

# Integrating Patient-Family Communication and Progressive Muscle Relaxation for Managing Asthma-Related Anxiety in the ICU: A Single-Case Study

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**Abstract:** *This case study describes how Progressive Muscle Relaxation (PMR) and Patient-Family Communication (PFC) were used to address anxiety associated with asthma in an intensive care unit. In addition to standard care, a 36-year-old female patient experiencing a severe asthma attack (STAI: 65) and acute anxiety got structured video communication and PMR sessions twice a day for seven days. Notable benefits included a normalized respiratory rate, decreased anxiety (STAI: 38), and enhanced PEFR (250 L/min). The example supports a biopsychosocial paradigm in critical care treatment and demonstrates the advantages of integrating psychological and relaxation techniques with standard asthma management.*

**Keywords:** Asthma Exacerbation, Anxiety, ICU, Patient-Family Communication, Progressive Muscle Relaxation, Psychological Intervention, Case Study, Critical Care Rehabilitation

## 1. Introduction

Asthma is a chronic inflammatory respiratory disorder characterized by bronchial hyperresponsiveness and variable airflow obstruction (1). Asthma has been recognized for centuries and remains a major global health problem. Asthma remains a major global health problem due to its high prevalence, impact on quality of life, and risk of severe exacerbations (2). According to international guidelines, asthma severity is stratified into four levels—intermittent, mild persistent, moderate persistent, and severe persistent—based on symptom frequency and treatment needs (3). Diverse clinical phenotypes, such as allergic, non-allergic, late-onset, and fixed airflow limitation forms, are increasingly recognized to guide personalized therapy. The fundamental pathology involves chronic airway inflammation leading to bronchial hyperresponsiveness and reversible airflow limitation (4). Clinically, asthma manifests as wheezing, shortness of breath, chest tightness, and coughing—often worsening at night or early in the morning (5). Common triggers include allergens, respiratory infections, cold air, exercise, and environmental pollutants (6). Disease manifestations range from asymptomatic periods to acute exacerbations and in severe chronic cases, may cause airway remodeling with fixed obstruction. Treatment focuses on reducing inflammation and relieving bronchospasm. Inhaled corticosteroids (ICS) are first-line therapies, while short-acting  $\beta_2$ -agonists offer quick symptom relief. For persistent symptoms, long-acting  $\beta_2$ -agonists may be added, along with leukotriene modifiers or theophylline. Systemic corticosteroids are used in acute exacerbations (7). The link between asthma and anxiety is well-

documented (8). Family involvement in ICU care enhances patient outcomes (9). While PMR with biofeedback has shown long-term benefits in asthma, our case demonstrates that PMR alone can reduce anxiety rapidly in ICU patients (10). Patient-family communication (PFC) also reduces anxiety through emotional support (11) and information sharing (12). PMR, a structured technique that eases autonomic arousal and tension (13), has been proven to lower anxiety (14), reduce stress (15), and is practiced by sequential muscle relaxation and slow breathing (16). This case evaluates the combined effects of PFC and PMR during a life-threatening asthma episode in ICU (17). The objective of this case study is to evaluate the effect of Progressive Muscle Relaxation and Patient-Family Communication on anxiety reduction and respiratory outcomes in a patient with severe asthma exacerbation admitted to the intensive care unit.

## Patient Information

A lady with severe chronic asthma, age 36, was admitted to the critical care unit after experiencing a potentially deadly exacerbation due to a respiratory tract infection. Her severe anxiety (STAI: 65/80) and acute respiratory distress (RR: 28/min, HR: 110 bpm, PEFr: 180 L/min) were made worse by her lack of family support and inadequate communication. To address these issues, a combination of Progressive Muscle Relaxation (PMR) and Patient-Family Communication (PFC) via video chats was used. This intervention led to improved coping, less anxiety, and better breathing. By the time of discharge, respiratory and psychological markers were stabilized, demonstrating the need for all-encompassing care for ICU asthma.

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## Clinical Findings

With a respiratory rate of 28 breaths per minute and a PEFr of 180 L per minute on Day 1, the patient displayed symptoms of respiratory distress and significant anxiety (STAI: 65). Progressive Muscle Relaxation (PMR) and Patient-Family Communication (PFC) were used in tandem as an intervention. By the third day, the patient's PEFr increased to 210 L/min, their anxiety level dropped to a STAI score of 52, and their respiratory rate improved to 22 breaths per minute. As demonstrated by the decrease in anxiety to STAI 38, the return of the respiratory rate to normal at 18 breaths per minute, and the rise in PEFr to 250 L/min, there was a notable clinical and psychological recovery by Day 7 after ongoing therapy.

## Timeline

**Day 0 (09/01/2025):** ICU admission with severe asthma exacerbation and marked anxiety.

**Day 1 (10/01/2025):** Referral received for respiratory and physiotherapy management.

**Day 2 (11/01/2025):** Intervention started-Patient-Family Communication (PFC) via video calls and Progressive Muscle Relaxation (PMR), twice daily.

**Day 3 (12/01/2025):** Improvements noted: STAI reduced to 52, respiratory rate 22 breaths/min, PEFr 210 L/min.

**Day 4–5 (13–14/01/2025):** Ongoing progress in anxiety and respiratory function.

**Day 6 (15/01/2025):** Clinical stabilization achieved.

**Day 7 (16/01/2025):** STAI dropped to 38, respiratory rate normalized, PEFr 250 L/min; patient discharged.

## Diagnostic Assessment

The patient exhibited tachypnea (28 breaths per minute), a PEFr of 180 L/min, and auxiliary muscle usage at the time of admission to the critical care unit. Acute respiratory acidosis with hypoxemia was seen in the ABG trial (pH 7.31, PaCO<sub>2</sub> 48 mmHg, PaO<sub>2</sub> 61 mmHg). Larger, infiltrate-free lungs were seen on a chest X-ray. Obstructive airway disease was verified by post-stabilization spirometry (FEV<sub>1</sub> 42%, FEV<sub>1</sub>/FVC 0.59). Elevated CRP and leukocytosis suggested an infection-induced exacerbation. The patient had significant psychological anxiety (STAI score: 65/80), which was made worse by poor communication and family separation. This resulted in dyspnoea and a feeling of uneasiness. Acute severe asthma with concomitant anxiety was diagnosed based on the data, necessitating ventilatory support and integrated physiotherapy that included Progressive Muscle Relaxation (PMR) and Patient-Family Communication (PFC). Throughout the research procedure, there were no problems with diagnosis.

## Diagnosis

In addition to acute anxiety, the patient was diagnosed with a severe asthma attack brought on by a respiratory tract

infection. Clinical assessment, chest radiography, spirometry, and laboratory tests were used to thoroughly rule out differential diagnoses, such as pneumonia, pneumothorax, pulmonary embolism, chronic obstructive pulmonary disease (COPD) exacerbation, and heart failure.

## Prognosis

The patient with acute anxiety and severe asthma exacerbation (PEFr 180 L/min; PaO<sub>2</sub> 61 mmHg) significantly improved with ventilatory support and integrated physiotherapy, which included Progressive Muscle Relaxation (PMR) and Patient-Family Communication (PFC). By Day 7, the anxiety (STAI) score decreased to 38 and the PEFr rose to 250 L/min, demonstrating successful stabilization. The good response points to a satisfactory recovery despite the possibility of further exacerbations, underscoring the significance of continuous rehabilitation and long-term asthma treatment.

## Therapeutic Intervention

Corticosteroids, nebulizer bronchodilators, antibiotics, and non-invasive breathing techniques are all advised by medical therapy. On the second day, patient-family communication and progressive muscle relaxation physiotherapy started. Supportive care and this integrated strategy led to clinical improvement and ICU discharge on Day 7. Progressive Muscle Relaxation sessions were conducted twice daily for approximately 20 minutes under physiotherapy supervision using sequential contraction and relaxation of major muscle groups combined with slow breathing techniques. Patient-Family Communication was facilitated through video calls twice daily lasting 10–15 minutes to provide emotional reassurance and reduce anxiety.

## Follow-Up and Outcomes

The patient's respiratory function remained stable (PEFr 270 L/min) two weeks after leaving the intensive care unit, and their symptoms, anxiety levels, and sleep quality all improved. Recovery was aided by ongoing PMR and family support. There were no readmissions, and long-term asthma and mental health monitoring was advised.

Ethical Consideration: Informed consent was obtained from the patient for publication of this case report and all personal identifiers were kept confidential.

## 2. Discussion

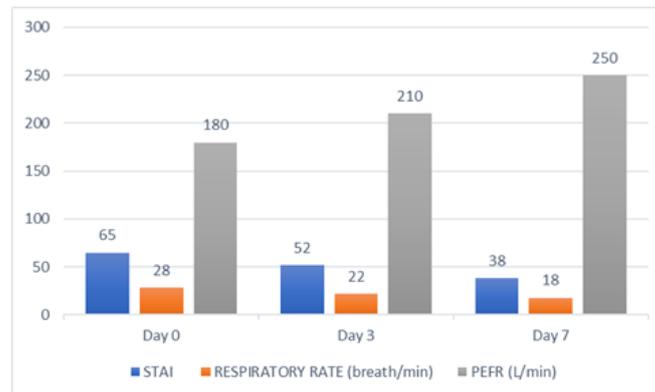
Asthma is characterized by variable airflow limitation and bronchial hyperresponsiveness and chronic inflammatory airway disease (1). Complex immunological responses brought on by environmental factors are part of its pathogenesis, which influence disease severity and progression (2). Improved asthma classification and customized treatment strategies have been made possible by developments in clinical and molecular understanding (3). Asthma control and quality of life are negatively impacted by psychological burden, particularly anxiety, which is a crucial but sometimes disregarded component of

asthma care (4). While anxiety might exacerbate respiratory symptoms, asthma bouts can also create psychological distress (5). Anxiety and asthma are related to each other. Isolation, communication problems, and fear of procedures like mechanical ventilation all contribute to psychological stress, which raises anxiety levels in intensive care unit (ICU) settings (6). Family involvement in ICU care reduces this anxiety by providing emotional support and reducing patient isolation (7). Open visitation and shared decision-making are two family-centered care (FCC) approaches that enhance clinical outcomes and patient and family satisfaction (8). For asthmatics, progressive muscle relaxation (PMR) is a helpful method for lowering anxiety. Our results show that PMR alone can quickly improve psychological and physiological markers in intensive care unit settings, despite prior research focusing on the long-term advantages when paired with biofeedback (9). According to clinical studies, PMR helps to improve respiratory outcomes and reduce anxiety (10). It has been demonstrated that relaxation methods like PMR and biofeedback breathing enhance asthma management and stress reactions (11). PMR has been shown to be an effective non-pharmacological adjunct in asthmatic adults and adolescents (12). In addition to lowering anxiety, PMR enhances mental health and asthma trigger control (13). Reducing the frequency of exacerbations and encouraging treatment compliance (14). Our multi-component intervention significantly decreased anxiety and improved respiratory function (PEFR rose from 180 to 250 L/min) in intensive care unit (ICU) patients in just one week. It combined organized video conversations with PMR to facilitate patient-family communication (PFC). Both emotional and physiological demands are met by this biopsychosocial approach, which is in line with research showing that multifaceted approaches produce greater treatment results than single-dimension approaches (15). The Global Initiative for Asthma (GINA) promotes comprehensive medical and psychosocial care in line with this integration (16).

### 3. Conclusion

This case study demonstrates that integrating Progressive Muscle Relaxation and structured Patient-Family Communication alongside standard medical therapy may reduce anxiety and improve respiratory outcomes in ICU patients with severe asthma exacerbation. The findings suggest that psychosocial support combined with physiotherapy-based relaxation techniques may complement conventional treatment in critical care settings. Larger clinical studies are required to confirm these findings.

Parameter	Day 0	Day 3	Day 7
STAI	65	52	38
RESPIRATORY RATE (breath/min)	28	22	18
PEFR (L/min)	180	210	250



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