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BHARANGI GUDA IN THE MANAGEMENT OF *TAMAKA SHWASA*: A COMPREHENSIVE REVIEW AND PAEDIATRIC DOSE FORMULATION USING *DILLING'S RULE*

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ABSTRACT

Background: *Standardizing traditional treatments in contemporary clinical practice requires the integration of modern pediatric pharmacokinetics with classical Ayurvedic pharmacology. This article evaluates Bharangi Guda, a polyherbal mixture found in the Bhaishajya Ratnavali. It is primarily used to cure bronchial asthma (Tamaka Shwasa) and hiccups (Hikka).*

Methods: *By closely examining ancient texts, this study aligns modern inflammatory ideas with the classical roots of respiratory distress (Pranavaha Srotas). The synergistic pharmaceutical architecture of the formulation was analyzed, with special focus on the bronchodilatory and Vata-Kapha-calming properties of its primary drug, Bharangi (Clerodendrum serratum), as well as Dashamoola (anti-inflammatory), Trikatu (Agni-deepana/appetizer), and Yavakshara (mucolytic). To address the critical problem of pediatric posology in Kaumarabhritya, Dilling's rule was systematically applied to adult dosage parameters to build a reproducible pediatric dosing framework.*

Results: *The pharmacological investigation emphasizes Bharangi Guda's specific mast-cell stabilizing and airway-clearing actions. Additionally, using Dilling's rule reduces the pharmacological constraints of varying metabolic clearance in contemporary clinical settings by offering a consistent, useful method for pediatric dosing.*

Conclusion: *In providing a regulated, secure, and effective regimen for treating childhood respiratory distress with Bharangi Guda, this thorough analysis effectively bridges the knowledge gap between ancient pharmacology (Bhaishajya Kalpana) and contemporary pediatric pharmacology.*

KEYWORDS: *Bharangi Guda, Tamaka Shwasa, Kaumarabhritya, Pranavaha Srotas, Dilling's Rule, Pediatric Posology, Bhaishajya Kalpana, Clerodendrum serratum*

1. INTRODUCTION

Respiratory disorders have posed a significant global health burden, prompting the evolution of highly specialized therapeutic interventions within traditional medical systems. In the foundational texts of *Ayurveda*, conditions such as *Tamaka Shwasa* (clinically similar to bronchial asthma) and *Hikka* (hiccups) are classified under the severe afflictions of the *Pranavaha Srotas*. These pathologies are fundamentally understood as complex dysregulations of the *Vata* and *Kapha doshas*, originating from the *Pitta Sthana*, which encapsulates the anatomical domains of digestion and gastrointestinal metabolism.

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Among the most efficacious of these classical interventions is *Bharangi Guda*, a highly concentrated, semi-solid polyherbal confection (*Avaleha* or *Guda* formulation) detailed in the esteemed medieval compilation, the *Bhaishajya Ratnavali*. *Bharangi Guda* derives its therapeutic nomenclature and primary efficacy from its principal ingredient, *Bharangi*, botanically identified as *Clerodendrum serratum*, which has profound *Shwasahara* (anti-asthmatic) and *Kaphapaha* (mucolytic) properties. The formulation's efficacy is further bolstered by the profound anti-inflammatory action of *Dashamoola*, the thermogenic and bioavailability-enhancing properties of *Trikatu*, the aromatic preservation of *Trijata*, and the potent alkalizing, mucus-cleaving effects of *Yavakshara*. All of these active principles are suspended in *Guda* (jaggery) and *Madhu* (honey), which stabilizes the bioactive phytoconstituents and ensures their targeted delivery to the inflamed mucosal linings of the respiratory tract.

Although *Bharangi Guda's* pharmacological effectiveness in adult populations has been thoroughly studied and clinically proven, its application to pediatric medicine—a branch of Ayurveda known as *Kaumarabhritya*—presents a very difficult pharmacokinetic issue. From infancy through puberty, children's physiological, metabolic, and enzymatic profiles change dynamically, leading to notable differences in medication absorption, distribution, metabolism, and excretion. Ayurveda historically approaches pediatric dosing through individualized, subjective assessments of a child's *Bala* (vital strength), *Vaya* (chronological age), and *Agni* (metabolic capacity). However, the global modernization and integration of traditional medicine require standardized, universally applicable dosing algorithms to ensure both systemic safety and therapeutic efficacy. *Dilling's rule*, an age-based pharmacological formula originating conceptually in ancient times but formalized in the twentieth century, has been widely adopted as a pragmatic tool for calculating these pediatric dosages.

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2. Objectives This comprehensive review aims to analyze the pharmacological synergy of *Bharangi Guda's* botanical components, align classical Ayurvedic concepts of respiratory pathogenesis with modern inflammatory mechanisms, and systematically apply *Dilling's rule* to establish a safe, standardized pediatric posology for managing *Tamaka Shwasa* in the field of *Kaumarabhritya*.

3. Methodology The systematic gathering and analysis of data for this comprehensive report involved seamlessly merging classical Ayurveda with contemporary biomedical and pharmacological evidence. The primary textual data were sourced from the foundational treatises of Ayurveda, collectively known as the *Brihat Trayi*: the *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. Specific analytical attention was directed toward chapters delineating the pathogenesis and management of respiratory diseases, notably *Hikka Shwasa Chikitsa*, and the pharmacological classifications of herbs into functional groups such as *Gana* and *Varga*. The exact formulation architecture of *Bharangi Guda* was retrieved from the *Bhaishajya Ratnavali*. Furthermore, literature pertaining to pediatric pharmacokinetics and mathematical dose-calculation models was critically reviewed to construct a highly structured, evidence-based posological framework for children.

4. Sampling design *Not applicable.*
5. Statistical design *Not applicable.*
6. Geographical area *Not applicable.*
7. Results To fully understand why this medicine works and how to use it safely for children, it is important to study the ancient views on illness, plant types, medicine preparation, and child dosing. Ancient Ayurvedic texts group hiccups (*Hikka*) and breathing issues like asthma (*Shwasa*) together because they share the same causes, origins, and treatments. According to the *Charaka Samhita (Chikitsa Sthana, Chapter 17*), both are very hard to cure and can be deadly if ignored. These conditions start in the digestive system and are caused by a severe, simultaneous imbalance of *Kapha* and *Vata*. The text highlights how sudden and dangerous these conditions are, noting that while many diseases cause pain, asthma and hiccups are the most quickly fatal because they stop a person's breath. The Sanskrit verse notes: **यथा श्वासश्च हिक्का च प्राणानाशु निकृन्ततः || अन्यैरप्युपसृष्टस्य रोगैर्जन्तोः पृथग्विधैः | अन्ते सञ्जायते हिक्का श्वासो वा तीव्रवेदनः** || This translates to the understanding that individuals suffering from any other chronic disease can eventually become afflicted with painful *Hikka* and *Shwasa* at terminal stages, making their management paramount.

The etiology involves repeated exposure to environmental triggers (*Raja*, *Dhuma*, *Sheeta Vata*) alongside severe dietary indiscretions (*Rooksha Anna*, *Vishama Ashana*). Furthermore, physical exhaustion, excessive sexual intercourse, long walks, and the suppression of natural urges (*Vega Dharana*) provoke Vata, causing the *Prana* and *Udana* sub-types to reverse their downward courses into a pathological upward trajectory (*Pratiloma*). Concurrently, accumulated Kapha obstructs the *Pranavaha Srotas*, physically trapping the erratic Vata. This collision results in mechanical obstruction, mucosal edema, and severe paroxysmal bronchospasm characteristic of *Tamaka Shwasa*.

Bharangi (*Clerodendrum serratum*) is central to managing respiratory ailments. The plant is known by highly descriptive synonyms including *Padma*, *Phanji*, *Angaravalli*, *Brahmanayashtika*, and *Bhruguja*. The *Sushruta Samhita* mandates the inclusion of *Bharangi* in the *Pippalyadi Gana (Sutrasthana 38/22)*, a group of herbs highly effective in mitigating *Kapha* and powerfully kindling the digestive fire, which is essential since *Shwasa* originates in the *Pitta Sthana*. The herbs in this group are characterized by their *Katu* (pungent) taste and *Ushna* (hot) potency, enabling them to break down *Ama* (toxic metabolic waste) and relieve spasmodic pain. From a pharmacological perspective, the roots and leaves of *Clerodendrum serratum* contain flavonoids like hispidulin, scutellarein, and luteolin, alongside D-mannitol, oleanolic acid, and steroidal saponins. These compounds act collectively as mucolytics, bronchodilators, and anti-inflammatory agents.

Bharangi Guda's formulation, detailed in the *Bhaishajya Ratnavali (Hikka Shwasa Rogadhikar 16/52-56)*, targets intense symptomatology. The formulation dictates the use of 4.8 kilograms of raw *Bharangi* root and 4.8 kilograms of *Dashamoola*. *Dashamoola* comprises the roots of five large trees and five smaller shrubs, universally acclaimed for their profound *Vata*-pacifying, analgesic, and anti-inflammatory actions. The raw mass is submerged in 57.6 liters of pure water and subjected to controlled boiling until reduced to one-fourth of its original volume, yielding 14.4 liters of highly concentrated *Kashaya*. It is then combined with 4.8 kilograms of *Guda* (jaggery) and cooked to a semi-solid *Avaleha*. Finally, *Prakshepa Dravyas* are incorporated: 48 grams each of *Trikatu* and *Trijata* herbs, and 24 grams of *Yavakshara* (alkaline ash from Hordeum vulgare). Once cooled, 288 grams of *Madhu* (pure honey) is integrated to act as a vital *Yogavahi*, transporting active ingredients deep into the pulmonary tissues.

Bharangi Guda's Rasa Panchaka breaks down the pathogenesis (*Samprapti Vighatana*) from multiple angles. *Deepana and Pachana* properties *(Trikatu and Yavakshara)* digest underlying *Ama*. The *Ushna* and *Teekshna* qualities *(Dashamoola and Bharangi)* reduce severe mucosal swelling. Herbs like *Pippali* possess *Vatanulomana* properties, guiding *Prana Vayu* back to its downward trajectory, while *Bharangi* serves as a direct mucolytic. At a molecular level, this pathology is driven by a Type 2 (T2) inflammatory response (mast cell degranulation, elevated IgE). Flavonoids in *Bharangi* exhibit potent mast-cell stabilizing properties, halting the release of histamine. *Dashamoola* exerts analgesic and anti-inflammatory effects by inhibiting cyclooxygenase (COX-2) enzymes. *Trikatu* acts as a bioenhancer; active alkaloid piperine inhibits CYP3A4 and P-glycoprotein efflux pumps, delaying metabolic degradation. *Yavakshara* serves as a remarkable pH-altering mucolytic that actively cleaves complex mucoprotein bonds.

Applying *Dilling's rule* to this potent formulation provides an age-stratified dosing schedule. Based on a maximum adult dose of 12 grams daily, pediatric dosages can be calculated

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systematically: 1 Year (0.6 g), 3 Years (1.8 g), 5 Years (3.0 g), 8 Years (4.8 g), 12 Years (7.2 g), and 16 Years (9.6 g).

8. Suggestions While *Dilling's rule* provides a highly accessible metric that satisfies the need for standardization, its application to potent polyherbal formulations demands careful clinical consideration. Age-based formulas inherently assume a strict, linear correlation between chronological age and the maturation of hepatic and renal clearance systems. A child's liver mass relative to their total body weight is significantly larger than an adult's, which can lead to faster-than-expected clearance of certain phytoconstituents.

Furthermore, escalating global rates of childhood obesity complicate age-based dosing. A ten-year-old child with a significantly higher body mass index and expanded volume of distribution in adipose tissue may require a dose much closer to an adult parameter to achieve optimal plasma serum concentrations. Therefore, while the calculated mathematical dose provides a scientifically grounded starting point, the clinician must seamlessly integrate the classical Ayurvedic principle of physically assessing the child's *Bala* (strength) and *Agni* (digestive fire). If the child exhibits signs of gastric irritation—a documented side effect of the high *Trikatu* and *Yavakshara* content—the dose must be immediately titrated downward. Conversely, in acute, life-threatening exacerbations characterized by severe mucous plugging, the dosage may need slight upward adjustment under strict medical supervision.

9. Conclusion *Bharangi Guda* stands out as a highly potent and clinically relevant Ayurvedic formulation for the management of Tamaka Shwasa (bronchial asthma). The comprehensive review of its pharmacological profile highlights its inherent *Vata-Kapha Shamaka* properties, driven by the bronchodilatory, anti-inflammatory, and mucolytic actions of its primary botanical, Clerodendrum serratum. These therapeutic mechanisms effectively target the root pathogenesis of *Tamaka Shwasa*, offering symptomatic relief and long-term respiratory support. Extending the benefits of *Bharangi Guda* to pediatric populations requires careful attention to posology to ensure safety and efficacy. By systematically applying *Dilling's Rule*, this study bridges traditional *Ayurvedic* wisdom with modern pharmacological standards. This methodical approach to dose calculation provides a standardized, age-appropriate framework that mitigates the risks of toxicity and sub-therapeutic dosing in children. Ultimately, translating the adult dosage into precise pediatric formulations enhances its clinical utility and safety profile.

10. Area for further research Moving forward, large-scale clinical trials and pharmaceutical efforts to improve the palatability of this standardized pediatric dose are warranted. Such advancements will not only improve medication compliance among children but also firmly establish *Bharangi Guda* as a safe, evidence-based, and frontline integrative therapy for childhood asthma management.

11. Figures, tables and references

Table 1: Classification and functional categorization of *Bharangi (Clerodendrum serratum)* across classical texts

Classical Treatise	Categorization (Gana / Varga)	Primary Therapeutic Indication and Action
Charaka Samhita	*Pureeshasangrahaneeya Gana*	Bowel binding, regulation of gastrointestinal fluids, and mucosal stability.
Charaka Samhita	*Shaka Varga*	Vegetable group possessing distinct medicinal value and nutritional properties.
Sushruta Samhita	*Pippalyadi Gana*	Management of Kapha disorders, Pratishyaya (rhinitis), appetite stimulation, and tumors.
Sushruta Samhita	*Arkadi Gana*	Eradicating Kapha, metabolizing excess fat, neutralizing toxins, and deep wound healing.
Ashtanga Hridaya	*Arkadi Gana*	Formulations utilized in cleansing therapies (Shodhana) and Kapha mitigation.
Ashtanga Hridaya	*Sursadi Gana*	Direct intervention for respiratory distress, persistent cough, and bronchial mucosal inflammation.

Table 2: Comparative historical analysis of standard pediatric dose calculation rules

Rule Nomenclature	Mathematical Calculation Formula	Primary Clinical Utility and Inherent Limitations
Dilling's Rule	(Age in years/20) x Adult dose	Simple and rapid for field use; highly inaccurate for neonates.
Young's Rule	[Age in years/(Age in years+12)] x Adult dose	Quick estimation; poses risks of suboptimal dosing in overweight children.
Clark's Rule	(Weight in lbs/150) x Adult dose	Highly accurate as it directly accounts for body mass.
Fried's Rule	(Age in months/150) x Adult Dose	Designed for the unique metabolic states of neonates and infants.
Cowling's Rule	(Age at next birthday/24) x Adult Dose	Considered a safe age-based technique, computationally slightly more complex.

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Table 3: The Rasa Panchaka of the constituent ingredients in Bharangi Guda

Ingredient	Rasa (Taste)	Guna (Qualities)	Virya (Potency)	Vipaka
Bharangi	*Tikta, Katu, Kashaya*	*Laghu, Ruksha*	*Ushna*	*Katu*
Dashamoola	*Kashaya, Tikta, Madhura*	*Guru, Ruksha*	*Ushna*	*Katu*
Trikatu	*Katu*	*Laghu, Teekshna*	*Ushna*	*Katu*
Trijata	*Katu, Tikta, Madhura*	*Laghu, Ruksha, Teekshna*	*Ushna*	*Katu*
Yavakshara	*Katu, Lavana*	*Laghu, Snigdha, Teekshna*	*Ushna*	*Katu*
Guda	*Madhura*	*Guru, Snigdha*	*Ushna*	*Madhura*
Madhu	*Madhura, Kashaya*	*Laghu, Ruksha*	*Sheeta*	*Katu*

Table 4: Detailed pharmacological breakdown of the ingredients in Bharangi Guda

Ingredient	Primary Bioactive Constituents	Pharmacological Mechanism of Action in Respiratory Disease
Bharangi	Hispidulin, Saponins, Luteolin	Mast-cell stabilization, profound suppression of IgE, airway bronchodilation.
Dashamoola	Various flavonoids, Sterols	COX-2 enzyme inhibition, profound systemic anti-inflammatory action.
Trikatu	Piperine, Gingerol, Shogaol	Systemic bioavailability enhancement via CYP450 inhibition, local mucolytic action.
Yavakshara	Potassium carbonate, alkalines	Potent pH-altering mucolytic, cleavage of mucous glycoproteins.
Guda & Madhu	Complex sugars, enzymatic proteins	Demulcent tissue soothing, acts as a Yogavahi (catalytic cellular vehicle).

Table 5: Standardized pediatric posology for Bharangi Guda utilizing Dilling's Rule

Patient Age	Calculation	Total Daily Dose	Clinical Administration and Titration Strategy
1 Year	(1/20) X 12gm	0.6 g	Administer as 0.3 g twice daily; mix with ample honey to prevent irritation.
3 Years	(3/20) X 12gm	1.8 g	Administer as 0.9 g twice daily with warm milk; monitor for abdominal distress.
5 Years	(5/20) X 12gm	3.0 g	Administer as 1.5 g twice daily with warm milk or lukewarm water.
8 Years	(8/20) X 12gm	4.8 g	Administer as 2.4 g twice daily; ideal age for full mucolytic action.
12 Years	(12/20) X 12gm	7.2 g	Administer as 3.6 g twice daily; titrate up to 4.0 g during acute exacerbations.
16 Years	(16/20) X 12gm	9.6 g	Administer as 4.8 g twice daily; approaches adult dosing parameters.

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