A Study to Assess the Effectiveness of Bubble Therapy on Respiratory Distress among Patients in Selected Hospitals of Sangli, Miraj, and Kupwad Corporation Area

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ABSTRACT :

Background:
Respiratory distress is a major cause of morbidity and mortality worldwide. Non-invasive, cost-effective interventions like bubble therapy may help improve respiratory function.

Research Question:
Is bubble therapy effective in reducing respiratory distress among patients?

Study Design and Methods:
A quantitative quasi-experimental pre-test and post-test control group design was used. A total of 40 patients were selected using purposive sampling and divided into experimental (n=20) and control (n=20) groups. The experimental group received bubble therapy, while the control group received routine care. Data were collected using a respiratory distress scale and analyzed using descriptive and inferential statistics.

Results:
The post-test meant respiratory distress score was lower in the experimental group (6.05) compared to the control group (7.95). Statistical analysis showed a significant difference between groups ($p<0.05$), indicating effectiveness of bubble therapy.

Conclusion:
Bubble therapy significantly reduces respiratory distress among patients. It is a simple, low-cost, and effective intervention that can be incorporated into routine nursing care.

Keywords:

Bubble Therapy; Respiratory Distress; ARDS; Non-invasive Therapy; Nursing Intervention

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Introduction

Respiratory distress is a critical clinical condition affecting both adults and children, often associated with diseases such as acute respiratory distress syndrome (ARDS) and lower respiratory tract infections. It significantly contributes to global morbidity and mortality.

Bubble therapy, a form of non-invasive respiratory support, works by creating positive expiratory pressure, helping to open airways, improve oxygenation, and facilitate secretion clearance. It is simple, cost-effective, and feasible in low-resource settings.

Despite advancements in respiratory care, there is a need for accessible and effective interventions. This study aims to evaluate the effectiveness of bubble therapy in reducing respiratory distress.

MATERIALS AND METHODS

Study Design:
Quasi-experimental pre-test and post-test control group design

Setting:
Selected hospitals of Sangli, Miraj, and Kupwad Corporation area, Maharashtra, India

Population:
Patients with respiratory distress

Sample Size:
40 patients (20 experimental, 20 control)

Sampling Technique:
Purposive sampling

Inclusion Criteria:

- Patients willing to participate
- Admitted in selected hospitals
- Age above 18 years

Exclusion Criteria:

- Critically ill patients
- Patients on ventilator
- Cardiac patients

Intervention:
Bubble therapy administered for 10 minutes daily for 5 days

Data Collection Tool:
Respiratory distress scale

Validity and Reliability:

- Content validated by 16 experts
- Reliability coefficient (r = 0.91)

Data Analysis:

- Descriptive statistics (mean, SD, percentage)
- Inferential statistics (unpaired t-test)

Ethical Consideration:
Approval obtained from Institutional Ethical Committee. The information received with the consent was taken from participants.

Results :

The findings revealed:

- Mean post-test score in control group: 7.95
- Mean post-test score in experimental group: 6.05

There was a statistically significant reduction in respiratory distress in the experimental group compared to the control group ($p<0.05$).

The null hypothesis was rejected, indicating that bubble therapy is effective in reducing respiratory distress.

RESULT

The statistical data was organized into 4 section. The findings of the study are as follows.

Data was analyzed according to the objectives.

- **Section I:** Frequency and percentage distribution of demographic variables.

- **Section II:** Analysis of respiratory distress before bubble therapy among patients with respiratory distress.
- **Section III:** Analysis of respiratory distress after bubble therapy among patients with respiratory distress.
- **Section IV:** Compare between the pretest and posttest respiratory distress in experimental and control group.

Table no. 1: Frequency and percentage distribution of the socio-demographic variables.

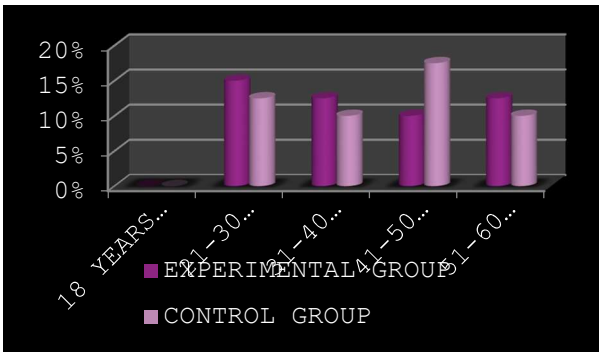
n=20+20

sr. no	demographic variables		Experimental group		Control group	
			Frequency	Percentage	Frequency	Percentage
1	Age	18 years and above	0	0%	0	0%
		21 to 30 years	6	15%	5	12.5 %
		31 to 40 years	5	12.5 %	4	10%
		41 to 50 years	4	10%	7	17.5 %
		51 to 60 years	5	12.5 %	4	10%
2	Gender	Male	11	27.5 %	12	30%
		Female	9	22.5 %	8	20%
3	Education	Illiteracy	10	25%	5	12.5 %
		Primary	6	15%	9	22.5 %
		Secondary and higher secondary	3	7.5%	2	5%
		Graduate and postgraduate	1	2.5%	4	10%
4	Clinical profile	Medical history - Asthma - COPD - ARDS - Other	5 7 6 2	12.5 % 17.5 % 15% 5%	6 8 2 4	15% 20% 5% 10%
		Duration of respiratory distress - < 3 months - 1-3 months - 3-6 months - < 6 months	13 6 1 0	32.5 % 15% 2.5% 0%	9 5 3 3	22.5 % 12.5 % 7.5% 7.5%

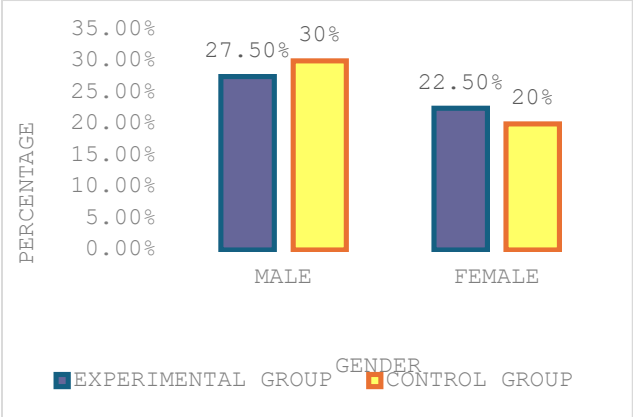
Result:

Table no.1 shows that frequency and percentage distribution of demographic variable in experimental group maximum patients were in the age group 21to 30 years that is 15% and in control group 41 to 50 years that is 17.5%. In gender 27.5% were male in experimental group and 30% male in control group. 22.5% Females in experimental group and 20% females were in control group. According to education illiterate were maximum 25%, primary having 15%, secondary and higher secondary having 7.5% and graduate and postgraduate having 2.5% and in control group primary were maximum 22.5%, illiterate having 12.5%, graduate and post graduate having 10% and secondary and higher secondary having 5%. medical history of sample with COPD were found 20% in experimental and 17.5% in control group. Asthma were 15% in control and 12.5% in experimental group. ARDS were 15% in experimental

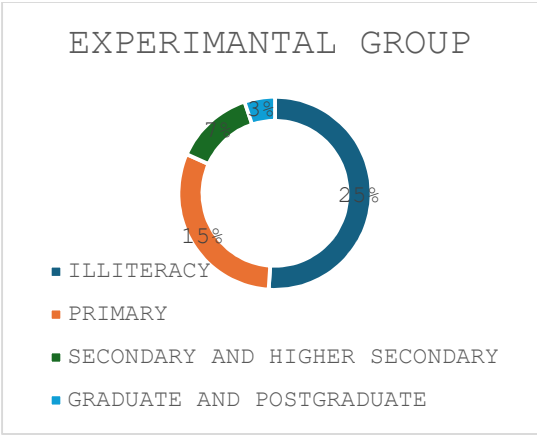
and 5% in control group. Duration of respiratory distress, 32.5% in experimental and 22.5% in control were <3 months, 15% in experimental and 12.5% in control were 1-3 months, 2.5% in experimental and 7.5% in control were 3-6 months,7.5% in control were >6 months.



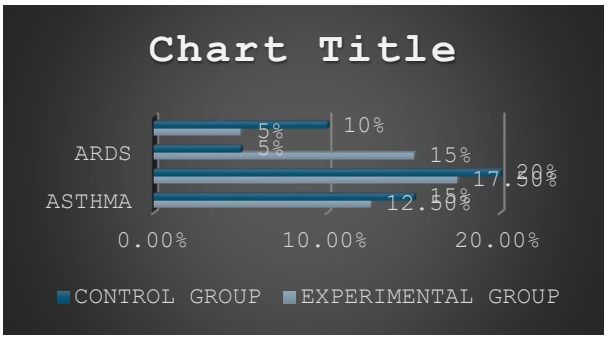
Graph no.1: Age in experimental and control group.



Graph no.2: Gender in experimental and control group.



Graph no.3: education in experimental group.



Graph no 4: Medical history in experimental and control group.

Table no.2: Frequency and percentage distribution of pre-test level of respiratory distress in experimental group and control group.

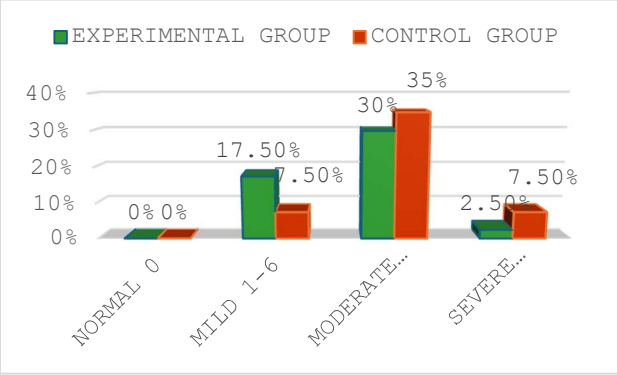
	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Normal -0	0	0%	0	0%
Mild – 1-6	7	17.5%	3	7.5%
Moderate 7-12	12	30%	14	35%
Severe 13-18	1	2.5%	3	7.5%

n=20+20

Variable	Experimental group		Control group	
	Mean	SD	Mean	SD
Heart rate per minutes	1	0.3111	0.85	0.5104
Respiratory rate per minutes	1.04	0.4523	1.24	0.6410
Restlessness non-purposeful movements	0.63	0.5242	0.91	0.3918
Paradoxical breathing pattern: abdomen moves in on inspiration	0.6	0.8360	0.82	0.7015
Accessory muscle use : rise in clavicle during inspiration	0.57	0.5667	0.93	0.4910

Grunting at end respiration : guttural sound	1.02	0.8751	0.74	0.5985
Nasal flaring : involuntary movements of	0.46	0.7021	0.66	0.6125
Look of fear	0.9	0.8194	1.12	0.6817
Spo2	1.05	0.5186	1.48	0.3805

Analysis of respiratory parameters before intervention of bubble therapy among patients with respiratory distress.



Graph no. 5: Frequency and percentage distribution of pre-test level of respiratory distress in experimental group and control group.

Result:

The above table shows that, in experimental group most of the patient30% having moderate distress,17.5% have mild distress and2.5% have severe distress and in control group, most of the patient 35% having moderate distress, 7.5% have mild distress and 7.5% have severe distress.

Above table shows that, in experimental group mean of heart rate is 1 and SD is 0.31, mean of respiratory rates per minutes is 1.04 and SD is 0.45, mean of restlessness non-purposeful movement is 0.63 and SD is 0.52, mean of paradoxical breathing pattern is 0.6 and SD is 0.83, mean of assecory muscle use is 0.57 and SD is 0.56, mean of grunting at end respiration; guttural sound is 1.02 and SD is 0.87 mean of nasal flaring is 0.46 and SD is 0.70 mean of look of fear is 0.9 and SD is 0.81 mean of spo_2 is 1.05 and SD is 0.51 and in control group mean of heart rate is 0.85 and SD is 0.51, mean of respiratory rates per minutes is 1.24 and SD is 0.64, mean of restlessness non-purposeful movement is 0.91 and SD is 0.39, mean of paradoxical breathing pattern is 0.82 and SD is 0.70, mean of assecory muscle use is 0.93 and SD is 0.49, mean of grunting at end respiration; guttural sound is 0.74 and SD is 0.59, mean of nasal flaring is 0.66 and SD is 0.61, mean of look of fear is 1.12 and SD is 0.68, mean of spo_2 is 1.48 and SD is 0.38.

Table no.3: Frequency and percentage distribution of post-test level of respiratory distress in experimental group and control group.

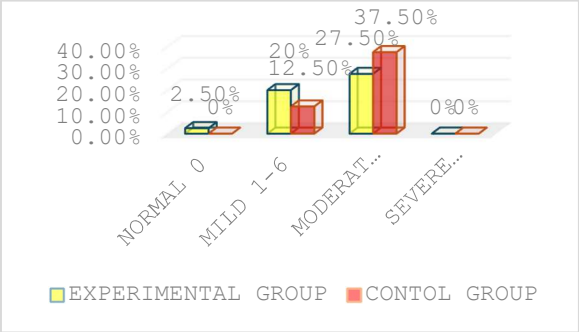
n=20+20

	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Normal -0	1	2.5%	0	0%
Mild – 1-6	8	20%	5	12.5%
Moderate 7-12	11	27.5%	15	37.5%
Severe 13-18	0	0%	0	0%

Variable	Experimental group		Control group	
	Mean	SD	Mean	SD
Heart rate per minutes	0.79	0.3007	0.81	0.5128
Respiratory rate per minutes	0.81	0.3462	0.98	0.5727
Restlessness non-purposeful movements	0.53	0.5322	0.9	0.3920
Paradoxical breathing pattern: abdomen moves in on inspiration	0.5	0.7326	0.78	0.6517
Accessory muscle use : rise in clavicle during inspiration	0.6	0.5390	0.91	0.4833
Grunting at end respiration : guttural	0.84	0.8094	0.74	0.5985

sound				
Nasal flaring : involuntary movements of	0.52	0.7237	0.66	0.6125
Look of fear	0.82	0.8256	1.08	0.6755
Spo2	0.89	0.4610	1.23	0.4014

Analysis of respiratory parameters after intervention of bubble therapy among patients with respiratory distress



Graph no. 6: Frequency and percentage distribution of post-test level of respiratory distress in experimental group and control group.

Result:

The above table shows that, in experimental group most of the patient27.5% having moderate distress,20% have mild distress and2.5% have normal and in control group, most of the patient 37.5% having moderate distress and 12.5% have mild distress.

Above table shows that, in experimental group mean of heart rate is 0.79 and SD is 0.30, mean of respiratory rates per minutes is 0.81 and SD is 0.34, mean of restlessness non-purposeful movement is 0.53 and SD is 0.53, mean of paradoxical breathing pattern is 0.5 and SD is 0.73, mean of assecory muscle use is 0.6 and SD is 0.53, mean of grunting at end respiration; guttural sound is 0.84 and SD is 0.80 mean of nasal flaring is 0.52 and SD is 0.72 mean of look of fear is 0.82 and SD is 0.82, mean of spo_2 is 0.89 and SD is 0.46 and in control group mean of heart rate is 0.81 and SD is 0.51, mean of respiratory rates per minutes is 0.98 and SD is 0.57, mean of restlessness non-purposeful movement is 0.9 and SD is 0.39, mean of paradoxical breathing pattern is 0.78 and SD is 0.65, mean of assecory muscle use is 0.91 and SD is 0.48, mean of grunting at end respiration; guttural sound is 0.74 and SD is 0.59, mean of nasal flaring is 0.66 and SD is 0.61, mean of look of fear is 1.08 and SD is 0.67, mean of spo_2 is 1.23 and SD is 0.40.

Table no.4: Comparison between post-test scores of respiratory distress on experimental group and control group.

n=20+20

Post test	mean	S.D.	unpaired t test	Table value	Conclusion
Experimental group	6.05	3.11997	2.0708	1.860	Significant
Control group	7.95	2.665076			

Variable	Experimental group		Control group		T value	P value
	Mean	SD	Mean	SD		
Heart rate per minutes	0.79	0.3007	0.81	0.5128	0.1504	0.8812
Respiratory rate per minutes	0.81	0.3462	0.98	0.5727	1.1359	0.2630
Restlessness non-purposeful movements	0.53	0.5322	0.9	0.3920	2.5032	0.0167
Paradoxical breathing pattern: abdomen moves in on inspiration	0.5	0.7326	0.78	0.6517	1.2769	0.2093
Accessory muscle use : rise in clavicle during	0.6	0.5390	0.91	0.4833	1.9149	0.0630

inspiration						
Grunting at end respiration : guttural sound	0.84	0.8094	0.74	0.5985	0.4442	0.6593
Nasal flaring : involuntary movements of	0.52	0.7237	0.66	0.6125	0.6603	0.5130
Look of fear	0.82	0.8256	1.08	0.6755	1.0899	0.2826
Spo2	0.89	0.4610	1.23	0.4014	2.4873	0.0173

Comparison of respiratory parameters after intervention of bubble therapy among patients with respiratory distress.

Graph no.7: Comparison between post-test mean and S.D. scores of experimental group and control group.

Result:

Above table shows that, according to comparison between control and experimental group, the mean is 6.05 and S.D. is 3.119 and of experimental group, in control group mean is 7.95 and SD is 2.665 the result shows that comparison between experimental and control group, calculated value is more than table value, so bubble therapy is effective on respiratory distress. Above table shows that, in experimental group mean of heart rate is 0.79 and SD is 0.30, mean of respiratory rates per minutes is 0.81 and SD is 0.34, mean of restlessness non-purposeful movement is 0.53 and SD is 0.53, mean of paradoxical breathing pattern is 0.5 and SD is 0.73, mean of assecory muscle use is 0.6 and SD is 0.53, mean of grunting at end respiration; guttural sound is 0.84 and SD is 0.80 mean of nasal flaring is 0.52 and SD is 0.72 mean of look of fear is 0.82 and SD is 0.82, mean of spo_2 is 0.89 and SD is 0.46 and in control group mean of heart rate is 0.81 and SD is 0.51, mean of respiratory rates per minutes is 0.98 and SD is 0.57, mean of restlessness non-purposeful movement is 0.9 and SD is 0.39, mean of paradoxical breathing pattern is 0.78 and SD is 0.65, mean of assecory muscle use is 0.91 and SD is 0.48, mean of grunting at end respiration; guttural sound is 0.74 and SD is 0.59, mean of nasal flaring is 0.66 and SD is 0.61, mean of look of fear is 1.08 and SD is 0.67, mean of spo_2 is 1.23 and SD is 0.40. According to statistical analysis the restlessness non-purposeful movement and spo_2 shows statistical significance on respiratory distress.

Discussion

The study findings indicate that bubble therapy significantly reduces respiratory distress. This aligns with previous studies demonstrating the effectiveness of non-invasive respiratory therapies such as balloon therapy and breathing exercises.

Bubble therapy improves airway patency, enhances oxygenation, and reduces breathing. Its simplicity and low cost make it particularly useful in resource-limited settings**.**

Conclusion

The present study was conducted to assess the effectiveness of bubble therapy on respiratory distress among patients admitted in selected hospitals of Sangli, Miraj, and Kupwad corporation area. The findings of the study clearly indicate that bubble therapy is an effective non-invasive intervention in reducing respiratory distress among patients. The comparison between pre-test and post-test scores in the experimental group demonstrated a significant reduction in respiratory distress levels after the administration of bubble therapy. In contrast, the control group showed comparatively less improvement. The statistical analysis revealed that the calculated 't' value was higher than the table value, indicating a significant difference between the experimental and control groups.

Furthermore, specific respiratory parameters such as restlessness (non-purposeful movements) and oxygen saturation (SpO_2) showed statistically significant improvement in the experimental group. This suggests that bubble therapy not only improves subjective distress levels but also contributes positively to physiological parameters. Hence, it can be concluded that bubble therapy is a simple, cost-effective, and beneficial technique that can be incorporated into routine nursing care for patients with respiratory distress. The study supports the use of bubble therapy as an adjunctive

therapeutic intervention to improve respiratory outcomes and enhance patient comfort. Future studies with larger sample sizes and in diverse clinical settings are recommended to generalize the findings and strengthen the evidence base. Bubble therapy is an effective, safe, and economical intervention for reducing respiratory distress among patients. It can be easily implemented in clinical practice and should be incorporated into routine nursing care.

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Declaration of interest

The authors declare no conflict of interest.

REFERENCES

1. Donahoe M. Acute respiratory distress syndrome: A clinical review. Pulm Circ. 2011;1(2):192–211.
2. Rawal G, Yadav S, Kumar R. Acute respiratory distress syndrome: An update and review. J Transl Int Med. 2018;6(2):74–77.
3. Mathai SS, Rajeev A, Adhikari KM. Effectiveness of bubble CPAP in respiratory distress. Indian Pediatr. 2015;52(3):207–210.
4. Faal G, Eghbal F. Continuous positive airway pressure in respiratory distress management. J Neonatal Nurs. 2016;22(5):234–239.
5. Koti J, Murki S, Gaddam P. Bubble CPAP for neonatal respiratory distress: A randomized controlled trial. J Trop Pediatr. 2010;56(4):244–249.
6. Thukral A, Sankar MJ, Chandrasekaran A. Efficacy of CPAP in respiratory distress syndrome. Cochrane Database Syst Rev. 2016;2016(2):CD002271.
7. World Health Organization. Global surveillance, prevention and control of chronic respiratory diseases: A comprehensive approach. Geneva: WHO; 2007.
8. Black RE, Cousens S, Johnson HL. Global, regional, and national causes of child mortality. Lancet. 2010;375(9730):1969–1987.
9. GBD 2015 LRI Collaborators. Estimates of the global, regional, and national morbidity and mortality of lower respiratory infections. Lancet Infect Dis. 2017;17(11):1133–1161.
10. Jobe AH, Bancalari E. Bronchopulmonary dysplasia. Am J Respir Crit Care Med. 2001;163(7):1723–1729.
11. Subramaniam P, Ho JJ, Davis PG. Prophylactic nasal CPAP for preventing morbidity and mortality in very preterm infants. Cochrane Database Syst Rev. 2016;2016(6):CD001243.
12. Kaur C, Saini SS, Singh S. Effect of balloon therapy on respiratory function. Int J Nurs Educ. 2019;11(3):45–49.
13. Polit DF, Beck CT. Nursing research: Generating and assessing evidence for nursing practice. 10th ed. Philadelphia: Wolters Kluwer; 2017.
14. Burns N, Grove SK. Understanding nursing research: Building an evidence-based practice. 6th ed. St. Louis: Elsevier; 2011.
15. Sharma SK. Nursing research and statistics. 3rd ed. New Delhi: Elsevier; 2018.
16. Park K. Preventive and social medicine. 26th ed. Jabalpur: Banarsidas Bhanot; 2021.
17. Potter PA, Perry AG. Fundamentals of nursing. 9th ed. St. Louis: Elsevier; 2017.
18. Lewis SL, Bucher L, Heitkemper MM. Medical-surgical nursing. 10th ed. St. Louis: Elsevier; 2017.
19. Brunner LS, Suddarth DS. Textbook of medical-surgical nursing. 14th ed. Philadelphia: Wolters Kluwer; 2018.