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Effect of Diaphragmatic Breathing Exercises on Pelvic Floor Muscle Function in Women with Stress Urinary Incontinence

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Abstract

Stress urinary incontinence (SUI) is a prevalent condition among women characterized by involuntary leakage of urine during activities that increase intra-abdominal pressure such as coughing, sneezing, or exercise. The coordination between the diaphragm and pelvic floor muscles plays a vital role in maintaining continence. This study aimed to evaluate the effect of diaphragmatic breathing exercises on pelvic floor muscle strength, urinary leakage frequency, and quality of life in women with SUI.

An experimental pre-test and post-test design was conducted on 30 female participants aged 25–45 years diagnosed with stress urinary incontinence. Participants underwent a 6-week intervention program including diaphragmatic breathing, thoracic expansion exercises, and relaxation breathing. Outcome measures included pelvic floor muscle strength (Modified Oxford Scale), urinary leakage frequency, and quality of life scores. Statistical analysis was performed using paired t-test.

Results demonstrated significant improvement in pelvic floor muscle strength (1.8 ± 0.5 to 3.3 ± 0.6), reduction in urinary leakage frequency (10.2 ± 2.1 to 4.8 ± 1.5 episodes/week), and improvement in quality of life (66.5 ± 5.2 to 42.3 ± 4.8) with $p < 0.001$. The study concludes that diaphragmatic breathing exercises are effective, non-invasive, and economical interventions for managing stress urinary incontinence.

Keywords: Stress urinary incontinence, diaphragmatic breathing, pelvic floor muscles, physiotherapy, quality of life

1. Introduction

Stress urinary incontinence (SUI) is one of the most common urogynecological conditions affecting women worldwide. It is defined as the involuntary leakage of urine during physical exertion, coughing,

sneezing, or activities that increase intra-abdominal pressure. The condition significantly affects physical, psychological, and social well-being, leading to decreased quality of life.

The pelvic floor muscles (PFM) play a crucial role in maintaining continence by providing support to pelvic organs and controlling urethral closure. Weakness or dysfunction of these muscles can result in urinary leakage. Traditionally, pelvic floor muscle training (PFMT) has been the cornerstone of physiotherapy management for SUI.

Recent research highlights the functional relationship between the diaphragm and pelvic floor muscles. Both structures work synergistically to regulate intra-abdominal pressure. During inhalation, the diaphragm contracts and descends, causing the pelvic floor muscles to respond accordingly. Dysfunction in breathing patterns can disrupt this coordination, potentially affecting pelvic floor function.

Diaphragmatic breathing exercises are commonly used in cardiopulmonary physiotherapy to improve lung function and breathing efficiency. Emerging evidence suggests that these exercises may also facilitate pelvic floor activation, thereby improving muscle strength and reducing urinary symptoms.

This study aims to explore the effectiveness of diaphragmatic breathing exercises in improving pelvic floor muscle function and reducing symptoms in women with stress urinary incontinence.

2. Objectives

1. To assess pelvic floor muscle strength in women with stress urinary incontinence.
2. To evaluate the effect of diaphragmatic breathing exercises on pelvic floor muscle strength.
3. To assess changes in urinary leakage frequency.
4. To evaluate improvement in quality of life.

3. Methodology

Study Design

An experimental pre-test and post-test design was used.

Participants

A total of 30 female participants aged between 25–45 years diagnosed with stress urinary incontinence were included.

Inclusion Criteria

- Women aged 25–45 years
- Diagnosed with stress urinary incontinence
- Able to perform breathing exercises

Exclusion Criteria

- Pregnancy
- History of pelvic surgery
- Severe cardiopulmonary conditions

Intervention Protocol

Participants followed a structured 6-week physiotherapy program including: - Diaphragmatic breathing exercises - Thoracic expansion exercises - Relaxation breathing techniques

Frequency: 10–15 minutes/session, 5 days/week.

Outcome Measures

1. Pelvic Floor Muscle Strength (Modified Oxford Scale)
2. Urinary Leakage Frequency (episodes per week)
3. Quality of Life Questionnaire

4. Data Analysis

Data were analyzed using paired t-test to compare pre-test and post-test values. A p-value of <0.05 was considered statistically significant.

5. Results

The study included 30 participants who completed the 6-week intervention.

Pelvic Floor Muscle Strength

The mean pelvic floor muscle strength improved significantly from 1.8 ± 0.5 (pre-test) to 3.3 ± 0.6 (post-test) ($p < 0.001$).

Urinary Leakage Frequency

The mean urinary leakage frequency reduced from 10.2 ± 2.1 episodes/week to 4.8 ± 1.5 episodes/week ($p < 0.001$).

Quality of Life

Quality of life scores improved significantly from 66.5 ± 5.2 to 42.3 ± 4.8 ($p < 0.001$).

These findings indicate that diaphragmatic breathing exercises had a statistically significant positive effect on all outcome measures.

6. Discussion

The present study demonstrates that diaphragmatic breathing exercises significantly improve pelvic floor muscle strength and reduce urinary leakage in women with stress urinary incontinence.

The improvement in pelvic floor muscle strength may be attributed to the coordinated activity between the diaphragm and pelvic floor muscles. During diaphragmatic breathing, the descent of the diaphragm increases intra-abdominal pressure, leading to reflex activation of pelvic floor muscles. Over time, this repeated activation enhances muscle strength and endurance.

The reduction in urinary leakage frequency observed in this study is consistent with previous research emphasizing the role of pelvic floor strengthening in continence management. Improved muscle function provides better urethral support, thereby reducing leakage episodes.

Quality of life improvements observed in participants highlight the broader impact of physiotherapy interventions. Reduced symptoms lead to increased confidence, social participation, and psychological well-being.

Compared to traditional pelvic floor exercises, diaphragmatic breathing offers additional benefits such as improved respiratory efficiency, relaxation, and ease of performance. It is particularly beneficial for patients who have difficulty performing isolated pelvic floor contractions.

The study findings support the integration of diaphragmatic breathing exercises into physiotherapy protocols for managing stress urinary incontinence.

Limitations

- Small sample size
- Short duration (6 weeks)
- Lack of control group

7. Future Recommendations

- Larger randomized controlled trials
- Long-term follow-up studies
- Comparison with traditional pelvic floor training

8. Conclusion

Diaphragmatic breathing exercises are effective in improving pelvic floor muscle strength, reducing urinary leakage, and enhancing quality of life in women with stress urinary incontinence. These exercises are safe, non-invasive, and cost-effective, making them a valuable addition to physiotherapy management.

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