

## **MANAGEMENT OF DOSHIKA KASA IN SUB-ACUTE AND CHRONIC STAGE WITH VYAGHRI HARITAKI AVALEHA IN CHILDREN**

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### **Abstract**

Respiratory Tract Infections (RTI) accounting about more than 50% of patients attending pediatric OPD as cough is the most frequent symptom of respiratory diseases majority of the patients' present recurrent cough as the manifestation of recurrent respiratory disease. From the Ayurvedic point of view, the descriptions about the disease Kasa clearly correlates with cough. Moreover the pathophysiology of Kasa almost exactly correlates the mechanism of cough reflex. It is important to treat any disease in childhood age at the earliest as it may hamper the Growth and development of child. Long standing disease affects the immunity and chronicity of the Kasa leads to Kshaya which has multi-system involvement. Due to disease, school absenteeism and expenditures of medicine are the burden on the society. As Kasa is Kapha-Vata predominant disorder, Ayurvedic medicine may help to decrease the recurrence, improve immunity, and check symptoms naturally. With this aim, clinical study was undertaken on Kasa in sub-acute and chronic stage for duration of 4 weeks and also with follow-up of 4 weeks. The drug Vyaghri Haritaki Avaleha was given orally with luke warm water. All the patients were kept under strict Pathyapalana (dietary & life-style modification) during the treatment. The observation on effect of therapy was encouraging and showed less recurrence.

**Key words:** Vyaghri Haritaki Avaleha; Kasa; Respiratory Tract Infections; Cough.

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## INTRODUCTION

Respiratory complaints are well defined clinical condition in contemporary medical science. They are classified under the broader heading of Respiratory Tract Disorders, which is group of different symptoms & diseases. Thus Respiratory Tract Infections (RTI) accounting about more than 50% of patients are attending pediatric OPD in developing and even developed countries worldwide.<sup>[1][2]</sup> As cough is the most frequent symptom of respiratory diseases,<sup>[3]</sup> majority of the patients' present recurrent cough as the manifestation of recurrent respiratory disease. In Ayurvedic point of view descriptions of disease Kasa clearly correlates with cough. Moreover the pathophysiology of Kasa almost exactly correlates the mechanism of cough reflex.<sup>[4]</sup>

As per World Health Organization, as top five cause for death in year 2011, birth asphyxia cause 11% but severe infection lead with 26% death in child mortality rate up to 4 year age group,<sup>[5]</sup> in toddler age child starts to take part in external activities and outdoor games so they are prone to infection because of dust, fume, allergic substance etc. World Health Organization (WHO) have produced lot of data on respiratory diseases, which shows special relation between indoor air pollution and cooking sources especially in rural India,<sup>[6]</sup> as well as in urban area pollution from industry, vehicles, tobacco smoke exposures to air, exposure to allergens have been correlated with airway hyperactivity in several studies.

Since Kapha Dosha is dominating in childhood and Kapha Dosha is one of the causes in the production of Kasa. Further it has been observed in the Kaumarbhritya OPD that the incidence of Respiratory Infection presenting with Kasa Roga is more. Early intervention is necessary in case of Kasa as it is a potential Nidanarthakara Vyadhi (causative factor for another disease) to

produce Kshaya (emaciation).<sup>[7]</sup> Also it is important to treat any childhood period at the earliest as it may hamper the proper Vriddhi (Growth and development) of child which is clearly described by Acharya Charaka, that Avighata (dis-interruption) as Shareera Vriddhikara Bhava (i.e. Vighata hinders Shareera Vriddhi).<sup>[8]</sup> As per Acharya Vagbhat - Kase Nidigdika (Solanum surattense Burm.) means drug of choice for cough. For that Vyaghri Haritaki Avaleha, - a polyherbal Ayurvedic compound has been in use since ages, and has been found to be useful in treating respiratory disorders and promoting health.<sup>[9]</sup> Considering all these points the present work was taken to evaluate the efficacy of Vyaghri Haritaki Avaleha on Vataja, Pittaja and Kaphaja – Doshika Kasa in sub-acute and chronic stage.

## MATERIALS AND METHODS

The study was started after Ethical clearance by Institutional Ethics Committee, Vide: Ref-PGT/7-A/Ethics/2012-2013/1964 dated on 21/09/2012 and also registered in Clinical Trials Registry – India (CTRI). The registration number is CTRI/2013/03/003475 [Registered on: 12/03/2013] - Trial Registered Retrospectively. Total 25 patients of Doshika variety of Kasa were registered from Outpatient Department of Kaumarabhritya, Post Graduate Hospital, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. Out of 25 patients 23 completed the prescribed course of treatment.

### Plan of study

A simple randomized open ended clinical trial with drug Vyaghri Haritaki Avaleha was planned.<sup>[10]</sup> Ingredients and method of preparation of the drug is mentioned in Table 1 & Figure 1 respectively. Dose was fixed according to Young's rule - Adult dose (Child age / Child age + 12). Dose of Avaleha in classics is mentioned for adults is 1 Pala (48

g), so dose was fixed according to Young's formula as compared to adult dose of Avaleha as 1 Pala (48 g). Dose as per age mentioned in Table 2. Time of administration was Abhakta (empty stomach) twice a day with Koshna Jala (Luke warm water). Duration of treatment was 4 weeks and follow up of 4 weeks. Patients were given specific instruction on Pathyapathya (diet and lifestyle modification) as per the disease.

### **Inclusion criteria**

Children of both sex belonging to age group 3 to 12 years, patient presenting with the classical symptoms of Kasa as per their Dosha variety (Vatika, Paitika, Shleshmika) since 2 weeks.

### **Exclusion criteria**

Age below 3 years and above 12 years, patient presenting with symptoms of Tamaka Shwasa (Bronchial asthma), Kshayaja & Kshataja Kasa, patient presenting with Pneumonia, COPD, Emphysema, Diphtheria, Pertusis, patient associated with systemic illness such as TB, HIV, and other chronic debilitating diseases.

### **Investigations**

Routine blood examination (Hb%, TC, DC, ESR) and AEC (absolute eosinophil count) were carried out in all the patients before initiating the administration of the drug and after completion of course of treatment.

### **Assessment criteria**

Subsidence of the clinical signs and symptoms i.e. Shushka Kasa (dry cough), Peetanishthivana (yellow sputum), Sweta Khapanishthivana (white sputum), duration of bouts of cough, frequency of bouts of cough, rhonchi, crepitation etc; absence of recurrence during follow-up, changes in general health

conditions, changes in hematological parameters. The result in the clinical study was analyzed on 23 patients by applying paired 't' test on all the signs and symptoms mentioned in assessment criteria. The difference of individual score SD was calculated with Standard Error in Mean (SEM). These data are shown as Mean  $\pm$  SEM, to quantify the percentage of improvement in each patients, it was calculated using the formula  $(BT-AT)/BT \times 100$  except Sharira upachaya (Body weight) and Hb%, for these two parameters formula was  $(AT-BT)/AT \times 100$ .

### **Effect of therapy**

In each patients' individual statistical analysis, results less than 25% as unchanged, 26 to 50% as mild positive response, 51 to 75% as moderate positive response, 76 to 99% as marked positive response and 100% as cured, complete remission of sign and symptoms were evaluated.

## **RESULTS AND DISCUSSION**

### **Age**

Maximum number of patients found in age group 6-9 years (44%) as they are more susceptible for infections from play schools, schools and unhygienic eating habits.<sup>[11]</sup> (Table 3)

### **Sex**

Maximum number of patients (72%) was male. No relation between the gender and Kasa has been established in the classics. Similarly, in the modern era also, no such relation has been established.

Male children tend to suffer more, since they have smaller air ways for a given lung size, which is independently inherited in addition to the fact that boys have a higher incidence of respiratory infections during childhood.<sup>[12]</sup> (Table 3)

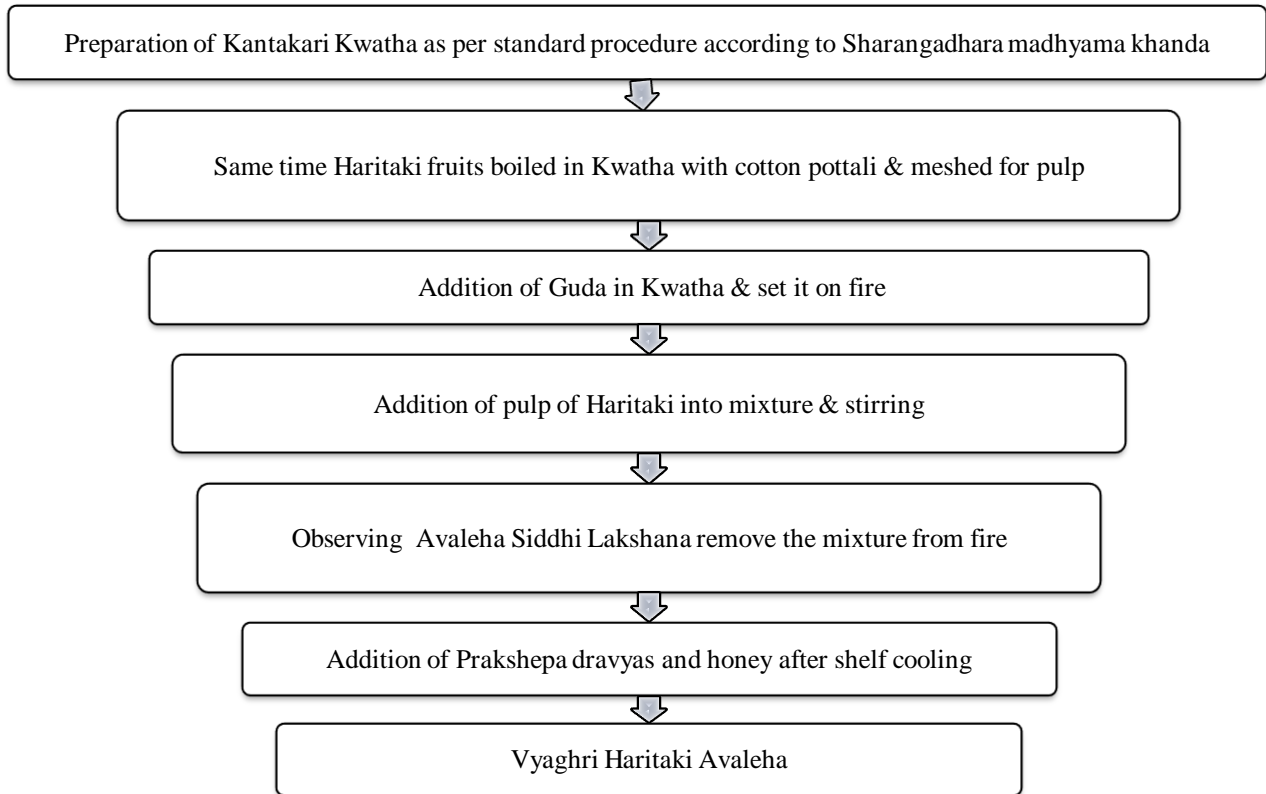
**Table 1: Contents of Vyaghri Haritaki Avaleha**

Sanskrit Name	Botanical Name	Parts Used	Parts
Kantakari	<i>Solanum surattense</i> Burm.	Whole plant (Fresh)	100
Haritaki	<i>Terminalia chebula</i> Retz.	Fruit rind (Dry)	50
Shunthi	<i>Zingiber officinale</i> Roxb.	Rhizome (Dry)	2
Maricha	<i>Piper nigrum</i> Linn.	Fruit(Dry)	2
Pippali	<i>Piper longum</i> Linn.	Fruit (Dry)	2
Twak	<i>Cinnamomum zylanicum</i> Breyn.	Bark (Dry)	1
Tejapatra	<i>Cinnamomum tamala</i> Nees & Eberm	Leaf (Dry)	1
Ela	<i>Elleteria cardmomum</i> Maton	Fruit (Dry)	1
Nagakesara	<i>Mesua ferrea</i> Linn.	Stamen (Dry)	1
Guda (Jaggery)			100
Madhu (Honey)			6

**Table 2: Dose as per age**

Age in Years	Dose per day (Divided in 2 doses)	Age in Years	Dose per day (Divided in 2 doses)
3	8 g	8	16 g
4	10 g	9	17 g
5	12 g	10	18 g
6	13 g	11	19 g
7	15 g	12	20 g

**Figure 1: Method of preparation for Vyaghri Haritaki Avaleha**



### **Religion**

Maximum number of patients (88%) was Hindus because the study was conducted in city Jamnagar which is Hindu dominant area. (Table 3)

### **Education**

Maximum number of patients (84%) was school going. They are more susceptible for infections from play schools, schools and unhygienic eating habits.<sup>[13]</sup> (Table 3)

### **Parental education**

48% parents of the patients were graduate while 52% parents were found under-graduate[up to Sec. (28%) & up to Higher sec. (24%)] which might have caused the disease due to their less awareness of habits like hygiene, dietary habits like Ajirashana (eating during indigestion) etc., deranged Dinacharya (proper daily routine) & Rutucharya (proper routine according to season) of children. (Table 3)

### **Socio-economic status**

Maximum number of patients (80%) were from upper middle class family where the child is pampered more and improper food habits like more of ice-creams & chocolates etc. are given which lead to Nidanasevana (causative factors) & lead to recurrent health problems. (Table 3)

### **Family status**

Parents from nuclear family (40%) were more aware of infections & disease in children and so strictly followed Pathyapathya (diet and lifestyle modification) during the study which was helpful.

In patients from joint family (60%) more pampering was found from grandparents &

exclusive consumption of chocolates, ice-creams etc. were noted as causative factors. Improper food habits also were found more in these patients. (Table 3)

### **Residence area**

Patients were more from urban area (88%), where infections spread easily due to congested population. Animal dung and nearby municipality dustbins also affect immunity & recurrent health problems.

During the study it was found that, the children who migrate to urban from rural areas, begun to experience a much higher prevalence of respiratory complaints when followed over a period than similar children who remain in the rural areas. (Table 3)

### **Birth weight**

Normal birth weight was found in maximum (72%) patients while Low Birth weight (08%) was found in the patients, where immaturity of body systems & low immunity are more susceptible towards infections which affects in pre-school age and earlier stage of life. (Table 3)

### **Perinatal History**

Illness of mother during pregnancy and 1<sup>st</sup> week of life of child affect response to infections in child. In study normal Perinatal History was found in maximum (96%) patients. (Table 3)

### **Immunization History**

Maximum (96%) patients were properly immunized up-to their age, suggesting absence of relation between the disease and immunization as it only stimulates specific immunity towards particular disease. (Table 3)

**Table 3: Demographic Data of observation**

Observations	Result Max. (%)	Observations	Result Max. (%)
Age (6-9 years)	44	Pratishyaya (Rhinitis)	92
Sex (Male)	72	Associated Symptoms – Nasal Discharge	60
Religion (Hindu)	88	Crepitation	56
Education (School going)	84	Chronicity ( 2 to 3 weeks)	48
Paternal education (Graduate)	48	History of present illness - Recurrent Cough	76
Socio-economical status (Upper middle class)	80	Mode of onset- Gradual	88
Family status (Joint)	60	Periodicity –Rutu sandhi (Seasonal)	92
Residence (Urban)	88	Treatment in last 2 weeks (Modern)	60
Birth History- Full Term Normal Delivery	68	Srotas Involvement – Rasavaha + Annavaha + Pranavaha	100
Birth weight (2.5 to 3 kg)	72	Doshapradhanya – Vata	44
Perinatal History – Normal	96	Dushya – Rasa dhatu	100
Immunization History – Proper	96	Vyadhi prakruti – Chirakari	52
Developmental History – Proper	92	Sadhyata – Kruchhrasadhya	56
Diet type – vegetarian	80	Prakruti – Vata-Pittaja	44
Rasa dominant diet – Madhura	100	Agni – Vishama	52
Guna dominant diet – Guru	96	Sara – Madhyama	72
Aaharaja Nidana – Guru aahara	96	Samhanana (built) – Madhayama	72
Snigdha aahara	80	Satmya (homologation) – Avara	72
Diet habit – Samashana	84	Satva (mental strength) – Avara	88
Viharaja Nidana – Dhoomopaghata	88	Aaharashakti (capacity of food intake) – Avara	92
Rajopaghata	84	Desha – Sadharana	80
Aggravating factors – ice-cream	40	Vyadhi kala (period of exacerbation ) – Sharada	44
Chocolate	28	Vyadhi prakara (type of disease) – Vataja	56
Poorvarupa – Shookapoorna galasyata	84	Relieving factors – Ushnodaka (warm water)	48
Chief complaints – Kasa pravrutti (Coughing)	92	Tulasi swarasa (juice of Ocimum sanctum Linn.)	32

### Dominant Rasa (taste) & Guna (property) in diet

Increased use of Madhura Rasa (sweet taste) in diet was found in 100% patients. Especially fruit-jam, Jaggery with Ghrita (clarified butter) and sweets as common components of their routine food which increase Kapha and lead to Rasavaha and Annavaha Srotasadusti as Vyanjaka Hetu (exciting cause) in development of disease.<sup>[14]</sup> (Table 3)

### Aaharaja Nidana

Patients with Guru (heavy) (96%) & Snigdha (oily) (80%) quality dominant diet were having Kaphapradhana symptoms whereas those with Abhishyandi (deflective) (76%) & Shita (cold) (64%) quality dominant diet was found to have Vatapradhana symptoms by creating the Srotorodha (blocking the channels) and vitiate the normal path of Vata. While Guru Property which is heavy for digestion hampers the function of Agni.

All Aaharaja Nidana (dietary causes) mainly acts as Utpadaka (predisposing) as Vyanjaka Hetu (exciting cause).<sup>[15]</sup> Improper food habits like Vishamashana (64%) and Samashana (84%) cause Aama formation which leads to Annavaha & Rasavaha Srotodushti.<sup>[16]</sup> (Table 3)

#### **Viharaja Nidana (daily regimen causes)**

Rajopaghata (exposure to dust) (88%) and Dhoomopaghata (exposure to smoke) (84%) act as allergens and predisposing factors. Raja (dust) and Dhooma (smoke) contain number of allergens which adds to chronic airway inflammation in airways. Swapnavicheshta (wrong habits for sleep) (68%) was found very common due to habit of watching television late night during vacations while patients going to afternoon schools woke-up late in the morning which affects general health. Divaswapa (day sleep) (44%) leads to Doshaprakopa which is an important factor for manifestation of the disease. (Table 3)

#### **Aggravating factors**

Ice-cream (40%) and Chocolates (28%) were found as main triggering factors while Vatasevana (exposure to air) (12%) due to direct exposure to fan and traveling were reported in patients, suggestive of Sannikrushta Nidana (triggering causative factors) in manifestation of the disease.<sup>[17]</sup> Among the Nidana (causative factors) Biscuits (12%), Fruits (28%), Cake (16%), Dadhi (curd) (4%) were listed and also on the basis of attribute of commonly used food articles. Allergens of various types and chemical nature may act as exciting causes and produce respiratory complaints labelled as allergic conditions. In that conditions common symptom of cough found which was clearly correlated with disease Kasa. (Table 3)

#### **Poorvarupa (premonitory signs)**

Galalepa (sticky feeling in throat) (68%) and Talulepa (sticky feeling in palate) (64%) both were found as Kapha Nanatmaja Vyadhi (disease produced by only vitiated kapha) which may be symptoms of Aama produced by Rasavaha and Annavaha Srotodushti.<sup>[18]</sup> Kanthe Kandu (itching sensation in throat) (32%) and Shookapoornagalasyata (pricking sensation in throat) (84%) were found; and these are as a result of involvement of Doshas viz. Vata and Vata-Kapha, act as irritant for upper respiratory tract. (Table 3)

#### **Chief Complaints**

Kasa pravrtti (cough reflex) (92%) and Pratishtyaya (rhinitis) (92%) were found where Pratishtyaya (rhinitis) suggests Rogasya Nidanarthkartva (one disease become cause for another disease).<sup>[19]</sup> Long standing Pratishtyaya (rhinitis) causes the Khavaigunya in Pranavaahasrotas. It is helpful in manifestation of the Kasa. Jwara (fever) was found in 60% patients because of the chronicity of disease and infections spread to respiratory tract. (Table 3)

#### **Associated symptoms**

Nasal discharge (60%) and Nasal congestion (32%) which suggests the affected upper respiratory tract. Rhonchi (40%) and Crepitations (56%) during examinations suggest infections spread to lower respiratory tract. (Table 3)

#### **Chronicity**

48% patients were affected from 2-3 weeks which suggests the Sub-acute stage of the disease. 32% patients were affected from 3-4 weeks & 20% from more than 4 weeks suggestive of chronic stage of the disease i.e. Chirakari (chronic) nature of disease. (Table 3)

### **History of present illness**

76% patients were suffering from recurrent cough which suggests history of past illness & low immunity to factors affecting Respiratory tract. (Table 3)

### **Mode of onset**

In 88% of patients Gradual onset of Kasa was found which suggests Chayapoorvaka Doshaprakopa (Dosha vitiation after aggregation). (Table 3)

### **Periodicity**

In 92% patients had prone state of complaint during Rutusandhi (time of changing season one to another) was observed, as they had no ideas of Rutucharya (proper routine according to season). (Table 3)

### **Treatment taken in last 2 weeks**

All patients (100%) had taken treatment for Kasa for 2 weeks before enrolling in the study. Among them 60% had taken modern medicines still complaints were not dissolved due to strong and deep pathogenesis of the disease. (Table 3)

### **Dosha-Dushya and Srotas Involvement**

Vata (44%) and Vata-Kapha (36%) Dosha pradhanya was found while Rasa Dhatu as Dushya was found in 100% of patients. The disease is caused by vitiation of Vata-Kapha Dosha. Involvement of Rasavaha, Annavaha & Pranavaha Srotasa was found in 100% patients leading to Vyadhi-Samprapti (manifestation of disease). Vitiating Vata and Kapha Dosha gets Samoorchhana (involved) with Rasa Dhatu in Kaphasthana (cough dominant place) produce Sanga Janita Srotodusti (manifestation due to obstruction in channels), which obstruct the flow of Prana Vayu and ultimately manifest as Pranavaha

Srotos Pradushti Lakshana (respiratory tract complaints). (Table 3)

### **Vyadhi prakruti (nature of disease) & Sadhyata (prognosis)**

The disease was extended to three Srotas (channels) & also 52% patients had a Chirakari nature (sub-acute & chronic stage), so it comes under Kruchchhasadhya (difficult to cure) stage of prognosis.<sup>[20]</sup> (Table 3)

### **Dhashavidha parikshya bhava**

#### **Prakruti**

Vata-Pitta dominancy was found in 44% patients. In 36% patients Vata-Kapha Prakruti was found. These qualities of Prakruti are favorable to the Dosha which is dominant in body.<sup>[21]</sup> (Table 3)

Madhyama Sara was found in 72% of the patients. Due to immature Dhatu difficult to analyzed Sara. Still, an attempt was done on the basis of current behaviour, physical features, other physical characters etc.<sup>[22]</sup> (Table 3)

Madhyama Samhanana (medium built) in 72% and Sama Pramana in 100% of patients. Satmya (homologation) was found Avara in 72% patients due to their choosy nature for taste and pampering in food habits. Avara Satva (low mental strength) was found in 88% patients because the subject for study is 3 to 12 years age-group. All children are sensitive and have comparatively low tolerance. (Table 3)

Avara Aaharashakti (low capacity for food intake) was found in 92% patients which was a result of Mandagni (48%) & Vishamagni (52%). While Avara Vyayamashakti (low capacity for exercise) was found in 96% of patients due to chronicity of the disease and Balakshaya (loss of physical strength). 80% of



the patients were found from Sadharana Desha (general habitat). (Table 3)

As Vyadhi Kala (period of exacerbation) Sharada (autumn) (44%), Vasanta (early winter) (32%) and Shishira (late winter) (20%) were found. Winter is time for Kapha sanchaya (accumulation of cough) as favorable to manifestation of disease Kasa. These are the factors disease was found in the period.<sup>[23]</sup> (Table 3)

### **Vyadhi prakara (type of disease)**

Maximum (56%) patients had Vataja Kasa while Kaphaja Kasa was found in 24% patients while 20% patients had Pittaja Kasa. Main vitiated Dosha are Vata and Kapha for the Vyadhi, so fewer patients were found as Pittaja type of Kasa. (Table 3)

### **Relieving factors**

48% patients were relieved from Kasa by Ushnodaka (luke warm water).<sup>[24]</sup> While Tulasi Swarasa (juice of *Ocimum sanctum*) (32%), Madhu (honey) (16%) and Haridrayukta dugdha (milk added with turmeric) (20%) were also used for relief as home remedy and Upashaya (exploratory therapy) for the disease. (Table 3)

### **Discussion on Disease review**

Since the Kasa is a Vata -Kapha dominated disease, its incidence should be witnessed more during the childhood, which is the normal time of Kapha dominance. The disease Kasa explained in Ayurvedic classics includes many of the upper and lower respiratory disease as it is evident by the vast collection of signs and symptoms. Cough is considered as a symptom in western medicine. Even though cough is a symptom of underlying disease, it is the reflex generated predominantly by the receptors located in the respiratory tree. Thus a patient presenting with cough at first draws the

attention of physician towards respiratory system, and many a times the pathology is located within upper or lower respiratory tract.<sup>[25]</sup> In addition to above data the description of the Samprapti (manifestation) of Kasa almost exactly correlates the mechanism of cough reflex.<sup>[26][27]</sup> Thus beyond doubt Kasa can be considered as Cough in modern terms. When the child suffers from recurrent Kasa there is chances of developing the complications such as severe lower respiratory infections (LRTI -Pneumonia etc), hyper reactive airway diseases (HRAD), leads to nutritional deprivation and hampered growth. In Astanga Sangraha it is described that on long run Kasa leads to Varna (texture), Oja (absence of dhatu), Bala (strength) and Mamsa Kshaya (loss of mamsa dhatu).<sup>[28]</sup> Thus the situation warrants an immediate insight deep in to the matter with timely intervention.

### **Previous research on Vyaghri Haritaki Avaleha**

In Kaumarbhritya Department, till today, no work has been carried out on Kasa with Vyaghri Haritaki Avaleha. Only one work by Dubey Arvind Kumar, in year 2012, Ph.D. thesis was done on Tamaka Shwasa – “A comparative study on Tamaka Swasa (Bronchial Asthama) with Ashtanga Avaleha and Vyaghri Haritaki Avaleha in Children at Kaumarbhritya Department, I.P.G.T. & R.A., Jamnagar. In that study, on clinical symptoms i.e. Shwasa Kashtata (breathlessness), Shwasa Vega (asthma attack), Kasa (coughing), Kaphanishtivana (expectoration of cough), Peenasa (rhinitis) and wheeze, drug Vyaghri Haritaki Avaleha found with highly significant results. The study also conclude that, both groups showed statistically significant results but comparing between groups the differences was statistically insignificant (>0.05). Though, group Ashtang Avaleha (66.66%) showed comparatively better results than group Vyaghri Haritaki Avaleha (63.15%).

## Discussion on Drug review

The drug form Avaleha is indicated in obstruction in flow of Prana Vayu due to vitiated Kapha which are the main factors for the pathogenesis of disease Kasa and Avaleha form solves the issue of palatability in children.<sup>[29]</sup> Vyaghri Haritaki Avaleha had bitter-astringent taste<sup>[30]</sup> with combination of many ingredients which excellent balance to enhance the Vata-Kaphahara, Deepana (appetizer property), Pachana (digestive property), and Vatanulomana properties due to its Chaturjata<sup>[31]</sup> and Trikatu<sup>[32]</sup> ingredients, which are the main factors for the pathogenesis of disease Kasa. The Deepana-Pachana (appetizer-digestive) properties<sup>[33]</sup> of the drug digest the Saama Kapha by enhancing the Jatharagni as well as Rasa Dhatvagni and Bhutagni, Which neutralize the Srotorodha (blockage in channels) in Annavaha and Pranavaha Srotasa due to Saama Kapha and Vata. Furthermore, Vyaghri Haritaki Avaleha indicated in diseases like Shwasa (asthma), Kasa (cough) and Peenasa (rhinitis).<sup>[34]</sup>

## Probable mode of action

The main logics behind the actions are as follows:

The Dosha-Prashamana Vatahara and Kaphahara by Kantakari,<sup>[35]</sup> Pippali, Sunthi, Maricha, Ela, Patra act on the main Doshas which contribute to the Samprapti are present. Deepana-Pachana Karma due to Pippali,<sup>[36]</sup> Maricha, Kantakari, Haritaki, Twak, Nagakeshara, Shunthi digest Ama. Vatanulomana property of Haritaki, Pippali, Twak, Shunthi maintain the normal flow of Vata. Rasayana Karma of Haritaki<sup>[37]</sup> and Pippali may work in building strength of Pranavaha Srotas. Drugs Kantakari, Haritaki, Shunthi, Pippali, Maricha, Twak, Ela and Patra indicated in Shwasa (asthma), Kasa

(cough) and Peenasa (rhinitis) also act on the symptoms.

The pharmacological studies already reported on the individual drugs also favor its effect in Respiratory disease. Hepatoprotective, anti-inflammatory, analgesic, anti-microbial activity proved by Ela.<sup>[38]</sup>

Expectorant activity of Kantakari, Shunthi; Anti-inflammatory activity of Maricha, Pippali, Shunthi, Nagakesara; Immunostimulating activity of Kantakari,<sup>[39]</sup>

Anti-asthmatic activity of Pippali, Nagakesara; Anti-tussive effect of Shunthi; Bronchodilator activity of Pippali; Immunomodulator activity of Pippali. Anti-microbial activity of Kantakari,<sup>[40]</sup> Maricha, Twak,<sup>[41]</sup> Anti-bacterial activity of Maricha, Twak.<sup>[42]</sup>

## Effect on symptoms

The drug had provided relief in all the cardinal and associated symptoms of Kasa irrespective of their Doshika presentations. 100% relief in Sweta kaphanishthivana (white cough expectoration) while 92.30% of relief in Peeta Nishthivana (yellow cough expectoration) were found which are the cardinal features of Kaphaja Kasa and Pittaja Kasa respectively.

Among Vataja Kasa it provided 89.47% relief in Shushka Kasa (dry cough), 94.11% relief in Parshwashoola (pain in the side of chest), 88.88% relief in Shirashoola (headache), 88.88% in Swarabheda (hoarseness of voice) and 94.44 % relief in Daurbalya (weakness). In Kaphaja Kasa it provided 88.88% in Mandagni (low digestive power), 90.90% in Peenasa (rhinitis), 86.95% in Aruchi (loss of taste/appetite) and 83.33 % relief in Kaphapoornavaksha (fullness of chest with cough). All the changes were statistically highly significant. (Table 4)

**Table 4: Effect on the symptoms of disease Kasa**

Dosha	Features	N	BT	AT	% of relief	± SEM	T	P
Vataja Kasa	Shushka Kasa (dry cough)	14	1.35	0.14	89.47	0.18	6.49	<0.001
	Parshwashoola (pain in sides of chest)	17	1.00	0.05	94.11	0.05	16.00	<0.001
	Shirahshoola (headache)	9	1.00	0.11	88.88	0.11	8.00	<0.001
	Urahshoola (pain in chest)	8	1.00	0.12	87.50	0.12	7.00	<0.001
	Swarabheda (hoarseness of voice)	18	1.00	0.11	88.88	0.07	11.66	<0.001
	Shushka-ura, kantha, vaktra (dryness of chest, throat, mouth)	11	1.00	0.09	90.90	0.09	10.00	<0.001
Pittaja Kasa	Daurbalya (weakness)	18	1.00	0.05	94.44	0.05	17.00	<0.001
	Peetanishthivana (yellow sputum)	10	1.30	0.10	92.30	0.20	6.00	<0.001
	Swarabheda (hoarseness of voice)	16	1.00	0.06	93.75	0.06	15.00	<0.001
	Moha (stupor)	10	1.00	0.10	90	0.10	9.00	<0.001
	Aruchi (anorexia)	23	1.00	0.13	86.95	0.07	12.11	<0.001
	Jwara (fever)	21	1.00	0.04	95.23	0.04	20.00	<0.001
Kaphaja Kasa	Sweta khapanishthivana (white sputum)	11	1.00	0.00	100	0.00	-	<0.001
	Mandagni (low digestive power)	18	1.00	0.11	88.88	0.07	11.66	<0.001
	Aruchi (anorexia)	23	1.00	0.13	86.95	0.07	12.11	<0.001
	Peenasa (rhinitis)	22	1.00	0.09	90.90	0.06	14.49	<0.001
	Kaphapoornavaksha (fullness of chest with cough)	6	1.00	0.16	83.33	0.16	5.00	<0.001

**Table 5: Effect on the signs of disease Kasa**

Features	N	BT	AT	% of relief	± SEM	T	P
Bouts of cough-Duration	23	2.17	0.17	92	0.14	14.22	<0.001
Bouts of cough-Frequency	23	2.17	0.17	92	0.14	14.22	<0.001
Sleep disturbance	6	1.00	0.16	83.33	0.16	5.00	<0.001
Throat congestion	6	1.16	0.16	85.71	0.25	3.87	<0.05
Fever	21	1.00	0.04	95.23	0.04	20.00	<0.001
Crepitation	13	1.00	0.00	100	0.00	-	<0.001
Rhonchi	10	1.00	0.00	100	0.00	-	<0.001

**Table 6: Effect on the Aturabala**

Features	N	BT	AT	% of relief	±SEM	T	P	
Agni-bala	Abhyavaranashakti	23	2.00	0.21	89.13	0.10	16.49	<0.001
	Jaranashakti	23	2.00	0.21	89.13	0.10	16.49	<0.001
	Ruchi hi aaharakale	23	1.04	0.08	91.66	0.07	12.51	<0.001
Deha-bala	Bala vridhi	21	1.19	0.09	92	0.11	9.31	<0.001
	Shariraupachaya (Body Weight)	23	19.47	20.07	2.94↑	0.12	4.61	<0.001
	Swaravarnayoga	19	1.05	0.21	80	0.08	9.79	<0.001
Satva-bala	Activity	23	1.78	0.91	48.78	0.11	7.60	<0.001
	Nindralabhoyathakalam	17	1.00	0.05	94.11	0.05	16.00	<0.001
	Vaikarikiranam cha swapnanamadarsanam	17	1.00	0.05	94.11	0.05	16.00	<0.001

↑ - Increase.

**Table 7: Effect on hematological parameters**

Features	N	BT	AT	% of relief	± SEM	T	P	
Hb%	23	11.31	11.60	2.50 ↑	0.12	2.35	<0.05	
Total W.B.C.	23	10469.5	9286.9	11.29 ↓	706.2	1.67	>0.05	
Differential Count	N	23	54.08	46.47	14.06 ↓	3.18	<0.05	
	E	23	4.91	5.87	19.46 ↑	0.67	1.41	>0.05
	L	23	38.30	44.95	17.36 ↑	2.97	2.23	<0.05
	M	23	2.60	2.69	3.33 ↑	0.12	0.69	>0.05
ESR	22	12.81	9.45	26.24 ↓	2.00	1.67	>0.05	
AEC	23	534.7	565.2	5.69 ↑	92.70	0.32	>0.05	

↑ - Increase; ↓ - Decrease.

**Table 8: Overall effect of treatment on subjective and objective parameters**

	N	BT	AT	% change	± SEM	T	P
Overall effect	23	97.52	13.80	83.71 ↓	5.83	14.33	<0.001

↓ - Decrease.

**Table 9: Individual overall effect on subjective and objective parameters**

Zones based on % relief	No. of patients	%
Cured (100 %)	00	00
Marked positive response (76 - 99 %)	00	00
Moderate positive response (51 – 75%)	19	82.60
Mild positive response (26 – 50 %)	02	8.69
Unchanged (0 – 25%)	02	8.69
<b>Total</b>	<b>23</b>	<b>100</b>

**Table 10: Effect on recurrence of symptoms of Kasa**

Recurrence during follow-up	N	No Event (%)	< Freq & Int (%)	Same freq & < int (%)	Same freq & int (%)
	23	86.95	13.04	00	00

### Effect on signs

The drug also showed statistically highly significant relief in duration of each bout with 92%, daily frequency of bouts with 92% while 100% relief in both Crepitation and Rhonchi. On fever 95.23% relief was found. The results were statistically highly significant. While in Throat congestion statistically significant result was found with relief of 85.71%. (Table 5) Effect on Aturabala (strength of the patient) was mentioned in Table 6.

### Agni Bala (digestive power strength)

The drug provided 89.13% relief in both Abhyavaranashakti (capacity of food intake) and Jaranashakti (capacity of digestive power) while 91.66% relief was found on Ruchi hi aaharakale (appreciation of taste at the time of food). Above changes were statistically highly significant.

### Deha Bala (physical strength)

92% and 80% improvement in the Balavridhhi (increase in strength) and Swaravarnayoga

(texture, luster and voice) which are parameters for Dehabala (physical strength), 2.94% body weight increased and 48.78% improvement in Activity which are statistically highly significant.

### **Satva Bala (mental strength)**

94.11% improvement in both Nindralabhoyathakalam (adequate sleep at night) and Vaikarikaranam chaswapnanamadarshanam (absence of discomfort dreams) were found.

All the changes were statistically highly significant. Satva bala (mental strength) is very much related to the counseling of the patients during the treatment. Improvement in sleep may be due to decreased symptoms of Kasa. (Table 6)

### **Effect on other Hematological parameters**

The drug showed an increase of 2.50% in Hb%, decrease of 11.29% in total W.B.C., a decrease of 26.24% in the Erythrocyte Sedimentation Rate and an increase of 5.69 % in Absolute Eosinophil Count. On Hb%, Neutrophil count and lymphocyte count significant changes found. (Table 7)

### **Overall effect of therapy**

Overall effect of treatment in was 83.71% percentages, which was statistically highly significant because the drug having all the properties required to break the Samprapti (manifestation) of Kasa. (Table 8)

### **Individual overall effect of therapy**

When the individualized overall effect of therapy were considered highest number of patient (82.60%) got Moderate positive response, 8.69% was observed with Mild positive response, and 8.69% of patients were observed Unchanged. (Table 9)

### **Effect of therapy on recurrence/prevention**

86.96% of the patients had no recurrence of the symptoms during the follow up period while 13.04% of the patients had recurrence but with lesser frequency and intensity may due to Rasayana (rejuvenation) effect of the drug on Pranavaha srotas. (Table 10)

### **CONCLUSION**

Vyaghri Haritaki Avaleha showed statistically highly significant result on most of the signs and symptoms of all type of Doshika Kasa. On Aturabala (strength of the patient) statistically highly significant results were found. The drug had not shown much effect on hematological parameter as compare to subjective parameters. The drug built immunity due to Rasayana (rejuvenation) effect on Pranavaha srotas as observed by low recurrence rate during follow-up. On overall effect, highly significant results were found which is encouraging.

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