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Clinical study on the effect of balashoshahara rasayana in balashosha

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Abstract
Balashosha is a pediatric condition described in Ayurvedic literature, characterized by progressive depletion of bodily tissues due to impaired nourishment and digestion. It is often correlated with various forms of childhood malnutrition in modern medicine, particularly Protein-Energy Malnutrition (PEM). This condition manifests predominantly in early childhood, a critical period for growth and development. Balashosha arises due to the impaired function of Agni (Agnimandya), leading to inadequate transformation and assimilation of nutrients essential for dhatu poshana (tissue nourishment). Classical texts attribute this to a combination of causes including maternal malnutrition, improper breastfeeding, infections, and hereditary factors.
The clinical features of Balashosha include emaciation, pallor, delayed milestones, irritability, poor appetite, fatigue, and compromised immunity. If left unaddressed, the condition may result in stunted growth, cognitive impairment, and increased morbidity and mortality. Ayurvedic management of Balashosha emphasizes holistic interventions involving dietary regulation, use of Rasayana (rejuvenating) drugs, Balya (strength-promoting) herbs, and Panchakarma therapies tailored to the child's strength. Herbs such as Ashwagandha, Shatavari, Bala, Vidarikanda, and formulations like Ghrita, Leha and medicated biscuits have shown promising results in improving nutritional status and overall growth. This review aims to explore the etiopathogenesis, clinical presentation, and holistic management of Balashosha in light of classical Ayurvedic principles and recent clinical studies. Emphasis on early diagnosis, maternal education, and lifestyle modifications is crucial to prevent long-term complications and ensure optimal growth and development in children.

Keywords: Balashosha, pediatric malnutrition, ayurvedic nutrition, rasayana, child growth, agnimandya

1. Introduction
Childhood is a crucial phase of life characterized by rapid growth, development, and physiological transformation. Nutrition plays a pivotal role during this period, and any disturbance in the nutritional supply can lead to various disorders, one of the most significant being Balashosha. This term, derived from classical Ayurvedic texts, denotes a condition of progressive dhatu kshaya (tissue depletion) in children, primarily due to inadequate nourishment and impaired digestion. Balashosha has a strong conceptual resemblance to Protein-Energy Malnutrition (PEM) as recognized in contemporary pediatrics.
Acharya Vagbhata was the first to give a scientific yet concise explanation of Balashosha in the Balamaya Pratishedha Adhyaya (Chapter on Pediatric Disorders) of the Ashtangahridayam [1].
"Infants who indulge excessively in day time (atyahah), sleep (svapna) consume, cold water (sheetambu), and consume breast milk that is shlaishmika (Kapha-dominant), develop obstruction (sroto-rodha) in the Rasavaha Srotas (channels carrying nutrient plasma) due to increased Kapha. As a result, symptoms such as anorexia, nasal catarrh, fever, and cough arise, leading to progressive emaciation. The child becomes dried-up (shushka), with oily face and pale (snigdha shukla mukhekshanah).

As a result
- The body fails to receive proper nutrition.
- This chronic deficiency impairs the growth and development of the child.
- Eventually, the child develops the condition known as Balashosha (pediatric nutritional deficiency/emaciation).

Modern epidemiological studies have identified malnutrition as a leading contributor to under-five mortality and morbidity, particularly in low-income regions. Despite multiple public health initiatives, childhood malnutrition continues to be a major health burden in India. Ayurveda provides a promising and integrative framework for its prevention and management through Ahara (dietary guidelines), Aushadha (herbal medications), and Rasayana therapy.

This paper aims to bridge the traditional Ayurvedic understanding of Balashosha with modern clinical insights, and to evaluate the efficacy of a novel Ashwagandha-Shatavari-Bala-Vidarikand-Panchakola-Soybean-based Ayurvedic biscuit formulation in managing mild to moderate cases of pediatric malnutrition. The study is designed to contribute to integrative pediatric nutrition protocols by offering a safe, culturally acceptable, and nutritionally potent intervention.

2. Objective of the Study

The objective of this research is to evaluate the efficacy of a formulation composed of Ashwagandha (Withania somnifera), Shatavari (Asparagus racemosus), Bala (Sida cordifolia), Vidarikand (Pueraria tuberosa), Panchkola (a classical Ayurvedic combination), and Soybean (Glycine max), as a Balashoshahara Rasayana (rejuvenative formulation for pediatric malnutrition) in the management of Balashosha (pediatric malnutrition or emaciation in children).

According to classical Ayurvedic texts, the Panchakola [2] group of herbs is traditionally recognized for its Deepana (appetizer), Pachana (digestive stimulant), Vatakapha-nashaka (pacification of Vata and Kapha doshas), and Srotoshodhana (channel-cleansing) properties. The other four herbs—Ashwagandha (Withania somnifera), Shatavari (Asparagus racemosus), Bala (Sida cordifolia), and Vidarikand (Pueraria tuberosa)—are highly regarded in Ayurvedic literature for their, Balya [3] (strength-promoting), Brimhana [4] (tissue-nourishing), Hridya [5] (cardiotonic) and Rasayana [6] (rejuvenative) effects.

Soybean (Glycine max), a nutrient-dense legume, is known for its Balya (strength-enhancing), Vata-shamaka (Vata-pacifying) properties and high-quality protein content, making it a suitable modern nutritional adjunct [7].

Based on these considerations, the combined use of these ten ingredients may offer a synergistic effect in managing.

Balashosha (pediatric emaciation or malnutrition). Therefore, the aim of this research is to assess the clinical efficacy of a biscuit-based formulation containing these ingredients in preschool children (under 6 years of age) diagnosed with Balashosha.

For this study, the ten ingredients were processed into nutraceutical biscuits, manufactured in collaboration with a certified biscuit producer, and administered to the selected pediatric participants.

3. Materials and Methods

Formulation and Preparation Method

Ingredients

Table 1: Medicinal Constituents

Herb	Quantity
Ashwagandha(Withania somnifera)	3 kg
Shatavari (Asparagus racemosus)	3 kg
Bala beej (Sida cordifolia seeds)	3 kg
Vidarikand (Puerariatuberosa)	3 kg
Panchakola (Classical herbal group)	1 kg
Soybean (Glycine max)	5.5 kg

Table 2: Base/Subsidiary Ingredients

Ingredient	Quantity
Whole wheat flour	32 kg
Semolina (Suji)	12.5 kg
Sugar (finely powdered)	25 kg
Clarified butter (Ghee)	25 kg
Cow's milk	25 litres

Equipment Used

Grinder, mixer, flour sieve, large steel mixing tray (paraat), rolling board (chakla) and rolling pin (belan), steel plate (tastri), kitchen tongs (chimta), and coal-fired stove.

Method of Preparation

- **Powdering:** All medicinal herbs were finely ground using a grinder and sieved to obtain a uniform, fine powder.
- **Creaming:** Powdered sugar was placed into a mixer, followed by the addition of clarified butter (ghee). The mixture was blended until it achieved a smooth, homogenous consistency.
- **Dough Formation:** To the ghee-sugar mixture, the herbal powders, semolina, and whole wheat flour were gradually added. While mixing, milk was added intermittently to achieve a soft, pliable dough similar to that used for making traditional flatbreads (roti).
- **Shaping:** The prepared dough was transferred to a large mixing tray. Portions of the dough were rolled flat using a rolling pin, and biscuit-sized pieces were cut from the rolled dough.
- **Baking:** These biscuit pieces were placed on a steel plate and baked over a coal-fired flame using kitchen tongs. Baking continued until the biscuits turned golden brown and crisp, which was considered the indicator of complete cooking.
- **Packaging:** After cooling, the biscuits were stored in hygienic plastic pouches for further use in the clinical trial.

Therapeutic Justification

The formulated biscuit is designed to serve as a Balya (strength-promoting), Brimhana (tissue-building), Kantikara (complexion-enhancing), Dhatu-vardhaka (nutritive), Arochaka-nashaka (anti-anorexic), Pratishyaya-nashaka (anti-cold/cough), Rasayana (rejuvenative), and Vata-Kapha hara (Vata-Kapha pacifying) compound. These properties align with the Ayurvedic understanding of Balashosha (pediatric emaciation), targeting both its Samprapti (pathogenesis) and promoting post-illness recovery.

4. Experimental Evaluation

To scientifically validate the therapeutic efficacy of the Balashoshahara Rasayana formulation in the management of Balashosha (pediatric emaciation), a structured clinical trial was conducted on selected pediatric patients. The experimental procedure was executed as outlined below:

1) Patient selection

Patients were selected from the Outpatient Department (OPD) of Aarogyashala, National Institute of Ayurveda, Jaipur, based on specific diagnostic criteria for Balashosha.

a) Symptom Complex (Diagnostic Criteria)
Selection was based on the following classical clinical features of Balashosha:

- **Arochaka:** Loss of appetite
- **Pratishyaya:** Chronic cold or nasal discharge
- **Jwara:** Recurrent fever
- **Kasa:** Cough
- Mukha Snigdhata
- Netra Snigdhata
- **Mukha Shwetata:** Pallor of the oral cavity
- **Netra Shwetata:** Conjunctival pallor
- **Shushkata:** Generalized dryness
- **Shwasa:** Breathlessness or laboured breathing

b) **Physical Examination**
In addition to general clinical assessment, the following anthropometric measurements were recorded:

- Body weight.
- Height.
- Head circumference.
- Chest circumference.
- Mid-arm circumference.

Furthermore, detailed Ayurvedic assessments were conducted, including

- Dosha, Dushya, Srotas evaluation.
- Prakriti analysis.
- Dashavidha Pariksha (Tenfold Examination).
- Ashtavidha Pariksha (Eightfold Clinical Examination).

c) Laboratory Investigations
The following hematological and biochemical parameters were assessed to support clinical diagnosis and monitor progress.

- Total Leukocyte Count (TLC)
- Differential Leukocyte Count (DLC)
- Hemoglobin percentage (Hb %)
- Total RBC (TRBC)
- Erythrocyte Sedimentation Rate (ESR)
- Serum Total Protein
- Albumin/Globulin Ratio (A/G Ratio)

d) **Case History Sheet**
A structured Balashosha-specific case history proforma was developed for each selected patient. It included:

- The patient's chief complaints
- Observed symptoms based on Ayurvedic and modern parameters
- Baseline assessments and periodic progress evaluations
- Clinical findings from both subjective and objective investigations

2). Patient Grouping
In this clinical study, the selected patients (Age- 1 to 5 years) were divided into the following two groups:

Group A - Treated Group (Chikitsita Varga)
This group consisted of 30 pediatric patients, who were administered the formulated medicated biscuit prepared from Ayurvedic ingredients. The dosage was set at 1 gram per kilogram of body weight per dose, given twice daily for a duration of two months.

Each 1-gram dose of the biscuit contained

a) **100 mg of each:** Ashwagandha(Withania somnifera), Shatavari(Asparagus racemosus), Bala(Sida cordifolia), and Vidarikand(Pueraria tuberosa)
b) 10 mg of Panchakola powder
c) The herbal powders were incorporated into biscuit form as the delivery method (after Churna Kalpana), to ensure better palatability and compliance in children.
d) **Anupana (vehicle for administration):** Warm milk

Group B - Control Group (Achikitsita Varga)
This group included 20 patients, who did not receive any herbal medication. Instead, they were placed on an adequate and nutritionally appropriate diet designed to fulfill their caloric and protein needs.

Nutritional planning was based on

a) The child's current weight
b) The ideal weight expected for their age
c) The mean of actual vs. ideal weight was used to calculate caloric requirements

Each child was provided with

a) 100 kcal/kg/day
b) 2-3 g/kg/day of protein
c) Of the total calorie intake, 20% of calories were derived from protein sources
d) The diet included wholesome and accessible food items such as milk, pulses, vegetables, rice, chapati, and fruits, based on affordability and regional availability.
e) The intervention duration for this group was also two months, similar to the treated group.

5. Results
A. Improvement in Nutritional Status (Malnutrition)
In Group 'A', none of the patients were found to be in the normal nutritional category before treatment. However, after the treatment, 8 out of 30 patients shifted into the normal category. Before treatment, 6 patients were classified under Grade I malnutrition, and this number increased to 10 following treatment. Similarly, 10 patients were initially in Grade II, which decreased slightly to 9 post-treatment. Grade III also had 10 patients before treatment, but this number significantly dropped to 3 after the intervention. As for Grade IV malnutrition, 4 patients had belonged to this category prior to treatment, but not a single patient remained in this grade after treatment. Thus, the data clearly indicated a substantial improvement in the nutritional status of the patients after administration of the medicated biscuit therapy.
In Group 'B', after treatment, 5 patients showed improvement and shifted to the normal nutritional category. Prior to treatment, there were 4 patients in Grade I malnutrition, which reduced to 3 after the intervention. There were 10 patients in Grade II before treatment, and this number

Table 3: Pre and Post-Treatment Malnutrtional Status of Patients - Group 'A'

Category	Before Treatment		After Treatment	
	Number of Patients	Percentage	Number of Patients	Percentage
0	0	00.00%	8	26.66%
I	6	20.00%	10	33.33%
II	10	33.33%	9	30.00%
III	10	33.33%	3	10.00%
IV	4	13.33%	0	00.00%
Total	30	100.00%	30	100.00%

decreased to 9 afterward. In Grade III, 5 patients were recorded initially, and this reduced to 3 following treatment. Grade IV initially had one patient, but no patients remained in this category post-treatment. Thus, even with only dietary management (adequate diet), a certain level of improvement in the severity of malnutrition was observed, although it was comparatively less significant than in Group 'A'.

C. Symptomatological Improvement in Balashosha

In Group A, after the treatment, the greatest improvement was observed in the symptom of Arochaka (loss of appetite). Moderate improvement was seen in symptoms such as Pratishyaya, Jwara, Kasa, and Shwasa.

However, there was no observable improvement in symptoms such as SnigdhaMukha, SnigdhaNetra, MukhaShwetata,

Table 4: Pre and Post-Treatment Body Weight Status of Patients - Group 'A'

S.No.	Age (Years)	Pre-Treatment Weight (kg)	Estimated Normal Weight (kg)	Post-Treatment Weight (kg)	Weight Gain (kg)
1	2.5	8.0	14.6	10.0	2.0
2	2.5	7.0	14.6	8.5	1.5
3	3.0	10.0	15.6	11.0	1.0
4	1.0	6.5	10.1	9.0	2.5
5	4.5	13.0	18.8	14.8	1.8
6	6.0	14.0	21.9	17.0	3.0
7	3.5	13.0	16.6	16.5	3.5
8	4.0	12.0	17.7	13.0	1.0
9	1.25	5.0	10.7	7.0	2.0
10	2.0	8.0	13.7	9.5	1.5
11	4.0	10.0	17.7	13.0	3.0
12	1.5	8.0	11.4	9.2	1.2
13	5.0	15.5	20.0	17.0	1.5
14	1.5	7.0	11.4	8.6	1.6
15	2.5	7.0	14.6	9.0	2.0
16	5.0	12.0	20.0	13.0	1.0
17	4.5	12.0	18.8	15.5	3.5
18	4.0	9.0	17.7	10.5	1.5
19	2.5	10.0	14.6	11.2	1.2
20	1.5	8.5	11.4	9.0	0.5
21	3.0	8.0	15.6	9.8	1.8
22	4.5	10.0	18.8	10.8	0.8
23	3.0	12.0	15.6	15.0	3.0
24	2.5	11.5	14.6	13.0	1.5
25	2.0	9.0	13.4	10.2	1.2
26	4.0	13.5	17.7	14.2	0.7
27	3.0	9.0	15.6	10.5	1.5
28	3.0	7.0	15.6	9.5	2.5
29	4.5	10.5	18.8	12.5	2.0
30	3.0	9.0	15.6	9.5	0.5

B. Gain in Body Weight

In, Group A, after treatment, all patients showed weight gain. The minimum weight gain observed was 0.5 kg, and the maximum was 3.5 kg. This indicated an overall positive trend in nutritional status improvement.

In Group B, weight gain was observed in only 13 patients after they were provided with adequate nutrition alone. The minimum recorded weight gain was 0.8 kg, while the maximum weight gain reached 3.0 kg.

However, a decline in weight compared to the pre-treatment level was observed in 4 patients, with the minimum weight loss being 0.2 kg and the maximum reaching 1.5 kg.

NetraShwetata, Shushkata, and Shwasa.

In Group B, after the treatment, only slight improvement was observed in the symptoms of Arochaka, Pratishyaya, Jwara, and Kasa. However, there was no observable improvement in symptoms such as SnigdhaMukha, SnigdhaNetra, MukhaShwetata, NetraShwetata, Shushkata, and Shwasa.

6. Discussion

In children, due to mandagni (weak digestive fire), aama (undigested metabolites) forms, leading to an increase of saama kapha in the body. This obstructs the rasa vah srotas (the channels responsible for nourishing the body), due to

Table 5: Pre and Post-Treatment Condition of Symptoms of Balashosha in Patients Group 'A'

Symptom	Pre-Treatment		Post-Treatment		Completely Benefitted	
	Patients	Percentage (%)	Remaining Patients	Percentage (%)	Patients	Percentage (%)
Arochaka	27	90.00	3	11.11	24	88.88
Pratishyaya	25	83.33	11	44.00	14	56.00
Jwara	25	83.33	11	44.00	14	56.00
Kasa	28	93.33	14	50.00	14	50.00
Mukha Snigdhata	30	100.00	26	86.66	4	13.33
Netra Snigdhata	30	100.00	26	86.66	4	13.33
Mukha Shwetata	30	100.00	25	83.33	5	16.66
Netra Shwetata	30	100.00	26	86.66	4	13.33
Shushkata	30	100.00	26	86.66	4	13.33
Shwasa	18	60.00	10	55.55	8	44.44

which proper nutrition of rakta and subsequent dhatus (body tissues) does not occur. As a result, the child becomes afflicted with Balshosha (a condition similar to pediatric malnutrition or emaciation).

Hence, drugs possessing the following qualities are considered effective in this disease

Deepana (appetizer),Pachana (digestive),Srotoshodhaka (channel-cleansing),Balya (strength-promoting),Brimhana (nourishing),Hridaya (cardiotonic), Vata-Kapha Shama (pacifying Vata and Kapha).

The selected formulation is described in many Ayurvedic classical texts as having Shosha (Kshaya) Nashak (anti-emaciation) effects. Based on these authoritative classical statements (Aapta Vachana), this study was conducted to evaluate their efficacy.

Ashwagandha (Withania somnifera)

Ashwagandha has madhura rasa and vipaka, ushna virya (hot potency), and snigdha guna (unctuous property), which makes it vata-shamaka. It also has tikta and katu rasa (bitter and pungent taste), and is laghu (light) and ushna (hot) in nature, making it kapha-shamaka and agnivardhaka (digestive stimulant) [8].

Shatavari (Asparagus racemosus)

Shatavari has guru (heavy), snigdha (unctuous) qualities, and madhura rasa-vipaka, which makes it Vata-shamaka and Ojas-vardhaka. Being Agnivardhaka, it enhances digestion and helps eliminate Aamadosha (toxins).Due to its Rasayana, Balya, Hridaya, and Kshaya-Nashaka properties, it is effective in Balshosha [9].

Bala (Sida cordifolia): Due to its snigdha (unctuous) and madhura rasa (sweet taste),Bala pacifies Vata dosha, promotes strength (balya) and enhances Ojas (viral energy). It is also described as Kshaya-Nashaka (anti-emaciation) [10]

Vidarikanda (Pueraria tuberosa)

Vidarikanda is madhura (sweet) in rasa and vipaka, guru (heavy), snigdha (unctuous), and has sheeta virya (cool potency). Due to these properties, it acts as a Rasayana (rejuvenator), Brimhana (nourishing), Balya (strength-giving), and is also Hridaya (good for the heart) [11].

Panchakola (Group of five pungent herbs)

Panchakola consists of Pippali (long pepper), Pippalimoola (root of long pepper), Chavya, Chitraka, and Shunthi (dry ginger). All these are:Katu rasa, Teekshna, Ushna, Deepana-Pachana (digestive and appetite-stimulating), Vata-Kapha Shamaka (pacifies Vata and Kapha), Srotoshodhaka (cleanses the body channels) [12].

Soybean (Glycine max)

Soybean is madhura-kashaya rasa, guru (heavy), snigdha (unctuous), and ushna virya (hot in potency), which makes it Vata-shamaka, Balya (strength-promoting) [13].

The biscuit format proved effective in improving adherence and child acceptance. The Ayurvedic approach addresses the root cause—Agnimandya—while supporting overall dhatu poshana. This integrative approach is potentially scalable in rural public health systems.

7. Conclusion

This study concludes that an Ayurvedic biscuit formulation containing Ashwagandha, Shatavari, Bala, Vidarikand, Panchakola, and Soybean significantly improves nutritional and clinical outcomes in children with mild to moderate Balashosha. It offers a culturally acceptable, safe, and effective solution for addressing pediatric malnutrition through a holistic approach. Integration into public health programs is recommended.

8. Conflict of interest: None

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