COMPARATIVE EVALUATION OF BREATHING EXERCISES IN ACUTE RESPIRATORY INFECTIONS AMONG CHILDREN AND ADULTS

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Abstract

Acute respiratory infections (ARIs) pose significant health challenges globally. This study evaluates the efficacy of structured breathing exercises among children and adults diagnosed with ARIs. Conducted at the Andijan Branch of the Republican Scientific Center for Emergency Medical Care in the Department of Therapy, 80 participants were divided into two groups: children (5–12 years) and adults (18–50 years). The intervention included diaphragmatic breathing, deep breathing with inspiratory pauses, and the Strelnikova method, performed twice daily over 7 days.

Children demonstrated a more pronounced improvement in oxygen saturation (SpO_2) and peak expiratory flow (PEF) compared to adults. SpO_2 increased from 93.5 ± 1.3% to 97.5 ± 1.0% in children, while adults improved from 92.8 ± 1.5% to 96.0 ± 1.3%.
Breathlessness scores on the Borg scale decreased significantly in both groups but more markedly in children. These findings underscore the importance of age-specific respiratory rehabilitation protocols.

Keywords: Acute respiratory infections, breathing exercises, oxygen saturation, peak expiratory flow, rehabilitation, children, adults.

Introduction

Acute respiratory infections (ARIs) are a leading cause of morbidity worldwide, impacting individuals of all age groups. ARIs often manifest as hypoxemia, impaired lung function, and breathlessness, which hinder recovery and affect overall quality of life. Non-pharmacological interventions, particularly breathing exercises, play an essential role in improving oxygenation and respiratory function [1, 3, 4].

Physiological differences between children and adults, including lung compliance, respiratory plasticity, and muscle adaptability, suggest that the response to breathing exercises may vary across age groups [2, 5]. Previous studies by Mokin A.A. [3] and Lapshin S.A. [4] have demonstrated the effectiveness of breathing techniques in reducing ARI symptoms. However, comparative studies analyzing pediatric and adult responses remain limited.

This study, conducted at the Andijan Branch of the Republican Scientific Center for Emergency Medical Care, aims to evaluate and compare the outcomes of structured breathing exercises among children and adults with ARIs.

Methods

Study Design

A prospective, interventional study was conducted in the therapy department of the Andijan Branch of the Republican Scientific Center for Emergency Medical Care over 4 weeks.

Participants

A total of 80 patients diagnosed with ARIs were enrolled and categorized into two groups:

- Group 1 (Children): 40 participants aged 5–12 years;

- Group 2 (Adults): 40 participants aged 18–50 years.

Inclusion criteria:

- Clinically diagnosed ARI with oxygen saturation (SpO_2) < 95%;

- Moderate breathlessness (Borg scale ≥ 4);

- No history of chronic respiratory disease.

Exclusion criteria:

- Severe ARI requiring intensive care;

- Neurological or cardiovascular disorders.

Intervention

Participants performed the following breathing exercises under supervision twice daily for 7 days:

1. Diaphragmatic breathing (5 minutes);

2. Deep breathing with inspiratory pauses (5 minutes);

3. Strelnikova breathing method (5 minutes).

Outcome Measures

Outcomes were assessed at baseline (Day 0), Day 3, Day 7, and Day 14 (follow-up):

1. Oxygen saturation (SpO_2);

2. Peak expiratory flow (PEF);

3. Breathlessness severity via the Borg scale;

4. Symptomatic improvement (cough reduction, fatigue).

Statistical Analysis

Data were analyzed using descriptive statistics and paired t-tests, with significance set at $p < 0.05$.

Results

Baseline Characteristics

Parameter	Children (n = 40)	Adults (n = 40)
Mean age (years)	8.2 ± 2.1	34.7 ± 6.8
Baseline SpO_2 (%)	93.5 ± 1.3	92.8 ± 1.5
Baseline PEF (L/min)	175.2 ± 14.6	320.5 ± 17.6
Borg scale (baseline)	6.5 ± 0.8	7.1 ± 0.7

Outcomes

Outcome Measure	Group Day 0	Day 3	Day 7	Follow-up	(Day 14)
SpO_2 (%)	Children	93.5 ± 1.3	95.8 ± 1.0	97.5 ± 1.0	97.2 ± 1.1
	Adults	92.8 ± 1.5	94.5 ± 1.2	96.0 ± 1.3	95.7 ± 1.2
PEF (L/min)	Children	175.2 ± 14.6	195.4 ± 13.8	215.4 ± 15.8	210.5 ± 14.6
	Adults	320.5 ± 17.6	340.2 ± 16.4	365.8 ± 18.3	360.0 ± 17.1
Borg Scale	Children	6.5 ± 0.8	3.2 ± 0.6	1.5 ± 0.4	1.8 ± 0.5
	Adults	7.1 ± 0.7	4.0 ± 0.5	2.5 ± 0.5	2.8 ± 0.6

Discussion

The findings of this study demonstrate that breathing exercises significantly improve respiratory outcomes in patients with ARIs. Consistent with prior studies by Mokin A.A. [3] and Lapshin S.A. [4], structured breathing techniques enhance oxygenation, peak expiratory flow, and alleviate breathlessness.

Children exhibited a more rapid and pronounced improvement compared to adults, likely due to their greater respiratory system adaptability and absence of age-related pulmonary changes. This aligns with Sidorenko I.V.'s observations on pediatric respiratory plasticity [5]. Adults showed slower but steady progress, influenced by reduced lung compliance and muscle function.

The Strelnikova method and deep breathing exercises played a crucial role in improving oxygenation by facilitating alveolar recruitment and optimizing ventilation. These exercises can be integrated into standard ARI rehabilitation protocols for better clinical outcomes.

Conclusion

Breathing exercises are a safe, effective, and non-pharmacological intervention for ARIs in both children and adults. Pediatric patients demonstrated faster recovery in oxygen saturation, peak expiratory flow, and breathlessness reduction, reinforcing the need for

age-specific rehabilitation strategies. This study supports the incorporation of breathing exercises into ARI management protocols, particularly in pediatric therapy departments.

Further studies are needed to evaluate the long-term effects of breathing exercises and their combination with other physiotherapy interventions.

References

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