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"A COMPARATIVE STUDY OF PIPPALI CHURNA & BIBHITAKA CHURNA ON KASA IN CHILDREN"

Dr. Mosim Momin[1], Dr. Hridaynath Lad[2] and Dr. Shende Krushnadev[3]*

[1]Asst. Proff., Dept. of Balrog Dr. D.Y. Patil Ayurved College, Pune, M.S. India.
[2]Asso. Proff., Dept. of Stree Rog Prasutitantra Dr. D.Y. Patil Ayurved College, Pune, M.S. India.
*[3]Asst. Proff., Dept. of Kayachikitsa Dr. D.Y. Patil Ayurved College, Pune, M.S. India.

*** Corresponding Author: Dr. Shende Krushnadev**
Asst. Proff., Dept. of Kayachikitsa Dr. D.Y. Patil Ayurved College, Pune, M.S. India.

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ABSTRACT
The prevalence rate of cough is 25% in children which seen all over the world. Cough has broad- spectrum etiology, which ranges from allergens to infections. Cough occurs in association with acute upper respiratory infection, acute pharyngitis, acute bronchitis and chronic sinusitis, all of which rank among the top 10 reasons for visiting family physicians. Cough occurs because of irritation of respiratory mucosa. Cough is an important defense mechanism of respiratory system and help to bring out the infected secretion from trachea & bronchi. Pippali churna is very effective in curing the kasa especially occurred in children explained by sarngadhar,[4] while Bibhitaka churna is very effective in curing all the five types of kasa explained by vagbhat. By looking at rasa, vipak, veerya, dosha, guna, karma of both the churna it appears that both are very effective in combating the signs and symptoms associated with kasa. Therefore, the present research work entitled "A comparative study of Pippali churna & Bibhitaka churna on kasa in children" is planned to evaluate the relative merit of the oral administration of Pippali churna & Bibhitaki churna.

KEYWORDS: Pippali churna, Bibhitaka churna, vipak, veerya, dosha, guna.

INTRODUCTION

Good health is considered to be the root of the objects of human life like Dharma, Artha and Kama. Health does not mean as a merely absence of disease but it is a physical, mental, social and spiritual well being of a person. Disease stands as a great obstacle in the achievement of good health. "The war between health and diseases starts with the onset of Life". Hence every child needs to be protected from mortality and morbidity, to grow up as a healthy citizen.

Certain diseases may not be life threatening but increasingly annoying and irritating to the individual in his routine activity. More over when neglected they may lead to a series of complications later. A very common clinical condition, Kasa (Cough) is one among them increasingly prevalent now days, demanding greater concern over it.

Cough occurs because of irritation of respiratory mucosa. Cough is an important defense mechanism of respiratory system and help to bring out the infected secretion from trachea & bronchi.

To and fro movement of air through the Pranavaha srotas is the vital sign of Prana, the normalcy of which suggests health.[1] The abnormality of respiration indicates disease, and its cessation marks death. This unique sign of life is affected in the disease Kasa.

The prevalence rate of cough is 25% in children which seen all over the world. Cough has broad- spectrum etiology, which ranges from allergens to infections. Cough occurs in association with acute upper respiratory infection, acute pharyngitis, acute bronchitis and chronic sinusitis, all of which rank among the top 10 reasons for visiting family physicians.

The cough is considered as a symptom in the modern medicine. It is seen associated with many of the systemic disorders. The attack rate of cough in children is very high leading to morbidity and mortality.

Sequential administration of the Snehana, Swedana, Shodhana, Dhoopana, Shamana and Rasayana line of treatment forms the complete treatment of kasa explained in the Ayurvedic literature.[3] Among these procedures, the Shamana line of treatment that includes oral administration of medicine is of almost importance as the administration is very easy and also effective compared to shodhana in children. Plenty of research works have been carried out in relation to the Shamana treatment as

directed in Ayurveda and their therapeutic effect is proved. Many more herbal combinations are described in Ayurveda and their therapeutic effect in kasa is yet to be explored.

Considering the above points the present work is undertaken by choosing Pippali churna & Bibhitaki churna mention in the sarngadhar & vagbhat samhita respectively as a drugs, which has high reputation for curing cough.

Pippali churna is very effective in curing the kasa especially occurred in children explained by sarngadhar,[4] while Bibhitaka churna is very effective in curing all the five types of kasa explained by vagbhat.[5]

By looking at rasa, vipak, veerya, dosha, guna, karma of both the churna it appears that both are very effective in combating the signs and symptoms associated with kasa. Therefore, the present research work entitled "**A comparative study of Pippali churna & Bibhitaka churna on kasa in children"** is planned to evaluate the relative merit of the oral administration of Pippali churna & Bibhitaki churna.

AIMS AND OBJECTIVES

The present clinical study entitled**:** "**A comparative study of Pippali churna & Bibhitaka churna on kasa in children"** was carried out with the following Aims and objectives.

1. To find out the etiopathogenesis of Kasa in children.
2. To evaluate the effect of Pippali churna lehan in reducing Kasa.
3. To evaluate the effect of Bibhitaka churna lehan in reducing Kasa.
4. To compare the effect of Pippali churna & Bibhitaka churna on kasa.

An annoying and disturbing symptom, the cough is highly prevalent in childhood associated with many of the local and systemic disorders. It is commonly seen associated with fever, running nose, tonsillitis, pharyngitis, laryngitis and other lower respiratory diseases.

Pippali churna is very effective in curing the kasa especially occurred in children explained by sarngadhar, while Bibhitaka churna is very effective in curing all the five types of kasa explained by vagbhat.

By looking at rasa, vipak, veerya, dosha, guna, karma of both the churna it appears that both are very effective in combating the signs and symptoms associated with kasa. As well as to see the effect of the drugs in reducing the reoccurrence of the disease kasa and its associated symptoms.

MATERIAL AND METHODS

The present clinical study entitled "**A comparative study of Pippali churna & Bibhitaka churna on kasa in children."** was carried out with the following Aims & objectives.

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4) To compare the effect of pippali churna & Bibhitaka churna on kasa.

TYPE OF STUDY

Single blind comparative clinical study.

STATISTICAL ANALYSIS

The collected data analyzed using Wilcoxon Signed Ranks Test.

Drugs

a) Pippali Churna

Pippali churna is very effective in curing the kasa especially occurred in children explained by sarngadhar.

b) Bibhitaka Churna

Bibhitaka churna is very effective in curing, all the five types of kasa explained by vagbhat.

Method of Preparation

Drugs: a) Pippali Churna
b) Bibhitaka Churna

pippali churna & Bibhtaka churna were prepared in the pharmacy of R.S &. B.K. department of our institute. Both drugrs were authentified, standardized in the Vasantidevi college of pharmacy, Kodoli.

Source of Data

Patients

Total 60 patients suffering from kasa were selected by clinical examination in the OPD of kaumarbhritya tantra of Y.A. dharmarth rugnalaya, kodoli.

A general examination was carried out in all patients presenting with Kasa roga, which included the examination of heart, lungs, abdomen for liver, spleen etc. and then as per the below mentioned criteria random selection of the patients was made.

Inclusion Criteria

1. Patients presenting with Kasa with two or more symptoms described in the context of Kasa were selected.
2. Cough less than Fifteen days duration was selected.
3. Patients were selected irrespective of sex, Cast, Occupation and between the age group of 5 - 16 yrs.

Exclusion Criteria
1. Kshataja Kasa
2. Kshayaja Kasa
3. Patients having concomitant other systemic disorders like Bronchial asthma, Pneumonia, Bronchiectasis, Lung abscess, Foreign body, pertusis etc.
4. Kasa associated with jwara.
5. Cases of kasa, which were ineffectively treated by any other therapies or drugs.

METHODS
Group A = 30 cases – Treated with **Pippali Churna+ madhu**
Group B = 30 cases – Treated with **Bibhitaka churna +madhu**
Written formal consent of parent taken.

The present study includes a sample size of 60 children in and around kodoli. All of them and their guardian were made to understand about the study and the informed consent was obtained. Only after getting the informed consent, they were included in the study.

DOSE AND DURATION
Pippali Churna
Dose
05-16 Year 250-800 mg/day. (according to dilling formula)
Time : Four times in a day.
Route of administration : Oral route
Anupan : Madhu
Duration : 08 days

Bibhitaka churna
Dose
05-16 Year 1.5-5 gm/day. (according to dilling formula)
Time : Four times in a day.
Route of administration : Oral route
Anupan : Madhu
Duration : 08 days

Method of study
Initially the vital data like, Name, age, sex, religion, occupation, Education, habitat, diet, socio economic status, type of family was recorded.

While taking the history of present illness (Nidana Panchaka), every patient was enquired for various etiological factors described for vataja, pittaja and kaphaja kasa. This consisted of the general etiological factors like Dhoomopaghata, rajopaghata, ativyayama, bhojanasya vimarga gamana and special factors like Rookshahara, sheetahara etc mentioned in the context of vataja kasa. Similarly Katu, ushna, vidaahi and amla kshara ahara sevana for pittaja kasa and swapna vicheshta, guru, abhishyandhi and snigdhahara for kaphaja kasa.

All the patients were enquired for the presence of symptoms of poorva roopa mentioned for kasa like, Kanthe kandu, shookapoorna galaasyata etc.
An effort was made to evaluate the status of lakshanas of individual kasa with the help of preformed table before and after the treatment.

With the questionnaire the mode of onset of kasa, duration, frequency, occasional variation in the pattern and periodicity was noted down.

Sincere effort was made to evaluate the aggravating factors of kasa like early morning, night, exposure to cold food stuffs, cold environment, similarly the relieving factors such as hot food stuffs, hot environment, kaphashteevan etc was enquired and noted.

With relevant history, time of occurrence of kasa, nature of cough i.e. dry or productive with the quality of sputum was recorded before and after the treatment.

Under Rogi pareeksha, relevant data such as kula vrittanta, jaata poorva vittanta, jattottara vrittanta as well as developmental mile stones and samskaras performed were noted initially. The prakriti of the patient was evaluated.

By enquiring with the patients guardian, the saatmyata of the patient to madura, katu, sheeta ahara etc was noted.

The samhanana, satwa, saara, agni bala, deha bala, ahara shakti and koshta of the patient was ascertained.

The pramana of the patient like weight was recorded using necessary instruments.

Under vikruti pareeksha, effort was made to evaluate the doshas with the help of ashta vidha pareeksha.

Using a thermometer, the temperature of the patient was noted before and after the treatment.

All the srotas were examined using available Ayurvedic and modern parameters before and after the treatment. Special emphasis was given to Pranavaha sroto pareeksha.

Under sthanika pareeksha, shiro, greeva, koshta, hasta and pada were examined mainly to observe for enlargement of lymph nodes before and after the treatment.

Arishta lakshanas were noted initially to exclude the patient from the study and during the course of treatment to avoid the complications in the patient.

The Investigations related to cough were done before and after treatment, to evaluate the improvement and the condition of the patient through the improvement in laboratory investigation values. Total WBC count,

Differential count, ESR, was done in all the patients before and after treatment.

Detailed evaluation of Respiratory system was made to diagnose the disease and to know the severity of the disease. It was also helpful in assessing the improvement in the condition of the patient before and after treatment.

Under Inspection the shape of the chest was noted for its symmetry. Type of breathing, respiratory rate, respiratory rhythm and movement of chest was recorded to know the severity of the disease as well as to exclude the underlying diseases such as Pneumonia, Pleural Effusion etc.

Palpation was done to confirm the centralization or deviation of Trachea, symmetrical movement of chest wall and for Tactile vocal fremitus.

On percussion, it was examined to note the abnormalities like resonant, hyper resonant, dull or stony dull areas over the chest wall to evaluate the other under lying signs.

Type of breath sounds was recorded on Auscultation. It was also noted for the presence of added sounds like the wheeze or crepitations.

The diagnosis of kasa was made on the presence of two or more lakshanas mentioned under specific variety of kasa.

The Lakshanas like Shushka kasa, Hruth shoola, Parshwa shoola, Shira shoola, Ura shoola, Swara bhedha, Shushka – ura, kanta, vaktra, Daurbalya, Kshobha, Moha and Kruchrena alpa kapha shteevana were considered for diagnosing the vataja kasa.

Peeta nishteevana, Tiktaasyata, Swara bhedha, Urodhooma, Trishna, Daaha, Moha, Aruchi and Bhrama are the lakshanas taken for diagnosing the Pittaja variety of kasa.

The Kaphaja kasa was diagnosed on the basis of following lakshanas. They are Bahula, madhura, snigdha, Ghana kapha nishteevana, Mandaagni, Aruchi, Vamana, Peenasa, Shareera guruta, Asya Madhurata and Loma harsha.

Assessment Criteria

1. Assessment was made on the basis of improvement in the clinical features.
2. The assessment was based on the gradation of both Subjective and Objective clinical features before and after treatment.

Subjective Criteria

1) Number of bouts of cough: The number of bouts of cough in one hour will be noted.

More than 8 bouts of cough	03
3 to 7 bouts of cough	02
Less than 3 bouts of cough	01
Absence of bouts of cough	00

2) Disturbance of sleep

Cough always disturbs sleep	03
Gets cough before sleeping or wakes the child in the morning	02
Cough occasionally disturbs sleep	01
Cough not interfering with sleep	00

Objective Criteria

1. Throat Infection

Severe Throat Infection	03
Moderate Severe Throat Infection	02
Mild Throat Infection	01
Throat Infection Absent	00

2. Added Sounds

(a) Wheeze

Marked Polyphonic wheezing all over the lung field	04
Polyphonic moderate wheezing all over the lung field	03
Marked Polyphonic wheezing limited to zones	02
Mild monophonic wheeze present	01
Wheezing absent	00

(b) Crepitations

Scattered all over the lung field	03
Distributed here and there in all the zones	02
Present in one or two zones	01
Absent Crepitations	00

3. Sputum

Kapha- puthi, puya, grathita and offensive	04
Thick large quantity of solid white sputum	03
Moderately thick slightly yellowish in colour	02
Serous expectoration with traces of thick sputum	01
No productive cough	00

4. Laboratory Investigations

Improvement in laboratory investigation reports will be observed: ESR, AEC.

OBSERVATIONS AND RESULTS

Sixty five patients were registered for the clinical trial. By following the inclusion and exclusion criteria 65 patients were randomly selected. These patients were then divided into two groups, 1st Group containing 33 and 2nd group containing 32 patients. Three patients from 1st Group discontinued the treatment as one patient developed vomiting after taking Pippali Churna and two patients couldn't continue full course of treatment. Hence dropped from treatment**.** Two patients from 2ndgroup couldn't continue full course of treatment, hence dropped from treatment**.** Thus the complete clinical trial was completed on sixty patients, each group consisting of 30 patients each.

The observations made were graded and tabulated as follows.

1. Age Incidence

Table 22 Showing the age incidence

Age Years	Group A	%	Group B	%	Total	%
5-8	13	43.3	18	53.3	31	51.67
9-12	11	36.7	7	23.3	18	30
13-16	6	20	5	16.7	11	18.335

Among 60 patients 31 patients (51.67%) belonged to the age group of 5-8 yrs. 18 patients (30%) belonged to the age group of 9-12 yrs and 11 patients (18.34%) belonged to 13-16yrs of age group. This showed that the prevalence of kasa in the age group of 5-8 yrs.

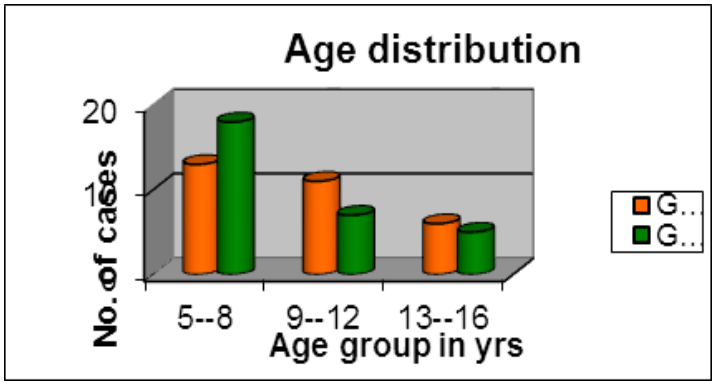

Figure 5 Showing the age incidence

2. Sex incidence

Table 23 Showing the sex incidence

Sex	Group A	%	Group B	%	Total	%
Male	21	70	18	60	39	65
Female	9	30	12	40	21	35

Among 60 patients 39 (65%) were male and 21 (35%) were females. Group A consisted of 21 male and 9 females while Group B had 18 males and 12 females.

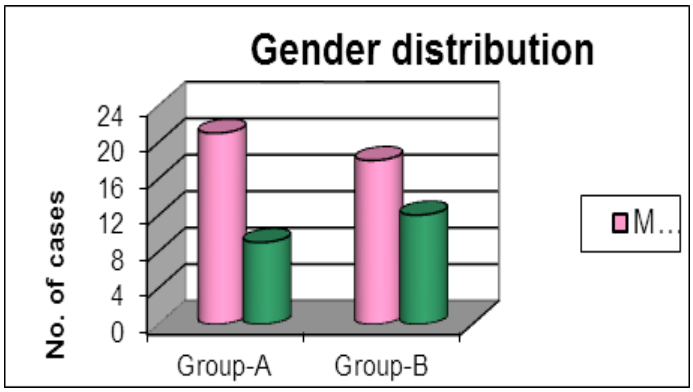

Figure 6 Showing the sex incidence

3. Religion

Table 24 Showing Religion of patients

Religion	Group A	%	Group B	%	Total	%
Hindu	27	90	27	90	54	90
Muslim	3	10	1	3.3	4	6.65
Christian	0	0	2	6.7	2	3.35

Among 60 patients 54 patients (90%) were from Hindu, 4 patients (6.65%) from Muslim and 2 patient (3.35%) were from Christian community.

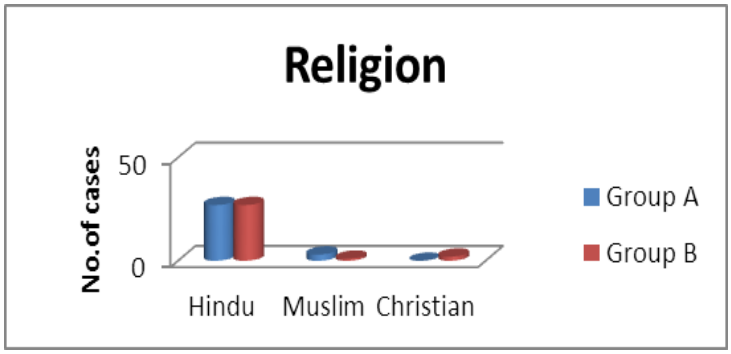

Figure 7 Showing Religion of patients

4. Socio-economic status

Table 25 Showing socio-economic status

Socio-economic status	Group A	%	Group B	%	Total	%
Lower Class	9	30	10	33.3	19	31.65
Middle class	16	53.3	12	40	28	46.65
Upper class	5	16.7	8	16.7	13	21.65

In Group A 16 patients belonged to Middle class, 9 to Lower class and 5 to Upper class, while in Group B 12 patients belonged to Middle class, 10 to Lower class and 8 to Upper class. The incidence of kasa was more observed in middle class (46.65%) i.e28 patients.

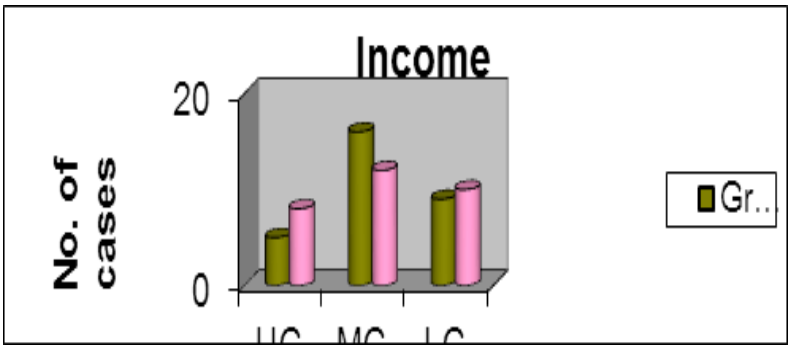

Figure 8 Showing socio-economic status

5. Diet

Table 26 Showing Dietary habits of the patient

Dietary habits	Group A	%	Group B	%	Total	%
Vegetarian	4	13.3	5	16.7	9	15
Mixed	26	86.7	25	83.3	51	85

Maximum 51 patients (85%) from mixed diet and only 9 patients (15%) from vegetarian diet.

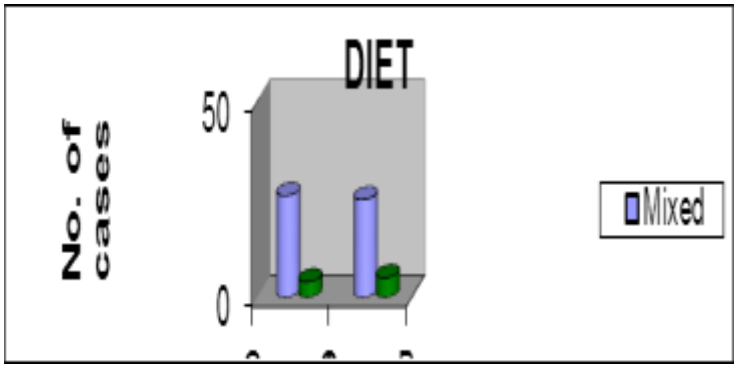

Figure 9 Showing Dietary habits of the patient

6. Educational status of the patients

Table 27 Showing educational status of the patients

Education	Group A	%	Group B	%	Total	%
Primary school	27	90	27	90	54	90
Secondary school	3	10	3	10	6	10

Maximum54 patients(90%) from Primary school and only 6patients (10%) from Secondary School.

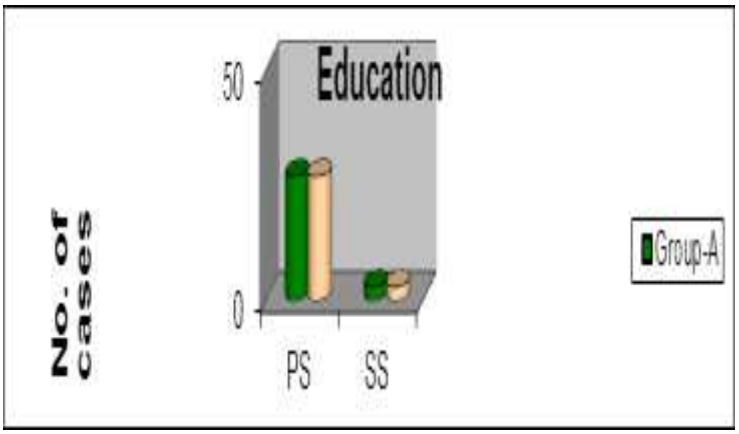

Figure 10 Showing educational status of the patients

7. Ahara Sambandhi nidana

Table 28 Showing Ahara Sambandhi nidana in the patients of kasa.

Ahara Sambandhi Nidana	Group A	%	Group B	%	Total	%
Rookshaahara	5	16.7	5	16.7	10	16.65
Sheetaahara	14	60	15	50	29	48.35
Kashayaahara	0	0	0	0	0	0
Katuahara	6	20	5	16.7	11	18.35
Ushnaahara	1	3.3	0	0	1	1.65
Vidahiahara	5	16.7	4	13.3	9	15
Amla ksharaahara	3	10	2	6.7	5	8.35
Guru ahara	11	36.7	10	33.3	21	35
Abhishyandhiahara	13	43.3	11	36.7	24	40
Madhuraahara	12	40	10	33.3	22	36.65
Snigdhaahara	6	20	8	26.7	14	23.35
Alpaaharasevana	3	10	5	16.7	8	13.35
Pramitashana	4	13.3	5	16.7	9	15
Anashana	2	6.7	1	3.3	3	5

29 patients (48.35%) had SheetaAhara as the Nidana. Madhura Ahara was found as the cause in 22 patients (36.65%) where as Guru Ahara was found as Nidana in 21 patients (35%). Abhishyandhi ahara and sigdha ahara was nidana in 24 patients (40%) and 14 patients (23.25%) respectively.

8. Vihara Sambandhi nidana

Table 29 Showing Vihara Sambandhi nidana in the patients of kasa.

Vihara Sambandhi Nidana	Group A	%	Group B	%	Total	%
Rajo upaghata	15	50	12	40	27	45
Dhoomo paghata	12	40	10	33.3	22	36.65
Bhojanasya vimargagamana	1	3.3	3	10	4	6.65
Kshavatu vegadharana	0	0	0	0	0	0
Swapna vicheshta	5	16.7	4	13.3	9	15
Ativyayama	3	10	4	13.3	7	11.65
Sheetavihara	24	80	26	86.7	50	83.33

Maximum of 50 patients (83.33%) had sheetavihara as the nidana for kasa, Where as rajoupaghata and dhoomopaghata was found in 27patients (45%) and 22 patients (36.65%) respectively.

9. PoorvaRoopa

Table 30 Showing PoorvaRoopa in the patients of kasa.

PoorvaRoopa	Group A	%	Group B	%	Total	%
Shookapoorna galaasyata	12	40	10	33.3	22	36.65
KantheKandoo	26	86.7	24	80	50	83.33
Bhojyanamavarodha	1	3.3	2	6.7	3	5
Gala lepa	2	6.7	1	3.3	3	5
Taalulepa	2	6.7	3	10	5	8.35
Sashabdha	10	33.3	8	26.7	18	30
Vaishamya (agni)	2	6.7	1	3.3	3	5
Arochaka	14	46.7	13	43.3	27	45
Agnisaada	12	40	10	33.3	22	36.65

Kanthekandu was evidently seen in 50 patients (83.33%) as the poorvaroopa of kasa. Sashabdha (abnormal sound in lungs) and agnisada were seen in 18 patients (30%) & 22 patients (36.65) respectively. Shookapoorna galaasyata and arochaka was seen 22 patients (36.65%) & 27 patients(45%)respectively.

10. Type of Kasa

Table 31 Showing the type of Kasa

Type of Kasa	Group A	%	Group B	%	Total	%
Vataja	10	33.3	12	40	22	36.65
Pittaja	6	20	5	16.7	11	18.35
Kaphaja	14	46.7	13	43.3	27	45

Out of 60 patients from both groups, 22patient belonged to vataja kasa, 11 belonged to pittaja kasa and 27 belonged to kaphaja kasa.

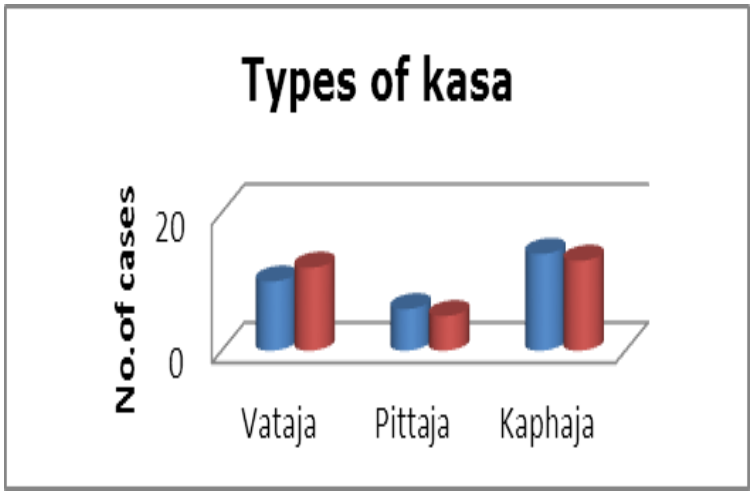

Figure 11 Showing Type of Kasa

11. Vataja Kasa

Table 32 Showing the Incidence of various associated signs and symptoms among 22 patients of VatajaKasa.

Signs & Symptoms	Group A	%	Group B	%	Total	%
Shushka kasa	10	100	12	100	22	100
Hruthshoola	5	50	3	25	8	36.36
Parshwashoola	8	80	10	83.33	18	81.81
Shirashoola	9	90	10	83.33	19	86.36
Urashoola	10	100	12	100	22	100
Swarabhedha	5	50	6	50	11	50
Shushka ura, kanta, vaktra	1	10	3	25	4	18.18
Daurbalya	3	30	0	-	3	13.63
Kshobha	4	40	3	25	7	31.81
Moha	0	-	0	-	0	-
Kruchrena alpa kapha shteevana	6	60	8	66.66	14	63.63

Shushkakasa and urashoola was found as lakshana in all the 22 patients (100%) of vatajakasa. Shirashoola & Parshwashoola were observed in 19 patients (86.36%) & 18 patients (81.81) respectively. Swarabhedha was seen in 11 patients (50%). Shushka – ura, kanta, vaktra and Kruchrena alpa kaphashteevana was noted in 4 patients (18.18%) 14 patients (63.63) respectively.

12. Pittaja Kasa

Table 33 Showing the Incidence of various associated signs and symptoms among 11 patients of Pittaja Kasa.

Signs & Symptoms	Group A	%	Group B	%	Total	%
Peeta nishteevana	4	66.66	3	60	7	63.63
Tiktaasyata	3	50	2	40	5	45.45
Swarabhedha	2	33.33	1	20	3	27.27
Urodhooma	1	16.66	0	-	1	9.09
Trishna	6	100	5	100	11	100
Daaha	6	100	5	100	11	100
Moha	0	-	0	-	0	-
Aruchi	5	83.33	4	80	9	81.81
Bhrama	0	-	0	-	0	-

Trishna and Daaha were seen in the 11 patients (100%) of pittajakasa. Aruchi, Peetanishteevana, Tiktaasyata, Swarabhedha were noted in 9 patients (81.81%), 7 patients(63.63%), 5 patients(45.45%), 3 patients(27.27%) respectively.

13. Kaphaja Kasa

Table 34 Showing the Incidence of various associated signs and symptoms among 27 patients of Kaphaja Kasa.

Signs & Symptoms	Group A	%	Group B	%	Total	%
Bahula, madhura, snigdha, Ghana kaphanishteevan	14	100	13	100	27	100
Manda agni	14	100	13	100	27	100
Aruchi	12	85.71	10	76.92	22	81.81
Vamana	7	50	4	30.76	11	40.74
Peenasa	14	100	13	100	27	100
Shareera guruta	7	50	6	46.15	13	48.14
Asyamadhurata	7	50	6	46.15	13	48.14
Loma harsha	2	14.28	4	30.76	6	22.22

Bahula, madhura, snigdha and Ghana kaphanishteeva, Mandagni and peenasa were noted in all the 27 patients (100%) of kaphajakasa. Aruchi, Shareeraguruta, Asya Madhurata were noted in the 22 patients (81.81%), 13 patients (48.14%), 13 patients (48.14%) respectively.

14. Mode of onset

Table 35 Showing the mode of onset of kasa

Mode of onset	Group A	%	Group B	%	Total	%
Sudden	1	3.3	0	-	1	1.65
Gradual	20	66.7	18	60	38	63.33
Episodic	5	16.7	8	26.7	13	21.65
Continuous	2	6.7	2	6.7	4	6.65
Initially episodic followed by continuous	2	6.7	2	6.7	4	6.65

Out of 60 patients, 38 patients (63.33%) had gradual onset. 13 patients (21.65) had episodic onset. Continuous and initially episodic followed by continuous onset was observed in 4 patients (6.65%) each.

15. Aggravating factors

Table 36 showing the Aggravating factors of cough

Time	Group A	%	Group B	%	Total	%
Coldfood stuffs	18	60	14	46.7	32	53.33
Exposure to cold	20	66.7	22	73.3	42	70
Early morning	15	50	10	33.3	25	41.65
Night	8	26.7	6	20	14	23.35
Not significant	8	26.7	5	16.7	13	21.65

It was observed that in 32 patients cold foodstuffs aggravated the Kasa while in 14 patients Kasa aggravated during night time, followed by Exposure to cold in 42patients, in 25 patients kasa aggravated during Early morning.

16. Relieving factors

Table 37 showing the Relieving factors of cough

Time	Group A	%	Group B	%	Total	%
Hot foodstuffs	20	66.7	18	60	38	63.33
Hot environment	16	53.3	12	40	28	46.65
Day	2	6.7	1	3.3	3	5
Kaphashteevana	6	20	4	13.3	10	16.65
Not significant	10	33.3	12	40	22	36.65

Hot foodstuffs relieved the symptoms in majority of the patients i.e. in 38 patients. Kapha shteevana relieved kasa in 10 patients, where relieving factors were not significant in 22 patients. Hot environment relieved the symptoms in 28 patients.

17. Time of occurrence

Table 38 showing the time of occurrence of bouts of cough

Time	Group A	%	Group B	%	Total	%
Early morning	10	33.3	6	20	16	26.65
Afternoon	0	-	0	-	0	0
Evening	2	6.7	1	3.3	3	5
Night	4	13.3	3	10	7	11.65
Dayand night	4	13.3	3	10	7	11.65
Irregular time	10	33.3	17	56.7	27	45

Out of 60 patients, 27 patients (45%) belonged to irregular time of occurrence of bouts of cough. 16 patients (26.65%) were noted in early morning.

18. Periodicity of cough

Table 39 Showing the Periodicity of cough

Periodicity	Group A	%	Group B	%	Total	%
Seasonal	10	33.3	8	26.7	18	30
Perennial	0	-	0	-	0	-
Irregular	20	66.7	22	73.3	42	70

It was observed that 42 cases (70%) reported irregular period of cough and 18 cases (30%) reported seasonal onset.

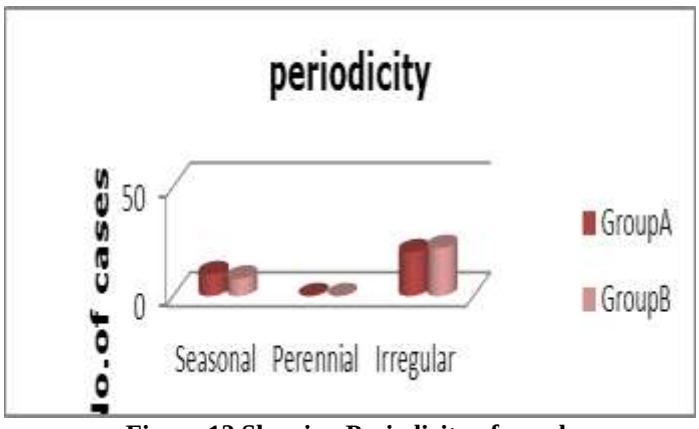

Figure 12 Showing Periodicity of cough

19. Type of cough

Table 40 Showing the type of cough

Type of cough	Group A	%	Group B	%	Total	%
Dry	10	33.3	12	40	22	36.65
Productive	20	66.7	18	60	38	63.35

Among 60 patients, 38 patients (63.35%) had productive cough and remaining 22 patients (36.65%) had dry cough.

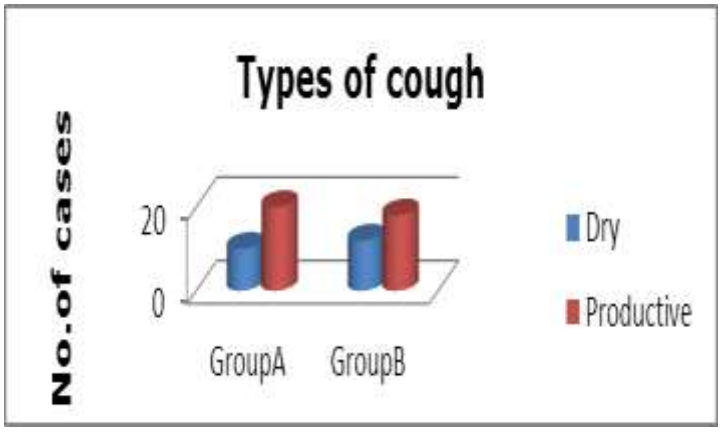

Figure 13 Showing Types of cough

20. Immunization

Table 41 Showing Immunization status of patients

	Group A	%	Group B	%	Total	%
Immunized	30	100	30	100	60	100
Unimmunized	0	-	0	-	0	-

100% immunization was observed in the patients of both the groups.

21. Prakruti

Table 42 Showing the Prakruti of the patient

DehaPrakriti	Group A	%	Group B	%	Total	%
Vata-Pitta	5	16.7	8	26.7	13	21.65
Kapha-Vata	15	50	16	53.3	31	51.66
Kapha-Pitta	10	33.3	6	20	16	26.65

Out of 60 patients, 31patients (51.66%) belonged to kapha-vata prakruti. 16 patients belonged to kapha-pitta prakruti and 13 patients belonged to vata-pitta prakruti.

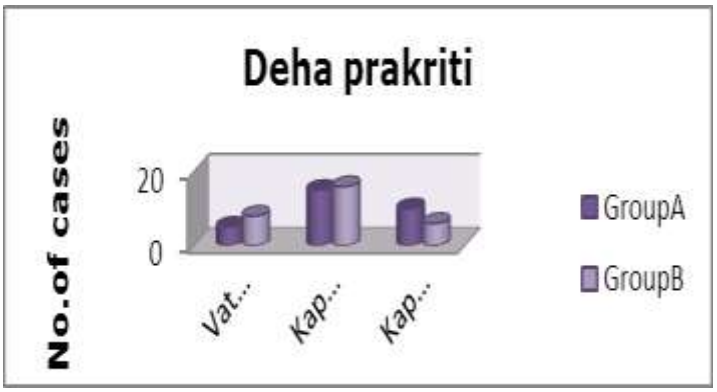

Figure 14 Showing the Prakruti of the patient

22. Agni bala

Table 43 Showing the Agni bala of the patient

Agni	Group A	%	Group B	%	Total	%
Teekshna	6	20	5	16.7	11	18.35
Vishama	10	33.3	12	40	22	36.65
Manda	14	46.7	13	43.3	27	45
Sama	0	-	0	-	o	-

Out of 60 patients, 11 patients (18.35%) & 22 patients (36.65%) were noted having teekshna and vishama agni respectively. while 27 patients (45%) had manda agni.

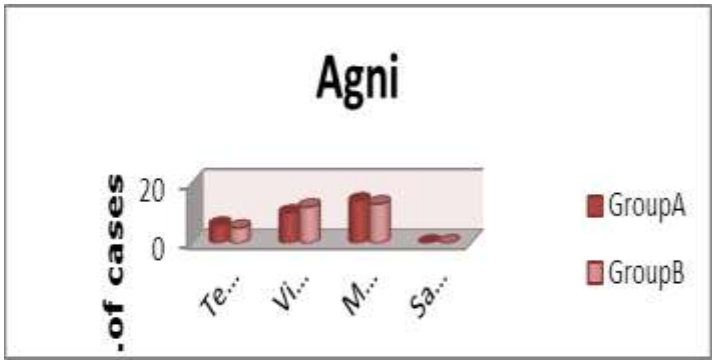

Figure 15 Showing the Agni bala of the patient

23. Throat Infection

Table 44 Showing the Presence of Throat Infection in the patient of cough

Throat Infection	Group A	%	Group B	%	Total	%
Present	20	66.7	17	56.7	37	61.65
Absent	10	33.3	13	43.3	23	38.35

Among 60 patients, 37 patients presented with throat infection along with kasa, while the rest 23 did not had any throat infection.

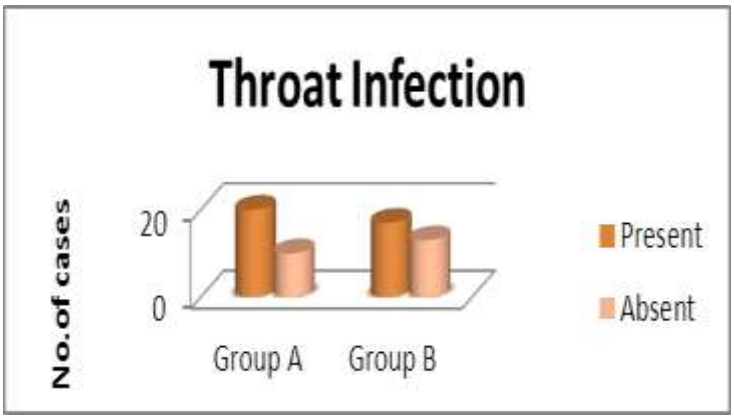

Figure 16 Showing the Throat Infection of the patient

OBSERVATION BASED ON ASSESSMENT CRITERIA

1. Number of bouts of cough

Table 45 showing the statistical analysis of number of bouts of cough before and after treatment.

No. of Bout of cough / Hour	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	1.57	0.626	0.30	0.535	4.802	<0.001 HS
Group-B	1.53	0.681	0.37	0.556	4.636	<0.001 HS

In group-A before treatment, the mean Number of bouts of cough score was found to be 1.57 and after treatment mean Number of bouts of cough score had come down to 0.30. The difference between BT and AT was highly significant. In group-B before treatment, the mean Number of bouts of cough score was found to be 1.53 and after treatment mean Number of bouts of cough score had come down to 0.37. The difference between BT and AT was highly significant.

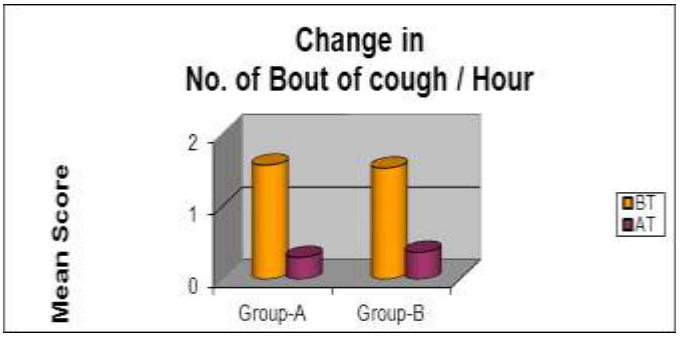

Figure 17 Showing the statistical analysis of number of bouts of cough before and after treatment.

2. Sleep Disturbance

Table 46 showing the statistical analysis of Sleep Disturbance before and after treatment.

Sleep Disturbane	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	1.17	1.085	0.43	0.626	3.999	<0.001 HS
Group-B	1.07	1.112	0.53	0.776	3.557	<0.001 HS

It was found that there was a reduction of mean sleep disturbance score from 1.17 to 0.43 in Group A which was highly significant while Group B showed a reduction of mean sleep disturbance score from 1.07 to 0.53, which was also highly significant.

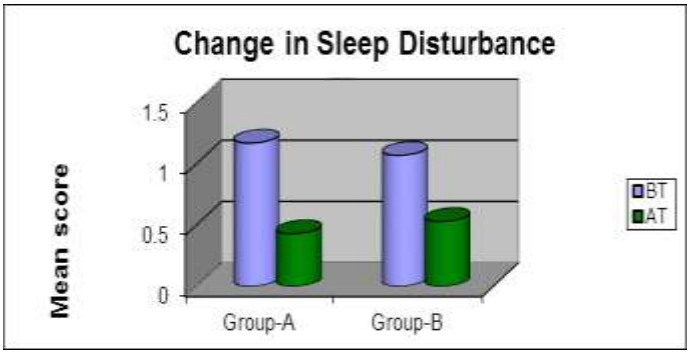

Figure 18 Showing the statistical analysis of Sleep Disturbance before and after treatment.

3. Throat Infection

Table 47showing the statistical analysis of Throat Infection before and after treatment.

Throat Infection	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	1.07	0.980	0.23	0.430	3.852	<0.001 HS
Group-B	0.90	0.923	0.67	0.844	2.111	<0.05 Sig

In group-A before treatment, the mean throat Infection score was found to be 1.07 and after treatment mean throat Infection score had come down to 0.23. The difference between BT and AT was highly significant. In group-B before treatment, the mean throat Infection score was found to be 0.90 and after treatment mean throat Infection score had come down to 0.67. The difference between BT and AT was significant.

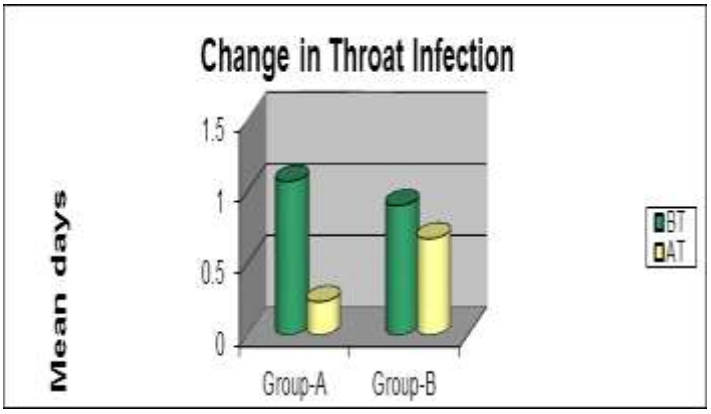

Figure 19 showing the statistical analysis of Throat Infection before and after treatment.

4. Wheezing

Table 48 showing the statistical analysis of Wheezing before and after treatment.

WHEEZING	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	0.80	1.095	0.50	0.861	2.179	<0.05 Sig
Group-B	0.70	1.022	0.47	0.819	2.333	<0.05 Sig

It was found that there was a reduction of mean Wheezing score from0.80 to 0.50 in Group A which was significant while Group B showed a reduction of mean Wheezing score from0.70 to 0.47, which was also significant.

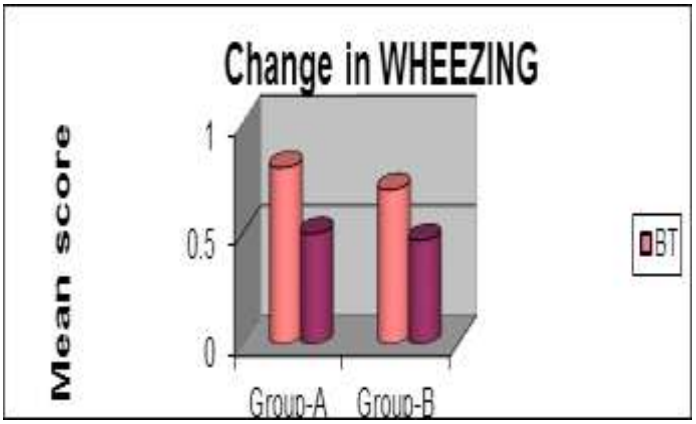

Figure 20 showing the statistical analysis of Wheezing before and after treatment.

5. Crepitations

Table 49 showing the statistical analysis of Crepitations before and after treatment.

CREPITATION	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	0.67	.844	0.20	0.484	3.5	<0.001 HS
Group-B	0.67	.711	0.17	0.379	3.638	<0.001 HS

In group-A before treatment, the mean Crepitations score was found to be 0.67 and after treatment mean Crepitations score had come down to 0.20. The difference between BT and AT was highly significant. In group-B before treatment, the mean Crepitations score was found to be 0.67 and after treatment mean Crepitations score had come down to 0.17. The difference between BT and AT was highly significant.

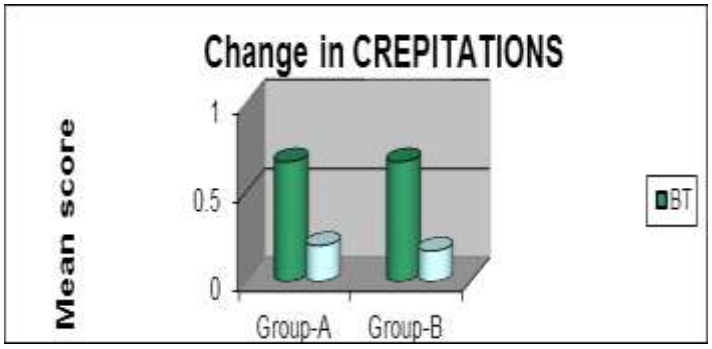

Figure 21 showing the statistical analysis of Crepitations before and after treatment.

6. Quality of sputum

Table 50 showing the statistical analysis of quality of Sputum before and after treatment.

QUALITY OF SPUTUM	BT		AT		Wilcoxon Signed Ranks Test Z	P
	Mean score	Sd	Mean score	Sd		
Group-A	1.17	1.117	0.57	0.774	3.531	<0.001 HS
Group-B	1.07	1.230	0.87	1.008	2.121	<0.05 Sig

It was found that there was a reduction of mean quality of sputum score from1.17 to 0.57 in Group A which was highly significant while Group B showed a reduction of mean quality of sputum score from 1.07 to 0.87, which was significant.

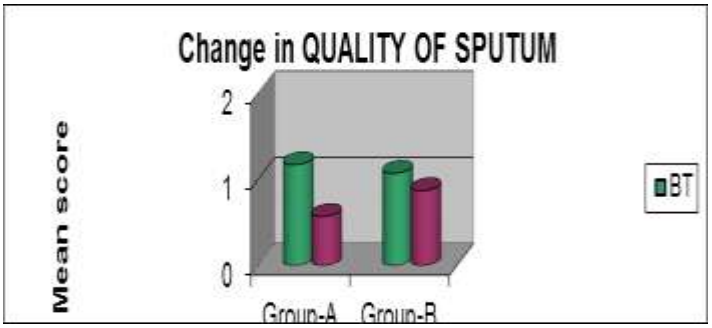

Figure 22 showing the statistical analysis of Quality of Sputum before and after treatment.

7. Laboratory Investigation Values

a) AEC

Table 51 showing the statistical analysis of AEC before and after treatment.

AEC	BT		AT		Paired t	P
	Mean AEC	Sd	Mean AEC	Sd		
Group-A	366.97	306.95	233.33	128.510	3.790	<0.05 Sig
Group-B	344.20	322.29	263.17	206.166	2.504	<0.05 Sig

It was found that there was a reduction of mean AEC score from 366.97 to 233.33 in Group A which was significant while Group B showed a reduction of mean AEC score from 344.20 to 263.17, which was also significant.

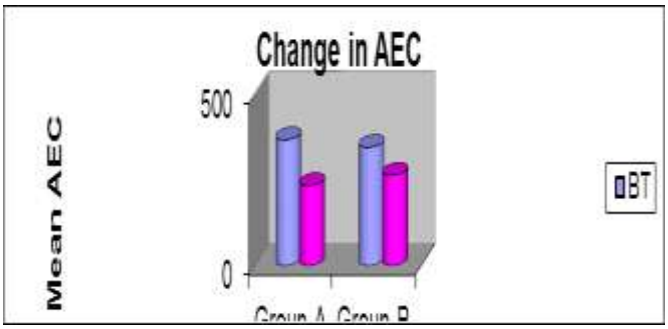

Figure 23 showing the statistical analysis of AEC before and after treatment.

b) ESR

Table 52 showing the statistical analysis of ESR before and after treatment.

ESR	BT		AT		Paired t	P
	Mean ESR	Sd	Mean ESR	Sd		
Group-A	13.10	9.517	9.27	2.463	2.768	<0.05 Sig
Group-B	12.67	8.470	10.53	5.063	2.305	<0.05 Sig

It was found that there was a reduction of mean ESR score from 13.10 to 9.27 in Group A which was significant while Group B showed a reduction of mean ESR score from 12.67 to 10.53, which was also significant.

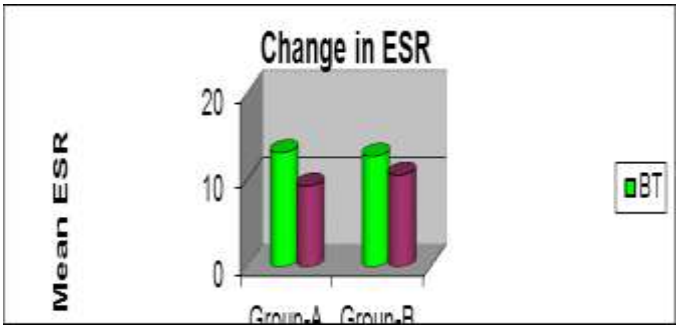

Figure 24 showing the statistical analysis of ESR before and after treatment.

DISCUSSION

The research work was conducted, to see the efficacy of Pippali churna & Bibhitaka churna in the management of kasa in children aged between 5 to 16 years. The study included total 60 patients. They were divided randomly into two groups, each group consisting of 30 patients each. The group A received Pippali churna, where as Group B was given Bibhitaka churna. The discussion on material and methods, as well as on observation and results is done below.

DISCUSSION ON MATERIAL AND METHODS

Age

The Clinical study was conducted on children of age group between 5 to 16 years as the out door activity of the child is more, child can easily communicate its complaints and the administration of churnas are easy in this group.

Selection of Drug

Many single and compound preparations have been mentioned in Ayurvedic classics for the treatment of kasa. pippali churna & Bibhtaka churna are most efficient drugs for curing the kasa mentioned in sarngadhar & vagbhat samhita respectively.

Pippali churna is very effective in curing the kasa especially occurred in children explained by sarngadhar. Bibhitaka churna is very effective in curing, all the five types of kasa explained by vagbhat. So these drugs were selected to evaluate its efficacy clinically.

Dose

The churna were administered four times (qid) a day, given in the form of lehan with madhu. It is told that frequent (muhur muhur) administration of drug will be beneficial in the disease of kasa. Dose of churna adjusted according to age (dilling formula).

Selection of Patients

Patients suffering with Kasa of duration of less than 8 days were selected for the study as they respond well to the treatment and the complications are very less and more over the patients can be managed on OPD basis itself.

Assessment Criteria

The clinical symptoms were graded to evaluate the results statistically and arrive at a conclusion.

DISCUSSION ON OBSERVATIONS AND RESULTS

Age

The present study showed that, maximum number of patients i.e 51.67% belonged to the age group of 5 – 8 yrs. This was noted because of excessive playing, maximum exposure to dust, allergens and consumption of cold foodstuffs. As these age group children are more seen mingling with other children of same age, leading to more chances of respiratory tract problems caused by droplet infection.

Sex

In the present study, it was observed that more number of patients were male children (65%) than female children (35%). This may be because of exposure to dust and allergens during high out door activities of male children.

Religion

Present study reveals that maximum number of patients (90%) belonged to Hindu community. This may be because of high Hindu residents in this locality.

Socio-economic distribution
Socio-economic distribution of patients revealed that prevalence of kasa was more (46.65%) in middle class children. This could be due to the presence of residence or the school in polluted atmosphere like dust, smoke etc. and living in a congested place without proper ventilation, which plays a contributory role in the production of kasa.

Diet
The study revealed that, maximum patients were belonging to mixed diet (85%). This may be because of usage of more oily, fried and chilly foodstuffs.

Education: Maximum 54 patients (90%) from Primary school.

Ahara Sambandhi nidana
Sheeta (48.35%), guru (35%), madhura ahara (36.65%) and abhishyandhi (40%) were predominantly seen as the nidana factor in the present clinical trail. This incidence is as a result of natural likings in children. These nidanas are kapha vardhaka by nature leading to the disease kasa.

Vihara sambandhi nidana
Exposure to cold environment (83.33%), raja (45%) and dhooma (36.65%) were predominantly seen as viharaja nidana in the present study.

The sheeta aharas like freezed water, cool drinks, ice creams, wet grapes, banana, milk & milk products, rookshaharas like roti, chapatti and bakery food stuffs made of goduma were seen as nidana factor for causing vataja kasa.

Katu, vidahi ahara up to some extent amla ahara were observed as the etiological factors for pittaja kasa.

Sheeta ahara, madhura ahara like sweets, abhishyandhi ahara like milk & milk products, excessive moistened food stuffs were noted in causation of kaphaja kasa.

The repeated exposure to similar nidanas was seen triggering the disease.

The viharaja nidanas were seen in starting the sanchaya of doshas. Sudden aggravation of the disease was noted with exposure to viharaja nidanas.

Poorva Roopa
Eliciting the poorva roopa was a task in children. As it didn't interfear with the routine work of children, the parents were unaware of these symptoms. The poorva roopa mentioned like kanthe kandoo (83.33%) was predominantly noticed in the study. It was seen in both vataja and kaphaja kasa. Sashabdha (30%) (abnormal sounds heard during breathing) was seen in vataja kasa, where as agnisada (36.65%), arochaka (45%), shooka poorana galasyata (36.65%) and bhojyanam avarodha (5%) was observed in kaphaja kasa.

Mode of onset
63.33% of patients showed gradual onset of the disease. In 21.65% of patients it was episodic. continuous & Initially episodic followed by continuous were seen in 6.65% of cases. The gradual onset was understood as the accumulation and movement of doshas in shad kriya kala.

The onset gives the clue regarding the acute and chronicity of the disease, nija and agantuka causes as well as help to find out etiology and severity of the illness.

Aggravating factors
Cold foodstuffs (53.33%) and exposure to cold environment (70%) were seen as the prime-aggravating factor. The diurnal variation like early morning and night aggravation were noted in 41.65% & 23.35% of cases respectively. The supine postures leading to obstruction of the air ways by the mucus and excessive accumulation on mucus in side the lung by sun rising time are the reasons for night and early morning aggravation of cough respectively.

Relieving Factors
Hot foodstuffs (63.33%) like hot water, coffee etc and hot environment (46.65%) were predominantly seen as relieving factors of kasa. Kaphashteevana relieved kasa in (16.65%) patients. As both of these are causing removal and liquefaction of kapha from the upper respiratory tract, they are by clearing the airways.

Time of occurrence
The occurrence of kasa at irregular time was observed in 45% of patients. Early morning and night occurrence were noted in 26.65% &11.65% of cases respectively. The children instead of taking out the sputum from the throat, they swallowed. Thus becoming the cause for repeated obstruction of the airways leading to irregular onset of cough.

Periodicity of cough
Irregular periodicity (70%) was seen in present clinical trial. This incidence is inferred as the predominance of kapha in childhood and repetitive involvement of children in etiological factors.

Type of Cough
63.35% patients had productive cough and remaining 36.65% had dry cough. Productive cough was seen in kaphaja and pittaja kasa and dry cough was seen in vataja kasa. As sheeta, snigdha, madhura, abhishyandhi ahrara sevana is predominantly seen with the aggravating nidanas like raja and dhoomopaghata caused more of productive cough.

Immunization
100% immunization was observed in both the groups of patients. It is due to the increased awareness of Immunization.

Prakruti
31 patients belonged to kapha-vata prakruti. 13 belonged to vata-pitta prakruti and 16 belonged to kapha pitta prakruti. This gives the idea about occurrence of more kaphaja and vataja kasa in the present study.

Agni
11(18.35%) patients & 22(36.65%) patients were noted having teekshna and vishama agni respectively, while 27 patients (45%) had mandagni.

Throat Infection
The present incidence shows that maximum number of patients (61.65%) had throat infection associated with kasa. This is a common phenomenon in school going children.

Diagnosis
The kaphaja kasa (45%) was predominantly seen among the patients of kasa in the present study. The second larger being vataja kasa (36.65%) and pittaja kasa (18.35%) was least to be seen in the study.

This incidence could be as the children are having kapha predominance and indulge in kaphakara ahara vihara dominantly. Increase in exposure to raja, dhooma and excessive playing could be the reason for vataja kasa which is seen in 22patients.

Shushka kasa (100%), parshwa shoola (81.81%), ura shoola (100%) shira shoola (86.36%), swara bhedha (50%) and hruth shoola (36.36%) was elicited in the patients of vataja kasa. Eliciting Kruchrena alpa kaphashteevana became bit difficult due to swallowing of sputum by the children.

In the patients of pittaja kasa peeta nishteevanam (63.63%), trishna (100%), daaha (100%) and aruchi (81.81%) were predominantly observed. The lakshanas like moha and urodhooma was not seen in any of the patients.

Lakshanas of kaphaja kasa were easily explained by the parents and elicited. Peenasa (100%), mandagni (100%), bahula, madhura, snigdha, Ghana kapha shteevana (100%), shareera guruta (48.14%) and aruchi (81.81%) were noted in most of the patients. Asya madhurata, vamana and loma harsha were not seen prominently.

Number of bouts of cough
In both the groups 'p' value<0.001 hence the difference between BT and AT was highly significant. Both the chruna are equally effective in reducing the number of bouts of cough in children.

Sleep Disturbance
In both the groups 'p' value<0.001 hence the difference between BT and AT was highly significant. The cough disturbing the sleep of the child was reduced within 3 to 4 days of treatment with both the churna in all the varieties of kasa.

Throat Infection
Group A showed reduction of mean Throat Infection score from 1.07 to 0.23 with p value < 0.001 hence result was highly significant while Group B showed a reduction of mean Throat Infection score from 0.90 to 0.67 with p value <0.05, which was significant. Pippali churna is more effective in reducing the throat infection than Bibhitaka churna. The commonly seen throat infections were Tonsillitis and Oro-Pharyngitis.

Wheezing
It was found that there was a reduction of mean Wheezing score from 0.80 to 0.50 with p value < 0.05 in Group A which was significant.

while Group B showed a reduction of mean Wheezing score from 0.70 to 0.47, with p value <0.05 which was also significant. Both the chruna are equally effective in reducing the Wheezing.

Crepitations
In both the groups 'p' value<0.001 hence the difference between BT and AT was highly significant. Both the chruna are equally effective in reducing the crepitations.

Quality of Sputum
The sputum was seen in kaphaja and pittaja kasa. There was dry cough in vataja kasa. It was found that there was a reduction of mean quality of sputum score from 1.17 to 0.57, with p value <0.001 in Group A which was highly significant while Group B showed a reduction of mean quality of sputum score from 1.07 to 0.87, with p value <0.05 which was significant. Hence Pippali churna is more effective in reducing the Quality of Sputum than Bibhitaka churna.

Laboratory Investigation Values
It was found that there was a reduction of mean AEC score from 366.97 to 233.33, with p value <0.05 in Group A which was significant while Group B showed a reduction of mean AEC score from 344.20 to 263.17, with p value <0.05 which was also significant. Hence both churna are equally effective in reducing the AEC.

There was a reduction of mean ESR score from 13.10 to 9.27, with p value <0.05 in Group A which was significant while Group B showed a reduction of mean ESR score from 12.67 to 10.53, with p value < 0.05 which was also significant. Hence both churna are equally effective in reducing the ESR.

Follow Up
All the patients were followed up for the recurrence of kasa and its associated symptoms after 15 days. None of the treated patients were observed with recurrence of kasa or its associated symptoms.

CONCLUSIONS

Based on the observations and results of the study, the following conclusions can be drawn.

- Sheeta Ahara was nidan in 29 patients. Madhura Ahara was found as the cause in 22 patients where as Guru Ahara was found as Nidana in 21 patients. Abhishyandhi ahara and sigdha ahara was nidana in 24 patients and 14 patients respectively.
- Maximum of 50 patients had sheeta vihara as the nidana for kasa, Where as rajo upaghata and dhoomopaghata was found in 27patients and 22 patients respectively.
- Kanthe kandu was evidently seen in 50 patients as the poorva roopa of kasa. Sashabdha (abnormal sound in lungs) and agnisada were seen in 18 patients & 22 patients respectively. Shooka poorna galaasyata and arochaka was seen in 22 patients & 27 patients respectively.
- Out of 60 patients from both groups, 22 patient belonged to vataja kasa, 11 belonged to pittaja kasa and 27 belonged to kaphaja kasa.
- Pippali churna is more effective than Bibhitaka churna in reducing the throat infection & quality of sputum.

REFERENCE

1. Abhimanyu Kumar; Child health care in Ayurveda, Sri Satguru Publications, Delhi, 1st Edition, 1999; 158, 233, 234, 235.
2. Agnivesha, Charakasamhita (Hindi Commentary by Vidyothini), Chaukamba Bharati Academy Publication, Varanasi, Volume I, Reprint 2001; 713.
3. Agnivesha, Charakasamhita with English Translation by Bhagwandash (R.K. Sharma), Volume IV, Chowkamba Sanskrit Series Office, Varanashi, II Edition, 2000; 157-201.
4. Annonymous, Yogaratnakara with Vaidyaprabha, Hindi Commentary, Dr. Indradevi Tripathi and Dr. Daya Shankar Tripathi, Krishnadas Academy, 1st Edition, 1998; Varanasi, 317-334.
5. Arunadatta, Astanga hridaya, Sarvanga Sundara Vyakya, Vaidya H.P. Krishnadas Academy of Varanasi, 1995; 575-602.
6. Bhela, Bhela Samhita, Sharma P.V., Chaukambha Vishwabharati, Varanasi, 1st Edition, 2000; 146-150.
7. Bhava Misra; Bhavaprakash Vidyotini, Hindi Commentary, Choukambha Sanskrit Sansthan, Varanasi, First Edition, 1993; Part II.
8. Brahmanand Tripathi, Astanga Hridaya, Nirmal Hindi Commentary, Edr. Bramhanand Tripathi, Chaukamba Sanskrit Pratisthana, Delhi, 1st Edition, 1999; 586-608.
9. Barbara Baes, To Guide Physical Examination & History taking, J.B. Lippincott company, East Washington, 6th Edition, 1995; 229-240.
10. Braunwald Harrison's Principle's of Internal Medicine, Vol. II, McGraw Hill Medical Publications, 15th Edition, pp. 203-204.
11. Bouchier A.D., Index of Differential Diagnosis, Ian A.D. Boucher, Horald Ellis, Peter R. Fleming, Butterworth, Heinemann, Linacsa House, Jordan Hill Oxford, pp. 129, 134.
12. Chakrapani, Charakasamhita, Edition IV, Vaidya Yadavaji Trikamji Acharya, Chaukamba Sanskriti Sansthan Publisher, Varanasi, 1994; 539-541.
13. Christopher Halsett et. al., Davidson's Principles of Medicine, Edtr. Christopher Halsett et.al,. Churchil Livingstone, U.K. 18th Edition, 1999; 332-333.
14. Chaudri, Concise Medical Physiology, New Central Book Agency, Calcutta, 3rd Edition, 2000; 151.
15. Dalhana, Sushruta Samhita, Nibandha Sangraha Sanskrit Commentary, Editor Jadavaji Trikamaji Acharya, Chaukambha Surabharati Prakashana, Varanasi, Reprint, 1999; 765-770.
16. Devendranath Misra, Koumarbhritya, Devendranath Misra, Choukambha Vidyabhavana, Varanasi, 2002; Edition, 504.
17. Elizabeth K.E., Fundamentals of Pediatrics, Paras Publications, Hyderabad, 2nd Edition, 2002; 261.
18. Guyton & Hall, Textbook of Medical Physiology, Estreen Press, Bangalore, 9th Edition, 2001; 481.
19. Gangadhar, Charaka Samhita, Part IV, Chaukamba Orientalia, Varanasi, 1st Edition, 1999; 3034, 3068.
20. Ghai. O.P., Essential Pediatrics, Interprint Publication, New Delhi. IV Edition, 1996; 273, 274.
21. Govindadas, Bhaishajya Ratnavali, Shashri R.D., Chaukamba Sanskrit Bhavana, Varanasi, 13th Edition, 1999; 315, 329, 540.
22. Indu, Astanga Sangraha, Shashilekha Sanskrit Commentry, Athavale A.P. Shrimad 1980, Atreya Prakashana, pp. 22, 26.
23. Kirtikar & Basu, Indian Medical Plants, Editor Blatter E, Cailus J.F., International Book Distributors,9/3 Rajapur Road, Dehradun., 2nd Edition, pp. 64, 38, 396, 263.
24. Madhavakara, Madhavanidana, Madhukosha Sanskrit Commentary with Vidyotini Hindi Commentary Part II, Prof. Yadunandana Upadhayaya. 25th Edition, 1995; Part I: 270, 281.
25. Mark R.D., CIMS 5 Minute Clinical Assist, Bio-Gard Private Limited, Bangalore1st Indian Edition, 1996; 158, 159.
26. Monier Monier William, A Sanskrit English Dictionary, Motilal Banarasidas Publishers Private Limited, Delhi. 5th Edition, 1997; 281.
27. Nelson, Text Book of Pediatrics, Reed Elsevier India Private Ltd, New Delhi, 17th Edition, 2004; 835 – 1195, 1401 – 1474.
28. P.G. Mehta's, practical medicine, Hari Bhavan, Mumbai, 15th Edition, 2001; 3.
29. Praful B. Godkar, Text book of medical laboratory technology, 4th Edition, 2001; 613, 612.
30. Partha Sarathy .A, IAP Textbook of Pediatrics, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi. II Edition, 2002; 723.
31. Raju C.M.M - The Effect of Drakashadichurna in Kasa – An observational study, 2002.

32. Ranjith Roy Desai, Nidana Chikitsa Hastamalaka, Printed by Bidyanath Ayurveda Bhavan, Allahabad, Part-IV, 1st Edition, 1975; 1-118.
33. Satoskar, R.S., Pharmacology and Pharmacotherapeutics, 2002, Popular Prakashana, Mumbai, Revised 17th Edition, pp 307-312.
34. Sainani G.S., API Text Book of Medicine, Published by Association of Physicians of India, Bombay, 5th Edition, 1997; 214, 304.
35. Sharangadhara, Sharangdhara Samhita (English Translated by Srikantamurthi) Chaukhamba Orientalia, Varanasi, IV Edition, 2001.
36. Shastry V.L.N.; Kaumarbhrityam, Ramani Publications, Andra Pradesh, 1st Edition, 2003; 216.
37. Sharma P.V., Dravya Guna Vijyana, Vol. II, Chaukamba Bharati Academy, Varanasi, Reprint, 2001.
38. Stedman's, Medical Dictionary, Scientific Book Agency, Calcutta, 21st Edition, 1966; 375.
39. Tiwari. P.V., Kashyapa samhita text book (English translation) Varanasi, Chaukamba Vishwa Bharathi Publications. 1st Edition, 1996; 206.
40. Tripathi K.D, Essentials of Medical Pharmacology, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, 4th Edition, 2001; 222 – 225.
41. Vaidya V. Gogate, Ayurvedic Pharmacology & Therapeutic use of medical plants, Mumbai, 2nd Edition, 1997.
42. Wayne Harris, Examination Pediatrics, 1993, Jaypee Brothers, P.B. No. 7193, New Delhi, 1st Indian Edition, pp. 306.