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## CRITICAL ANALYSIS OF COMMONLY USED CLASSICAL AYURVEDA FORMULATIONS IN PRANAVAHA SROTAS ROGAS IN CHILDHOOD AYURVEDA CLINICAL PRACTICE

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### ABSTRACT

In children, acute respiratory infections are one of the major cause of morbidity and mortality and it is of particular importance in developing countries like India. The classical Ayurveda formulations discussed here are *Ativishadi Churna*, *Kumarakalyana Rasa* and *Chaturjatadi Avaleha* which work on *Pranavaha Srotas Rogas* in childhood Ayurvedic clinical practice. **Aims and Objectives:** To critically analysis, some important classical Ayurveda formulations useful for treatment of respiratory tract disorders in children for its contents, mode of action and *Karmukata*. **Materials and Methods:** Various Ayurveda classics and various research article published in journals are reviewed and analyzed. **Discussion:** In Yoga, *Ativishadi Churna* drugs like *Pippali*, *Ativisha* and *Shringi* which are able to keep the homeostasis of all the three *Doshas* and helps to enhance body immunity in growing phase of child. The Yoga *Kumarakalyana Rasa* increase body immunity, increase liver functional capacity and corrects the homeostasis at cellular level. The Yoga *Chaturjatadi Avaleha*, looks like a *Rasayana* or supplementary Yoga which increase the immunity of child and promote the growth and development. **Conclusion:** From the present study it can be concluded that *Ativishadi Churna*, *Kumarakalyana Rasa* and *Chaturjatadi Avaleha* are quite useful in childhood upper and lower respiratory tract infections both as prophylactic and curative formulations.

**KEYWORDS:** *Kumarakalyana Rasa*, *Pranavaha Srotas*, immunity

### I. INTRODUCTION

Childhood period, which is also period of maximum growth and development, will have direct impact on future life of an individual. Meanwhile due to various factors like increasing pollution level, modernized dietary habits, mechanical life style, increasing stress level, pediatric population is worst affected and becoming more prone to respiratory tract infections which hamper the phase of Growth and development in children. In children, recurrent respiratory infections are one of the major cause of morbidity and mortality and it is of particular importance in developing countries like India<sup>1</sup>. The increasing morbidity and mortality rates can be stopped by appropriate diagnosis, treatment and adequate immunisation<sup>2</sup>. Many classical Ayurveda formulations are used traditionally for treating recurrent respiratory tract infections. This present study describes some of the important classical Ayurveda formulations is quite beneficial in the treatment of recurrent respiratory tract infections.

### II. AIMS AND OBJECTIVES

To critically analysis, some important Ayurvedic formulations (*Yogas*) useful for treatment of respiratory tract disorders in children for its contents, mode of action and *Karmukata*.

### III. MATERIALS AND METHODS

Various Ayurveda classics and various research article published in journals are reviewed and analyzed.

### MEHODODOLOGY

**Ativishadi Churna** is one among the important Yoga mentioned in Ayurveda literatures like *Ashtanga Hridaya*, *Ashtanga Samgraha* and *Gadanigraha Samhita* with special reference to respiratory tract disorders in children. However it has got other indication like *Chardi* and *Jwara* also. Hence this Yoga is best suited for infancy period when there will be issue related to administration of medicine. As it is administered with *Madhu* and it is not only palatable but also good *Yogavahi*.

Ingredients<sup>3, 4, 5</sup> of this Yoga are *Ativisha*, *Shringi* and *Pippali* or *Ativisha* which are made in to *Churna*. This Yoga is administered in *Lehya* form with *Madhu*.

Major content of this Yoga is *Ativisha* which is belong to group of *Arshoghna*, *Lekhaniya* (*Charaka*), and included under *Piplyadi*, *Vachadi* and *Mustadi Gana* (*Sushruta*) by various authors. Another content is *Karkatashringi* which is an established *Kasahara* and classified under *Hikkanigrahana* (*Charaka*) and included under *Kakolyadi Gana*. (*Sushruta*) by various authors. *Karkatashringi* is also the major component of *Balachaturbhadra* which is established Yoga for many childhood ailments. Another content is *Pippali* which is an established *Kasahara* and classified under *Hikkanigrahana*, *Shirovirechana*, *Chardinigrahana*, *Triptighna*, *Deepaniya*, *Shulaprashamana Mahakashaya* (*Charaka*) and included under *Pippalyadi*, *Urdhvabhagahara Shodhana*, *Shirovirechana Gana* (*Sushruta*), *Vamana* and *Vatsakadi Gana* (*Vagbhatta*) and also best *Rasayana* as per various authors.

On analysis of chemical ingredients<sup>6, 7, 8</sup> which are present in above drugs it is found that atisine, tanin, terpinoids, flavonoids, piperine and pipartine are the major alkaloids. However the above drugs were also proved for its anti-inflammatory and anti-pyretic, immunomodulatory activity, expectorant activity and antimicrobial activity by different research studies<sup>9, 10</sup>.

Indication of this Yoga is in childhood *Kasa* (cough), *Jwara* (fever), *Chardi* (vomiting). However this looks like a medicine for upper and lower respiratory tract disease in children. *Jwara* and *Chardi* may be the complications of same disease.

Upon analysis of *Panchabhoutika* properties of the drugs in this Yoga it is found that *Ativisha* is *Kaphapittashamaka* due to *Tikta Rasa*, *Vatashamaka* due to *Ushna Virya*, *Deepana*, *Pachana*, *Chardinigrahana*, *Jwaraghna Tikta*, *Katu Rasa* and *Ushna Virya*. This has been supported by previous research study titled as in vitro propagation of *Aconitum balfourii* Stapf.: an important aconite of the Himalayan alpine conducted by Pandey H et al. shows that *ativisha* carries antibacterial activity against gram negative (diarrhea causing) bacteria *Escherichia coli*, *Shigella flexneri*, *Pseudomonas aeruginosa* and *Salmonella typhi*<sup>11</sup>. *Karkatashringi* is *Kaphavatashamaka* and *Anulomaka* due to *Ushna Virya*, *Kaphanisaraka* and *Kaphashamaka* due to *Tikta*, *Kashaya Rasa*. The mast cell stabilization, antihistaminic and spasmolytic activity of the drug has been proved by previous research work aqueous extract of galls was evaluated using albino Wistar rats and guinea pigs. All these findings revealed the antiasthmatic activity of aqueous extract of *P. integerrima* galls<sup>12</sup>.

*Pippali* act as *Vatanulomana* due to *Snigdha Guna* and *Ushna Virya*, *Deepana*, *Pachana*, *Vatakaphashamaka* due to *Ushna Virya*. Meanwhile *Pippali* has been proved for its antihistaminic, immunomodulatory activity by various research works. This is further supported by previous study conducted on extract of the fruits in milk reduced passive cutaneous anaphylaxis in rats and protected guinea pigs against antigen induced bronchospasm by *Kulashrestha VK et.al*<sup>13</sup>.

**Kumarakalyana Rasa** is one of the important Yoga mentioned in *Bhaishajya Ratnavali* with special reference to respiratory tract disorders in children. This is also the most popular and commonly used Yoga in childhood clinical practice. However it has got other indication like *Jwara*, *Grahadosha*, *Kamala*, *Atisara*, *Krishna*, *Viakritagni* also.

Ingredients<sup>14</sup> of this Yoga are *Rasa Sindura*, *Mukta Bhasma*, *Swarna Bhasma*, *Abhrka Bhasma*, *Lauha Bhasma*, *Swarna Maksika Bhasma* and *Bhavana Dravya* is *Kumari Swarasa*. Method of preparation is, by preparing the fine powders of above *Churna Dravyas* and *Vati* is prepared as per classical method.

Key content of this Yoga are *Mukta Bhasma* which is classified under *Ratna* (*Rasa Ratna Samuchhya*). Another major content is *Swarna Bhasma*, which is included under *Trapvadi Gana* (*Sushruta*), *Madhura Gana* (*Vagbhatta*) and *Louhavarga* (*Rasa Ratna Samuchhya*). Another content is *Abhraka Bhasma* which is classified under *Maharasa* (*Rasa Ratna Samuchhya*). While *Lauha Bhasma* is classified under *Trapvadi Gana* (*Sushruta*), *Tikta Varga* (*Vagbhatta*), *Louhavarga* (*Rasa Ratna Samuchhya*). Another content is *Swarna Maksika Bhasma* is also another major content, which is classified under *Maharasa* (*Rasa Ratna Samuchhya*). *Bhavana* is given by *Kumari Swarasa* which is an established *Vayasthapana* and classified under *Dahaprashamana*, *Trishnanigrahana*, *Stanya Shodhana*, *Triptighna* (*Charaka*), *Guduchyadi*, *Patoladi*, *Aragvadhadi*, *Kakolyadi*, *Vallipanchamoola Gana* (*Sushruta*) by various authors.

On analysis of chemical ingredients<sup>15, 16, 17</sup> which are present in above drugs it is found that HgS, Au, Fe, Mg, Ca, Cu, S, aloin and anthraquinone are the major alkaloids. However the above drugs were also proved for enhancing bioavailability, antioxidant, rejuvenating effect, anti-inflammatory, immunomodulatory, antacid, haemotonic (increase hemoglobin level), haematogenic (helps in formation of R.B.C.), antidiarrhoeal, antipyretic and antiallergic activities by different research studies<sup>18, 19</sup>.

Classical textual indication of this Yoga is for *Jwara, Shwasa, Vamana, Parigarbhika, Grahadosha, Stanyasya Agrahanam (Anorexia towards Breast Milk), Kamala, Atisara, Krisata and Agnivikara in childhood*. Dose is ½ to 1 *Mudaga Pramana Vati* as per the age of child.

On analysis of *Panchabhoutika* properties of the drugs, in this Yoga it is found that *Parada* is *Vrishya* (aphrodisiac), *Vardhakya Harana* (anti-ageing), and *Rasayana* (immunomodulator) due to *Madhura, Snigdha Guna, Mutrala* due to *Madhura Vipaka*<sup>20</sup>.

*Abhraka Bhasma* is *Vranashodhaka* due to *Katu Rasa, Dahashamaka* due to *Madhura, Sheeta Guna*. Previous study showed that *Abhraka Bhasma* is beneficial in the treatment of Malabsorption, Asthma, Bronchitis, UTI and Digestive impairment<sup>21</sup>.

*Kushta Tila Kalan (KTK)*, a gold preparation used in *Unani-Tibb* is claimed to possess general tonic, anti-infective and rejuvenating properties. Its immunomodulatory activity was evaluated in male mice. KTK was orally administered to animals at dosage of 6.25, 12.5, 25 and 50 mg/kg body weight for 10 days. Besides general immuno-pathological parameters, cell-mediated immunity was evaluated by measuring delayed type of hypersensitivity response (DTH) while humoral immunity was assessed using plaque forming cell (PFC) assay. KTK augmented both the immune responses at dose levels of 6.25, 12.5 and 25 mg/kg<sup>22</sup>. *Kumari* is *Kaphapittashamaka, Jwaraghna, Deepana, Pachana* due to *Tikta Vipaka, Shothahara* due to *Katu Rasa, Balya and Brimhana* due to *Snigdha, Picchila Guna*. This is further supported by previous study Jyotsana et al. showed a significant increase in total white blood cell and macrophage count upon administration of Aloe vera extract. The immunomodulatory activities of the polysaccharides of Aloe vera have been attributed to activation of macrophage cells to generate nitric oxide, secrete cytokines (e.g. tumor necrosis factor-alpha or TNF-α, interleukin-1 or IL-1, interleukin-6 or IL-6 and interferon-γ or INF-γ) and present cell surface markers<sup>23</sup>.

***Chaturjatadi Avaleha*** is one among the important Yoga mentioned in *Gadanigraha Samhita* with special reference to respiratory tract disorders in children. However it has got other indication like *Ajeerna, Balya and Sarvarogahara* too. None of the other authors apart from *Gadanigraha* mentioned regarding this Yoga.

Ingredients<sup>24</sup> of this Yoga are *Chaturjataka* (cinnamon, cardamom, *Tejapatra and Nagkashera*), *Talisapatra, Kushtha, Trikatu (Shunti, Maricha, Pippali), Chavya, Pippalimoola, Tavakshira, Shweta Jeera* and *Ashwagandha*. Method of preparation is, the drugs are made into *Kwatha* and later *Avaleha* is prepared as per classical method and *Avaleha* is administered with *Sarpi*.

Meanwhile, key content of this Yoga is *Twaka* which is classified under *Eladi (Sushruta) and Trijata (Ashtanga Hridaya)* by various authors. Another content is *Talisapatra* which is classified under *Shirovirechana (Sushruta)*. Another content is *Shunti* which is known *Triptighna* and belong to *Arshoghna, Deepaniya, Shulaprashamana, Trishnanigrahana (Charaka)* and included under *Pippalyadi, Trikatu (Sushruta), Panchakola and Shadushana (Bhavaprakasha)* by various authors. Another content is *Chavya* which is a known *Triptighna* and classified under *Arshoghna, Deepaniya, Shoolaprashamana (Charaka), Pippalyadi (Sushruta), Panchakola and Shadushana Gana (Bhavaprakasha)* by various authors.

On analysis of chemical ingredients<sup>25, 26</sup> which are present in above drugs it is found that cinnamaldehyde, eugenol, zingiberene, piparine and piplartin are the major alkaloids. However the above drugs were also proved for its antibacterial, anti-inflammatory, antitussive, antipyretic and cardiovascular activity by different research studies<sup>27, 28</sup>. Main indication of this Yoga is in childhood *Shwasa, Kasa and Ajeerna*.

On analysis of *Panchabhoutika* properties of the drugs in this Yoga it is found that *Twaka* is *Kaphavatashamaka* due to *Ushna Virya, Deepana, Pachana, Anulomana* due to *Katu, Tikta, Ushna*. This is further supported by previous study Matan et al. reported the effects of cinnamon oils on different bacterial (*Pediococcus halophilus* and *Staphylococcus aureus*), fungal (*Aspergillus flavus, Mucor plumbeus, Penicillium roqueforti, and Eurotium sp.*), and yeast species (*Candida lipolytica, Pichia membranaefaciens, Debaryomyces hansenii, and Zygosaccharomyces rouxii*), indicating that cinnamon is a natural antimicrobial agent.

*Talisapatra* is *Kaphavatashamaka* due to *Ushna Virya, Deepana, Pachana, Anulomana* due to *Tikta, Ushna, Shleshmahara, Shwasahara* due to *Tikta, Katu, Tikshna, Ushna*. This is further supported by previous study which shows the cough suppressive ability of polysaccharide compounds from *Salvia officinalis* was significant and antitussive effect was lower than codeine but significantly similar to dropropizine<sup>29</sup>. *Shunti* is



*Kaphavatashamaka* due to *Ushna Virya*, *Kaphaghna* and *Shwasahara* due to *Katu Rasa* and *Snigdha Guna*, *Deepana - Pachana* due to *Katu Rasa* and *Ushna Virya*. *Shunti* has immunomodulatory and analgesic activity. This is further supported by previous study conducted on ginger root and its components which can prevent NFκB activation induced by a variety of agents and down regulation of NF-κB gene products involved in cellular rise and angiogenesis<sup>30</sup>. *Chavya* is *Kaphavatashamaka*, *Triptighna*, *Deepana*, *Pachana*, *Shulaprashamana*, *Vatanulomana* due to *Ushna Virya*, *Katu Rasa*. This is further supported by previous study Jadid et al. (2017) reported the antioxidant activity of *P. retrofractum* fruit extracted in different solvents (methanol, ethyl acetate, n-hexane) using 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay at various concentrations. The results showed that the DPPH free radicals were scavenged by all plant extracts in a concentration-dependent manner.

#### IV. DISCUSSION

*Ativishadi Churna* reveals that it can be better indicated in childhood upper and lower respiratory tract infections or childhood *Kasa* associated with *Jwara* and *Chardi*. However descending viral infection in gastro intestinal tract may even cause vomiting during the course of illness, which can be tackled by *Ativishadi Churna*. Dose of the *Yoga* has to adjusted as per *Bala*, *Kala*, *Desha* and *Dosha Dushya Vivechana* due to its antiviral and antibacterial effects against organisms which are prevalent in gut. Standard dose of *Kashayapana* can be taken as per dosage schedule explained for children (*Kashyapa*, *Bhavaprakasha* and *Yoga Ratnakara*). *Yoga* containing the *Vatanulomana* drugs like *Kasa* and *Chardi* will take care of vitiated *Vata*. This *Yoga* look like a mirror image of *Yoga Balachaturbhadra Churna*. The only difference is there is no *Musta* in this formulation. Hence almost all benefits of *Balachaturbhadra* can be also achieved by this *Yoga*. It is also mentioned that even *Ativisha* alone can be used to get useful effects and rightly *Ativisha* is mentioned as *Shishu Bhaishajya* also. *Karakatashringi* is also known for its *Hikkanigrahana* quality. However this *Yoga* is best in neonatal and infantile period as it is presented in *Lehya* form. Infants generally will encounter recurrent respiratory or gastrointestinal problems, which may be due to functional and structural immaturity of the organ system including the immune system. However most of the problems are either nutrition, hygiene, digestion and immaturity related. Drugs like *Pippali*, *Ativisha* and *Shringi* which are able to keep the homeostasis of all the three *Doshas* and helps to enhance body immunity in growing phase of child. *Madhu* is best for respiratory problem and GIT problem due to unique *Panchabhoutika Sangathana*. *Madhu* is also containing pollens which helps to trigger body immune system and retain it on alert state against antigens and quite beneficial effect due to its *Yogavahi* nature.

*Kumarakalyana Rasa* is one of the popular and most commonly prescribed in maximum childhood pathology. This is used as a broad spectrum medicine for various disorders of children. Specialty of this *Yoga* is it contains almost all *Rasashastra* preparations in the *Bhasma* form. Various *Rasa*, *Uparasa*, *Sadharana Rasa* and *Ratna Varga dravyas* which given in their *Bhasma* form which is maximum bioavailable with minute form of particle size are easily absorbable in to the blood. The ionic forms of these drugs like Fe<sup>+</sup>, Cu<sup>+</sup>, Ag, Au<sup>+</sup>, S etc. are believed to be working at cellular metabolic level, by moderating various metabolic process thus correcting the pathology at micro-molecular and genetic level. This becomes a drug of choice for all chronic disorders of childhood irrespective of *Srotus*. This also corrects macro-micro mineral deficiency and provide various co-factors, catalyst etc. for essential metabolic pathways. It increase body immunity, increase liver functional capacity and corrects the homeostasis at cellular level. Hence this is quite beneficial in childhood emaciation, degeneration, denervation, nutritional and infectious disorders. Hence the *Yoga Kumarakalyana Rasa* reveals that it can be better indicated in childhood upper and lower respiratory tract infections or childhood *Kasa-Shwasa* associated with *Jwara* and *Kamala*. Dose of the *Yoga* has to adjusted as per *Bala*, *Kala*, *Desha* and *Dosha Dushya Vivechana*. Dose is ½ to 1 *Mudaga Pramana Vati* as per the age of child can be taken. The *Swarna Bhasma*, *Mukta Pishti* and *Abhraka Bhasma* in *Kumarakalyana Rasa* improve immunity and brain power in children.

*Chaturjatadi Avaleha* reveals that this can be better indicated in childhood upper and lower respiratory tract infection or childhood *Kasa-Shwasa*-associated with *Ajeerna*. Dose of the *Yoga* has to adjusted as per *Bala*, *Kala*, *Desha* and *Dosha Dushya Vivechana*. Standard dose of *Avaleha* can be taken. *Yoga Chaturjatadi Avaleha* looks like a perfect blend of drugs to effectively combat the different causes of upper and lower respiratory tract infections, resulting in *Shwasa* and *Kasa*. Maximum drugs mentioned will not only aimed to correct the *Agni* and also helps as effective *Vatakapha Shamaka*. *Twaka* and *Chavya* is best *Vatakaphahara*, *Deepana* and *Pachana* by the virtue of its *Ushna* and *Katu Guna* of the drug and also reduces the bout of *Kasa*. *Talisapatra* has antitussive action and thus prevention of cough. *Shunti* which an effective immunomodulator will helps to prevent the recurrent respiratory infections by modulating immune system. Hence this *Yoga* is best to prevent the long term complication of respiratory tract infections like *Shwasa* and

*Kasa*, when used properly. When we analyzed the contents and indications of this Yoga, this look like a *Rasayana* or supplementary Yoga which increase the immunity of child and promote the growth and development. The common problems of growing child like micro and macro nutritional deficits can be very well tackled by this Yoga. This resolve common pediatric problems like *Ajeerna*, by its *Agnivardhaka* property and corrects the eating habits. *Ashwagandha* being a nourishing drug along with positive effects on neuro-cognitive status is present in this Yoga. It is told that this Yoga is *Balanam Angavardhanam*, it increase bodily tissues of the growing child (we find similar explanation in *Cchavanprasha Rasayana*). Keeping the immune status at high level naturally decrease the incidences of respiratory tract infections. Words like *Sarva Rogahara* indicates that it quite helpful in all common causes of childhood illness.

## V. CONCLUSION

From the present study it can be concluded that *Ativishadi Curna*, *Kumarakalyana Rasa* and *Chaturjatadi Avaleha* is quite beneficial in childhood upper and lower respiratory tract infections or childhood *Shwasa* and *Kasa* associated with co-morbidity related to other systems .

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