:00–21:00), respiratory status further improved. Wheezing and accessory muscle use were no longer observed, while oxygen saturation increased to 97–98% following discontinuation of oxygen therapy. The patient remained asymptomatic, with stable respiratory parameters and effective spontaneous breathing. These findings indicate that the nursing outcome *Effective Breathing Pattern* (SLKI) was achieved, supporting the resolution of the SDKI diagnosis *Ineffective Breathing Pattern* after implementation of SIKI-based interventions.

DISCUSSION

Asthma is a chronic inflammatory disease of the airways characterized by mucosal swelling, increased airway hyperresponsiveness to stimuli, and clinical manifestations such as dyspnea, wheezing, coughing particularly in the early morning chest tightness, hyperinflammation, and hyperventilation. This condition may significantly reduce quality of life, decrease productivity, increase school absenteeism, raise healthcare costs, and elevate the risk of hospitalization and even mortality (Fitri & Kartikasari, 2021).

Based on the findings of this case study conducted on Mrs. D in the Pulmonary Care Unit of RSUD Kota Baubau, the primary nursing problem identified was ineffective breathing pattern related to impaired gas exchange in a patient with bronchial asthma. The main intervention implemented was oxygen therapy administered via nasal cannula for 3 × 24 hours, which resulted in a significant improvement in the patient's respiratory status.

During the evaluation process, changes were observed in the use of accessory respiratory muscles, particularly the chest muscles. Initially, no accessory muscle use was evident; however, mild neck muscle retraction appeared on the second day and subsequently decreased on the third day. This change represents a physiological response to increased oxygen demand. As oxygenation improved, the workload of accessory respiratory muscles diminished. This finding is supported by Potter and Perry (2020), who stated that accessory muscles are activated during severe respiratory distress and gradually relax as gas exchange improves.

In addition, changes in adventitious breath sounds, specifically wheezing, demonstrated a clear trend toward improvement. Wheezing was initially prominent, became less audible on the second day, and was absent by the third day. Wheezing occurs as a result of bronchoconstriction that causes airflow turbulence in the small airways. The reduction in wheezing indicates bronchial relaxation and improved oxygen distribution to the alveoli. According to the Indonesian National Nurses Association (PPNI, 2021), indicators of successful intervention for ineffective breathing patterns include a decreased respiratory rate, deeper and more regular breathing, reduced use of accessory muscles, and improved breath sounds.

This case study demonstrates that oxygen therapy delivered via nasal cannula was effective in improving ineffective breathing patterns in an asthma patient in the Pulmonary Care Unit of RSUD Kota Baubau, as evidenced by a reduction in respiratory rate from 28 to 23 breaths per minute after three days of intervention. The increase in oxygen saturation (SpO_2) from 85–90% to 97–98%, the absence of accessory muscle use, and the reduction of dyspnea and wheezing support the achievement of the nursing outcome Breathing Pattern as defined in the Indonesian Nursing Outcome Standards (SLKI).

Previous studies by Firdaus et al. (2019) also reported that oxygen administration in asthma patients effectively increases oxygen saturation and reduces respiratory rate and work of breathing. Similar findings were reported by Prakoso (2024), who observed a reduction in wheezing and an increase in oxygen saturation after two days of oxygen therapy. These results are consistent with recent evidence highlighting the role of non-pharmacological oxygen therapy in managing hypoxemia due to bronchial obstruction during acute asthma exacerbations. Oxygen supplementation to maintain SpO_2 levels above 92–95% in hypoxemic asthma patients, thereby reducing respiratory workload and the risk of respiratory failure (GINA, 2022; Powers & Dhamoon, 2025; Reddel et al., 2022).

Furthermore, previous studies have demonstrated the effectiveness of nasal cannula oxygen therapy in reducing dyspnea among patients with asthma. Ruangsomboon et al., (2021) reported a significant reduction in dyspnea severity ($p < 0.05$) following nasal cannula oxygen administration at flow rates of 2–4 L/min delivered twice daily in patients with moderate asthma, which is comparable to the oxygen therapy protocol applied in this case study. Consistently, oxygen supplementation has been shown to decrease respiratory rate, alleviate breathlessness, and improve oxygen saturation by increasing alveolar oxygen concentration and enhancing gas diffusion (Patricia et al., 2019; Raeisi

et al., 2019). These findings are in line with international recommendations from the Global Initiative for Asthma (GINA), which emphasize the use of supplemental oxygen to maintain SpO_2 levels above 92–95% in patients with asthma-related hypoxemia to reduce respiratory workload and prevent deterioration (Reddel et al., 2022). The convergence of these findings supports the role of low-flow nasal cannula oxygen therapy as an effective complementary intervention in improving respiratory status and reducing dyspnea in patients with moderate asthma.

Physiologically, oxygen therapy enhances alveolar oxygen concentration by increasing the fraction of inspired oxygen (FiO_2), thereby elevating alveolar oxygen pressure (PAO_2) and facilitating more efficient oxygen diffusion into pulmonary capillaries. This process directly improves arterial oxygen saturation (SpO_2), reduces hypoxia and hypercapnia, and decreases the workload of accessory respiratory muscles, ultimately enhancing cellular metabolism and tissue perfusion (García-muro et al., 2020). In patients with bronchospasm due to asthma, oxygen therapy via nasal cannula at 3–4 L/min has been shown to effectively improve oxygen saturation (SpO_2) and reduce respiratory rate. Clinical observations indicate that following oxygen supplementation, patients often experience a decrease in respiratory rate from a tachypneic state (e.g., 28 breaths/min) to near-normal levels (around 23 breaths/min), along with the normalization of breathing patterns from irregular to regular. This reflects a reduction in respiratory workload and improved overall ventilation (Nolasco et al., 2022).

Evidence also shows that nasal cannula oxygen can raise SpO_2 to clinically acceptable levels ($\geq 95\%$) in patients experiencing acute hypoxemia due to asthma when combined with standard therapy, such as bronchodilators and corticosteroids (Hovagimyan et al., 2025). Importantly, conventional oxygen therapy has been reported to improve oxygenation without significant adverse effects, helping to prevent severe complications like status asthmaticus. Furthermore, studies on high-flow nasal cannula (HFNC) indicate similar trends, showing reductions in respiratory rate and improved oxygenation compared with conventional oxygen therapy, particularly in severe asthma exacerbations or hypoxemic respiratory failure (Geng et al., 2020).

The study by (García-muro et al., 2020; Hovagimyan et al., 2025) also found that patients showed a reduction in wheezing and accessory muscle use after 72 hours of oxygen therapy, further confirming the effectiveness of this intervention in the management of bronchial asthma..

Oxygen therapy via nasal cannula has therefore proven to be an effective method for managing hypoxemia in asthma patients. Research by Agustina and Ulya (2023) showed that oxygen therapy significantly reduces dyspnea and improves breathing patterns. These findings are further supported by Aini et al. (2024), who reported that oxygen therapy, whether delivered via nasal cannula or non-rebreather mask (NRM), significantly reduces respiratory rate and increases oxygen saturation ($p = 0.000$).

A study by Aini et al (2024) demonstrated a strong association between oxygenation methods and improvements in both level of consciousness and oxygen saturation. Meanwhile, KK Jaya (2024) reported that oxygenation interventions effectively improve ventilation, reduce accessory muscle use, and enhance respiratory status in asthma patients. Rachmawati (2022) further emphasized that oxygen therapy is a vital component in the management of acute asthma, as it prevents hypoxemia and accelerates the recovery process.

Based on the observational findings and supporting theoretical frameworks, it can be concluded that oxygen therapy administered via nasal cannula has a significant positive impact on improving ineffective breathing patterns in asthma patients. The effectiveness of this therapy is demonstrated by the achievement of key outcome indicators, including decreased respiratory rate, reduced wheezing, increased SpO_2, and diminished use of accessory respiratory muscles. This intervention is consistent with pathophysiological principles, nursing standards, and empirical evidence from previous studies.

Regarding implications and limitations, as a nursing intervention aligned with the Indonesian Nursing Intervention Standards (SIKI), nasal cannula oxygen therapy can be integrated into airway management in pulmonary care units, particularly for patients diagnosed with the Indonesian Nursing Diagnosis (SDKI) of Ineffective Breathing Pattern (D.0005). However, this single-case study is limited to one 43-year-old patient with a body mass index (BMI) of 26.14 kg/m^2; therefore, broader generalization requires further randomized clinical trials. Recommendations include respiratory monitoring every 30 minutes during the acute phase and patient education on the semi-Fowler position to optimize ventilation.

CONCLUSION

Oxygen therapy via nasal cannula proved effective in improving the ineffective breathing pattern in a patient with bronchial asthma within 3×24 hours. Clinical improvements were shown by a decreased respiratory rate, regular breathing pattern, reduced wheezing and accessory muscle use, and increased oxygen saturation from 85–90% to 97–98% even after oxygen discontinuation. This intervention supports the achievement of SLKI outcome indicators and can be applied as a SIKI-based nursing approach in pulmonary care. Further studies with larger samples are recommended to strengthen these findings.

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