
REVIEW ARTICLE

An Ayurveda Polyherbal Formulation Popularly Used In Pediatric Disorders: A Systematic Review

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ABSTRACT

Ayurveda medicine holds the key to various pediatric disorders, of which Balachaturbhadra formulation is one explicit drug of importance due to its broad-spectrum activity. A systematic literature review was conducted and reported according to accepted guidelines. Studies ranging from 2000-2021 were studied during this review. Balachaturbhadra was the only keyword used for the search with different spelling combinations. No filters or limits were used for the search. The primary outcome of the study is the different dosage forms that has been studied and the various diseases it is used in. Publications with full text were downloaded and data items including not limited to author details, site of the study, type of the study, objective of the study, year of publication, dosage form of the drug and action of drug were extracted, reviewed and analyzed systematically.

Keywords: Balachaturbhadra, Balaroga, Novel dosage forms, In-vivo studies, Systemic means, Data extraction

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INTRODUCTION

With a rise in childhood disorders and the apprehension of parents towards drug adverse effects and drug dependency, herbal medicine is gaining popularity all over the globe particularly in the educated class of the population. Ayurveda medicine holds the key to various pediatric disorders, of which Balachaturbhadra formulation is one explicit drug of importance due to its broad-spectrum activity. Various studies have been taken up by different researchers across the country to study its efficacy in varied conditions. Novel dosage forms of the formulation have also been studied to improve compliance in the pediatric population. One drug used in different forms in different conditions warrants the need for a compilation of data to better understand this formulation for academicians, clinicians and researchers. This paper is a humble attempt towards systematically reviewing the studies done on this drug till date and to discuss the wide range of action that the drug possesses.

METHODS

A systematic literature review was conducted and reported according to accepted guidelines. The review was conducted through the search engine Google Scholar for published research articles (51), Shodhganga, INFLIBNET Centre - a digital repository for Indian PhD theses (00) Ayurvedic Research Database - a searchable directory titles of all India ayurvedic PG and PhD theses (03), AYUSH RESEARCH PORTAL - Research Data of AYUSH Systems at Global Level (03), DHARA (Digital Helpline for Ayurveda Research Articles) - an online index of articles on Ayurveda published in research journals worldwide (00) and Researchgate (08)

Eligibility criteria:

Studies ranging from 2000-2021 were studied during this review. Balachaturbhadrha was the only keyword used for the search with different spelling combinations. No filters or limits were used for the search. All articles available in the public domain wherever full text was available was included in the review irrespective of indexed or non-indexed journal categories. Research articles, review articles and case studies were reviewed separately.

Outcomes of interest:

The primary outcome of the study is the different dosage forms that has been studied and the various diseases it is used in. Secondary outcomes include to study its multi-faceted action both in terms of Ayurveda and in pharmacology.

Selection of study and data extraction:

The author and mentor independently reviewed all the selected articles to comply with the eligibility criteria. Publications with full text were downloaded and data items including not limited to author details, site of the study, type of the study, objective of the study, year of publication, dosage form of the drug and action of drug were extracted. (Table No.1)

Synthesis methods: Table No.1

Authors	Site of study	Type of study	Objective of study	Year	Name used & Dosage form
Nariya <i>et al</i>	Central Council for Research in Ayurveda and Siddha, Ahmedabad	Animal study	Toxicity study - acute and long term	[13]	Balachaturbhadrha churna
Ajazuddin S Saraf	Ravishankar Shukla University, Raipur, Chhattisgarh	Pharmacognostic study	Fingerprinting methods	[1]	Balachaturbhadrha churna
Abhishek <i>et al</i>	IPGT & RA, Jamnagar	Pharmacognostic study	Pharmacognostical and Pharmaceutical Assay	[12]	Balachaturbhadrha churna
Shah Kiran	Smt. K. G. Mittal Punarvasu Ayurvedic College, Charni Road, Mumbai	Clinical study-Comparative research study	Therapeutic action in diarrhea in children (balaatisara)	[2]	Balachaturbhadrha syrup
Suhas A <i>et al</i>	IPGT&RA, Jamnagar	Pharmaceutico-Analytical study	Pharmacognostical and Pharmaceutical Evaluation	[14]	Balachaturbhadrha Vati
Sumod Khedekar <i>et al</i>	National Institute of Ayurveda	Review article	Therapeutic action in Respiratory diseases	[2]	Balachaturbhadrha Choorna
Rohit Gokarn <i>et al</i>	MGACHRC, Salod (H.), Wardha	Pharmaceutico-Analytical study	Dose modification and Standardization	[8]	Balachaturbhadrha syrup
Abhishek J. Joshi <i>et al</i>	IPGT&RA, Jamnagar	Animal study	Immunomodulatory activity	[10]	Balachaturbhadrha churna
Abhishek J. Joshi, <i>et al</i>	IPGT&RA	Pharmaceutico-Analytical study	Comparative study of market samples	[12]	Balachaturbhadrha (BCB) Churna
Wankhede Arun <i>et al</i>	MGAC, DMIMS, Wardha	Clinical study-Comparative research study	Therapeutic action in Gastrointestinal tract disorder in children	[3]	Balachaturbhadrha Avaleha
Abhishek Joshi <i>et al</i>	IPGT&RA, Jamnagar	Review article	Pharmaceutical standards review	[10]	Balachaturbhadrha churna
Bhumi Mori, K <i>et al</i>	IPGT&RA, Jamnagar	Pharmaceutico-Analytical study	Therapeutic action in URTI (Pratishyaya) in children	[5]	Balachaturbhadradi Yoga
Shantala Priyadarshini <i>et al</i>	Mysore, Karnataka	Case series	Cutaneous manifestations in Covid+ cases	[6]	Balachaturbhadrha rasa

Data Analysis:

A total of 14 published articles in indexed and peer-reviewed journals wherever full text was available was taken and reviewed. Of the 14 studies, 2 studies (14%) were research studies with double arm intervention comparative study protocol in two different diseases. 2 studies (14%) were based on case studies of which 1 study was a single case report and the other a case series reporting. 2 studies (14%) were animal studies in vivo reporting the acute and long-term toxicity and its immunomodulatory action. 2 studies (14%) were pharmacognostic studies with pharmacognostic assay and drug fingerprinting. 14 studies (28%) were analytical studies with dose modification, standardization and comparative protocols. 2 (14%) studies were review studies of the formulation based on pharmaceutical studies and Ayurveda references.

DISCUSSION

This drug has been studied by Shah Kiran *et al* [2], to observe the action of this drug on appetite, loose stools, stools with mucus, pain and distension of abdomen against *Vatsakadi Kashaya* and found that it acts as a digestive (*deepana*), carminative (*pachana*), capable of absorbing excessive moisture (*grahi*) and regulates the functions of *Vata (vatanulomana)* thus relieving the symptoms of acute gastroenteritis. He also adds significant relief from symptoms like loss of appetite, anorexia, and poor metabolic functions. Wankhede Arunet.al.,³ studied this drug in comparison to *Bilvadilehya* in gastroenteritis and established its *Kapha-Pitta* alleviating properties due to which subjects were relieved from continuous bouts of diarrhea. It has been proved to improve the digestive fire thus improving the body metabolism and facilitate the regulation of normal physiological functions of the body. The drug is and to have action on regulating thirst and reducing urine output thus decreasing the signs of dehydration (53%). Khedekar et.al. Compiled evidence data available on the drugs used in *Balachaturbhadra* formulation to study the effect on respiratory diseases using in-vitro studies and experimental studies.⁴ He concluded that all the four drugs possess antimicrobial, anti-diarrheal, analgesic, spasmolytic, antihistamine and immunomodulatory properties which can act in allergic respiratory diseases in children [5]. Shantala P et.al., has reported this drug to have an effect in management of allergic conjunctivitis in an infant along with other Ayurveda interventions to both mother and baby [6]. The drug's efficiency in managing cutaneous manifestations in covid positive cases has been reported as case series of 5 patients which includes 2 children.⁷ Balachurbhadrachurna was converted into syrup by Rohit Gokarn et al and studied to contain acid base strength compounds and polyphenol derivatives such as flavonoids [8]. In vivo animal studies conducted by Abhishek Joshi et.al., in an attempt to standardize the drug's pharmacognostical and pharmaceutical parameters evaluated the phyto-chemical composition of *Balachaturbhadra* and found it to be slightly acidic in nature and also showed the presence of carbohydrates, steroids, flavonoids, alkaloids, tannins, phenols and cardiac glycosides [9]. The percentage of water-soluble material is found to be more than that of alcohol-soluble material [10]. He has also established the formulation's immunomodulatory action by increasing cell mediated response, humoral immunity and cytoprotective activity [11, 12]. Nariya et.al. [13] studied acute and long-term toxicity in Wister albino rats and found that *Balachaturbhadra* formulation does not cause any signs or symptoms of toxicity even up to a dose of 2000 mg/kg. Which is more than 20 times the therapeutic equivalent dose [13]. The study also reports that there is only mild toxicity potential in long term administration of 45 days in high doses upto 900mg/kg in rats which is far from clinical dosage. The formulation was modified into tablet (*vati*) form by Suhas *et al.*, and pharmaceutically analysed for physico-chemical parameters and certain peaks were visualized under UV light after performing HPTLC [14].

CONCLUSION

The review of this formulation was done from published full text papers available in open access. The drug has been prepared and studied in dosage forms and combinations of *inunctus (avalehya)*, tablet (*vati*), and syrup form by various scholars and reported to be stable and effective. The efficacy of the drug has also been tested in disorders vis-à-vis diarrhea, upper respiratory tract infections, allergic rhinitis, allergic conjunctivitis and cutaneous manifestations in children, all pertaining to respiratory and gastrointestinal diseases in children. Studies have been conducted in many centers in India and no adverse reactions have been reported in-vivo till date.

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