Research Article

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A study to evaluate the effectiveness of strelnikova breathing exercises on respiratory status among school children with lower respiratory tract infection at Paediatric ward, Government Rajaji Hospital, Madurai.

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ABSTRACT

Background: The incidence of lower respiratory tract infections (LRTIs), including conditions like pneumonia and asthma, has been increasing in India. Strelnikova breathing exercises have shown potential in enhancing respiratory function in children suffering from LRTIs. **Aim of the Study:** The purpose of this study was to assess the impact of Strelnikova breathing exercises on the respiratory health of school-aged children diagnosed with LRTIs. **Methodology:** A true experimental design with a pretest-posttest control group was used. Sixty children, aged 3 to 12 years, diagnosed with LRTIs, were randomly assigned to either the intervention group (30 children) or the control group (30 children). **Results:** Children in the intervention group exhibited a notable improvement in respiratory status, as evidenced by a reduction in moderate infections from 76.7% in the pretest to 30% in the posttest, along with a shift toward mild infections (70%). The mean PRESS score significantly decreased from 2.17 to 1.20 (p=0.000). In contrast, the control group showed only slight improvement. **Conclusion:** The study found that Strelnikova breathing exercises significantly enhanced respiratory status in children with LRTIs, indicating that this intervention is effective in managing respiratory infections in pediatric patients. Further studies are suggested to explore its long-term effects.

Keywords: Lower respiratory infections, pneumonia, sterlnikova breathings.

INTRODUCTION

Children are considered valuable assets to families and society, with their early years forming the foundation for future potential. However, they often face health challenges, with respiratory tract infections (RTIs) being among the most common and serious, especially in developing countries. Lower respiratory tract infections (LRTIs), including asthma, pneumonia, and bronchitis, are particularly prevalent in children due to their underdeveloped airways. These infections can cause symptoms such as wheezing, difficulty breathing, and fever, sometimes requiring hospital care and potentially leading to chronic respiratory issues.

While antibiotics like amoxicillin are commonly used to treat LRTIs, non-severe cases often improve with shorter courses. Parental education and breathing exercises, such as Strelnikova exercises, can help manage symptoms. These exercises, involving short, active breaths, strengthen the lungs and should be done twice daily for five days.

In addition to physical effects, LRTIs can cause psychological stress for both children and their families. Complementary and alternative medicines (CAM) are sometimes used to support treatment, offering potential benefits beyond conventional methods.

NEED FOR THE STUDY

Pneumonia and asthma are major global health concerns, with 151.8 million new pneumonia cases and 13.1 million hospitalizations annually in children under 10. In India, respiratory infections contribute significantly to infant and child mortality, with pneumonia alone causing 1.6 million deaths globally. In Madurai, LRTI cases have been rising, with misconceptions hindering effective management. Studies, like Ranjita Jena's (2020), show that Strelnikova breathing exercises improve respiratory health in children with LRTIs. This study aims to assess the effectiveness of these exercises in schoolchildren with LRTIs.

MATERIALS AND METHODS

Study Design and Participants:

This study employs a true experimental pretest-posttest control group design. The participants include school children aged 3-12 years, with 60 children selected from the pediatric ward at Government Rajaji Hospital, Madurai, divided into two groups: an intervention group (30 children) and a control group (30 children).

Inclusion Criteria:

Children aged 3-12 years, able to perform exercises and willing to participate in the study, were included.

Exclusion Criteria:

Children who were critically ill or had physical or mental challenges were excluded.

Tools:

The data collection tool comprises three sections: Section A includes socio-demographic variables (e.g., age, gender, family income), Section B covers clinical variables (e.g., birth weight, immunization history), and Section C assesses respiratory status using the Pediatric Respiratory Severity Score (PRESS).

Data Collection Procedure:

Data collection took place from 04.07.2022 to 14.08.2022. Participants were randomly assigned to the intervention or control group, with the intervention group receiving Strelnikova breathing exercises twice daily for five days. Respiratory status was assessed using the PRESS score before and after the intervention. Consent and confidentiality were ensured throughout the process.

Data Analysis:

The collected data were analyzed using descriptive statistics (frequency and percentage distribution) for socio-demographic and clinical variables, and inferential statistics, including paired 't' tests and unpaired 't' tests and chi-square tests to examine associations between respiratory status and socio-demographic/clinical variables.

RESULTS

Demographic Variables of the Participants

This table presents the socio-demographic characteristics of participants, divided into the Intervention and Control groups. Key variables include the age of the child, gender, place of domicile, family type, location of residence, pet ownership, mosquito repellent usage, play materials, transportation to school, source of drinking water, and family income. The distribution of participants across these variables is similar in both groups, with slight differences in categories like family income and place of domicile. (Table 1)

Clinical Variables of the Participants

This table provides information on the clinical variables of the participants, including the term of birth, birth weight, breastfeeding history, immunization status, nutritional status, dietary habits, family history of respiratory infections, allergies, co-morbid conditions, previous hospitalization, and smoking habits in the family. Both groups show similar distributions, with some notable differences such as the higher prevalence of regular immunization in the control group and a higher rate of normal nutritional status in the control group as well.

Level of Respiratory Infection (Table 3)

The table presents the distribution of respiratory infection levels, categorized as mild, moderate, or severe, in both the Intervention and Control groups. The intervention group shows a significant improvement in the reduction of mild respiratory infections, with a higher percentage of participants in the posttest scoring in the mild category (70%) compared to the pretest (33.3%). In contrast, the control group shows only a slight shift in the distribution, with 23.3% scoring in the mild category at the posttest, up from 20% at the pretest. **(Table 3).**

Comparison of the means score among Intervention and Control Groups

This table further summarizes the pretest and posttest mean scores, standard deviations, and the statistical significance of changes for both groups. The intervention group showed a mean score reduction from 2.17 to 1.20 (mean difference = -0.100), which was highly significant (p = 0.000). The control group, however, had a smaller mean score reduction from 2.27 to 1.80 (mean difference = -0.600), which was statistically significant (p = 0.006). **(Table 4)**

Table 1: Demographic Variables of the Participants (n = 60)

Socio-demographic variables	Intervention Group (f)	Intervention Group (%)	Control Group (f)	Control Group (%)
Age of the child				
(a) 3-6 years	16	53.3%	16	53.3%
(b) 7-12 years	14	46.7%	14	46.7%
Gender				
(a) Male	19	63.3%	15	50.0%
(b) Female	11	36.7%	15	50.0%
Place of domicile				
(a) Urban	15	50.0%	15	50.0%
(b) Sub-urban	10	33.3%	7	23.3%
(c) Rural	5	16.7%	8	26.7%
Type of family				
(a) Nuclear family	20	66.7%	20	66.7%
(b) Joint family	7	23.3%	6	20.0%
(c) Extended family	3	10.0%	4	13.3%
Location of house				
(a) Hospital	10	33.3%	7	23.3%

(b) Industries	6	20.0%	6	20.0%
(c) Market	5	16.7%	4	13.3%
(d) Others	9	30.0%	13	43.3%
Type of pet animals				
(a) Dog	6	20.0%	7	23.3%
(b) Cat	5	16.7%	1	3.3%
(c) Others	5	16.7%	8	26.7%
(d) None	14	46.7%	14	46.7%
Type of mosquito repellents used				
(a) Coil	9	30.0%	4	13.3%
(b) Liquid	8	26.7%	13	43.3%
(c) Others	7	23.3%	5	16.7%
(d) None	6	20.0%	8	26.7%
Type of play materials				
(a) Plastic	19	63.3%	14	46.7%
(b) Mud	4	13.3%	12	40.0%
(c) Others	7	23.3%	4	13.3%
Mode of transportation to school				
(a) By walk	6	20.0%	11	36.7%
(b) Two-wheeler	12	40.0%	8	26.7%
(c) Bus	6	20.0%	5	16.7%
(d) Others	6	20.0%	6	20.0%
Source of drinking water				
(a) Corporation water	15	50.0%	11	36.7%
(b) Mineral water	10	33.3%	15	50.0%
(c) Others	5	16.7%	4	13.3%
Monthly income of the family				
(a) < Rs.5000	2	6.7%	4	13.3%
(b) Rs.5001-10,000	14	46.7%	12	40.0%
(c) Rs.10,001-15,000	12	40.0%	9	30.0%
(d) Above Rs.15,000	2	6.7%	5	16.7%

Table 2: Table 2: Clinical Variables of the Participants (n = 60)

Clinical Variables	Intervention Group (f%)	Control Group (f%)
Term of baby at birth		
(a) Preterm	5 (16.7%)	5 (16.7%)
(b) Post term	3 (10%)	2 (6.7%)
(c) Full term	22 (73.3%)	23 (76.7%)
Birth weight of the child		
(a) Below 1000 gms (extreme low birth weight)	0 (0%)	0 (0%)
(b) Below 1500 gms (very low birth weight)	2 (6.7%)	4 (13.3%)
(c) Below 2500 gms (low birth weight)	8 (26.7%)	7 (23.3%)
(d) Above 2500 gms	20 (66.7%)	19 (63.3%)
History of breastfeeding practice		
(a) Yes	27 (90%)	26 (86.7%)
(b) No	3 (10%)	4 (13.3%)
Immunization status		
(a) Regularly immunized	22 (73.3%)	23 (76.7%)
(b) Irregularly immunized	8 (26.7%)	7 (23.3%)
Nutritional status of the child		
(a) Normal nutritional status	5 (16.7%)	13 (43.3%)
(b) I Degree malnutrition	15 (50%)	15 (50%)
(c) II Degree malnutrition	9 (30%)	1 (3.3%)
(d) III Degree malnutrition	1 (3.3%)	1 (3.3%)
Dietary habit		
(a) Vegetarian diet	6 (20%)	11 (36.7%)
(b) Mixed diet	24 (80%)	19 (63.3%)
Family history of respiratory infections		
(a) Grandparents	4 (13.3%)	5 (16.7%)
(b) Parents	5 (16.7%)	4 (13.3%)
(c) Other infection	7 (23.3%)	3 (10%)
(d) None	14 (46.7%)	18 (60%)
Type of allergy		
(a) Dust	7 (23.3%)	8 (26.7%)

(b) House mites	3 (10%)	3 (10%)
(c) Food	8 (26.7%)	0 (0%)
(d) No allergy	12 (40%)	19 (63.3%)
Co-morbid conditions		
(a) Viral and bacterial infections	2 (6.7%)	3 (10%)
(b) Congenital diseases	1 (3.3%)	2 (6.7%)
(c) Immune compromised children	0 (0%)	0 (0%)
(d) None	27 (90%)	25 (83.3%)
Previous history of hospitalization		
(a) Respiratory infection	12 (40%)	10 (33.3%)
(b) Others	1 (3.3%)	2 (6.7%)
(c) None	17 (56.7%)	18 (60%)
Smokers in family		
(a) Father	9 (30%)	7 (23.3%)
(b) Mother	0 (0%)	0 (0%)
(c) Others	6 (20%)	4 (13.3%)
(d) None	15 (50%)	19 (63.3%)

Table 3: Level of Respiratory Infection.

PRESS Score (Respiratory Infection)	Intervention Group (Pretest)	Intervention Group (Posttest)	Control Group (Pretest)	Control Group (Posttest)
Mild (0-1)	7 (33.3%)	21 (70%)	6 (20%)	7 (23.3%)
Moderate (2-3)	23 (76.7%)	9 (30%)	24 (80%)	23 (76.7%)
Severe (4-5)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 4: Comparison of mean score on the level of diarrhoea among children. (n = 40)

Group	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD	Mean Difference	Paired 't' Test
Intervention Group	2.17	0.791	1.20	0.610	-0.100	t = 0.861, p = 0.000 HS
Control Group	2.27	0.785	1.80	0.610	-0.600	t = 2.971,

						p = 0.006 *

DISCUSSION:

The study results showed that the intervention group experienced a significant improvement in respiratory infection levels, with a reduction in moderate infections from 76.7% at pretest to 30% at posttest, and an increase in mild infections from 0% to 70%. The mean score for the intervention group decreased significantly from 2.17 to 1.20 (p = 0.000). In contrast, the control group showed minimal improvement, with moderate infections reducing slightly from 80% to 76.7%, and the mean score decreasing from 2.27 to 1.80 (p = 0.006).

CONCLUSION:

The study concluded that the intervention significantly improved respiratory infection levels in the intervention group, with a notable reduction in moderate infections and a shift to milder cases. In contrast, the control group showed minimal improvement. The results suggest that the intervention was effective in reducing the severity of respiratory infections.

RECOMMENDATION:

It is recommended to implement the intervention more widely to reduce the severity of respiratory infections. Future studies could explore its long-term effects and applicability in different populations. Additionally, further research could focus on optimizing the intervention for even greater effectiveness.

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