RESEARCH PAPER

Effectiveness of Respiratory Care Bundle on Dyspnea among Patients with Respiratory Problems at Selected Tertiary Care Hospitals, Belagavi

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ABSTRACT

Objectives:

1. To assess the level of dyspnea among patients with respiratory problems in study group & control group.
2. To evaluate the effectiveness of respiratory care bundles on dyspnea among patients with respiratory problems in study group.
3. To find out the association between pretest level of dyspnea scores with their socio-demographic variables.

Background:
COPD, asthma, pneumonia, and other pulmonary conditions all contribute significantly to morbidity and poor wellbeing around global. most upsetting symptoms of respiratory disorders is dyspnea, or difficulty breathing, which frequently results in reduced functional ability, anxiety, and an extended hospital stay. To enhance patient outcomes and general wellbeing, dyspnea must be effectively managed. Respiratory care bundles are straightforward, economical, and evidence-based methods that can improve lung function, encourage airway clearance, and lessen dyspnea. They include a variety of interventions like oral hygiene, deep breathing exercises, and incentive spirometry. In order evaluate impact on RCB at dyspnea in Pt's with respiratory issues admitted to particular tertiary care hospitals in Belagavi, the current research done.

Methodology:
Quasi Experimental research design with a control group approach at the beginning and end. Using a non-probability purposive sampling technique, 60 patients with respiratory issues were chosen, 30 of whom were placed Experimental Group & 30 Control Group. Baseline information was gathered consuming structured clinical and sociodemographic data sheet. The degree of dyspnea (mild, moderate, and severe) was evaluated using a standardized (mMRC) dyspnea assessment scale. While the control group received standard care, the experimental group received a respiratory care bundle that included incentive spirometry, deep breathing exercises, and oral hygiene. Dyspnea was measured in both groups before and after the test. Descriptive and inferential statistics, such as the Wilcoxon Signed Rank, got hired in it's analysis.

Results:
Most participants were between the ages of 51 and 60, with a higher percentage of females in both groups. The majority of participants had been ill for six months to a year, and the majority were married. Among the participants, chronic obstructive pulmonary disease was the most prevalent diagnosis.

Most patients in both groups had severe dyspnea at baseline. 100% of participants in the control group were classified as having severe dyspnea at the post-test, indicating a worsening condition. Following intervention, treatment team dyspnea levels significantly improved, with 66.7% improving to mild and 33.3% to moderate; none of the participants remained in the severe category.

According to the within-group comparison, the experimental group's dyspnea scores significantly decreased ($p = 0.001$), Control Group scores meaningfully improved ($p = 0.003$). Additionally, substantial variation at after-test results ($p = 0.001$) was found between the groups, demonstrating the efficacy of the respiratory care bundle. Furthermore, there was no discernible correlation between certain sociodemographic characteristics and pre-test dyspnea scores.

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Conclusion:
The study found that the respiratory care bundle is an effective, simple, and non-invasive intervention for reducing dyspnea in patients with respiratory problems. When respiratory care bundles are used in clinical settings, patient outcomes can be greatly improved, respiratory function can be improved, and recovery times can be accelerated.

Keywords: *Effectiveness, Respiratory care bundle, Dyspnea, Respiratory problems, Oral Hygiene, Deep breathing exercises, Incentive spirometry.*
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INTRODUCTION

The main causes of illness and death worldwide, respiratory diseases pose a serious threat to global health. disorders including interstitial lung disorders, pneumonia, TB, asthma, and chronic obstructive lung disease significantly decrease respiratory function and lower quality of life. The World Health Organization, or WHO, (WHO) estimates that chronic respiratory disorders kill millions of people each year and impact hundreds of millions of people worldwide.[1] The multifaceted experience of dyspnea is impacted by environmental, social, psychological, and physiological variables. It is caused by intricate relationships between cerebral circuits, emotional reactions, respiratory mechanics, and anomalies in gas exchange.[2]

Dyspnea, according to the American Thoracic Society, is a subjective feeling of discomfort during breathing that is made up of qualitatively different feelings that vary in intensity. Due to the subjective nature of dyspnea, validated instruments like the Medical Research Council's (MRC) Dyspnea Scale are necessary for an appropriate assessment. Effective dyspnea management requires both non-pharmacological and pharmaceutical approaches.[2]

Respiratory care bundles are organized collections of evidence-based interventions that are administered collectively. Initiatives for quality improvement that sought to standardize care and lessen variation in clinical practice gave rise to the idea of care bundles. Interventions including oral hygiene, Deep breathing exercises, and incentive spirometry.[3]

When it comes to the application of care bundles, one of the most researched respiratory illnesses is chronic obstructive pulmonary disease (COPD). Persistent airflow restriction, ongoing inflammation, and a gradual deterioration in lung function are the hallmarks of COPD.[4] Dyspnea can worsen quickly in acute respiratory disorders including influenza or acute flare-ups of asthma and COPD, necessitating prompt medical attention. In acute care settings, the goals of respiratory care bundles are to maintain respiratory status, avoid problems, and encourage healing.[5]

Clinical markers like saturation of oxygen concentrations, lung function examinations, hospital readmission rates, quality of life questionnaires, and dyspnea ratings are frequently used to assess the efficacy of respiratory care packages.[6] These bundles offer patients comprehensive, standardized therapy by combining several evidence-based approaches. The goal of the current study is to assess how well respiratory care bundles work to lessen dyspnea in patients with respiratory issues. Better patient outcomes, higher quality of life, and lower healthcare expenditures can result from this. In the end, implementing respiratory care bundles can help manage respiratory illnesses more effectively and deal with the rising prevalence of these problems both nationally and internationally.[7]

MATERIAL AND METHODS

A quantitative research approach with a quasi-experimental pre-test and post-test control group design was used to evaluate the effectiveness of a respiratory care bundle on dyspnea among patients with respiratory problems. The study was conducted among hospitalized patients diagnosed with respiratory conditions. A total of 60 participants were selected, with 30 each assigned to the control and experimental groups using a purposive sampling technique based on the inclusion criteria. Patients diagnosed with respiratory problems, who were conscious, communicative, willing to participate, and available during the data collection period were included in the study. Critically ill patients requiring mechanical ventilation, those with cognitive impairment, and those unwilling to participate were excluded. The respiratory care bundle administered to the experimental group included deep breathing exercises, incentive spirometry, and oral Hygiene, while the control group received routine hospital care. Data were collected using a structured socio-demographic and clinical questionnaire and the mMRC dyspnoea Scale to assess the level of dyspnea. Pre-test assessment was conducted for both groups prior to the intervention. The respiratory care bundle was then implemented for the experimental group, and post-test assessment was carried out after completion of the intervention period. Data analysis was performed using descriptive statistics such as frequency, percentage, mean, standard deviation, median, and interquartile range. Inferential statistics included the Wilcoxon Signed Rank Test for within-group comparisons, the Mann–Whitney U Test for between-group comparisons, and the Chi-square test to determine the association between dyspnea levels and selected demographic variables. A p-value of less than 0.05 was considered statistically significant. Ethical

approval was obtained from the institutional ethics committee prior to the study. Informed consent was taken from all participants, and confidentiality and anonymity of the data were strictly maintained throughout the study.

RESULTS

Table 1: Comparison of Baseline Characteristics between Control and Experimental Groups

		Total (60)		Control (30)		Experimental (30)	
		n	%	n	%	n	%
Age	*21 - 30*	0	0	0	0	0	0
	31 - 40	9	15	4	13.3	5	16.7
	41 - 50	24	40	11	36.7	13	43.3
	51 - 60	27	45	15	50	12	40
Gender	*Male*	25	41.7	11	36.7	14	46.7
	Female	35	58.3	19	63.3	16	53.3
Marital status	*Married*	40	66.6	23	76.7	17	56.7
	Unmarried	12	20	5	16.7	7	23.3
	Separated	4	6.7	1	3.3	3	10
	Widow	4	6.7	1	3.3	3	10
Religion	*Hindu*	11	18.3	7	23.3	4	13.3
	Christian	24	40	6	20	18	60.1
	Muslim	15	25	11	36.7	4	13.3
	Others	10	16.7	6	20	4	13.3
Educational status	*No formal education*	12	20.1	7	23.3	5	16.7
	Primary Education	17	28.3	7	23.3	10	33.3
	High School/ Higher Secondary	17	28.3	9	30.1	8	26.7
	Graduate	14	23.3	7	23.3	7	23.3
Occupation	*Unemployed*	15	25	6	20	9	30.1
	Self-employed	18	30	11	36.7	7	23.3
	Private employee	13	21.7	6	20	7	23.3
	Government employee	14	23.3	7	23.3	7	23.3
Family Income	*< = 5000*	11	18.3	5	16.7	6	20
	5001 - 10000	22	36.7	11	36.6	11	36.7
	10001 - 15000	14	23.3	8	26.7	6	20
	> =15001	13	21.7	6	20	7	23.3
Place residence	*Rural*	28	46.7	14	46.7	14	46.7
	Urban	32	53.3	16	53.3	16	53.3
Duration illness	*< = 6 months*	21	35	12	40	9	30
	6 months - 1 year	30	50	15	50	15	50
	> 1 year	9	15	3	10	6	20
Family history of respiratory diseases	*Yes*	17	28.3	7	23.3	10	33.3
	No	43	71.7	23	76.7	20	66.7
Are you taking Treatment for respiratory disease?	*Yes*	36	60	20	66.7	16	53.3
	No	24	40	10	33.3	14	46.7
Comorbid Illness	*HTN*	12	20	5	16.7	7	23.3
	DM	25	41.7	13	43.3	12	40
	AKD/ CKD	5	8.3	3	10	2	6.7
	Cardiac Disease	8	13.3	4	13.3	4	13.3
	Others	10	16.7	5	16.7	5	16.7
Diagnosis	*ARDS*	7	11.7	3	10	4	13.3
	Asthma	6	10	2	6.7	4	13.3
	Aspiration Pneumonia	1	1.7	1	3.3	0	0
	Asthma	2	3.3	2	6.7	0	0
	Bronchial Asthma	5	8.3	3	10	2	6.7

	COPD	18	30	10	33.2	8	26.7
	Lung Abscesses	7	11.7	3	10	4	13.3
	Lung CA	7	11.7	2	6.7	5	16.7
	Pneumonia	5	8.3	2	6.7	3	10
	Viral Pneumonia	2	3.3	2	6.7	0	0

Baseline characteristics were comparable between the control (n = 30) and experimental (n = 30) groups, indicating overall homogeneity. Most participants were aged 41–60 years, with females comprising the majority in both groups. Most were married, and educational status was similar, with primary and high school education being most common. Occupation, family income, and place of residence showed comparable distributions across groups. Most participants had been ill for 6–12 months, while a slightly higher proportion in the experimental group had illness duration exceeding one year. Family history of respiratory illness was somewhat higher in the experimental group, whereas more control participants were receiving therapy. Diabetes mellitus was the most common comorbidity, followed by hypertension and cardiovascular disease. COPD was the most frequent diagnosis in both groups, followed by ARDS, asthma, lung abscess, lung cancer, and pneumonia. Overall, the baseline characteristics were similar between groups before the intervention.

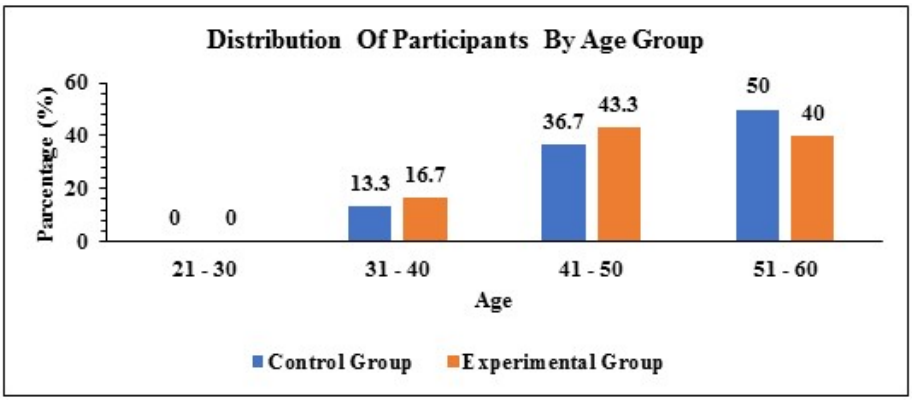


Figure No-1: Distribution of Participants by Age Group

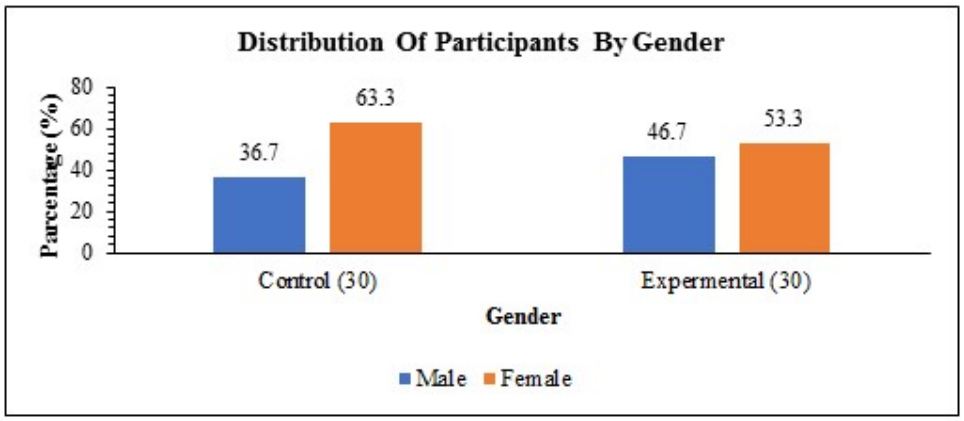


Figure No-2: Distribution of Participants By Gender

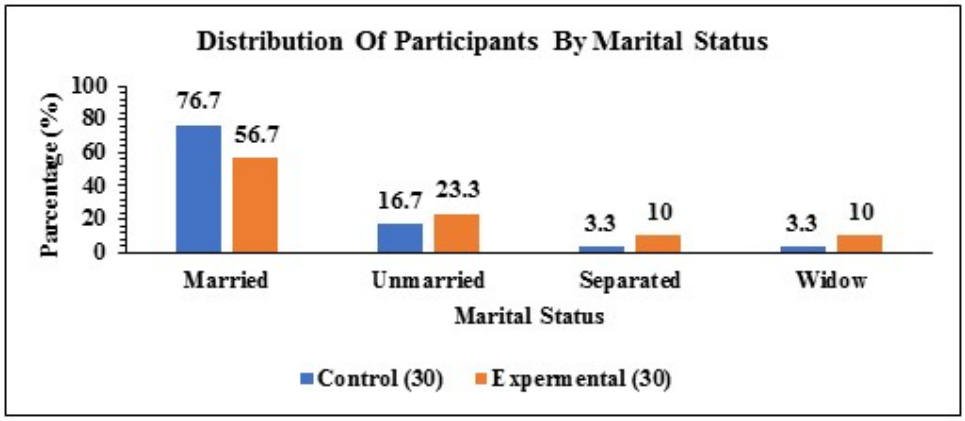


Figure No-3: Distribution of Participants by Marital Status

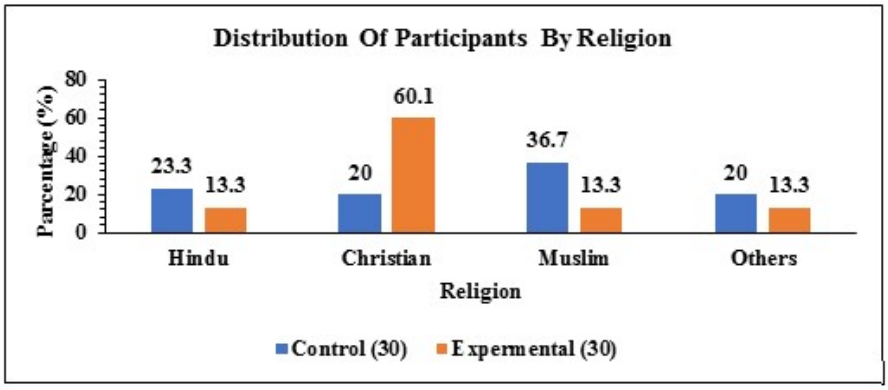


Figure No-4: Distribution of Participants by Religion

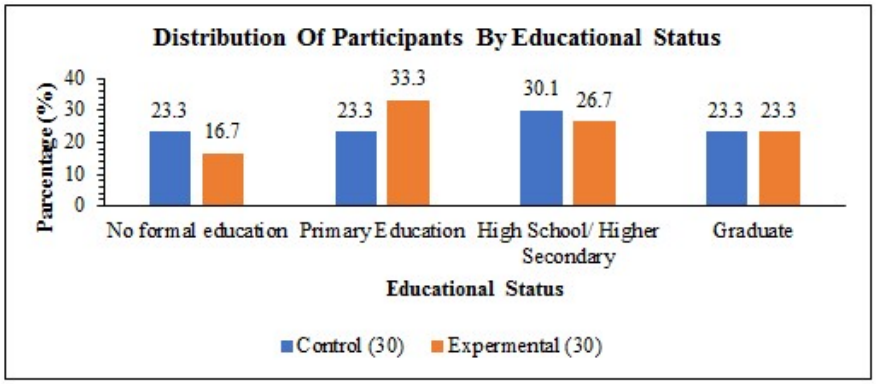


Figure No-5: Distribution of Participants by Educational Status

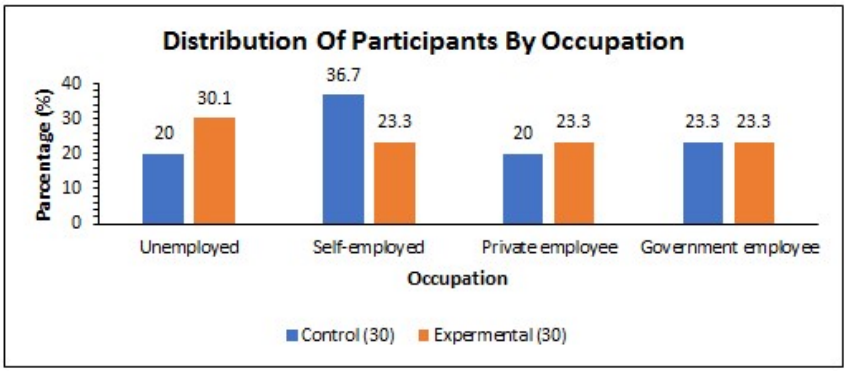


Figure No-6: Distribution of Participants by Occupation

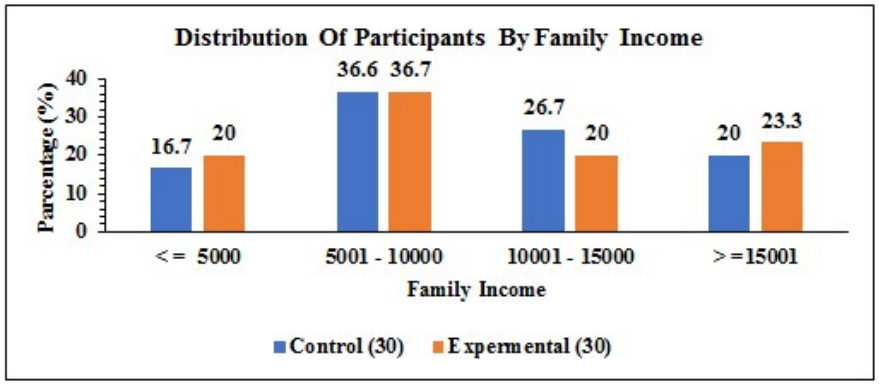


Figure No-7: Distribution of Participants by Family Income

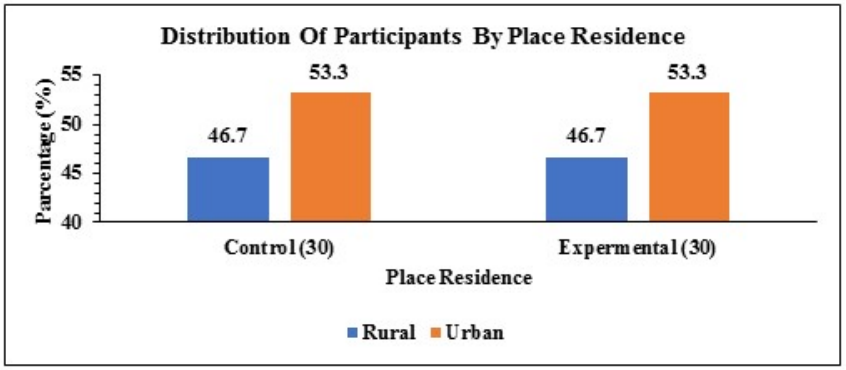


Figure No-8: Distribution of Participants by Place of Residence

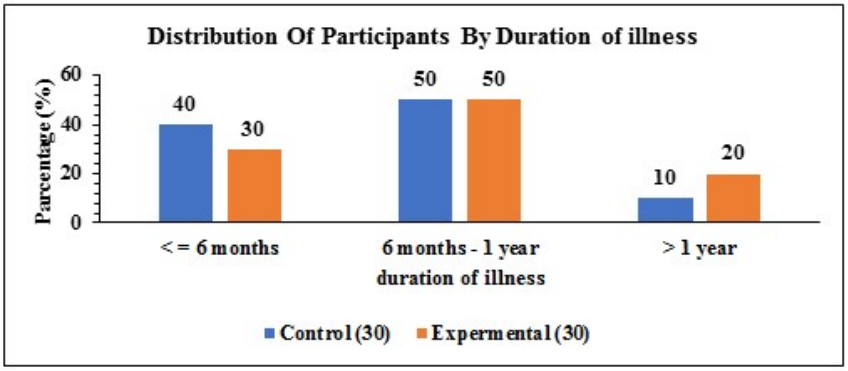


Figure No-9: Distribution of Participants by Duration Of illness

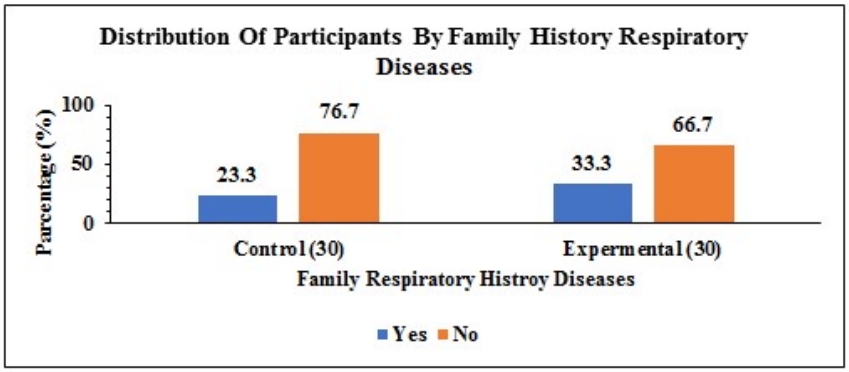


Figure No-10: Distribution of Participants by Family History of Respiratory Diseases

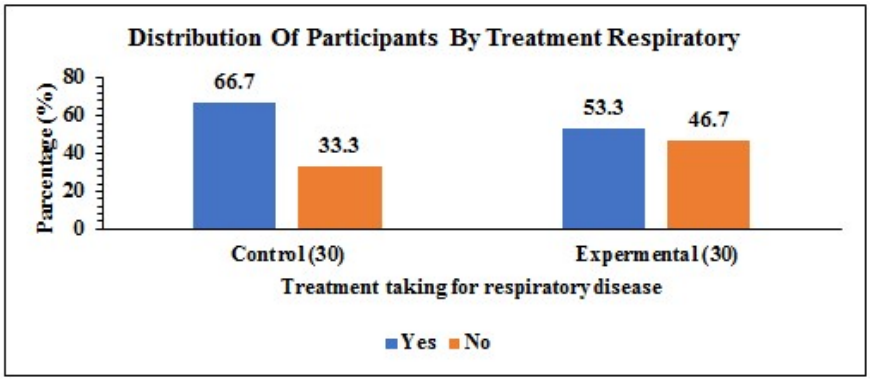


Figure No-11: Distribution of Participants by Respiratory Treatment

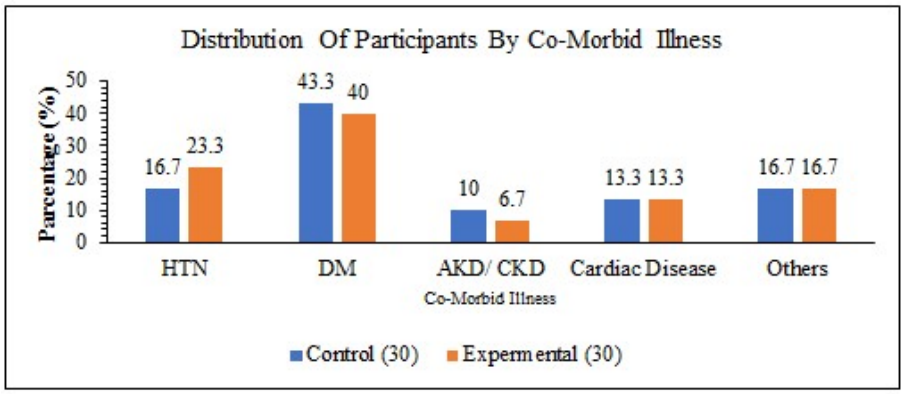


Figure No-12: Distribution of Participants by Co-Morbid Illness

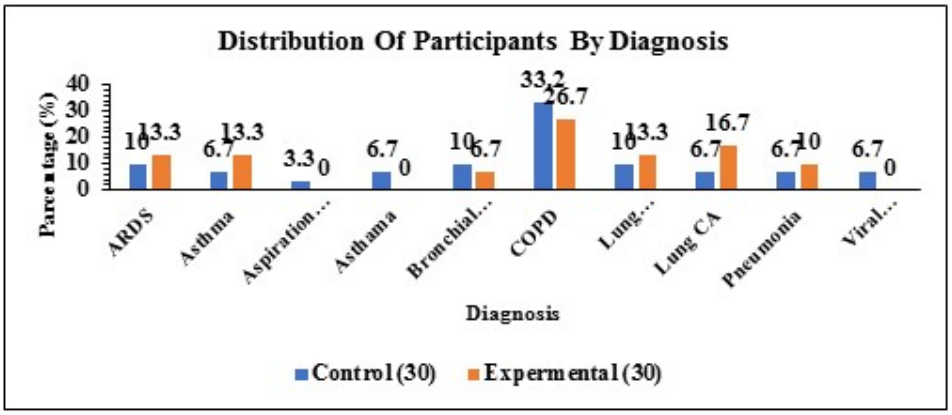
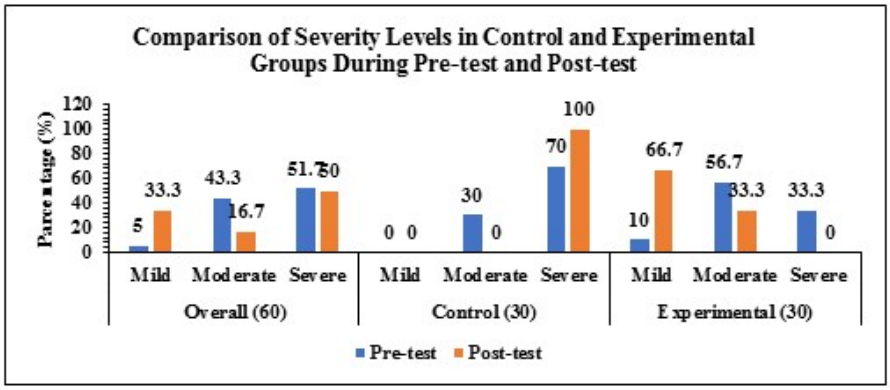


Figure No-13: Distribution of Participants by Diagnosis

Table 2: Comparison of Severity Levels in Control and Experimental Groups During Pre-test and Post-test (n = 60)

Group	Severity	Pre-test		Post-test	
		n	%	n	%
Overall (60)	*Mild*	3	5	20	33.3
	Moderate	26	43.3	10	16.7
	Severe	31	51.7	30	50
Control (30)	*Mild*	0	0	0	0
	Moderate	9	30	0	0
	Severe	21	70	30	100
Experimental (30)	*Mild*	3	10	20	66.7
	Moderate	17	56.7	10	33.3
	Severe	10	33.3	0	0



The comparison of severity levels between the control and experimental groups showed marked differences after the intervention. During the pre-test, most participants had severe (51.7%) or moderate (43.3%) symptoms. In the control group, symptom severity worsened, with all participants (100%) categorized as severe in the post-test. In contrast, the experimental group demonstrated substantial improvement: severe cases decreased from 33.3% to 0%, while mild cases increased from 10% to 66.7%, and the remaining participants (33.3%) had moderate symptoms. These findings indicate that the intervention was effective in reducing symptom severity in the experimental group compared to the control group.

Table 3: Within-Group Comparison of Pre-Test and Post-Test Scores Using Wilcoxon Signed Rank Test in Control and Experimental Groups

Group	Time	Mean	SD	Mean	IQR	Wilcoxon Signed Rank test (p value)
Control	*Pre-Test*	2.7	0.47	3	1	0.003*
	Post-Test	3	0	3	0	
Experimental	*Pre-Test*	2.23	0.63	2	1	0.001*
	Post-Test	1.33	0.48	1	1	

***Note** - p value is computed using Wilcoxon Signed Rank Test, (*) indicates statistically significant with p value < 0.05*

The Wilcoxon Signed Rank Test showed significant changes in severity scores within both groups. In the control group, the mean severity score increased from 2.7 ± 0.47 to 3.0 ± 0.0 (p = 0.003), indicating a significant worsening of symptoms. In contrast, the experimental group showed a significant reduction in severity, with mean scores decreasing from 2.23 ± 0.63 to 1.33 ± 0.48 (p = 0.001). These results suggest that the intervention was effective in reducing symptom severity in the experimental group.

Table 4: Between-Group Comparison of Pre-test and Post-test Scores Using Mann–Whitney U Test Between Control and Experimental Groups

Group	Time	Mean	SD	Mean	IQR	Mann Whitney U test (p value)
Pre-test	*Control*	2.7	0.47	3	1	0.003*
	Experimental	2.23	0.63	2	1	
Post-test	*Control*	3	0	3	0	0.001*
	Experimental	1.33	0.48	1	1	

***Note** - p value is computed using Mann Whitney U Test, (*) indicates statistically significant with p value < 0.05*

The Mann–Whitney U test showed significant differences between the groups. At pre-test, the control group had higher severity scores than the experimental group (p = 0.003). At post-test, the experimental group had significantly lower severity scores than the control group (p = 0.001), indicating the effectiveness of the intervention.

Table 5: Shift in disease severity among Experimental group

		Number	Percentage	
Group 1	**No Shift**	6	20	In the same group
	One Point Shift	21	70	Severe to Moderate (3 to 2) and Moderate to mild (2 to 1)
	Two Point	3	10	Severe to mild

	Shift			

The treatment group showed a positive shift in disease severity following the intervention. Of the 30 participants, 21 (70%) demonstrated a one-point improvement in severity, 3 (10%) showed a two-point improvement from severe to mild, and 6 (20%) experienced no change. Overall, the findings indicate a substantial reduction in disease severity after the intervention.

Table 6: Distribution of participants according to disease severity at pretest

Variables		Mild		Moderate		Severe		Chi-square value	p value
		n	%	n	%	n	%		
Age	*21 - 30*	0	0	0	0	0	0	3.069	0.546
	31 - 40	1	11.1	3	33.3	5	55.6		
	41 - 50	2	8.3	11	45.8	11	45.8		
	51 - 60	0	0	12	44.4	15	55.6		
Gender	*Male*	1	4	11	44	13	52	0.091	0.956
	Female	2	5.7	15	42.9	18	51.4		
Marital status	*Married*	2	5	15	37.5	23	57.5	2.734	0.841
	Unmarried	1	8.3	7	58.3	4	33.3		
	Separated	0	0	2	50	2	50		
	Widow	0	0	2	50	2	50		
Religion	*Hindu*	0	0	3	27.3	8	72.7	6.799	0.34
	Christian	3	12.5	10	41.7	11	45.8		
	Muslim	0	0	8	53.3	7	46.7		
	Others	0	0	5	50	5	50		
Educational status	*No formal education*	1	8.3	6	50	5	41.7	1.846	0.933
	Primary Education	1	5.9	7	41.2	9	52.9		
	High School/ Higher Secondary	0	0	7	41.2	10	58.8		
	Graduate	1	7.1	6	42.9	7	50		
Occupation	*Unemployed*	1	6.7	8	53.3	6	40	3.507	0.743
	Self-employed	0	0	7	38.9	11	61.1		
	Private employee	1	7.7	4	30.8	8	61.5		
	Government employee	1	7.1	7	50	6	42.9		
Family Income	*< = 5000*	0	0	7	63.6	4	36.4	7.553	0.273
	5001 - 10000	3	13.6	7	31.8	12	54.5		
	10001 - 15000	0	0	6	42.9	8	57.1		
	> =15001	0	0	6	46.2	7	53.8		
Place residence	*Rural*	2	7.1	9	32.1	17	60.7	2.831	0.243
	Urban	1	3.1	17	53.1	14	43.8		
Duration illness	*< = 6 months*	1	4.8	6	28.6	14	66.7	4.16	0.385
	6 months - 1 year	1	3.3	15	50	14	46.7		
	> 1 year	1	11.1	5	55.6	3	33.3		
Family history of respiratory diseases	*Yes*	2	11.8	5	29.4	10	58.8	3.467	0.177
	No	1	2.3	21	48.8	21	48.8		
Are you taking Treatment for respiratory disease?	*Yes*	1	2.8	17	47.2	18	50	1.251	0.535
	No	2	8.3	9	37.5	13	54.2		
Comorbid Illness	*HTN*	0	0	6	50	6	50	6.417	0.601
	DM	2	8	9	36	14	56		
	AKD/ CKD	1	20	1	20	3	60		
	Cardiac Disease	0	0	4	50	4	50		
	Others	0	0	6	60	4	40		
Diagnosis	*ARDS*	0	0	4	57.1	3	42.9	15.552	0.624
	Asthma	1	16.7	3	50	2	33.3		
	Aspiration Pneumonia	0	0	1	100	0	0		
	Asthma	0	0	0	0	2	100		
	Bronchial Asthma	0	0	4	80	1	20		
	COPD	1	5.6	8	44.4	9	50		
	Lung Abscesses	0	0	2	28.6	5	71.4		
	Lung CA	0	0	2	28.6	5	71.4		
	Pneumonia	1	20	2	40	2	40		
	Viral Pneumonia	0	0	0	0	2	100		

***Note** - p value is computed using Chi-square Test, (*) indicates statistically significant with p value < 0.05*

The Chi-square test showed no statistically significant association between disease severity at pre-test and any demographic or clinical variables, including age, gender, marital status, religion, education, occupation, family income, residence, duration of illness, family history, treatment status, comorbidities, and diagnosis ($p > 0.05$). These findings indicate that baseline disease severity was independent of the selected demographic and clinical characteristics.

DISCUSSION

The present study demonstrated that respiratory care bundles were effective in reducing dyspnea among patients with respiratory problems. Post-test findings showed marked improvement in the experimental group, with none remaining in the severe dyspnea category and significant reduction in dyspnea scores ($p = 0.001$). These findings are consistent with previous studies reporting the effectiveness of structured respiratory interventions in improving respiratory outcomes. However, unlike earlier studies, no significant association was observed between dyspnea severity and socio-demographic variables in the

present study. Overall, the findings support the clinical usefulness of respiratory care bundles in managing dyspnea among patients with respiratory disorders.

CONCLUSION

The present study assessed the effectiveness of a respiratory care bundle on dyspnea among patients with respiratory problems. Most participants had moderate to severe dyspnea during the pre-test. Following the intervention, the experimental group showed significant improvement in dyspnea levels, with a shift from severe to mild categories, whereas the control group showed no improvement. No significant association was found between dyspnea levels and socio-demographic variables. The findings suggest that respiratory care bundles are simple, cost-effective, and non-pharmacological interventions that can effectively reduce dyspnea and improve patient outcomes and quality of life.

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