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EFFECTIVENESS OF BUTEYKO BREATHING TECHNIQUE ON BREATHING EFFICACY AMONG CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS; AN INTERVENTIONAL STUDY

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a major respiratory disorder associated with breathlessness and impaired respiratory function. The Buteyko Breathing Technique (BBT) is a non-invasive breathing retraining method intended to improve breathing control.

Objective: To assess the effectiveness of BBT on breathing efficacy among patients with COPD.

Methods: A quantitative quasi-experimental pre-test and post-test control-group design was used among 202 patients with mild-to-moderate COPD, with 101 in the experimental group and 101 in the control group. The experimental group received BBT along with routine care for 7 days, while the control group received routine care alone. Breathing efficacy was assessed using the Modified Borg Dyspnea Scale and selected physiological parameters.

Results: Significant improvements were observed in respiratory rate, pulse rate, SpO_2 and perfusion index in the experimental group ($p<0.001$). The post-test Modified Dyspnea Scale score was lower in the experimental group than in the control group (2.50±0.74 vs 3.47±1.10; $t=7.267$, $p<0.001$).

Conclusion: BBT was effective in reducing dyspnea and improving selected physiological parameters and breathing efficacy among patients with COPD.

Introduction

"Breathing is not just survival; it is the essence of living." As per the WHO, Chronic obstructive pulmonary disease (COPD) is the third leading cause of death worldwide, causing approximately 3.4 million deaths annually and accounting for nearly 6% of all global deaths. Globally, about 213.4 million people are living with COPD. Nearly 90% of COPD-related deaths among individuals below 70 years occur in low- and middle-income countries. In India, an estimated 50–55 million people are affected by COPD, with a prevalence ranging from 5% to 10% among adults.[1]

According to the GOLD 2025 Report, COPD affects approximately 392 million people worldwide (10.3% of adults aged 30–79 years) and is responsible for about 3.5 million deaths annually, accounting for nearly 5% of all global deaths. GOLD recommends assessing COPD based on spirometry (post-bronchodilator FEV_1/FVC <0.70), symptom burden using the Modified Medical Research Council (mMRC) Dyspnea Scale or COPD Assessment Test (CAT), and the patient's history of exacerbations.[2]

The Buteyko Breathing Technique (BBT) is a scientifically developed breathing retraining method introduced by the Russian physician Dr. Konstantin Pavlovich Buteyko in the early 1950s. The technique is based on the theory that chronic hyperventilation plays an important role in the development and progression of many respiratory disorders, particularly Chronic Obstructive Pulmonary Disease (COPD).[3]

A typical Buteyko Breathing Technique session begins with one to two minutes of quiet nasal breathing to promote relaxation. This is followed by gentle nasal inspiration and slow nasal expiration. After each expiration, the patient performs a comfortable control pause and then resumes calm, shallow breathing. One complete breathing cycle usually requires 2–3 minutes; and five to six cycles are completed during one session. Each session lasts approximately 15–20 minutes, and the exercise is generally performed twice daily, providing a

total practice time of 30–40 minutes per day. In pulmonary rehabilitation programmes and research studies, including COPD interventions, the technique is commonly continued for 7–14 consecutive days or longer depending on the treatment protocol.[4]

Need for the Study

COPD is a major global health problem, causing persistent breathlessness and impaired respiratory function. Although breathing exercises may reduce dyspnea and improve respiratory outcomes, evidence specifically supporting Buteyko Breathing Technique (BBT) in COPD remains limited. Therefore, the present study was undertaken to evaluate the effectiveness of BBT on breathing efficacy among patients with COPD at GIMS Teaching Hospital, Gadag.[5]

Objectives

- To assess the level of breathing efficacy (respiratory rate, oxygen saturation, dyspnea level and perfusion index) before intervention among patients with chronic obstructive pulmonary disease.
- To evaluate the effectiveness of Buteyko Breathing Technique among patients with chronic obstructive pulmonary disease.
- To find out the association between socio-demographic variables and post-test score of the study.

Materials and Methods:

The present study was a quantitative quasi-experimental pre-test and post-test control-group design conducted among 202 COPD patients, with 101 in the experimental group and 101 in the control group. Patients aged 25–60 years, of either gender, diagnosed with mild-to-moderate COPD, willing to participate and providing written informed consent were included. Patients with severe respiratory illnesses such as pneumonia or tuberculosis, those receiving oxygen therapy, or practicing other breathing techniques were excluded.

Participants were selected using purposive sampling. The source manuscript does not specify whether a formal random or alternate allocation procedure was used to assign participants to the experimental and control groups; the authors should insert the exact allocation method used before submission.

The Modified Borg Dyspnea Scale (0–10) was used to assess breathlessness before and after 7 days of BBT. The BBT protocol consisted of 1–2 minutes of quiet nasal breathing, followed by gentle nasal inspiration and slow nasal expiration, a comfortable control pause after expiration, and calm shallow breathing. One cycle was described as requiring approximately 2–3 minutes, with 5–6 cycles per session. Each session lasted 15–20 minutes and was performed twice daily for 7 days.

Intervention fidelity was maintained by following a standardized Buteyko Breathing Technique (BBT) protocol for all participants in the experimental group. The same sequence of BBT, session duration, frequency, and technique was followed throughout the 7-day intervention period. Each session lasted 15–20 minutes and was conducted twice daily. The researcher provided the intervention according to the predetermined protocol and ensured that participants performed the technique correctly. A session checklist was used to record participation and completion of each session. Any deviation from the prescribed procedure was monitored and corrected immediately. Thus, consistency in the content, duration, frequency, and delivery of BBT was maintained for all experimental participants.

Data-collection instruments included the Modified Borg Dyspnea Scale, respiratory rate measurement, pulse rate measurement, pulse oximeter for SpO_2 and perfusion index (PI). The physiological parameters were assessed using standard clinical equipment according to the study protocol. Data were collected at pre-test before the intervention and at post-test after completion of the 7-day intervention period, using the same assessment procedure for the experimental and control groups.

Statistical analysis

Data were analyzed using descriptive and inferential statistics. Frequency and percentage were used to describe the socio-demographic characteristics. Mean and standard deviation were used to summarize breathing efficacy and physiological parameters. Paired t-test was used to compare pre-test and post-test scores within groups, while independent t-test was used to compare post-test scores between the experimental and control groups. The Chi-square test was used to determine the association between post-test breathing efficacy and selected socio-demographic variables. Statistical significance was set at $p<0.05$.

Ethical Considerations

Ethical clearance was obtained on 10/05/2025 from the Institutional Ethics Committee of GIMS Teaching Hospital (ECR/1798/Gadag/Inst/KA/2018), Written informed consent was obtained from all participants. Confidentiality and anonymity were maintained, and participants were informed about their right to withdraw from the study at any time without affecting their care.

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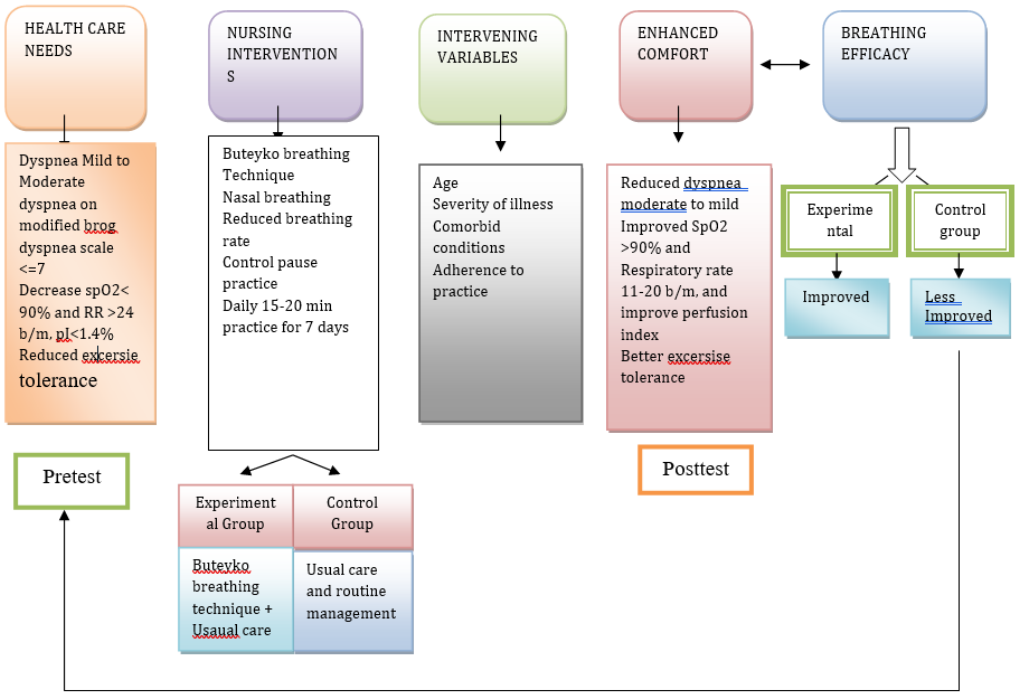
FIGURE 1: CONCEPTUAL FRAMEWORK COMFORT THEORY



"Katharine Kolcaba's Comfort Theory"

Results

Section I: Table -I Description of COPD Patients According To Their Selected Socio-Demographic Variables.

Variable	Majority category	N	%
Age	51–55 years	63	31.19
Gender	Male	131	64.85
Education	Post-matric education	79	39.11
Family monthly income	₹10,001–25,000	87	43.07
Type of house	Semi-pucca	101	50.00
Duration of COPD	1–3 years	77	38.12
Habits	Smoking	87	43.07
Occupation	Farmer	78	38.61
Cooking fuel	Firewood	72	35.64
Health information	Health worker	94	46.53
Area of living	Rural	125	61.88
Factories near home	No	121	59.90
Active smoker at home	Yes	114	56.44
Proper ventilation at home	No	138	68.32

Among 202 COPD patients, most were aged 51–55 years (31.19%) and male (64.85%). The majority had post-matric education (39.11%), family income of ₹10,001–25,000 (43.07%), and 1–3 years of illness (38.12%). Smoking (43.07%), farming (38.61%), firewood use (35.64%), rural residence (61.88%), and inadequate home ventilation (68.32%) were common characteristics. (Table-I)

Table II: Comparison of Pre-test and Post-test Physiological Parameter Scores Within Experimental and Control Groups (N=202)

Parameter	Exp. Pre Mean±SD	Exp. Post Mean±SD	Paired t	p	Control Pre Mean±SD	Control Post Mean±SD	Paired t	P
Respiratory rate	2.48±0.70	1.56±0.72	11.2	<0.05*	2.42±0.72	2.33±0.76	1.45	0.150 NS
Pulse rate	2.34±0.76	1.53±0.74	10.5	<0.05*	2.32±0.78	2.27±0.80	0.89	0.376 NS
SpO_2	2.45±0.74	1.47±0.71	12.1	<0.05*	2.44±0.75	2.38±0.77	1.12	0.265 NS
Perfusion index	2.43±0.72	1.55±0.74	10.9	<0.05*	2.43±0.74	2.38±0.76	0.98	0.329 NS

The experimental group showed significant improvement in respiratory rate (breaths/min), pulse rate (beats/min), peripheral oxygen saturation (SpO_2, %), and perfusion index (PI, %) was maintained compared with the pre-test values ($p < 0.001$), whereas the control group showed no significant change. (Table 2)

Table III :Comparison of Post-test Physiological Parameter Scores Between Experimental and Control Groups (N=202)

Parameter	Experimental Mean±SD	Control Mean±SD	Independent "t" test	p
Respiratory rate	1.56±0.72	2.33±0.76	7.4	<0.001*
Pulse rate	1.53±0.74	2.27±0.80	6.8	<0.001*
SpO_2	1.47±0.71	2.38±0.77	8.2	<0.001*
Perfusion index	1.55±0.74	2.38±0.76	7.1	<0.001*

SECTION III: Table IV ASSESSMENT OF PRE-TEST AND POST TEST LEVEL OF DYSPNEA AMONG COPD PATIENTS.

Level	Score	Experimental pre-test	Experimental post-test	Control Pre-test	Control Post-test
Mild	0–2	0 (0%)	57 (56.43%)	0 (0%)	24 (0%)
Moderate	3–7	101 (100%)	44 (43.56%)	101 (100%)	77 (100%)
Total		101 (100%)	101 (99.99%)	101 (100%)	101 (100%)

At pre-test, all participants had moderate dyspnea. After the intervention, 56.43% of the experimental group improved to mild dyspnea, whereas 76.24% of the control group remained at moderate dyspnea.

Table V:Paired t-test Comparison of Pre-test and Post-test Modified Borg Dyspnea Scale Scores (N=202)

Group	Pre-test Mean±SD	Post-test Mean±SD	Mean difference	t-value	p-value
Experimental (n=101)	4.990±0.714	2.504±0.743	2.486	34.894	<0.05*
Control (n=101)	5.504±0.502	3.465±1.100	2.039	22.386	<0.05*

The experimental group showed a greater reduction in dyspnea (mean difference = 2.486) compared with the control group (mean difference = 2.039). (Table V)

Table VI: Independent t-test Comparison of Post-test Modified Borg Dyspnea Scale Scores Between Experimental and Control Groups (N=202)

Group	Mean	SD	Mean difference	t-value	p-value	Inference
Experimental (n=101)	2.504	0.743	0.961	7.267*	<0.05	Highly significant
Control (n=101)	3.465	1.100				

The post-test Modified Dyspnea Scale score was lower in the experimental group (2.50±0.74) than in the control group (3.47±1.10), with a mean difference of 0.961 and t=7.267.(Table VI)

TableVII: Association Between Post-test Breathing Efficacy and Selected Socio-Demographic Variables (N=202)

Sl No	Socio Demographic Variable	Experimental Group (N=101)				Control Group (N=101)			
		X^2	Df	Table value	P value	X^2	df	Table value	P value
1	Age	7.815	3	2.032^{NS}	0.050^{NS}	7.815	3	4.326 ^{NS}	0.050^{NS}
2	Gender	3.841	1	2.620^{NS}	0.050^{NS}	3.841	1	2.087^{NS}	0.050^{NS}
3	Education	7.815	3	4.099^{NS}	0.050^{NS}	7.815	3	1.981^{NS}	0.050^{NS}
4	Family monthly income in Rupees	7.815	3	5.032^{NS}	0.050^{NS}	7.815	3	0.815^{NS}	0.050^{NS}
5	Type of house	5.991	2	0.459^{NS}	0.050^{NS}	5.991	2	0.657 ^{NS}	0.050^{NS}
6	Duration of illness	7.815	3	13.783*	0.003*	7.815	3	5.369 ^{NS}	0.050^{NS}
7	Habits	7.815	3	13.189*	0.004*	7.815	3	0.4512^{NS}	0.050^{NS}
8	Current occupation	7.815	3	5.713^{NS}	0.050^{NS}	7.815	3	5.388 ^{NS}	0.050^{NS}
9	Types of fuel used for cooking	7.815	3	2.016^{NS}	0.050^{NS}	7.815	3	1.886 ^{NS}	0.050^{NS}
10	Source of health information	7.815	3	5.942^{NS}	0.050^{NS}	7.815	3	**31.540 ***	**0.001***
11	Adequate ventilation	3.814	1	0.0482^{NS}	0.050^{NS}	3.814	1	1.782 ^{NS}	0.050^{NS}
12	Domestic animal in or near your home	3.814	1	2.312^{NS}	0.050^{NS}	3.814	1	1.438^{NS}	0.050 ^{NS}
12	Area living by	3.814	1	2.312^{NS}	0.050^{NS}	3.814	1	3.262 ^{NS}	0.050 ^{NS}
13	Any factories nearby home	5.991	2	9.306*	0.010*	5.991	2	**8.822 ***	**0.012 ***
14	Any active smoker in the home	3.814	1	0.480^{NS}	0.480^{NS}	3.814	1	**9.521 ***	**0.002***
15	Do you have proper ventilation at home	3.814	1	0.113^{NS}	0.113^{NS}	3.814	1	0.479 ^{NS}	0.479 ^{NS}

Significant at p<0.05 level

Note :- NS= Not significant , *=Statistically significant, df = Degree of freedom, X^2 = Chai square value.

Chi-square analysis showed significant associations at $p < 0.05$. In the experimental group: duration of illness (χ^2 = 13.783), habits (13.189), and factories near home (9.306). In the control group: duration of illness (13.783), health information source (31.540), factories near home (8.822), and active smoker at home (9.521).

Discussion

Principal Findings

The present study demonstrated that Buteyko Breathing Technique (BBT) improved breathing efficacy among patients with COPD. The experimental group showed

significant improvement in respiratory rate, pulse rate, SpO_2, and perfusion index ($p<0.001$). A significant reduction in dyspnea was also observed, with a greater reduction in Modified Borg Dyspnea Scale scores in the experimental group.

Comparison with Previous Literature

The findings support previous evidence that breathing exercises can improve respiratory function and reduce dyspnea among patients with COPD. The present study further indicates that BBT may be a useful complementary breathing intervention when provided along with routine medical care.

Implications for Nursing Practice

BBT can be incorporated into routine nursing care for patients with COPD as a simple, non-invasive and cost-effective complementary intervention. Nurses can educate and supervise patients in performing BBT and monitor respiratory rate, SpO_2, pulse rate and dyspnea before and after the intervention. The study findings support its use to promote breathing efficacy and respiratory comfort.

Implications for hospital implementation

Hospitals can include BBT in COPD nursing-care protocols and patient education programmes. Training nurses to demonstrate and supervise the technique may facilitate its consistent use along with routine medical management.

Strengths

The strengths of the study include a quasi-experimental design, adequate sample size of 202 participants were selected on purposive sampling technique, every day samples were assigned to group alternatively inexperimental (101) and control groups (101), assessment of physiological parameters and dyspnea, and evaluation of BBT over a 7-day intervention period.

Limitations

The study was conducted in a GIMS teaching hospital Gadag at medicine ward by purposive sampling selected COPD patients,study intervention BBT and standard care was Implemented to experimental (101) group and control group (101) was on standard care. pretest was taken for both groups and experimental group was practicing BBT every day 2 times in divided sessions of 40 minutes for the intervention period was limited to 7 days. Further studies with larger samples, multiple settings and longer follow-up are recommended.

Conclusion

The study concluded that Buteyko Breathing Technique was effective in improving breathing efficacy among patients with COPD. Significant improvements were observed in respiratory rate, pulse rate, SpO_2 and perfusion index, along with a significant reduction in dyspnea. The findings support BBT as a simple, non-invasive and cost-effective complementary nursing intervention that can be incorporated into COPD care.

Declarations

Funding: This study did not receive any institutional, commercial, or external financial support.

Conflicts of interest: The authors declare no conflicts of interest.

Ethical approval: Ethical approval was obtained from the Institutional Ethics Committee at Gadag institute of medical sciences Gadag IEC prior to the study. Written informed consent was obtained from all participants, and confidentiality and the right to withdraw from the study were ensured.

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Abbreviations

BBT: Buteyko Breathing Technique; COPD: Chronic Obstructive Pulmonary Disease; MDS: Modified Borg Dyspnea Scale; SpO_2: Peripheral oxygen saturation; RR: Respiratory rate; PI: Perfusion index; SD: Standard deviation.

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