



Research Paper

## A Study to Assess the Effectiveness of Buteyko Breathing Technique in Reducing Chest Pain Among Patients With Bronchial Asthma In Selected Hospital In Puducherry

DR.R.SRIDEVI<sup>1</sup>, K. ANUSUYA<sup>2</sup> & DR.G.MUTHAMILSELVI

<sup>1</sup>Professor in Nursing, Department of Medical Surgical Nursing, SMVNC, puducherry -605107

<sup>2</sup>B.Sc., (Nursing)-IV Year, Sri Manakula Vinayagar Nursing College, Puducherry-605107<sup>3</sup>Principal of Sri Manakula Vinayagar Nursing College, Puducherry -605107 Corresponding Author: Mrs.R.Sridevi-Mail ID: sridevir@smvnc.ac.in

### ABSTRACT:

Asthma is a disease affecting the lungs, causing repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. The main objective of the study to assess the effectiveness of Buteyko breathing technique in reducing chest pain among patients. The research approach used for this study was quantitative research approach. A pre-experimental design was adopted for this present study. By using purposive sampling technique, 30 patients with bronchial asthma were selected for the present study. The present study reveals that majority pre and post interventional level of bronchial asthma among patients. In pre-interventional level majority 16 (44.4%) of them had mild control, 11 (30.6%) of them had very severe control and 3 (8.3%) were had well control on bronchial asthma. In post-interventional level, majority 13 (36.1%) of them had mild control, 17 (47.2%) of them had well controlled bronchial asthma among patients. The study findings concluded that Buteyko breathing technique was effective in reducing chest pain among patients

**Keywords:** Bronchial asthma, Buteyko breathing technique, chest pain

### I. INTRODUCTION:

Life is dependent upon the action of breathing. Breathing is considered and believed as the most basic of all human body functions as it affects all body parts. As defined by the asthma is a disease that affects the lungs, which causes repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. It affects children in all age classes, but mostly begins in infancy. About 300 million people globally are affected by asthma, and it is likely that another 100 million will be affected by 2025. Over 80% of asthma-related deaths occur in low- and lower-middle income countries.

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms that vary over time and in intensity, together with variable expiratory airflow limitation. Asthma can affect people of any age, but often starts in childhood. Prevalence of asthma globally has estimated about 1% to 18% (300 million individuals) and in India has estimated about 2.05% to 3.5% (17-30 million individuals) of all age groups. Asthma is a rare cause of mortality, contributing to less than 1% of all deaths in most countries worldwide. The annual death rate of asthma in India is 250,000. Rates of death rise almost exponentially from midchildhood to old age, so the majority of asthma deaths occur after middle age in low- and middle-income groups.

Asthma is classified into two types, atopic and non-atopic. Atopic or Allergic asthma is most easily recognised asthma phenotype often commences in childhood and is associated with past and/or family history of allergic disease such as eczema, allergic rhinitis/food/drug allergy. NonAtopic or Non-Allergic asthma occurs in adults that is not associated with allergy.<sup>3</sup> Symptoms include wheeze, shortness of breath, chest tightness or cough and variable expiratory airflow limitation which often worse at night or in the early morning that vary over time and in intensity. The typical wheeze found in asthmatics is a continuous, polyphonic whistling sound produced in the airways' during expiration is due to obstruction of the airways on breathing out. The obstruction of the airways decreases the rate at which air can flow. This is felt as tightness in the chest and shortness of breath. The obstruction and inflammation cause coughing affecting the pulmonary function in asthmatics.<sup>3</sup> The causes of asthma are not well understood. A number of risk factors are associated with the condition, often in combination which can be genetic and/or environmental<sup>3</sup>. These variants are often triggered

by factors such as exercise, allergens/irritant exposure, change in weather, or viral respiratory infections.

Conservative treatment for bronchial asthma includes pharmacological and physical therapy. Pharmacological treatment includes Inhaled Corticosteroids (ICS) and Bronchodilators like Short-acting beta<sub>2</sub>-agonist (SABA) and Long-acting beta<sub>2</sub>-agonist (LABA)<sup>3</sup>. Pharmacological therapies have been shown to reduce symptoms, improve lung function and prevent exacerbations, with an acceptable safety profile. Physical therapy treatment for bronchial asthma is given to prevent chronic symptoms, to reduce frequent use of SABA, to maintain normal pulmonary function, to prevent exacerbations, minimize the need of emergency care, hospitalization, prevent loss of lung function and to prevent adverse effects of therapy by breathing exercises, chest percussion, postural drainage, active cycle of breathing technique and chest mobility exercises.

Breathing techniques along with pharmacological treatment showed better results in reducing asthma symptoms and improving the pulmonary function<sup>8</sup>. Several studies found out of that both breathing techniques like Buteyko breathing technique and pranayama like Nadi shuddhi were found to be effective to treat bronchial asthma.

Buteyko breathing method was named after its originator Dr. Konstantin Pavlovich Buteyko which lies on the fundamental principle of the carbon dioxide theory, a unique breathing therapy that uses breath control and breath holding exercises which are used to correct hyperventilation and low carbon dioxide level

In Buteyko's view, because CO<sub>2</sub> was so important, the body developed a set of defensive mechanisms to maintain CO<sub>2</sub>, including constriction of airways and blood vessels, and giving rise to diseases such as asthma and hypertension. According to his theory, CO<sub>2</sub> is a bronchodilator of the lung and low CO<sub>2</sub> "hypocapnia" has exacerbated multiple medical problems and developed as many as 150 symptoms and conditions. Therefore, he believed that a small rise in the CO<sub>2</sub> level has many beneficial results in the body including relaxing smooth muscle, increasing oxygenation, switching on the relaxing nervous system, and increasing the production of nitric oxide by the body. Relaxation of the bronchi and bronchioles can improve ventilation and greatly decrease airway spasms associated with asthma in the respiratory system.

Buteyko approach seeks to educate asthmatic patients to decrease airflow by teaching them the best way to hold their breath at the functional residual capacity. The key component of the Buteyko program is to minimize hyperventilation by periods of controlled reduction of breathing, known as "slow breathing" and "reduced breathing," coupled with periods of breath keeping, known as "control pauses" and "extended pauses". The use of the diaphragm for breathing is often recommended, and the use of accessory muscles for breathing is discouraged. They are sometimes accompanied in Buteyko by physical activities to increase the CO<sub>2</sub> build-up.

Advice and instruction on the effects of nasal breathing over oral breathing are also used in the Buteyko technique. The nose not only warm, filter, and humidify the inspired air, but also creates nitric oxide, which is a strong bronchodilator for asthma. In order to encourage nasal breathing, Buteyko patients are encouraged to breathe through the nose during the day and try to tap the mouth at night. The Buteyko technique also proposes lifestyle changes beyond breathing, including diet, allergy avoidance, and stress control [14]. The Buteyko method's four cardinal laws are as follows: keeping the mouth closed, keeping the back straight, breathing gently and silently, and eat only if hungry.

In asthma management, complementary and alternative medicine is enjoying a growing popularity worldwide. Buteyko Breathing exercise is a complementary or alternative therapy that healed chronic "breathing retraining technique" as a therapeutic process for asthma as well as other health conditions. It is a series of simple breathing exercises which help in controlling asthma and associated breathing disorders. At the core of the Buteyko breathing method is a list of reduced-breathing exercises that focused on nasal breathing, breath-holding and relaxation exercise.<sup>5</sup> Buteyko method contained subsequently power of controlling the breathing-related problems which bring the respiratory parameters of the body to the normal condition and helps to adopt a normal life pattern.

## **NEED FOR THE STUDY**

In Worldwide level

According to WHO, Asthma is one of the most common chronic diseases among children worldwide. Asthma affected an estimated 262 million people in 2019 and caused 461 000 deaths. Treatment and effective management of asthma saves lives.

According to systematic analysis for the Global Burden of Disease Study (2019), between 1990 and 2019, the declines were 24.05% in age-standardized asthma prevalence, 51.3% in mortality, and 42.55% in DALYs rate. However, the burden of asthma continued to rise, with an estimated 262.41 million prevalent cases globally.

Asthma caused greater DALYs in females than in males among people aged 20 years and older. At the global level, the percentages of high body-mass index, occupational asthma, and smoking contributing to DALYs due to asthma were 16.94%, 8.82%, and 9.87%, respectively. From 1990 to 2019, the incidence of asthma decreased from 601.20 per 1,00,000 to 477.92 per 1,00,000, and the mortality of asthma decreased from 8.60 per 1,00,000 to 5.96 per 1,00,000. High sociodemographic index (SDI) areas have higher age-standardised asthma incidence and low sociodemographic index areas have higher age-standardised asthma mortality.

In National level

According to the review study by Daniel et.al (2022), states that in 33 selected studies (pooled sample of 167,626 children), the estimated prevalence of asthma was 7.9% (95% confidence interval: 6.3–9.6%), I<sup>2</sup> = 99.1% (P < 0.001). The prevalence was higher among boys and in urban areas. Out of the 26 school-based studies, 13 studies used the ISAAC tool to estimate the prevalence of asthma among these groups was 6.5% (95% CI: 5.2–7.9%), 9.2% (95% CI: 5.1–14.4%), and 8.6% (95% CI: 3.3–16.0%),

In State level

In Tamilnadu, Shibi Chakravarthy et al. (2018) conducted a study on Prevalence of asthma in urban and rural children. Of the 855 children studied, the overall prevalence of breathing difficulty (including asthma) was 18% and the prevalence of 'diagnosed' asthma was 5%. Twenty-two per cent of urban and 9% of rural children 6-12 years of age reported breathing difficulty 'at any time in the past' (p < 0.01). A significantly higher proportion of 6-12-year-old urban children also reported nocturnal dry cough (28.4% v. 18.7%, p < 0.05). Urban children reported recent wheezemore often than rural children (92% v. 77%, p = 0.01).

In Puducherry, Ganesh S Kumar et al. (2016) made a study on prevalence of bronchial asthma and its associated factors among school children. Among 263 children, prevalence of ever bronchial asthma was found to be 5.3%, of which 4.2% had current episode of asthma during the last 1-year period. About 72.7% of the current asthmatics had cold or rhinitis and 54.5% each had itching or rashes and nocturnal dry cough.

Prevalence is more among the 12-13 years age group (6.5%) compared to the 14-16 years age group (3.6%). Boys (5.4%) and girls (5.2%) had comparable prevalence rates. The prevalence was significantly more among those with a family history of asthma, having smoking habits in any of the family members, and the absence of smoke outlet in the house (P < 0.05).

The investigator during clinical posting felt that many of the patient with bronchial asthma had chest pain. To improve breathing by muscle relaxation and reduce the chest pain, investigator selected the study is selected to assess the effectiveness of Buteyko breathing technique in reducing chest pain among patients with bronchial asthma in selected hospital in Puducherry.

## **STATEMENT OF THE PROBLEM**

A study to assess the effectiveness of Buteyko breathing Technique in reducing chest pain among patients with Bronchial asthma in selected hospital in Puducherry.

## **OBJECTIVES OF THE STUDY**

- To assess the pre and post interventional level of bronchial asthma among patients.
- To assess the effectiveness of Buteyko breathing technique in reducing chest pain among patients.
- To find out the association of level of bronchial asthma among patients with their selected demographic variables.

## **II. RESEARCH METHODOLOGY:**

### **RESEARCH APPROACH:**

A quantitative research approach was adopted for the present study.

### **RESEARCH DESIGN:**

A pre experimental design was adopted for the present study.

### **SETTING OF THE STUDY:**

The study was conducted in RICU, ICU and MEDICAL WARD at Sri Manakula Vinayagar Medical College and Hospital.

**POPULATION:**

The study population comprised of all the patients with bronchial asthma who admitted in RICU, ICU and MEDICAL WARD at SMVMCH, Puducherry.

**SAMPLE:**

The sample of the study consists of patients with bronchial asthma who admitted in RICU, ICU and MEDICAL WARD in SMVMCH, Puducherry, who meet the inclusion criteria

**SAMPLE SIZE:**

The sample size consists of 30 patients with bronchial asthma who admitted in RICU, ICU and MEDICAL WARD at SMVMCH, Puducherry

**SAMPLE TECHNIQUE:**

A purposive sampling technique was used to select the sample for the present study.

**SAMPLE SELECTION CRITERIA:**

**Inclusion criteria:**

- Patients who admitted SMVMCH, Puducherry
- Patients who could speak Tamil / English.

**Exclusion criteria:**

- Patients who were not willing to participate in this study.
- Unconscious patient.

**DESCRIPTION OF THE TOOL SECTION A:**

Demographic variables include Age, educational status, occupation, religion, income per month, area of residence, any history of bad habits, family history of asthma, any co morbidities, any other alternative therapy, BMI, Habits of smoking.

**SECTION B:**

The asthma control questionnaires consist of 5 items to assess the bronchial asthma. 0 = not at all, 1 = hardly any of the time, 2 = a little of the time, 3 = a moderate amount of the time, 4 = a lot of the time, 5 = most of the time, 6 = all of the time

**SCORING INTERPRETATION:**

S.NO	SCORE	INTERPRETATION
1	0-10	Well controlled
2	11-20	Mildly uncontrolled
3	>21	Very severely uncontrolled

**DATA COLLECTION PROCEDURE:**

After obtaining formal permission, the researcher proceeded with data collection. Informed consent was obtained from patients with bronchial asthma with who were included in the study. The researcher used a purposive sampling technique to select 30 patients with bronchial asthma in SMVMCH, Puducherry who fulfilled the criteria. Demographic data was collected. The asthma control questionnaires consist of 5 items to assess the bronchial asthma. The investigator assured the study participants that the study information will be kept confidential.

**MAJOR FINDING**

Regarding the age groups, the majority 27 (90%) were in the age group of above 35 years, 2 (6.7%) were in the age group of 21-25 years and 1 (3.3%) were above the age group of 26-30 years. Regarding educational status, 16 (53.3%) completed primary level, 7 (23.3%) were uneducated and 5 (16.7%) were graduate. With regards to occupation, majority 14 (46.7%) were self-employed, 9 (30%) were unemployed and 2 (6.7%) and 5 (16.7%) were private employed. In the aspect of religion, the data shows majority 30 (100%) were Hindu. With regards to income majority, 23 (76.7%) belong to an income of Rs. 9000 per month and 6 belong to the income

to Rs.9001/- to Rs.15000. With regards to area of residence, the data shows that the majority 26 (86.7%) were in rural area and 4 (13.3%) were in urban area. In aspect of any history of bad habits, majority 19 (30%) had bad habits. Regarding BMI, 17 (56.7%) were underweight and 12 (40%) were in normal BMI. In the view of habits of smoking, majority 18 (60%) were non smoker and 6(20%) were occasional smoker.

### III. RESULTS AND DISCUSSION

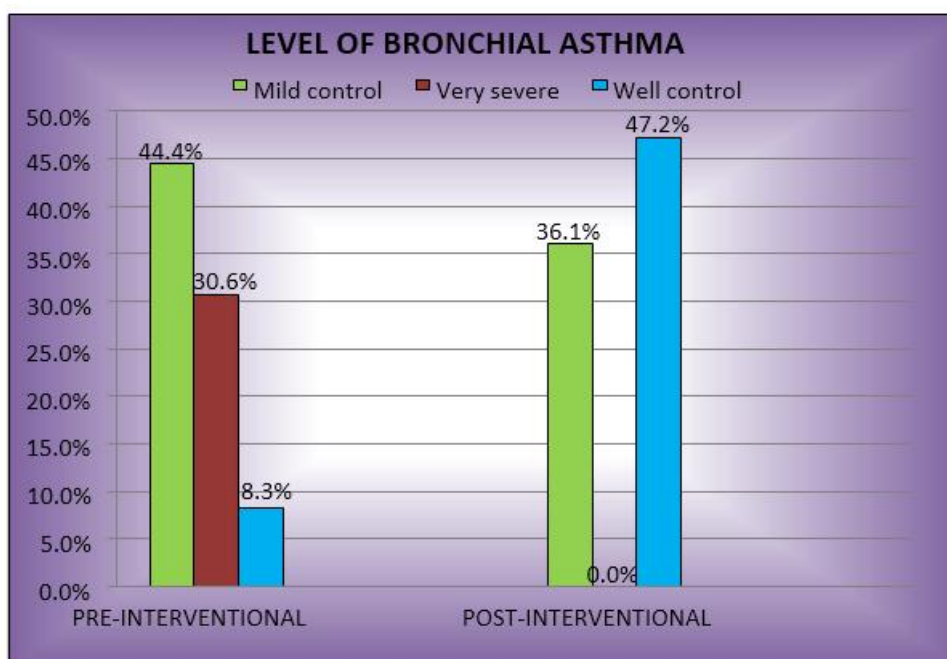
The study was conducted study to assess the effectiveness of Buteyko breathing Technique in reducing chest pain among patients with Bronchial asthma in selected hospital in Puducherry. The table 1 reveals the frequency and percentage-wise distribution of pre and post interventional level of bronchial asthma among patients. In pre-interventional level majority 16 (44.4%) of them had mild control, 11 (30.6%) of them had very severe control and 3 (8.3%) were had well control on bronchial asthma. In post-interventional level, majority 13 (36.1%) of them had mild control, 17 (47.2%) of them had well controlled bronchial asthma among patients. The table 2 shows that the pre-interventional mean score for the level of bronchial asthma was 19.40, SD 6.657 and the post- interventional mean score for bronchial asthma was 9.90, SD 2.396. The calculated ‘t’ value was 9.132, and the p-value is 0.00. Hence it is highly significant. This clearly shows Buteyko breathing technique is effective in reducing chest pain among patients with bronchial asthma. The study finding shows that there is no significance association between age, educational status, occupation, religion, income per month, area of residence, any history of bad habits, family history of asthma, any co-morbidities, any other alternative therapy, BMI, Habits of smoking.

**Table 1: Distribution of pre and post interventional level of bronchial asthma amongpatients..**

N=30

S.NO	Level of BronchialAsthma	PRE-TEST		POST-TEST	
		Frequency(n)	Percentage %	Frequency(n)	Percentage %
1.	Mild control	16	44.4%	13	36.1%
2.	Very severe control	11	30.6%	0	0%
3.	Well control	3	8.3%	17	47.2%

**Figure 1: Percentage wise distribution of the Bronchial Asthma of life among patient withbronchial asthma**



**Table 2: Effectiveness of Buteyko breathing technique in reducing chest pain among patients with bronchial asthma. N = 30**

S.NO	Level of Bronchial asthma	Mean	SD	Paired 't' value	'p' Value
1.	Pre-interventional	19.40	6.657	t = 9.132	p = 0.000* <b>(HS)</b>
2.	Post-interventional	9.90	2.396		

**Table 2: Association of pre interventional level of bronchial asthma patients with their selected demographic variables N = 30**

S.NO	Demographic variables	Level of Perception						X <sup>2</sup> value
		Mild control		Very severe control		Well control		
<b>1</b>	<b>Age in years</b>	N	%	N	%	N	%	X <sup>2</sup> = 8.843 p = 0.183(NS)
	a) 21 -25 years	1	3.3	0	0	1	3.3	
	b) 26 -30 years	1	3.3	0	0	0	0	
	c) 31 – 35 years	0	0.0	0	0	0	0	
	d) Above 35 years	10	33.3	10	33.3	1	3.3	
<b>2.</b>	<b>Education Status</b>							X <sup>2</sup> = 5.793 p = 0.760(NS)
	a) Uneducated	2	6.7	3	10.0	1	3.3	
	b) Primary level	8	26.7	4	13.3	0	0.0	
	c) Higher secondary	1	3.3	1	3.3	0	0.0	
	d) Graduate	1	3.3	2	6.7	1	3.3	
<b>3.</b>	<b>Occupation</b>							X <sup>2</sup> = 6.743 p = 0.664(NS)
	a) Government employed	1	3.3	1	3.3	0	0.0	
	b) Unemployed	5	16.7	2	6.7	1	3.3	
	c) Self employed	5	16.7	6	20.0	0	0.0	
	d) Private employed	1	3.3	1	3.3	1	3.3	
<b>4.</b>	<b>Religion</b>							<b>K</b>
	a) Hindu	12	40	10	33.3	2	6.7	
	b) Muslim	0	0	0	0	0	0	
	c) Christian	0	0	0	0	0	0	
	d) Others	0	0	0	0	0	0	
<b>5.</b>	<b>Income per month</b>							X <sup>2</sup> = 5.348 p = 0.500(NS)
	a) a) Below Rs.9000/-	10	33.3	8	8	1	3.3	
	b) b) Rs.9001/- to Rs.15000/-	2	6.7	2	2	1	3.3	
	c) c) Rs. 15000/- to Rs. 20000/-	0	0	0	0	0	0	
	d) d) Above Rs.20000/-	0	0	0	0	0	0	
<b>6.</b>	<b>Area of residence</b>							X <sup>2</sup> = 6.293 p = 0.074(NS)
	a) Rural	8	26.7	10	33.3	2	6.7	
	b) Urban	4	13.3	0	0	0	0	

<b>7.</b>	<b>Any history of bad habits</b>							X <sup>2</sup> =1.364 p = 0.714(NS)
	a) Yes (If yes,specify)	7	23.3	6	20.0	1	3.3	
	b) No	5	16.7	4	13.3	1	3.3	
<b>8.</b>	<b>Family history of asthma</b>							X <sup>2</sup> =0.2.143 p = 0.543(NS)
	a) Yes	5	16.7	2	6.7	1	3.3	
	b) No	7	23.3	8	26.7	1	3.3	
<b>9.</b>	<b>Any co- morbidities</b>							X <sup>2</sup> =6.667 p = 0.083(NS)
	a) Yes (If yes, specify.....)	8	26.7	2	6.7	1	3.3	
	b) No	4	13.3	8	26.7	1	3.3	
<b>10.</b>	<b>Any Other alternative therapy practicing for asthma</b>							X <sup>2</sup> =2.386 p = 0.496(NS)
	a) Yes (If yes, specify.....)	2	6.7	4	13.3	1	3.3	
	b) No	10	33.3	6	20	1	3.3	
<b>11</b>	<b>BMI</b>							X <sup>2</sup> =2.686 p = 0.847
	a) Normal	4	13.3	4	13.3	1	3.3	
	b) Underweight	8	26.7	5	16.7	1	3.3	(NS)
	c) Overweight	0	0	1	3.3	0	0	
<b>12</b>	<b>Habit of smoking</b>							X <sup>2</sup> =9.556 p = 0.145 (NS)
	a) Non -smoker	8	26.7	5	16.7	2	6.7	
	b) Occasional smoker	0	0	3	10	0	0	
	c) Habitual smoker	4	13.3	2	6.7	0	0	
	d) Passive smoker	0	0	0	0	0	0	

\*p<0.05 - Significant; p<0.01 - Highly Significant; K-constant

#### IV. CONCLUSION:

The present study assessed the knowledge regarding warning signs of Diabetes Mellitus among adults at selected rural area, Puducherry. The study findings concluded that there is no significance association between age, educational status, occupation, religion, income per month, area of residence, any history of bad habits, family history of asthma, any co-morbidities, any other alternative therapy, BMI, Habits of smoking with of pre interventional level of bronchial asthma patients.

#### V. RECOMMENDATIONS:

- Same study can be conducted with large samples.
- Same study can be conducted in hospital settings.

#### JOURNAL REFERENCE

- [1]. Wang, Z., Li, Y., Gao, Y. et al. Global, regional, and national burden of asthma and its attributable risk factors from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. *Respir Res* 24, 169 (2023). <https://doi.org/10.1186/s12931-023-02475-6>
- [2]. Hassan, E.E.M., Abusaad, F.E. & Mohammed, B.A. Effect of the Buteyko breathing technique on asthma severity control among school age children. *Egypt J Bronchol* 16, 45 (2022). <https://doi.org/10.1186/s43168-022-00149-3>
- [3]. Daniel, Roy Arokiam1; Aggarwal, Praveen2; Kalaivani, Mani3; Gupta, Sanjeev Kumar1., Prevalence of asthma among children in India: A systematic review and meta- analysis. *Lung India* 39(4):p 357-367, Jul–Aug 2022. | DOI: 10.4103/lungindia.lungindia\_706\_21
- [5]. Chakravarthy S, Singh RB, Swaminathan S, Venkatesan P. Prevalence of asthma in urban and rural children in Tamil Nadu. *Natl Med J India*. 2002 Sep;15(5):260-3. PMID: 12502136.
- [6]. Kumar GS, Roy G, Subitha L, Sahu SK. Prevalence of bronchial asthma and its associated factors among school children in urban Puducherry, India. *J Nat Sci Biol Med*. 2014 Jan;5(1):59-62. doi: 10.4103/0976-9668.127289. PMID: 24678199; PMCID: PMC3961954.
- [7]. Vagedes J, Helmert E, Kuderer S, Vagedes K, Wildhaber J, Andrasik F. The Buteyko breathing technique in children with asthma: a randomized controlled pilot study. *Complement Ther Med*. 2021 Jan;56:102582. doi: 10.1016/j.ctim.2020.102582. Epub 2020 Oct 23. PMID: 33197659.
- [9]. Acharya SM (2003) Asthma not a disease; Just weakness of the body; *Health Action*; Vol 16; Pg: 4 doi: 10.4103/0976-

- 9668.127289
- [10]. Ashok K (2000) The Diagnosis of Asthma; Department Chest Disease at Govt. Medical College and Hospital; Sector 32; Chandigarh, India.
- [11]. Karoro (2000) A study to investigate the effectiveness of pulmonary program for asthmapatients, www.bmn.com doi: 10.4103/0976-9668.127289
- [12]. 10.K Smith Sins (2001) Hospital Acquired Respiratory tract infection; American Journal of Nursing; Vol 101; No.1 doi: 10.4103/0976-9668.127289