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ROLE OF PRANAYAMA IN TAMAKA SHVASA (BRONCHIAL ASTHMA)

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Abstract: Bronchial asthma is one of the most common diseases which has been described elaborately as *Tamaka shvasa* in Ayurvedic literature. *Bhastrika Pranayama*, a part of Yoga is a non-pharmacological therapy for the management of *Tamaka shvasa*. *Pranayama* works in the patients of *Tamaka shvasa* by alleviating the aggravated *vata, kapha* and stimulating the digestive fire. In the present work a comparative study was conducted. The control group was subjected to standard drug therapy and trial group was subjected to *Bhastrika Pranayama* alongwith standard drug therapy. 60 patients (30 in each group) were selected for the present study. They were followed up three times at the interval of two weeks. Out of 60 patients, 25 patients in control group and 27 patients in trial group were available for the assessment at the end of the treatment. In the evaluation *Bhastrika Pranayama* shown significant additional effect with standard drug therapy for both subjective (symptoms) and objective (lung functions - FEV_1, FVC and PEFR) parameters. No side effect of *Pranayama* was seen in this study. Thus *Pranayama* is a safe and effective therapeutic procedure, so it should be considered for the routine treatment in the patients of *Tamaka shvasa* (bronchial asthma).

Keywords: Bronchial asthma, *Tamaka shvasa, Bhastrika pranayama,* Non-pharmacological therapy, Lung functions.

Introduction

Asthma is a Greek word, used in the meaning of 'panting' or 'to breath with open mouth.' WHO and NHLBI **(1995)** define asthma as "Asthma is a chronic inflammatory disorders of airways in which many cells play a role, in particular mast cells, eosinophils and T-lymphocytes. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness and cough, particularly at night and/or early in the morning. These symptoms are usually associated with widespread but variable airflow limitation, reversible either spontaneously or with treatment. The inflammation also causes an associated increase in airway responsiveness to a variety of stimuli." In India prevalence of bronchial asthma is 6% in majority of surveys.[1] The word *Tamaka* is derived from the root "*Tam-Tamyati"* which means darkness, suffocation, choke, exhaustion etc.[2] Thus *Tamaka shvasa* is a disease in which patient feels darkness or suffocation, choking or exhaustion during the respiration. *Tamaka shvasa* and bronchial asthma are much similar with respect to their etiology, pathogenesis, clinical features and prognosis. Till now, there is no potent drug for the radical cure of

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bronchial asthma hence there are continuous efforts to assess the role of alternatives through Yoga and various systems of Indian medicine in bronchial asthma.

Pranayama, a part of Yoga, is a technique to control the functioning of *pranavayu* in human body. It is an effective technique in the patients of *Tamaka shvasa*, which is a disease of *pranavahi srotasa* having disturbance of *pranavayu*.[3] For the asthmatics, *Bhastrika Pranayama* is an inexpensive non-pharmacological therapy without any side effect and the patient can do it easily at home with little training.

Aims and Objectives

Evaluation of the additional therapeutic effect of *Bhastrika Pranayama* in the patients of bronchial asthma

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Material and Methods

Study design

It was an open, prospective and randomized clinical trial. In this study a series of 60 patients of *Tamaka shvasa* (Bronchial asthma) were selected from the OPD of Tuberculosis and Respiratory Diseases, and *Svasthya Rakshana* OPD, Sir Sundarlal Hospital, Institute of Medical Sciences, B.H.U., Varanasi. These patients were divided randomly into two groups (30 patients in each) based on the type of therapy given.

Group A (Control group) -
Standard drug therapy*

Group B (Trial group) -
Bhastrika Pranayama along with standard drug therapy

*Standard drug therapy includes oral or inhaled bronchodilators, corticosteroids or other drugs according to the severity of disease.

Patients were advised for three follow-ups at the interval of 2 weeks.

Criteria of selection of patients

Inclusion criteria

- Patients of age between 20-60 years.
- Cases of episodic and chronic bronchial asthma.
- Patients fulfilling the diagnostic criteria of bronchial asthma.

Exclusion criteria

- Patients of age less then 20 years or more then 60 years.
- Patients of status asthmaticus, chronic obstructive pulmonary disease, bronchiectasis, pneumothorax, pulmonary eosinophillia, pulmonary edema, corpulmonale, pulmonary tuberculosis or any other serious lung disease.
- Substantial abnormalities in hematological, cardiovascular, renal, hepatic and metabolic functions.

Diagnostic criteria

The diagnosis of *Tamaka shvasa* (Bronchial asthma) has been made according to history, clinical features, blood investigations radiological investigations, pulmonary function test etc. Patients were properly investigated to confirm the bronchial asthma and to rule out the other diseases.

Method of Pranayama

Patients were advised to practice the *Pranayama* twice a day (morning and evening) with empty stomach. Before the practice of *Bhastrika Pranayama* they were advised to do preparatory practice of *Anuloma-Viloma* for 5 minutes, without breath retention. The *Bhastrika Pranayama* is advised for 3 rounds of 20 inspiration and expiration in a single sitting. Initially they were advised to practice the *Bhastrika Pranayama* with slow speed (1 round/min.) and then to increase the speed gradually to medium (2 rounds/min.) and fast (3 rounds/min.).

Assessment criteria

The assessment of the effect of treatment was based on both subjective (clinical features) and objective (examination, spirometry and blood examinations) parameters. It was done by intra-group comparison of BT & AT and inter-group comparison between group A and B.

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Observations and Discussion

Out of 60 registered patients 5 patients of group A and 3 patients of group B were irregular to their follow-ups so they were droped from the present study. Final assessment of results was done only in 52 patients whereas demographic details of all the 60 patients have been presented.

Table 1. Incidence of age in the patients of bronchial asthma

Age group (yrs)	No. of patients	Percentage
20-30	29	48.33
31-40	16	26.67
41-50	11	18.33
51-60	04	06.67
Total	60	100.00

Demographic Study

Incidence of age

The maximum numbers of cases (75%) were between the age group of 20-40 yrs, which indicates the early (childhood) onset of this disease **(Table 1).**

Incidence of sex

The male patients were more (66.67%) compared to female (33.33%), which may be due to the fact that males are more exposed to stress and other etiological factors **(Table 2).**

Table 2. Incidence of sex

Sex	No. of patients	Percentage
Male	40	66.67
Female	20	33.33
Total	60	100.00

Addiction

The 48.33% patients were addicted with smoking, tobacco chewing or alcoholism, while 51.67% patients were non-addicts. The habit of addiction reduces the lung functions and aggravates the disease **(Table 3).**

Table 3. Incidence of addiction in the patients

Addiction	No. of patients	Percentage
Smoking	08	13.33
Tobacco chewing	11	18.33
Smoking & tobacco chewing	04	06.67
Smoking & alcoholism	04	06.67
Smoking, tobacco chewing & alcoholism	02	03.33
No addiction	31	51.67
Total	60	100.00

History of allergy

The 63.33% patients had allergy to dust, smoke, pollens etc. indicate that allergens are most common triggering factors for the disease **(Table 4).**

Table 4. History of allergy

History	No. of patients	Percentage
Positive	38	63.33
Negative	22	36.67
Total	60	100.00

Family history

Family history of asthma or allergy was positive in 43.33% and negative in 56.67% patients. This observation shows the genetic predisposition of the disease. Higher negative history indicates the increment in new cases due to changing environmental conditions **(Table 5).**

Table 5. Family history of asthma/allergy

History	No. of patients	Percentage
Positive	26	43.33
Negative	34	56.67
Total	60	100.00

Table 6. Incidence of bronchial asthma in different Ritus (seasons)

Ritu (Season)	No. of patients	Percentage
Shishira	07	11.67
Vasanta	10	16.66
Grishma	03	05.00
Varsha	18	30.00
Sharad	15	25.00
Hemanta	07	11.67
Total	60	100.00

Seasonal variations

The incidence of bronchial asthma was observed in all seasons, but maximum patients were found in *Varsha ritu* (rainy season - 30%), *Sarad ritu* (autumn - 25%) and *Vasanta ritu* (spring - 16.66%). In rainy season *vata* it aggravated and in spring *kapha* is aggravated, these observations support the *kaphavataja* nature of disease. In *Vasanta* and *Sharad ritu,* pollens work as the triggering factors **(Table 6).**

Prakriti (physical and mental constitution)

In our study maximum patients had *Kaphavataja sharira prakriti* (65%), it signifies that *Tamaka shvasa* being a *Kaphavataja* disorder affects the people of same *Sharira prakriti*. The *Manas prakriti* of maximum patients was *Tamasika* (45%) and *Rajasika* (31.67). Which support the involvement of psychological factors in *Tamaka shvasa* **(Tables 7 and 8).**

Table 7. Incidence of Sharira Prakriti

Prakriti	No. of patients	Percentage
Vatapitta	12	20.00
Pittakapha	09	15.00
Kaphavata	39	65.00
Total	60	100.00

Table 8. Incidence of Manasa Prakriti

Prakriti	No. of patients	Percentage
Satvika	14	23.33
Rajsika	19	31.67
Tamasika	27	45.00
Total	60	100.00

Table 9. Inter-group comparison between group A & B for subjective parameters

Symptoms	Grading	Group-A		Group-B		χ^2 value (Intra-group comparison between groups A&B)		χ^2 value (Inter-group comparison between groups A&B)	
		BT	AT	BT	AT	Group-A	Group-B	BT	AT
Rhinorrhoea	0 1 2 3	05 06 13 06	09 16 0 0	05 07 11 07	24 03 0 0	$\chi^2 = 24.44$ P<0.001	$\chi^2 = 31.98$ P<0.001**	$\chi^2 = 0.32$ P>0.05	$\chi^2 = 13.46$ P<0.01 **
Cough	0 1 2 3	01 09 15 08	05 20 0 0	01 06 13 10	23 04 0 0	$\chi^2 = 29.29$ P<0.001**	χ=43.53 P<0.001**	$\chi^2 = 0.82$ P>0.05	$\chi^2 = 19.65$ P<0.01 **
Wheezing	0 1 2 3	0 03 14 13	05 20 0 0	0 05 15 10	21 06 0 0	$\chi^2 = 44.48$ P<0.001	$\chi^2 = 46.06$ $\chi^2 =$ P<0.001**	$\chi^2 = 0.93$ P>0.05	$\chi^2 = 15.01$ P<0.01 **
Tachypnoea	0 1 2 3	0 01 15 14	05 20 0 0	0 04 14 12	23 04 0 0	$\chi^2 = 51.16$ P<0.001 **	$\chi^2 = 48.98$ P<0.001**	$\chi^2 = 01.99$ P>0.05	$\chi^2 = 19.65$ P<0.01 **
Dyspnoea	0 1 2 3 4	0 03 15 14 0	05 20 0 0 0	0 1 14 12 04	09 18 0 0 0	$\chi^2 = 46.41$ P<0.001**	$\chi^2 = 50.21$ P<0.001**	$\chi^2 = 0.77$ P>0.05	$\chi^2 = 0.59$ P>0.05
Orthopnoea	0 1	11 19	20 05	09 21	25 02	$\chi^2 = 08.72$ P<0.01**	$\chi^2 = 20.60$ P<0.001**	$\chi^2 = 0.08$ P>0.05	$\chi^2 = 0.85$ P>0.05
Nocturnal dyspnoea	0 1	18 12	24 01	09 21	25 02	$\chi^2 = 07.90$ P<0.01**	$\chi^2 = 20.60$ P<0.001**	$\chi^2 = 04.31$ P<0.05 *	$\chi^2 = 04.72$ P<0.05*
Difficulty in talking	0 1	17 13	23 02	21 09	26 01	$\chi^2 = 06.89$ P<0.05**	$\chi^2 = 05.10$ P<0.05**	$\chi^2 = 0.65$ P>0.05	$\chi^2 = 04.72$ P<0.05*
Soreness of throat	0 1	24 13	23 02	21 09	26 01	$\chi^2 = 0.76$ P>0.05	05.10 P<0.05**	$\chi^2 = 0$ -	$\chi^2 = 0.60$ P>0.05
Sweating on forehead	0 1	17 13	19 06	18 12	26 01	$\chi^2 = 01.48$ P>0.05**	$\chi^2 = 08.67$ P<0.01**	$\chi^2 = 0.06$ P>0.05	$\chi^2 = 03.00$ P>0.05
Dryness of mouth	0 1	14 16	21 04	19 11	27 0	$\chi^2 = 06.68$ P<0.05**	$\chi^2 = 10.03$ P<0.01**	$\chi^2 = 01.08$ P>0.05	$\chi^2 = 02.70$ P>0.05
Tightness of chest	0 1	03 27	15 10	04 26	26 01	$\chi^2 = 13.30$ P<0.01**	$\chi^2 = 35.98$ P<0.001**	$\chi^2 = 0.16$ P>0.05	$\chi^2 = 08.19$ P<0.01**
Disease precipitation by cold and easterly wind	0 1	14 16	20 05	13 17	26 01	$\chi^2 = 05.08$ P<0.05**	$\chi^2 = 16.08$ P<0.01**	$\chi^2 = 0.07$ P>0.05	$\chi^2 = 1.97$ P>0.05
Heaviness of head	0 1	11 19	19 06	12 18	27 0	$\chi^2 = 07.00$ P<0.05**	$\chi^2 = 20.98$ P<0.001**	$\chi^2 = 0.07$ P>0.05	$\chi^2 = 05.16$ P<0.05*
Anorexia	0 1	07 23	18 07	10 20	26 01	$\chi^2 = 11.14$ P<0.01**	$\chi^2 = 21.58$ P<0.001**	$\chi^2 = 0.33$ P>0.05	$\chi^2 = 04.17$ P<0.05*
Excessive thirst	0 1	13 17	17 08	06 14	27 0	$\chi^2 = 02.43$ P<0.05**	$\chi^2 = 14.28$ P<0.01**	$\chi^2 = 0.27$ P>0.05	$\chi^2 = 07.90$ P<0.05*
Vomiting	0 1	19 11	23 02	20 10	26 01	$\chi^2 = 04.72$ P<0.05**	$\chi^2 = 06.22$ P<0.05**	$\chi^2 = 0.07$ P>0.05	$\chi^2 = 0.44$ P>0.05
Insomnia	0 1	09 21	18 09	08 22	25 02	$\chi^2 = 06.26$ P<0.05**	$\chi^2 = 22.70$ P<0.001**	$\chi^2 = 0.08$ P>0.05	$\chi^2 = 4.11$ P<0.05*

*Significant ** Highly significant

Clinical Study

Subjective parameters

From the **Table 9** it can be concluded that on intra-group comparison between BT & AT results were highly significant in both groups A & B. On Inter-group comparison between groups A & B there was no significant difference before treatment in the presence of symptoms in both groups A & B, except in the symptom of nocturnal dyspnoea, this signifies that both groups are identical. The effect of treatment in group B compared to group A was

Table 10. Inter-group comparison between group A & B for objective parameters

Variables	Group-A		Group-B		Intra-group comparison between BT & AT (Paired t test)		t - value on difference of BT and AT (Unpaired t test)
	BT(n=30) Mean±SD	AT(n=25) Mean±SD	BT(n=30) Mean±SD	AT(n=27) Mean±SD	Group-A Mean±SD	Group-B Mean±SD	
Pulse	81.63 ±8.35	76.79 ±5.39	83.17± 8.43	74.70 ±3.68	05.88±6.19 t=4.75 (P<0.001) *	08.37±6.34 t=6.86 (P<0.001) *	t = 1.43 P>0.05
Systolic BP	128.40 ±8.41	123.68 ±7.25	128.93 ±11.53	123.48 ±9.96	4.56±3.63 t=6.28 P<0.001) *	5.48±3.17 t=8.99 (P<0.001) *	t = 0.98 P>0.05
Diastolic BP	81.67 ±5.07	78.56 ±4.53	83.47 ±5.22	79.55 ±3.93	8.12±2.52 t=6.19 (P<0.001) *	3.92±2.96 t=6.89 (P<0.001) *	t = 1.05 P>0.05
R.R.	25.87 ±3.68	22.08 ±2.12	25.73 ±2.60	19.71 ±1.31	3.88±2.24 t=8.65 (P<0.001)*	6.44±2.10 t=15.94 (P<0.001) *	t = 4.26 P<0.001*
FEV_1	1.07 0.30	1.70 ±0.30	0.98 ±0.23	1.65 ±0.29	0.41±0.12 t=16.73 (P<0.001)*	0.68±0.09 t=37.22 (P<0.001) *	t = 8.83 P<0.001*
FVC	2.13 ±0.49	2.73 ±0.46	1.84 ±0.27	3.04 ±0.36	0.66±0.26 t=12.48 (P<0.001)*	1.21±0.16 t=40.67 (P<0.001) *	t = 9.30 P<0.001*
PEFR	139.67 ±36.15	179.68 ±54.10	129.00 ±23.98	207.78 ±30.68	45.28±38.80 t=5.83 (P<0.001) *	79.26±11.07 t=37.21 (P<0.001) *	t = 4.37 P<0.001*
TLC	7240.00 ±790.29	6968.00 ±614.22	7016.67 ±876.55	6596.30 ±652.5	244.00 ±409.35 t= 2.98 (P<0.01) *	355.56±440.57 t= 4.19 (P<0.001) *	t = 0.94 P>0.05
E%	9.47 ±3.39	6.32 ±1.95	8.80 3.44	4.56 ±1.85	3.08 ±2.04 t= 7.55 (P<0.001) *	4.22±2.45 t= 4.94 (P<0.001) *	t = 1.81 P>0.05
AEC	652.67 ±210.78	440.00 ±124.60	603.33 ±251.37	302.59 ±116.24	202.80 ±142.52 t= 7.11 (P<0.001)*	291.48±195.38 t= 7.75 (P<0.001)*	t = 1.86 P>0.05
ESR	7.63 ±3.23	5.60 ±1.91	8.97 ±4.08	5.74 ±1.81	1.68 ±1.99 t= 4.21 (P<0.001)*	3.00±3.03 t= 5.05 (P<0.001)	t = 1.82 P>0.05

*Highly significant

found significantly better for nocturnal dyspnoea, difficulty in talking, heaviness of head, anorexia, excessive thirst, insomnia. Highly significant results were observed for rhinorrhoea, cough, wheezing, tachypnoea and tightness of chest. Thus, overall effect of treatment on symptoms is better in group B as compared to group A.

Table 10 contains intra-group comparison (between BT and AT), the effect of therapy was significant with respect to pulse rate, blood pressure and respiratory rate. These values were significantly reduced in both groups. In the patients of bronchial asthma, usually the pulse rate, BP and respiratory rate remains high to overcome the effect of impaired lung function. As the lung function improved by therapeutic intervention these values become normal. On inter-group comparison between group A and B, effect was significantly better in group B with respect to respiratory rate. This is due to additional improvement in lung functions by *Bhastrika Pranayama.*

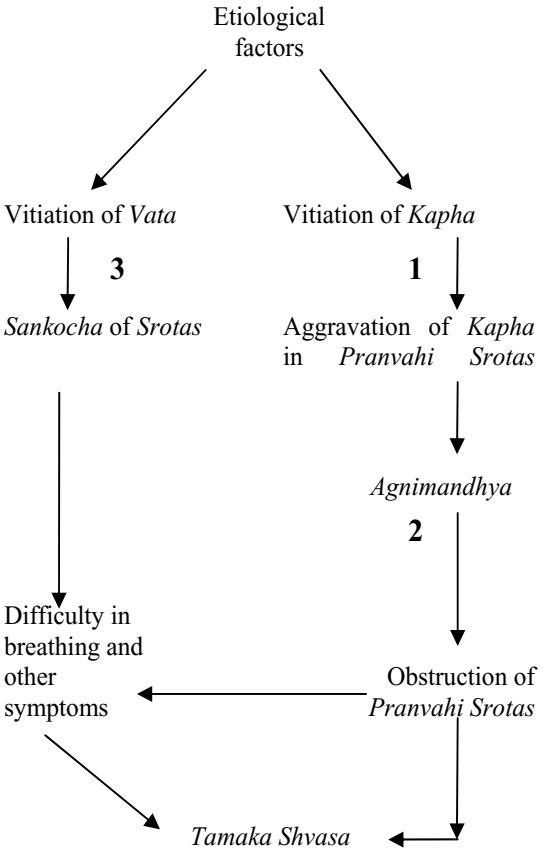

Figure 1. Showing Ayurvedic concept of etiopathogenises of *Tamaka shvasa*

On intra-group comparison (between BT and AT), the effect of therapy was significant with respect to FEV_1 , FVC and PEFR, these values were increased significantly in both groups. On inter-group comparison between group A and B, the effect was significantly better in group B compared to group A for above values. These observations indicate the additional effect of *Bhastrika Pranayama* to improve the lung function.

On Intra-group comparison (between BT and AT), the effect of therapy was significant with respect to TLC. This value reduced significantly after therapeutic intervention in both groups A and B. TLC increases in bronchial asthma due to inflammation and infections, as the inflammation is reduced with therapy, TLC becomes normal. On inter-group comparison between groups A and B, the effect of therapy was same in both groups. It signifies that there is no additional effect of *Bhastrika Pranayama* to reduce this value.

On intra-group comparison between BT and AT the effect of therapy was significant with respect to ESR. There was significant reduction in ESR in both groups. In bronchial asthma ESR value remains high due to chronicity of this disease. On inter-group comparison between group A and B the effect of therapy was same in both groups. This signifies *Bhastrika Pranayama* has no additional effect to reduce the ESR value **(Table 10).**

During the evaluation of therapeutic response it was seen that drug requirement was reduced in both the groups but due to

diversity of disease it was not possible to compare both the groups.

Mode of action of Bhastrika Pranayama

Bhastrika Pranayama breaks the pathogenesis of *Tamaka shvasa* at three different steps :

1. It stimulates the digestive fire (*Analasya pradipanam* - H. Y. P. 2/19), so that it prevents the *agnimandhya*.[4]
2. It pacifies the aggravated *kapha dosha* (*Kaphadhyargala nashanam* - H. Y. P. 2/66) and thus cleanses the obstruction of *pranavahi srotas*.[4]
3. *Pranayama* as the controller of *pranvayu*, alleviates the vitiated *vata dosha* and removes the *sankocha* of *srotas*.

In the pathogenesis of bronchial asthma main events are broncho-hyper-responsiveness (BHR), secretion of inflammatory mediators, mucosal edema and microvascular leakage. The first two events can be compared with disturbance of *vata dosha* and other two with *kapha dosha*. Thus *Pranayama* controls whole pathogenesis of bronchial asthma.

By the practice of *Pranayama*, forced vital capacity (FVC), peak expiratory flow rate (PEFR) and forced expiratory volume in one second (FEV_1) are increased, which indicate the improved lung function. The probable reason for it may be -

1. *Pranayama* stimulates the sympathetic nervous supply of respiratory system resulting in relaxation of constricted airways, which improves the PEFR and FEV_1.
2. It optimizes the ventilation perfusion ratio (V_A/Q) which is disturbed in bronchial asthma and thus increases the vital capacity of patients.
3. Practice of *Pranayama* balances the mental forces, which is beneficial for the functional defects (psychological origin) in asthmatics.

Conclusion

- *Tamaka Shvasa* is a complex disease of *Pranavahi Srotas* which is similar to bronchial asthma with respect to their etiology, pathogenesis, clinical features and prognosis.
- *Bhastrika Pranayama* has a definite additive effect with the standard drug therapy in the treatment of bronchial asthma on both subjective and objective parameters.
- *Bhastrika Pranayama* acts in bronchial asthma by alleviating *Vata* and *Kapha Dosha*, stimulating the digestive fire and improving the lung functions.
- *Bhastrika Pranayama* is a non-pharmacological therapy with definite efficacy and safety, cost of therapy is nil and patient can practice this at home easily with a little training, so it should be incorporated in the routine treatment of bronchial asthma.

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