

Critical appraisal of *pipasa* in chronic obstructive pulmonary disease

Research Article

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Abstract

The *Srotas* are well defined concept explained by *Acharya Sushruta* and *Charak*; *Udakvaha Srotas* is one of them. Its root source (*Moolsthan*) is *Talu & Kloma*. The root source *Talu* of *Udakvaha Srotas* is well known and understood as palate everywhere but still there is ambiguity about *Kloma*. The thirst (*Pipasa*) is prime symptom of interruption in *Udakvaha Srotas* similarly thirst is also found in chronic obstructive pulmonary disease (COPD) cases, therefore it would be possible to study the role of lungs in maintenance of water in the body. So, this was primary effort to study the structure *Kloma* in the body with the help of observational study i.e. by observing *Pipasa* in cases of COPD considering the lung as a controversial structure *Kloma*. Secondary objectives of the study were literature search about *Kloma*, study of *Viddha Lakshana* and correlation of *Kloma* with present well-known structure. So to explain the anatomical area of *Kloma* and specify *Kloma* with body organ was the prime plan to start this review.

Key Words: *Kloma*, Lungs, *Moolsthana*, *Pipasa*, *Udakvaha srotas*.

Introduction

Sushruta has rightly said that the proficient learner must clear all his doubt through learning theoretical and practical aspects of *Rachana Sharir* and proceed for the treatment of patient so the study of *Sharir* is inevitable (1).

The *Srotas* prime concepts described by ancient *Acharya* are well defined by *Acharya Sushruta* in *Dhamanivyakaran* Chapter of *Sharirsthana* while *Acharya Charak* has given separate fifth chapter *Srotovimana* in *Vimanasthana*. *Srotas* are the channels in our body for the transportation of materials (*Bhava-padarth*) from one place to another (2).

Among *Srotas*, *Udakvaha Srotas* is said to be prime *Srotas* in the body as per *Sushruta* and *Charak*. Its root source (*Moolsthan*) is *Talu & Kloma* (3). The role of *Udakvaha Srotas* is to maintain body fluids. When it is interrupted by any internal or external trauma it leads to either *Pipasa* or death (4).

The root source *Talu* of *Udakvaha Srotas* is well known and understood as palate everywhere but still there is ambiguity about *Kloma*. Different opinions are found in Ayurvedic texts regarding the *Kloma*. Some

organs which are considered in context of *Kloma* are *Pittashaya*, *Agniyashaya*, *Kanthanadi* and *Phupphusa* (5).

Pipasa is the prime symptom in vitiation of *Udakvaha Srotas*. A chronic obstructive pulmonary disease is a group of diseases where obstruction to the normal path of air takes place for longer duration and results in damage of its constituent unit alveoli. This is a type of internal trauma to the vital organ Lungs. The COPD is a condition where thirst is one of associate symptom found (6).

As thirst (*Pipasa*) is associate symptom of interruption in *Udakvaha Srotas* similarly thirst is also found in COPD cases, therefore it would be possible to study the role of lungs in maintenance of water in the body. So, by observing *Pipasa* in cases of COPD it would be possible to draw some conclusions about most controversial organ *Kloma*. The need of hour is to explore hidden facts related to *Kloma* in appropriate manners.

Aim

Study the relation between *Kloma* and *Pipasa* in cases of COPD.

Material and Methods

An observational study done on 30 pre-diagnosed patients of COPD to observe the *Viddha Lakshana Pipasa* of *Udakvaha Srotas* in cases of COPD in total duration of 2 years from Respiratory Department of AVBRH after getting approval from Institutional Ethics Committee for the study.

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Inclusion criteria

The pre-diagnosed cases of COPD irrespective of their Sex, religion and socio-economic status of age group between 35 to 60 years

Exclusion criteria

From pre diagnosed cases of COPD the patient of acute and chronic respiratory failure, emphysema,

acute and chronic pulmonary insufficiency following thoracic surgery, cardio respiratory failure and patient of fibrosis and carcinoma of lungs and patient having HIV/HBSAG with autoimmune disease were excluded.

Objective Parameters of assessment of COPD

- 1.PFT (Pulmonary Functional Test)
- 2.X-ray Chest P/A views

Table 1: Golden stages of COPD

Gold stage	Symptoms	Fev1 (%predicted)	*fev1/fvc (%)
I: Mild	Chronic cough or sputum may be present	>80	<0.7
II: Moderate	Dyspnea on exertion develops, some patients may develops have a frequent exacerbation	50-80	<0.7
III: Severe	Severe exertional dyspnea, fatigue and repeated exacerbations	30-50	<0.7
IV: Very Severe	Dyspnea worsen, potentially life-threatening exacerbations	<30	<0.7

Subjective Parameters

Criteria of assessment of Pipasa

The pre diagnosed patients of COPD were asked about *pipasa lakshan* according *Udakvaha Srotas dushti lakshans* explained in *Charak, Susruta* and other relevant text book of *Ayurveda*. The Patients were asked about whether *Mukha Shosha* is present or absent (whether patient is feeling dryness of mouth or not), *Jivha Soshha* is present or absent (whether patient is feeling dryness of tongue or not), whether *Talu Soshha* is present or absent (whether patient is feeling dryness of palate or not), whether *Kantha Shosha* is present or absent (whether patient is feeling dryness of throat or not). According to all above said symptoms *Pipasa lakshans* were recognized in COPD patient and *Shosha* assessment of organs is done in according to the symptoms.

Table No.2: Shosha present in organ

S.No	Shosha in organ	Absent /Present
1	Mukh	Absent/Present
2	Jivha	Absent/Present
3	Talu	Absent/Present
4	Kantha	Absent/Present
5	All organ	Absent/Present

Pipasa Gradation

- Grade 1: *Shosha* in *Mukh* organ
- Grade 2: *Shosha* in *Jivha* organ
- Grade 3: *Shosha* in *Talu* organ
- Grade 4: *Shosha* in *Kantha* organ
- Grade 5: *Shosha* in all organ

Statistical analysis

The observation was analyzed critically and scientifically by Statistical test and also with suitable Statistical analysis. As mentioned in methodology, obtained data through

Observational study was Statistically analyzed by searching for the association with *Vidhha Lakshan Pipasa* in pre-diagnosed COPD patient. Statistical

analysis was done by using descriptive statistics only and software used in the analysis was SPSS 22.0 version to draw the results.

Observations and results

In the study, 30 patients of pre diagnosed COPD males and females were evaluated on various parameters *Shosha* in *Mukha, Jivha, Talu, Kantha* along with its gradation. As per the observation the data was statistically analyzed to draw the result.

Table 3: Age wise distribution of patients

Age Group(yrs)	No of patients	Percentage
36-40 yrs	2	6.67
41-45 yrs	7	23.33
46-50 yrs	8	26.67
51-55 yrs	4	13.33
56-60 yrs	9	30
Total	30	100
Mean±SD	50.63±6.94 (37-60 years)	

As per inclusion criteria, patients were selected in the age group between 35 to 60 years and distributed into five groups. The 30 patients included pre diagnosed COPD male and female. In the age group of 36-40 years, 2 patients [6.67%] were enrolled. In the age group of 41-45 years, 7 patients [23.33%] were enrolled. In the age group of 46-50 years, 8 patients [26.67%] were enrolled. In the age group of 51-55 years, 4 patients [13.33%] were enrolled. In the age group of 56-60 years, 9 patients [30%] were enrolled.

Table 4: Gender wise distribution of patients

Gender	No of patients	Percentage
Male	15	50
Female	15	50
Total	30	100

All the 30 patients were selected randomly in which gender wise distribution of male and female were done. According random data 15 male patients (50%) and 15 female patients (50%) were enrolled for the study.

Table 5: Distribution of patients according to occupation

Occupation	No of patients	Percentage
Farmer	10	33.33
Housewife	15	50
Labor	1	3.33
Shopkeeper	4	13.33
Total	30	100

In the study 30 patient were selected irrespective of their sex and economical status. According occupation we found 10 patients (33.33%) were farmer by occupation, 15 patients (50%) were housewife, 1 patient (3.33%) was labor by occupation and 4 patients (13.33%) was shopkeeper by occupation.

Table 6: Distribution of patients according to Socio-economic status

Socio-economic status	No of patients	Percentage
Low	19	63.33
Middle	11	36.67
High	0	0
Total	30	100

In the study 30 patient were selected irrespective of their sex and economical status. According to socio economic status, low socio-economic status consists 19 patients (63.33%), middle socio-economic status consist 11 patients (36.67%) and no patient belongs to high socio-economic status in the study.

Table 7: Distribution of patients according to History

History	No of patients	Percentage
Cough	30	100
Expectoration	3	10
Breathlessness	11	36.67
Fever	0	0

In the study 30 patient were selected irrespective of their sex and economical status. According to patient's history of illness, 30 patient (100%) having history of cough, 3 patients (10%) having history of expectoration, 11 patients (36.67%) having history of breathlessness and no patient having history of fever in the study.

Table 8: Distribution of patients according to Past History

Past History	No of patients	Percentage
Hypertension	0	0
Diabetes	0	0

In the study 30 patients were selected irrespective of their sex and economical status, according to history of past illness of patients, none of the patient was hypertensive and diabetic In the study.

Table 9: Distribution of patients according to Personal History

Personal History	No of patients	Percentage
Occupation	4	13.33
Smoking	4	13.33
Alcohol	9	30
Exposure Mass	9	30

In the study 30 patients were selected, according to their personal history 4 patients (13.33%) having occupation history, 4 patients (13.33%) having smoking history, 9 patients (30%) having history of taking alcohol, and 9 patients (30%) are exposed to mass.

Table 10: Distribution of patients according to Chest X-Ray Examination

Chest X-ray Examination	No of patients	Percentage
Normal	30	100
Emphysema	0	0
Cavity	0	0

In the study, 30 patients of pre diagnosed COPD were selected and x- ray examination of patients shows normal x- ray of 30 patients (100%) and no patients having emphysema and cavity in their x- ray.

Table 11: Distribution of patients according to Pulmonary Function Test

Pulmonary Function Test	Mean	SD	Range
FEV1(% Predicted)	70.26	22.49	17-107
FVC (% Predicted)	76.80	25.49	35-128
FEV1/FVC Ratio	92.63	18.01	49-120
PEFR(Lit/Min)	63.43	49.20	2.39-241

In the study, 30 patients of pre diagnosed COPD were selected and distribution of patients according their pulmonary function test is FEV1 (%Predicted) = mean (70.26), and SD (22.49) and range between 17-107.

FVC (%Predicted) =mean (76.80) and SD (25.49) and range between 35-128. FEV1/FVC ratio= mean (92.63) and SD (18.01) and range between 49-120. PEFR (lit/min) = mean (63.43) SD (49.20) and range between 2.39-241.

Table 12: Distribution of patients according to Gold Staging

Gold Staging	No of patients	Percentage
Gold Stage 1	13	43.3
Gold Stage 2	8	26.7
Gold Stage 3	8	26.7
Gold Stage 4	1	3.3
Total	30	100

In the study, 30 patients of pre diagnosed COPD were selected and their distribution according to Gold Staging was Gold Stage 1 consist of 13 patients (43.3%), Gold Stage 2 consist of 8 patients (26.7%), Gold Stage 3 consist of 8 patients (26.7%), Gold Stage 4 consist of 1 patient (3.3%).

Table 13: Distribution of patients according to Criteria of assessment of Pipasa/Shosh in organ

Pipasa/Shosha in organ	No of patients	Percentage
Mukh	30	100
Jivha	30	100
Talu	16	53.33
Kantha	7	23.33
All Organ	7	23.33

In the study, 30 patients of pre diagnosed COPD were selected and their distribution according to Pipasa/Shosha in organ Mukh Shosha is present in 30 patients (100%), Jivha Shosha is present in 30 patients (100%), Talu Shosha is present in 16 patients (53.33%), Kantha Shosha is present in 7 patients (23.33%), all organ Shosha is present in 7 patients (23.33%).

Table 14: Distribution of patients according to grading (Pipasa)

Grading	No of patients	Percentage
Grade 1	0	0
Grade 2	14	46.7
Grade 3	9	30
Grade 4	0	0
Grade 5	7	23.3
Total	20	100

In the study, 30 patients of pre diagnosed COPD were selected and their distribution according to grading is, no patients of grade 1, 14 patients (46.7%) of Grade 2, 9 patients (30%) of Grade 3, 0 patient of Grade 4, 7 patients (23.3%) of Grade 5.

Table no.15 Distribution of patients according to COPD Gold Staging and Pipasa grading

SN	COPD GOLD STAGING	Pipasa Gradation
1	Stage 1	2
2	Stage 2	2-5
3	Stage 3	3-5
4	Stage 4	5

In the study, 30 patients of pre diagnosed COPD were selected and their distribution according to COPD Gold staging and Pipasa grading, In Stage 1 observe grade 2 of Pipasa, Stage 2 observe grade 2-5 of Pipasa, Stage 3 observe grade 3-5 of Pipasa, Stage 4 observe grade 5 of Pipasa.

Statistical analysis was done by using descriptive statistics only and software used in the analysis was SPSS 22.0 version.

Discussion

Essentially, the word *Kloma* distinguished from the time of *Vedic* period. The reference with respect to *Yakrita*, *Kloma* and *Pittasthana* found in *Vajasneya Samhita* made by God *Varuna* (7). Even in *Charaka Samhita*, in *Sharirsthana* seventh chapter, fifteen *Koshtanga* clarified and *Kloma* is one of them (8). Be that as it may, not a solitary reference discovered with respect to *Kloma* in *Sushrut Samhita* and *Sushruta Samhita* is the first *Vedik* literature which given the *Phuphphusa* one of the organs determined in the *Koshtanga*. In any case, it is impossible that the very ancient context *Charaka Samhita* couldn't include the *Phuphphusa* in *Koshtanga* (8). Correspondingly, in the *Eitareya Bramhana* (Vedic Context) 36 disagreement parts of creature yielded and among *Koshtanga* '*Kloma*' is referenced as a piece of forfeited (9). So therefore, in this situation *Phuphphusa* might be called as *Kloma* in that period.

As indicated by *Acharya Charaka*, *Vagbhata*, *Kashyapa* and *Bhela*; the *Kloma* is incorporated *Koshtanga* for example one of component of *Antaradhi* (Trunk), organ situated in the body cavity. Among all *Acharyas Charak*, *Bhel* and *Kashyapa*, included *Kloma* in the classification of *Koshtanga* (8,10,11) however then again; *Sushruta* included '*Phuphphusa*' as a *Koshtanga*.

As a part of surface anatomy, *Shushruta* expressed relative situation of *Kloma*, that is one of the structures which situated beneath and left of *Hridaya* for example *Pleeha*, and to one side of the heart above (*Vamataha* for example by the left half of the heart) for example *Phuphphusa* (left lung) (12). Thus, *Sushruta* has not think about right lung as a *Phuphphusa*. The commentary on *Ashtanga Hridaya* Chapter 12, Verse 3, additionally steadily offered proof to that *Kloma* is enormous mass comprised of strong tissue situated to one side of the heart (13).

Similarly, in a commentary *Madhukosh Madhavidan* by *Shrikanthadatta*, expressed the area of *Kloma* all things considered in superior aspect of *Vrukka* (kidney), the relative anatomy saw that upper pole of kidney lies at the degree of upper border of 12" thoracic vertebra and the lower border of each lung crosses 6 rib in the mid-clavicular line, the eighth rib in the mid-auxiliary line and posteriorly 2 cm lateral to 10" thoracic spine. Over the level of T11 vertebrae there is presence of diaphragm, pleural depression and lungs. So, it tends to be concluded that *Kloma* may be the organ present in thorax region (14).

The damage to the *Udakovaha Srotas* came about in to *Pipasa* (this may be happened because of irregularity of water liquid in the body) (15) and *Sadhyomarana* may be the result of thirst which might be chronic feature or related with genuine pathology, complicated diseases with bad prognosis. *Sadyapranhara Marma* also reflects severe dehydration because of severe hemorrhage and fluid loss, when vital organ structure i.e. *Mulsthana* injured causes sever thirst and immediate death despite not included in *Marma* (16). Hence, *Kloma* might be close organ to the *Marma* point.

Vagbhata in *Ashtanga Hridaya* has clearly referenced '*Kloma*' as a *Kaphasthana* (13). The case of different organs like Pancreas, Gall bladder, Caecum and so on is in effect naturally stand dropped as nobody has properties like *Kapha* (13). *Kapha* works through '*Ambukarmana*' for example water activity. This demonstrates *Kapha* and its whole capacities resemble water line activity. *Kloma* is a one of the individuals from *Kapha* transcendence framework; which sees the loss of water and flag the body for remuneration. Supporting to the water level adjusting, around 0.5% water vapors are available in climate and close by 5% vapors and follow gases are available in lapsed quality of human lungs for example water vapors amount is higher in the event of removed air. This demonstrates lungs assuming significant job in support of body liquids at essential stage also (17).

Klomanadi is one the type of *Sandhi* i.e. *Mandalasandhi* stated by *Sushruta* and narrated as '*Kanthsthasaktaya Nadya Vishanti*' which means the *Nadi* related with *Phuphphusa* having trachea like cartilaginous rings joined together to form *Kanthenadi*, that description exactly resembles with *Klomanadi* and Trachea (18,19). If Trachea is counted as a *Klomanadi*, then it is crystal and clear guideline to identify *Kloma* as a *Phuphphusa*.

Age

30 patients of pre diagnosed case of COPD from respiratory medicine department of AVBRH department were taken randomly for the study. In which patient enrolled of the age group of 35 to 60 years irrespective of sex. In the study, more prevalence was found in the age group between 50-60 years of age. Similar finding were observed in the study by [Lindberg](#) et.al. as COPD found relevant among middle-aged and elderly persons (20).

Gender

In the study, it was found that male and female are equally affected means out of 30 patients 15 male & 15 female. Peter J. Barnes reported that there were not relative sex differences about susceptibility and progression of COPD (21).

Occupation

In the study, it was found that out of total population 50% were housewives and which were affected because of exposure to the biomass (Chulha) and tobacco chewing. And 30% population were male farmer; affected most of the because of exposure to pollen grains and history of smoking found in males. Similar finding reported by [Jordi Olloquequi](#) and [Rafael Silva](#) regarding biomass which acts as a risk factor in COPD. At the same time [Bert Brunekreef](#) et.al focused on relation between airborne pollen concentrations and respiratory-disease mortality (22,23).

Social-economic status

In this section, low socio-economic category found most affected that is 19 patients out of 30(63.33%) because of stress level and addiction more

found in low socio-economic group. [Andrea S. et.al](#) also reported consistent significant inverse associations between socioeconomic status and COPD outcomes (24).

Pipasa and COPD gradation

In the study, all the patients were reported *Jivha* and *Mukha Shosha* that was included in grade II COPD. 53.33% (16) patients conveyed *Talu Shosha* which was included in grade III and 23.33% (7) patients having *Kantha Shosha* i.e. grade V with respect to their duration of 2 to 4 hours. It shows that the signs increase as per grade pattern, as the dyspnea increases; it activates paralimbic structures that relatively acts on homeostatic functioning of the body and develop thirst (25).

Thirst is the main indicator of the malfunctioning *Udakavaha Srotas* of which *Kloma* is one of the organs. A progressive fluid loss as a result of excessive hyper ventilation offered decrease in fluid density resulted in to feeling of dryness of the mouth first, throat later and later in a considerable thirst which is not quenched easily (26).

Gradation of pipasa in COPD

Out of 30 patients 46.7% (14) were found in Grade 2, 30% (9) of grade 3, and that of Grade 5 were 23.3% (7) which indicates that the *Pipasa* sign observed in *Mukha* (oral cavity), *Jivha* (tongue), *Talu* (palate), *Kantha* (throat) in patients of COPD. Theses all structures found in continuation with oropharynges and deeply situated trachea. As the gold staging increases, comparatively *Pipasa* grading also rises like in mild COPD grading of *Pipasa* was 2, moderate COPD grading of *Pipasa* in between 2 to 5 and that of severe COPD was in between 3 to 5. The dryness of mouth i.e. thrust (*Pipasa*) created happens because of dyspnea and respiratory resistance. Respiratory resistance values change dynamically over the course of lower to higher frequencies during stable tidal breathing and displayed characterized frequency specificity not only in the expiration but also in inspiratory phase in COPD patients. Supportive findings were reported by [Yamauchi Y. et.al](#) that respiratory resistance values at higher frequencies in the inspiratory and expiratory phases in the patients of moderate COPD were found greater than that of mild COPD (27).

Conclusion

There was noteworthy relation found between *Kloma* and *Pipasa*. Whereas, *Pipasa* grading was present in each Gold stage and the thirst is associative sign of COPD patient found in the study. As per literary research, a part of *Phuphphusa* (Lung) may be predictable organ, *Kloma*. So, it was concluded that *Kloma* is the body organ; *Mulasthanas* of *Udakavaha Srotas* but lack of stout references and findings in the study, one cannot confirm a *Phuphphusa* (lung) as a *Kloma* with the help of observed *Viddha Lakshana* i.e. *Pipasa* in COPD patients.

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