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 India1. The increasing morbidity and mortality rates can be stopped by appropriate diagnosis, treatment and adequate immunisation2. 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.

MEHODOLOGY
Ativishadi Churna is one of 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 Madhhu and it is not only palatable but also good Yogavahi.

Ingredients\(^3\), \(^4\), \(^5\) 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 Hikkanigrhana (Charaka) and included under Kakolyadi Gana. (Sushruta) by various authors. Karkatashringi is also the major component of Balachaturbdhara which is established Yoga for many childhood ailments. Another content is Pippali which is an established Kasahara and classified under Hikkanigrhana, Shirovirechana, Chardinigrhana, Triptighna, Deepaniya, Shulaprasramana Mahakashaya (Charaka) and included under Pippallyadi, Udavhabagahara Shodhana, Shirovirechana Gana (Sushruta), Yamana and Vatsakadi Gana (Vaghbhatta) and also best Rasayana as per various authors.

On analysis of chemical ingredients\(^6\), \(^7\), \(^8\) which are present in above drugs it is found that atisine, tanin, terpinoids, flavonoids, pipeline and piparticline are the major alkaloids. However the above drugs were also proved for its anti-inflammatory and anti-pyretic, immunomodulatory activity, expectorant activity and antimiicrobial activity by different research studies\(^9\), \(^10\).

Indication of this Yoga is in childhood Rasa (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, Chardinigrhana, 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 alpines conducted by Pandey H et al. shows that ativisha carries antibacterial activity against gram negative (diarrhea causing) bacteria Escherichia coli, Shigella flexineri, Pseudomonas aeruginosa and Salmonella typhi\(^11\). Karkatashringi is Kaphavatashamaka and Anulomaka due to Ushna Virya, Kaphanisarakara and Kaphhashamaka due to Tikta, Kashaya Rasa. The mast cell stabilization, antihistaminic and spasmylocytic 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\(^12\).

Pippali act as Vatuanulomana 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\(^13\).

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, Krisha, Viakritagni also.

Ingredients\(^14\) of this Yoga are Rasa Sindura, Mukta Bhasma, Swarna Bhasma, Abhraka Bhasma, Lauha Bhasma, Swarna Makhsika Bhasma and Bhavana Dravya is Kumari Swarasara. 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 Samuchchya). Another major content is Swarna Bhasma, which is included under Trapvadi Gana (Sushruta), Madhura Gana (Vaghbhatta) and Louhavarga (Rasa Ratna Samuchchya). Another content is Abhraka Bhasma which is classified under Maharasa (Rasa Ratna Samuchchya). While Lauha Bhasma is classified under Trapvadi Gana (Sushruta), Tikta Varga (Vaghbhatta), Louhavarga (Rasa Ratna Samuchchya). Another content is Swrana Makhsika Bhasma is also another major content, which is classified under Maharasa (Rasa Ratna Samuchchya), Bhavana is given by Kumari Swarasara which is an established Vayasthapana and classified under Dahaprasramana, Trishnanigrhana, Stanya Shodhana, Triptighna (Charaka), Guduchyadi, Patoladi, Aragyadhadi, Kakolyadi, Vallipanchamoola Gana (Sushruta) by various authors.
On analysis of chemical ingredients\textsuperscript{15, 16, 17} 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\textsuperscript{18, 19}.

Classical textual indication of this Yoga is for Jvara, Shwasa, Vamana, Parigarbhika, Grahadosha, Stanyasya Agrahanam (Anorexia towards Breast Milk), Kamala, Atisara, Krisata and Agnivikara in childhood. Dose is $\frac{1}{2}$ 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\textsuperscript{20}.

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\textsuperscript{21}.

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\textsuperscript{22}. 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-\alpha, interleukin-1 or IL-1, interleukin-6 or IL-6 and interferon-\gamma or INF-\gamma) and present cell surface markers\textsuperscript{23}.

**Chaturjatai 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\textsuperscript{24} of this Yoga are Chaturjataka (cinnamon, cardamon, Tejapatra and Nagakashera), 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 Hridya) 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, Trishnanigrahan (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\textsuperscript{25, 26} which are present in above drugs it is found that cinnamaldehyde, eugenol, zingiberene, piparine and pipilartin 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\textsuperscript{27, 28}. Main indication of this Yoga is in childhood Shwasa, Kasa and Ajeerna.

On analysis of Panchabhoustika 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 show the cough suppressive ability of polysaccharide compounds from Salvia officinalis was significant and antitussive effect was lower than codeine but significantly similar to dropropizine\textsuperscript{29}. 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. 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 gastrointestinal 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 Doshya Vivechana due to its antiviral and antibacterial effects against organisms which are prevalent in gut. Standard dose of Kashyapana 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 Yogī 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 Bhatajayaka also. Karakatashringi is also known for its Hikkanigrhana 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+, Cu+, Ag, Au+, 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 Doshya Vivechana. Dose is ½ to 1 Mudaga Praman 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 Ajerna. Dose of the Yoga has to adjusted as per Bala, Kala, Desha and Doshya 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. Talisaputra 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 neurocognitive 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 Chhavanprasha Rasyana). 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 Shwas and Kasa associated with co-morbidity related to other systems.

REFERENCES


