DOI: 10.7860/JCDR/2026/79406.24649

Research Protocol

Ayurveda Section

Efficacy of Adjuvant Role of *Dantimooladi Dhoom* versus Levosalbutamol and Ipratropium Bromide (Duolin) Nebulisation with Standard Care in Children with Bronchitis (*Kaphaja Kasa*): A Randomised Controlled Trial Research Protocol

MOHAMMAD ZAFAR[1], SONAMM KANZODE[2], ATUL ANDELKAR[3], PRACHI WARUKAR[4]

BY-NC-ND

ABSTRACT

Introduction: *Kasa* (cough), a common paediatric respiratory disorder, is primarily associated with the movement of *Vayu* and an imbalance of *Kapha Dosha*, which is predominant in childhood.

Need of the study: In paediatric practice, difficulty with the taste or swallowing of oral medicines can reduce treatment compliance. *Dantimooladi Dhoom* offers a potentially more child-friendly inhalation-based approach, with its action directed toward the respiratory passages. According to *Ayurvedic* principles, it may help loosen and clear accumulated *Kapha* (mucus), reduce congestion, and facilitate breathing. This study goal is to scientifically evaluate this classical *Ayurvedic* therapy in children with *Kaphaja Kasa* and assess its potential as a safe, practical, and supportive treatment option for childhood cough and bronchial conditions.

Aim: To study the comparative efficacy of Duolin Nebulisation versus a modified dosage form of *Dantimooladi Dhoom* in children with Bronchitis (*Kaphaja Kasa*).

Materials and Methods: A randomised controlled trial will be conducted at Mahatma Gandhi *Ayurveda* College, Hospital and Research Centre, Salod (H), Wardha, Maharashtra, India from November 2025 to July 2026. A total of 66 patients diagnosed with bronchitis (*Kaphaja Kasa*) will be enrolled and randomly allocated into two groups. For 15 days, Duolin nebulisation with standard care will be given to Group A in a standard paediatric dose of 0.5 mL of Duolin diluted with 2 mL of normal saline. Group B will receive the same treatment using the modified dosage form of *Dantimooladi Dhoom* (herbal smoke inhalation) with standard care. The overall assessment will be done using the Bronchitis Severity Score Paediatric version (BSS ped). Outcome measures will be assessed on the 16th day after completion of the therapy. Within-group comparisons will use the paired t-test, between-group comparisons the unpaired t-test, and categorical variables the Chi-square test. A p-value <0.05 will be considered statistically significant.

Keywords: *Aruchi*, Bronchial diseases, Cough, *Devdarvyadi yoga*, *Dhoomapana*, Inhalation therapy, *Kapha nishthivanam*, *Kapha vata prokop*, *Pranavaha srotas*

INTRODUCTION

Ayurveda mentions that in the *Nirukti* (Root), the *Vayu* passes from the *Kantha* to the *Shira*, and this passage is associated with the term "*Kasa*". *Kasa*, being a respiratory condition, is linked to the movement of *Vayu* [1]. *Acharya Charka* highlights its association with the release of congested *Vayu* (air), leading to the production of abnormal sounds, which could manifest as either a productive or dry cough. *Kapha Dosha* is indeed considered the main offender in the production of *Kasa* [2]. After maximal inspiration, the air is suddenly released through the partially closed glottis because of forceful contraction of the expiratory muscles. This produces a cough. Cough is an important defence mechanism of the respiratory system and helps to bring out the infected secretions from the trachea and bronchi [3].

In the treatment of *kasa*, many types of food, drinks, *Ghrit Yoga*, *Avaleh, Panak*, Milk, *Sarpiguda* and *Dhoompana* are prescribed to cure it. In paediatric treatment, the inhalation of herbal smoke or fumes is utilised for therapeutic purposes. This involves the use of specific herbs or substances that are believed to have beneficial effects on the respiratory system. [4] Bronchitis (*Kaphaja kasa*) is very common in children. Estimates of prevalence range from 4.7% to 23.3% of all reasons for medical visits, reaching up to 60% when considering patients or consultations specifically. Cough occurs more frequently in children than adults, with the lowest rates found in adolescents and during the summer. Acute cough is primarily caused by upper respiratory tract infections (62.4%) and bronchitis (33.3%), while subacute or chronic cough is often due to recurrent respiratory infections (27.7%), asthma (up to 50.4% in coughs lasting more than three weeks), and pertussis (37.2%). Serious conditions such as croup, pneumonia, or tuberculosis are uncommon. Among children with subacute and chronic cough, the cough duration ranged from 24 to 192 days. Approximately 62.3% of children with prolonged cough continue to cough two months after symptoms begin [5]. *Kasa* (cough) is not only a symptom (*paratantravyadhi*) but also a separate disease entity which is having its own pathogenesis (*swatantravyadhi*). Through this study bronchitis is compared with *Kaphaja Kasa* because both present with similar features, such as productive cough and *Kapha* predominance. However, they are not regarded as the same condition, since *Ayurveda* and modern medicine interpret their causation and disease process in different ways [6].

Oral medications are often poorly tolerated in paediatric patients due to difficulty and reluctance in ingestion. Therefore, alternative routes of administration need to be considered. *Dhoom* therapy (herbal smoke inhalation) offers a more acceptable approach, particularly in respiratory conditions. In comparison to antibiotics and other conventional medications, which may be costly and associated with adverse effects, *Dhoom* therapy can serve as a cost-effective option with quicker symptomatic relief. The inhalation route allows the drug to act directly on the respiratory tract, thereby enhancing efficacy and reducing systemic exposure [7].

Dhoomapana is a classical *Ayurvedic* therapy indicated in disorders of the *Pranavaha Srotas*. The smoke used should be mild, non irritating, and administered in small quantities and for a short duration, especially in children, to avoid irritation or toxicity. A low-dose *Dhoom* formulation has been selected with safety considerations in mind [8]. The formulation consists of commonly available medicinal plants such as *Baliospermum montanum* (*Dantimool*) and *Vitex negundo* (*Nirgundi*). Being composed of pure herbal ingredients, it is expected to produce minimal or no adverse effects in paediatric patients [9]. The formulation is administered through fumigation with the aim of controlling infection at an early stage and preventing its progression to more severe respiratory tract involvement.

Dantimool is described in *Ayurvedic* texts as having *Katu–Tikta Rasa*, *Ushna Virya*, and *Katu Vipaka*, with *Kapha–Vata* pacifying properties [10]. It helps in reducing airway congestion by liquefying and expelling *Kapha*, thereby relieving cough and obstruction in the *Pranavaha Srotas*. Its *Shothahara* and *Srotoshodhana* properties further support its use in inhalational therapies such as *Dhoomapana. Nirgundi* (*Vitex negundo*) possesses *Tikta–Katu Rasa*, *Ushna Virya*, and *Katu Vipaka*, and is known for its *Kapha–Vata shamana* action [11]. Both drugs exhibit *Ushna* and *Kapha*-reducing properties, making them useful in *Kaphaja Kasa* and other respiratory disorders. Their combined use enhances the overall therapeutic effect. Although modern toxicological data on the inhalation of *Dantimool* and *Nirgundi* in children are limited, the use of a controlled low-dose formulation helps ensure safety and minimises the risk of irritation or toxicity.

Devdarvyadi Yoga, described in *Bhaishajya Ratnavali*, is a classical *Ayurvedic* formulation indicated in the management of *Kasa* (cough) and related respiratory disorders. It contains ingredients such as *Devadaru* (*Cedrus deodara*) along with other herbs having *Kaphahara* and *Kasahara* properties. These drugs aid in loosening and expelling excess *Kapha*, clearing the airways, and facilitating easier breathing [12]. It is particularly useful in conditions like *Kaphaja Kasa* and *Shwasa*, where mucus accumulation leads to obstruction in the *Pranavaha Srotas*. In addition, its *Deepana* and *Pachana* actions help in reducing *Ama* formation, which plays a significant role in the pathogenesis of these conditions [13]. From a modern perspective, its effects can be correlated with expectorant, anti-inflammatory, and mild bronchodilator actions, making it beneficial in conditions such as bronchitis when used cautiously in children [14].

REVIEW OF LITERATURE

Acharya Charaka recommends *Dhoomapana* in conditions such as *Kasa*, *Shwasa*, *Peenasa*, and *Kantha Roga*, noting its role in liquefying accumulated *Kapha*, clearing obstructed channels, and facilitating normal respiratory function [15]. *Acharya Sushruta* emphasises that medicated smoke inhalation helps in removing excessive mucus from the upper respiratory tract and aids in preventing the recurrence of *Kapha*-predominant disorders. *Dhoomapana* improves voice clarity, reduces cough frequency, and relieves heaviness in the chest [16]. Duolin nebulisation, which contains salbutamol and ipratropium bromide, is widely used in paediatric practice to relieve wheezing and bronchospasm. Its main effect is bronchodilation, which helps open the airways and provides temporary relief from breathing difficulty [17].

Chakraborti A et al., studied the effect of adding ipratropium bromide to salbutamol in children with acute asthma. Children receiving combined salbutamol and ipratropium showed significantly greater improvements in percent-predicted PEFR and FEF25-75% compared with those receiving salbutamol alone [18].

Xu H et al., conducted a meta-analysis to evaluate the efficacy and safety of combining Ipratropium Bromide (IB) with salbutamol in children and adolescents with asthma. The analysis included 55 randomised controlled trials involving 6,396 participants aged ≤18 years. Compared with salbutamol alone, the combination therapy significantly reduced the risk of hospital admission (RR=0.79, 95% CI: 0.66-0.95; p-value=0.01), with greater benefits observed in patients with severe and moderate-to-severe asthma exacerbations [19].

Kesavan N et al., carried out a study on the pharmacognostic and pharmaceutical aspects of *Saraladi Dhoomapana Varti*. Their work helped in standardising the formulation and confirmed its suitability for use in therapeutic fumigation for respiratory disorders [20].

Mali A and Koli SA assessed the role of *Dashamoola Shatphala Ghrit* in the management of *Vataja Kasa*. The study reported noticeable improvement in symptoms such as cough, breathlessness, and overall respiratory discomfort following treatment. *Dashamoola Shatphala Ghrit* showed better results in reducing the symptoms of *Vataja Kasa* w.s.r. Tropical Pulmonary Eosinophilia [21].

Thus, this study aims to evaluate the efficacy of *Dantimooladi Dhoom*, administered in the form of *Varti*, in the management of *Kasa* (cough).

Primary objective:

- To assess the efficacy of the adjuvant role of *Dantimooladi Dhoom* and drug (*Devdarvyadi Yoga*) in the management of bronchitis (*Kaphaja Kasa*) in 5-15-year-old children.
- To assess the efficacy of the adjuvant role of Duolin and the standard drug (*Devdarvyadi Yoga*) in the management of bronchitis (*Kaphaja Kasa*) in 5-15-year-old children.
- Comparative evaluation of the efficacy of the adjuvant role of *Dantimooladi Dhoom* standard drug (*Devdarvyadi Yoga*) vs Duolin Nebulisation and Standard Drug (*Devdarvyadi Yoga*) with standard care in children with bronchitis (*Kaphaja Kasa*).

Null hypothesis (H_0): There is no significant difference in the efficacy of *Dantimooladi Dhoom* with standard care (*Devdarvyadi Yoga*) compared to Duolin nebulisation with standard care (*Devdarvyadi Yoga*) in the management of bronchitis (*Kaphaja Kasa*) in children.

Alternate hypothesis (H_1): There is a significant difference in the efficacy of *Dantimooladi Dhoom* with standard care (*Devdarvyadi Yoga*) compared to Duolin nebulisation with standard care (*Devdarvyadi Yoga*) in the management of bronchitis (*Kaphaja Kasa*) in children.

MATERIALS AND METHODS

A randomised controlled trial will be conducted at Mahatma Gandhi *Ayurved* College, Hospital and Research Centre, located in Salod (H), Wardha, Maharashtra, India from November 2025 to July 2026. Ethical clearance is approved by the IEC of M.G.A.C.H and RC, Salod (H), Wardha, Ref. No. MGACHRC/IEC/JUN – 2024/825. The study is registered with the Clinical Trial Registry of India under the registration number CTRI/2024/11/076313, dated November 11, 2024. Informed consent will be obtained before the commencement of the study.

Inclusion criteria: Children with a clinically confirmed diagnosis of bronchitis (*Kaphaja Kasa*) of age group 5-15 years of age. Parental or legal guardian written informed consent for their child's participation will be obtained. Children diagnosed with bronchitis (*Kaphaja Kasa*) with a duration of less than 15 days (acute cases only).

Patients with Bronchitis (*Kaphaja kasa*) will be selected from various check-ups arranged by the Institute as well as the *Kaumarbhritya* Outpatient Dept. and Inpatient Dept. of Mahatma Gandhi *Ayurved* College, Hospital and Research Centre, Salod (H), Wardha, Maharashtra, India.

Exclusion criteria: Subjects with complications of *Kasa*, i.e., fever, chronic obstructive bronchitis, tuberculosis, lung abscesses, pulmonary oedema resulting from cardiac and renal disease, pneumonia. Subjects with other systemic disorders and metabolic disorders. Subjects with *Kshataj* and *Kshayaj Kasa*. Severe bronchitis cases with a score of 16-20 on the bronchitis severity scale will be excluded from the study.

Sample size calculations:

Formula used:

$$n \geq \frac{(Z1-\alpha/2+Z1-\beta)^2 \times (\sigma 1^2+\sigma 2^2/r)}{(\mu 1-\mu 2)^2}$$

Input parameters

Alpha (α): 0.05

Beta (β): 0.01

Mean in Group 1 (μ_1): 68.19

Standard deviation in Group 1 (σ_1): 18.64

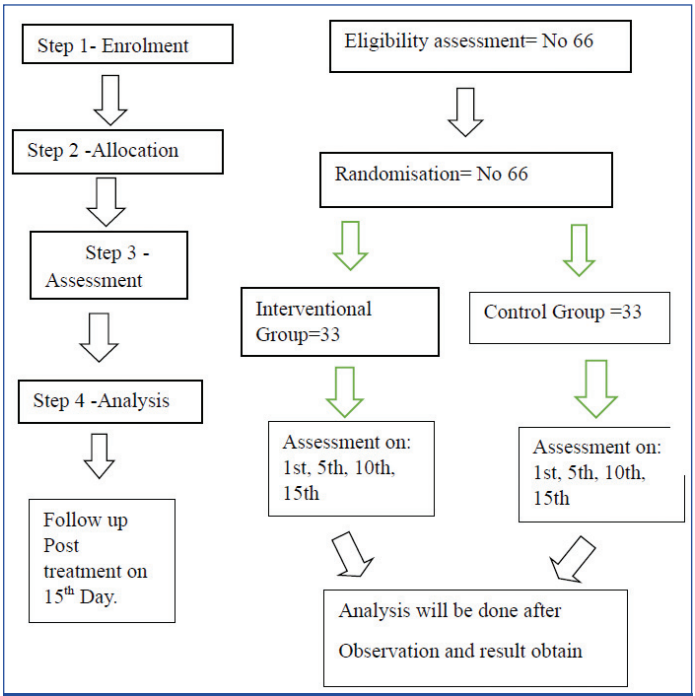
Mean in Group 2 (μ_2): 87.12

Standard deviation in Group 2 (σ_2): 17.10 [22]

Ratio (Group 2/Group 1): 1:1

$n=\{(1.96+2.33)^2 \times (18.64^2+17.10^2)\}/(87.12-68.19)^2=32.85\approx33$

A total of 66 patients will be enrolled. Group A will receive Duolin Nebulisation+ Standard Drug (*Devdarvyadi Yoga*) whereas Group B will receive the modified dosage form of *Dantimooladi Dhoom*+Drug (*Devdarvyadi Yoga*) in a modified dosage form [Table/Fig-1]. Simple randomisation is the sampling technique.



[Table/Fig-1]: Study protocol.

Randomisation will be carried out using a computer-generated random allocation sequence. Allocation concealment will be ensured through the Sequentially Numbered, Opaque, Sealed Envelopes (SNOSE) method, prepared by an independent third person. Participant enrolment and assignment to the intervention groups will be performed by the principal investigator according to the concealed allocation sequence. This will be a single-blind study in which participants will remain unaware of their allocated intervention.

Drug details of the modified dosage form of duolin: Duolin is a bronchodilator combination used for the management of bronchospasm in respiratory conditions such as bronchitis. It contains Levosalbutamol, a selective β2-adrenergic agonist, and IB, an anticholinergic agent. Levosalbutamol acts by stimulating β2 receptors in the bronchial smooth muscles, leading to relaxation of airway muscles and bronchodilation. IB blocks muscarinic receptors in the airway, thereby reducing bronchoconstriction and airway secretions. Duolin is commonly available as a nebulisation solution (repulse), content of 2.5 mL duolin is mentioned in [Table/Fig-2] [23].

S. No.	Ingredient	Strength
1.	Levosalbutamol	1.25 mg
2.	Ipratropium bromide	500 µg

[Table/Fig-2]: Contents of Duolin [23].

In the present study, a modified dosage form of Duolin was used to make it suitable for paediatric administration. The intervention consisted of 0.5 mL of Duolin solution diluted with 2 mL of normal saline and administered through nebulisation. The inhalational route allows the drug to reach the lower respiratory tract directly, producing rapid bronchodilation and symptomatic relief. This modified dosage ensures accurate dosing and better tolerability in children while maintaining therapeutic efficacy. The nebulisation was administered according to the study protocol for a duration of 15 days along with standard supportive care.

Procurement of raw materials: The raw materials required for the preparation of the study drugs, namely *Dantimooladi Dhoom* and *Devdarvyadi Yoga*, will be procured from authenticated and reliable sources. The crude drugs will be obtained either from the Department of *Dravyagun*, Mahatma Gandhi *Ayurveda* College, Hospital and Research Centre, Salod (H), Wardha, or from government-approved *Ayurvedic* pharmacies.

All raw materials will be botanically authenticated by experts from the Department of *Dravyagun* to ensure their identity, purity, and quality. After authentication, the study drugs will be prepared in the Department of *Rasashastra* and *Bhaishajya Kalpana* of the institute, following classical *Ayurvedic* texts and standard operating procedures [12]. Ingredients of *Devdarvyadi yoga* are illustrated in [Table/Fig-3].

S. No.	Name of herb	Scientific name	Family name	Part used	Proportion
1.	*Haritaki*	*Terminalia chebula*	Combretaceae	Fruit	1 part
2.	*Pippali*	*Piper longum*	Piperaceae	Fruit	½ part
3	*Musta*	*Cyperus rotundus*	Cyperaceae	Root	1 part
4	*Devdaru*	*Cedrus deodara*	Coniferae	Stem	1 part
5	*Shunthi*	*Zingiber officinale*	Zingiberaceae	Root	½ part

[Table/Fig-3]: Ingredients of *Devdarvyadi Yoga* [12].

Preparation of *Dantimooladi Dhoom*: *Dantimooladi Dhoom* will be prepared as per the procedure mentioned in *Bhaishajya Ratnavali* [12] at Datttraya *Rasashala*, MGACH and RC, Wardha. All the drugs mentioned in [Table/Fig-4] will be used in the form of *churna* (powder) and will be taken in equal quantities, that is 100 gm each (total 200 gm). Then this mixture will be applied to a gauze bandage and made into *varti* (Herbal fumigation stick).

Dhoomapana primarily causes excessive smoke and irritation in children; a modified dosage form has been used in the study to ensure safety, comfort, and standardisation. Instead of direct inhalation of dense smoke, the ignited *varti* will be held at a safe distance, and the mild fumes will be inhaled indirectly by the child for a limited duration

S. No.	Name of herb	Scientific name	Family name	Part used	Proportion
1.	*Dantimool*	*Baliospermum montanum*	Euphorbiaceae	Roots	1 part
2.	*Nirgundi*	*Vitex negundo*	Verbenaceae	Dried leaves	1 part

[Table/Fig-4]: Ingredients of *Dantimooladi Dhoom*.

(approximately 2-3 inhalations per sitting) under supervision. This modification helps to reduce excessive smoke exposure and irritation in children while maintaining the therapeutic effect of herbal fumigation. Thus, the drug composition, preparation and route of administration (*Dhoomapana*) were kept the same. The adjustment was made only in the way the drug was administered. Therefore, this should be understood as a procedural adjustment rather than a change in the drug itself. The properties of *Dantimooladi Dhoom* is shown in [Table/Fig-5]. Grouping and posology are detailed in [Table/Fig-6].

S. No.	Name of herb	*Rasa*	*Virya*	*Vipaka*	*Guna*	*Pradhan karma*
1.	*Dantimool*	*Katu*	*Ushna*	*Katu*	*Laghu*	*Kapha Vatahara Rechan Dipan*
2.	*Nirgundi*	*Katu*	*Ushna*	*Katu*	*Laghu, Ruksha*	*Vata kaphahara Caksusya Krmighan Varnaropna*

[Table/Fig-5]: Properties of *Dantimooladi Dhoom*.

Group	Sample size	Intervention	Dose and frequency	Duration	Follow-up
Group A	33	Duolin Nebulisation+ Standard drug	0.5 mL of Duolin diluted with 2 mL of normal Saline, 1 minute to 1.5 minutes BD *Devdarvyadi Yoga*- 5 mL BD	15 days	5th, 10th, 15th days
Group B	33	*Dantimooladi Dhoom*+ Standard drug	1 minute to 1.5 minutes BD *Devdarvyadi Yoga*- 5 mL BD	15 days	5th 10th, 15th days

[Table/Fig-6]: Grouping and posology.

Primary Outcomes

Objective criteria:

Bronchitis Severity Score Paediatric version (BSS ped): A validated, 3-item clinical rating scale will be used to measure the severity of acute bronchitis, particularly in preschool and young children. Each of the three items will be assessed on a 5-point scale ranging from 0 to 4. The total score is the sum of the following three components: Coughing (frequency and intensity); Pulmonary rales on auscultation (crackles/breath sounds); Dyspnoea (shortness of breath or breathing difficulty).

Scoring criteria are: Minimum Score: 0 (no symptoms)

Maximum score: 12 points (maximum overall severity) [24].

Subjective criteria:

1. *Kasa* (frequency)
2. *Kantha kandu*
3. *Mandagni*
4. *Kapha Nisthivanam*
5. *Aruchi*

Kasa (Frequency of cough) was assessed by noting the frequency of coughing during the day and night and its effect on sleep and routine daily activities, with scores ranging from no cough (0) to continuous cough disturbing sleep and daily work (4).

Kantha Kandu (Throat irritation) was evaluated by enquiring about the severity of throat irritation or itching and its role in triggering cough, graded from no irritation (0) to severe, persistent irritation (4).

Mandagni (Reduced digestive power) was assessed through appetite status, digestion pattern, and the presence of post-meal discomfort, graded from normal digestion (0) to marked indigestion with loss of appetite (4).

Kapha Nishthivanam (Expectoration) was assessed by observing the quantity, frequency, and ease of sputum expectoration, graded from absence of sputum (0) to copious and frequent expectoration (4).

Aruchi (Loss of taste/Appetite) was evaluated by the patient's interest in food and perception of taste, with scores ranging from normal appetite and taste (0) to severe loss of appetite and taste (4).

Outcomes assessment will be done at baseline and at follow-up at day 5th, 10th, and 15th (end of treatment).

STATISTICAL ANALYSIS

Data will be analysed using the Statistical Package for Social Sciences software version 25.0 (SPSS). For within-group comparisons, the paired t-test will be used when the data are normally distributed; for comparisons between the two groups, the unpaired t-test will be used for normally distributed variables. Categorical variables will be analysed using the Chi-square test to examine differences between groups. A p-value of <0.05 will be considered statistically significant.

Intervention modification: The ethics committee will be notified of any negative effects that occur during treatment. The patients will be cared for or the negative consequences will be addressed. If participants want to terminate the treatment, they have to justify why.

Participant timeline: The sequential progress of activities is represented in the study Gantt chart [Table/Fig-7], outlining all phases from protocol approval to thesis submission.

Scholar/Investigator	Dr. Mohammad Zafar					
Title	Comparative Evaluation of Efficacy of Adjuvant Role of *Dantimooladi Dhoom* vs Duolin Nebulisation with Standard Care in Children with Bronchitis (*Kaphaja kasa*): A Randomised Controlled Trial					
Steps	Q1	Q2	Q3	Q4	Q5	Q6
Approval from the IEC						
Review of literature						
Drug preparation						
Enrollment of the patient						
Data collection						
Statistical analysis						
Thesis writing						
Submission						

[Table/Fig-7]: Gantt chart.

Authors' contribution: MZ-Contributed to the conceptualization, study design, manuscript preparation, and correspondence; SK (Guide) supervised the study and critically reviewed the manuscript; AA-contributed to research coordination and methodological guidance; PW-contributed to literature review and manuscript preparation. All authors reviewed and approved the final manuscript.

REFERENCES

[1] Kasyapa Samhita or Vrddhjivakiya Tantra by Vrddha Jivaka by P. Hemaraja sarma by Hindi commentary Sri Satyapala Bhisagacharya viman sthan chap.1/10 page 89.
[2] Charaka Samhita vol 2 by Acharya vidhyadhar Shukl Ravidatta tripathi.chap.18/2 page 432.
[3] Guyton AC, Hall JE. Textbook of Medical Physiology. 13th ed. Philadelphia: Elsevier; Respiratory physiology—Cough reflex chapter.
[4] Vagbhata. Ashtanga Hridaya. Edited by Hari Sadasiva Sastri Paradakara. Reprint ed. Varanasi: Chaukhambha Surbharati Prakashan; Chikitsa Sthana, Kasa Chikitsa Adhyaya. p. 625-36.
[5] Bergmann M, Haasenritter J, Beidatsch D, Schwarm S, Hörner K, Bösner S, et al. Coughing children in family practice and primary care: A systematic review of prevalence, aetiology and prognosis. BMC Pediatr. 2021;21(1):260. Doi: 10.1186/s12887-021-02739-4. PMID: 34088294; PMCID: PMC8176681.
[6] Charaka Samhita of Agnivesha. Vol. 2. Varanasi: Chaukhambha Orientalia; 2014. Chikitsasthana, Kasa Chikitsa Adhyaya Chapter 18: p. 168-176.

[7] Lajoinie A, Janiaud P, Henin E, Gleize JC, Berlion C, Nguyen KA, et al. Assessing the effects of solid versus liquid dosage forms of oral medications on adherence and acceptability in children. Cochrane Database Syst Rev. 2017;2017(9):CD012783. Doi: 10.1002/14651858.CD012783. PMCID: PMC6483770.
[8] Mane RG, Kadam GD. Dhoopana review (ayurvedic fumigation): Traditional practice and modern evidence. International Journal of Advanced Research. 2025;13(09):569-74. Available from: https://dx.doi.org/10.21474/IJAR01/21739.
[9] Vaidya Chintamani vol 1 by Shri Vallabhacarya editor & translators K. Rama Chandra Reddy Varanasi: Chaukhamba orientalia 2013 page 348, 718.
[10] Darvyaguna Vijnana Vol 2 by D. Shanth Kumar Lucas Varanasi Chaukhambha Visvabharti Oriental reprint 2015 drug no.91 p.329.
[11] Nighantu Adarsa vol 2 by Bapalala G. Vaidya Chaukhambha Bharti Acadmy reprint 2019 drug no.395 p.232.
[12] Govind Das Sen. Bhaishajya Ratnavali. Varanasi: Chaukhambha Orientalia; 2016. Kasa Chikitsa Adhyaya; p. 403-05.
[13] Sharma RK, Dash B. Charaka Samhita. Vol. 2. Varanasi: Chowkhamba Sanskrit Series Office; 2014. Chikitsa Sthana, Kasa Chikitsa Adhyaya; p. 172-80.
[14] Srikantha Murthy KR. *Ashtanga Hridaya*. Vol. 2. Varanasi: Chowkhamba Krishnadas Academy; 2014. Chikitsa Sthana, Kasa Shwasa Chikitsa; p. 120-25.
[15] Agnivesha. *Charaka Samhita*. Revised by Charaka and Dridhabala; Sutrasthana, Dhoomapana Vidhi Adhyaya. Varanasi: Chaukhambha Orientalia; 2019.
[16] *Sushruta Samhita*. Dalhana commentary; Chikitsasthana, Kasa-Shwasa Chikitsa Adhyaya. Varanasi: Chaukhambha Sanskrit Sansthan; 2018.
[17] Kliegman RM, St Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM. Nelson Textbook of Paediatrics. 21st ed. Philadelphia: Elsevier; 2020.
[18] Chakraborti A, Lodha R, Pandey RM, Kabra SK. Addition of ipratropium bromide to salbutamol in acute asthma in children: A randomised controlled trial. Indian J Pediatr. 2006;73(11):979-83. Doi: 10.1007/BF02758300.
[19] Xu H, Tong L, Gao P, Hu Y, Wang H, Chen Z, et al. Combination of ipratropium bromide and salbutamol in children and adolescents with asthma: A meta-analysis. PLoS One. 2021;16(2):e0237620. Doi: 10.1371/journal.pone.0237620.
[20] Kesavan N, Vaghela DB, Harisha CR, Shukla VJ. Pharmacognostical and pharmaceutical evaluation of Saralaadi Dhoomapana Varti: A herbal formulation for Pratishyaya. Int J Innov Res Multidiscip Field. 2020;6(12):01-07.
[21] Mali A, Koli SA. Clinical evaluation of Dashamoola Shatphala Ghrita in the management of Vataja Kasa. J Ayurveda Integr Med Sci. 2021;6(3):78-82.
[22] Joiya SJ, Farhan ul Haq, Khan MA, Ahmad Z. Comparison of salbutamol alone and salbutamol in combination with ipratropium bromide in acute asthma in treatment of children. Professional Med J 2020; 27(6):1103-07. Doi: 10.29309/TPMJ/2020.27.06.3218.
[23] Medsafe. Duolin inhalation solution datasheet. New Zealand Medicines and Medical Devices Safety Authority; 2023.
[24] Lehrl S, Matthys H, Kamin W, Kardos P. The Bronchitis Severity Scale (BSS): A validated tool to assess the severity of acute bronchitis. Current Medical Research and Opinion. 2014;30(9):1829-40.

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate Scholar, Department of Balroga, Mahatma Gandhi Ayurvedic College and Hospital, Salod, Wardha, Maharashtra, India.
2. Associate Professor, Department of Balroga, Mahatma Gandhi Ayurvedic College and Hospital, Salod, Wardha, Maharashtra, India.
3. Project Coordinator, Department of Research, Lata Medical Research Foundation, Nagpur, Maharashtra, India.
4. Postgraduate Scholar, Department of Balroga, Mahatma Gandhi Ayurvedic College and Hospital, Salod, Wardha, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Mr. Mohammad Zafar,
Postgraduate Scholar, Department of Balroga, Mahatma Gandhi Ayurved College, Hospital and Research Centre, Salod, Wardha-442001, Maharashtra, India.
E-mail: drzafar313@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Oct 13, 2025
- Manual Googling: Sep 17, 2026
- iThenticate Software: Sep 19, 2026 (8%)

ETYMOLOGY: Author Origin

EMENDATIONS: 9

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Oct 12, 2025**
Date of Peer Review: **Dec 11, 2025**
Date of Acceptance: **Sep 22, 2026**
Date of Publishing: **Nov 01, 2026**