Keywords
Cerebral palsy, Guduchi Churna, Herbal intervention, Tinospora cordifolia, Vatahara diet, physiotherapy.

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# Clinical Efficacy of Guduchi Churna and Vatahara Diet as an Adjunct to Physiotherapy in Children with Cerebral Palsy: A Randomized Controlled Pilot Study

**Abstract**

**Introduction:** Cerebral palsy (CP) is a lifelong neurodevelopmental condition resulting from a non-progressive disturbance of the developing brain and is characterized by persistent limitations in movement, posture, and activity. Current management of cerebral palsy is multidisciplinary and primarily focused on improving functional ability, independence, and quality of life rather than reversing the underlying brain injury. Physiotherapy, occupational therapy, speech therapy, nutritional support, and appropriate pharmacological or surgical interventions are employed according to the child's individual needs. However, associated nutritional and functional limitations may affect rehabilitation outcomes. Ayurveda considers several manifestations of CP within a Vata-predominant neurological framework and emphasizes Vata-pacifying, nourishing, and Rasayana measures (rejuvenating). The present study aimed to evaluate the effect of a combination of Guduchi Churna (Tinospora cordifolia), Vatahara diet (nourishing diet mentioned in Ayurveda), and physiotherapy in pediatric cerebral palsy.

**Methods:** A randomized controlled clinical trial was conducted in children aged 2–10 years diagnosed with CP. Forty-five children were screened, 37 were enrolled, and 29 completed the study. Participants were allocated into two groups. Group A received Guduchi Churna, a structured Vatahara diet, and physiotherapy twice weekly, whereas Group B received physiotherapy twice weekly alone. The intervention was continued for 90 days, with assessments conducted at baseline and follow-up 30th 60th and 90th day. Outcome measures included appetite, sleep, bowel and urinary patterns, deep tendon reflexes, Medical Research Council (MRC) muscle-power grades, and graded gross- and fine-motor milestones. Within-group changes were analyzed using the Wilcoxon signed-rank test, while between-group comparisons were performed using the Mann–Whitney U test.

**Results:** Group A demonstrated significant improvement in appetite (median 8 to 10; p=0.001), right upper-limb power (3 to 4; p=0.021), left upper-limb power (3 to 4; p=0.002), right lower-limb power (3 to 4; p=0.003), left lower-limb power (3 to 4; p=0.003), and standing ability (2 to 4; p=0.005). Group B showed significant improvement in appetite (8 to 9; p=0.014), left lower-limb power (3 to 4; p=0.046), and standing ability (2 to 3; p=0.046). However, between-group comparisons for appetite, limb muscle power, and standing ability were not statistically significant (p>0.05). Sleep, bowel and urinary patterns, most reflex measures, and fine-motor parameters remained largely unchanged. No adverse effects were reported.

**Disscussion:** The combination of Guduchi Churna, Vatahara diet, and physiotherapy was associated with significant improvements in appetite, muscle power, and standing ability within the intervention group. However, the absence of significant between-group differences limits the ability to establish superiority over physiotherapy alone. Further adequately powered clinical studies are warranted to determine the efficacy of this combined approach in pediatric cerebral palsy.

## INTRODUCTION

Cerebral palsy is an umbrella term for a heterogeneous group of permanent disorders of movement and posture that cause activity limitation and arise from non-progressive disturbances in the developing fetal or infant brain. Although the initiating lesion is static, the clinical phenotype is dynamic because growth, musculoskeletal adaptation, learning, environmental demands, and secondary complications alter function throughout childhood. Contemporary definitions therefore place activity limitation alongside abnormalities of movement and posture, rather than treating cerebral palsy as a purely anatomical diagnosis [1,2]. The condition frequently coexists with epilepsy, sensory impairment, communication difficulty, feeding dysfunction, intellectual disability, pain, and behavioral or sleep problems. These associated features often determine participation and caregiver burden as much as the motor impairment itself [2].

Population estimates vary by setting, case ascertainment, gestational age distribution, and survival of high-risk newborns. A widely cited meta-analysis reported an overall prevalence of approximately 2.1 per 1,000 live births, with substantially higher prevalence among children born at very low birth weight [3]. The burden is especially consequential in low- and middle-income settings, where access to early diagnosis, rehabilitation, assistive technology, nutrition services, and multidisciplinary follow-up may be inconsistent. Early recognition and targeted intervention are recommended because neuroplasticity, family coaching, task-specific practice, and prevention of secondary complications are most useful when incorporated before avoidable disability becomes established [4].

The causes of CP are multifactorial. Prenatal brain maldevelopment, placental and fetal growth disorders, infection or inflammation, prematurity-related white matter injury, perinatal stroke, hypoxic-ischemic injury, kernicterus, neonatal infection, and genetic variants can contribute alone or in combination. Current evidence has displaced the older assumption that difficult labor or intrapartum asphyxia explains most cases [6-9]. The distribution and severity of the brain disturbance influence phenotype: spastic CP is the most common motor type, while dyskinetic, ataxic, hypotonic, and mixed presentations also occur. Because etiology and impairment profiles differ, individualized rehabilitation is essential.

No treatment reverses the established primary brain injury. Management instead seeks to optimize activity and participation, maintain joint range and skeletal alignment, improve strength and selective motor control, reduce troublesome spasticity or dystonia, support communication and feeding, and prevent secondary complications. Evidence syntheses favor goal-directed, task-specific, intensive and functionally meaningful interventions over passive approaches when the aim is motor learning [10,11]. Pharmacological and procedural treatments can reduce selected manifestations such as spasticity, but functional benefits are variable and treatment must be tailored to the individual child [12,13]. Physiotherapy therefore remains an essential component of multidisciplinary care.

Nutrition is another modifiable determinant of health and rehabilitation potential. Children with neurological impairment may have oral-motor dysfunction, dysphagia, prolonged mealtimes, gastroesophageal reflux, constipation, altered energy requirements, and caregiver-dependent food access. These factors increase the risk of undernutrition, micronutrient deficiency, reduced lean mass, poor bone health, and impaired growth [14-18]. Adequate protein, energy, essential fatty acids, vitamins, and minerals are also relevant to muscle maintenance and neuronal function. Nutritional interventions cannot repair the original cerebral lesion, but they may improve the biological substrate in which rehabilitation occurs by supporting energy availability, muscle protein general health [19].

Ayurveda does not describe cerebral palsy as a single named disease entity. The motor manifestations of cerebral palsy in the present study are interpreted within a Vata-predominant Ayurvedic framework that proposes that inadequate tissue nourishment and Dhatu Kshaya (loss of tissue) may contribute to Vata aggravation, with involvement of Majja Dhatu (can be interpreted as brain) and subsequent impairment of movement, neuromuscular function, coordination, and overall physical functioning. In Vata Vyadhi neurological diseases like CP), Rasayana (rejuvenating treatment ) and Vatahara diet are used to pacify aggravated Vata, support Dhatu nourishment, and improve strength and functional capacity. Rasayana promotes tissue nourishment and vitality, while a Vatahara diet counteracts Vata-aggravating qualities and supports proper tissue nutrition. [24-27.This conceptual model is not equivalent to modern neuroanatomical pathophysiology, but it provides the traditional rationale for selecting a nourishing diet and Rasayana drugs as adjunctive care.

Guduchi (Tinospora cordifolia) is a widely used Ayurvedic medicinal plant described as Rasayana, Balya , (strength-promoting), and supportive of digestion and systemic resilience. Phytochemical reviews identify alkaloids, diterpenoid lactones, glycosides, steroids, phenolic compounds, and polysaccharides among its constituents [20,22,23]. Experimental work has reported antioxidant, immunomodulatory, anti-inflammatory, and neuroprotective actions; an in-vitro study of cerebellar neurons found that a Tinospora fraction reduced glutamate-associated cellular stress and supported neurite outgrowth and neuronal plasticity [21]. Such data provide biological plausibility for investigation, but they do not establish clinical efficacy in CP. Translation from extracts or cell models to orally administered crude powder in children requires direct clinical testing.

The study on which the present paper is based identified a practical research gap: most Ayurvedic CP studies have used complex multimodal regimens, making it difficult to isolate the contribution of an oral Rasayana and a defined dietary approach. The trial therefore compared physiotherapy alone with physiotherapy plus Guduchi Churna and a Vatahara diet. The primary clinical interest was motor function, particularly muscle power and gross motor milestones such as head holding, sitting, and standing. The actual participant flow and aggregate outcome statistics were recorded in the study, and those statistics were interpreted conservatively. The aim is not to claim reversal of cerebral palsy, but to determine whether the adjunctive intervention generated a signal of functional benefit worthy of larger confirmatory research.

## 2 Materials and Methods

### 2.1 Study Design and Setting

The present study was based on a randomized controlled clinical trial conducted through the Kaumarbhritya/ Balaroga outpatient department of Bharati Ayurved Hospital, Pune. The intervention was administered for 90 days. Ethical approval was prospectively obtained from the Institutional Ethics Committee under reference number BVDU(DU)COA/885/2024-25. The study was registered with the Clinical Trials Registry–India under the reference REF/2025/02/099269.

### 2.2 Participants

**Inclusion Criteria**

Children aged 2–10 years diagnosed with cerebral palsy were eligible for participation. Children with any clinical type of cerebral palsy were considered eligible for inclusion. Participants whose parents or legal guardians provided informed consent and who fulfilled the predefined eligibility criteria were enrolled in the study.

**Exclusion Criteria**

Children with Grade V spasticity associated with contractures, metabolic syndrome, or developmental delay secondary to other diagnosed syndromes such as Down syndrome, Williams syndrome, or West syndrome were excluded. Children with severe infectious diseases, including tuberculosis or meningitis, and those with major congenital malformations, including congenital heart disease, were also excluded from the study.

### 2.3 Drug:

SOP: The Guduchi raw material was purchased locally, authenticated by Sheetal Analytical Laboratory, (GMP certified), and prepared according to the Ayurvedic Pharmacopoeia of India. The drug was standardized according to API parameters and stored in labeled airtight containers under hygienic conditions. A total of 90 sachets were prepared for each participant, corresponding to a 30-day supply (3 sachets per day). The sachets were packed and stored in an airtight container to maintain their quality and stability. The complete 30-day supply was dispensed at baseline, and adherence and clinical status were assessed at the scheduled follow-up visits.

### 2.4 Interventions

Forty-five children were screened, and 37 entered the randomized trial. Nineteen were allocated to the combined intervention and 18 to physiotherapy alone. Four participants in each group were lost to follow-up, leaving 15 and 14 completers, respectively (Figure 1). Children in Group A received Guduchi Churna, followed the Vatahara diet, and physiotherapy twice weekly for 90 days. Group B received physiotherapy twice weekly for the same duration. The Vatahara diet was prescribed as a structured nourishing dietary pattern. The study describes foods such as milk, ghee, rice, wheat, green gram/moong, dry fruits and seasonal fruits and discusses Brimhana (weight enhancing), Snigdha (unctuous) and Vata-pacifying characteristics.Physiotherapy was provided to both groups twice weekly; the study does not document a detailed exercise dose or fidelity checklist.

**Table 1. Trial design and intervention details**

| Characteristic | Group A | Group B |
|---|---|---|
| Final analyzed sample | 15 | 14 |
| Intervention | Guduchi Churna + Vatahara diet + physiotherapy | Physiotherapy alone |
| Physiotherapy frequency | Twice weekly | Twice weekly |
| Treatment duration | 90 days | 90 days |
| Follow-up assessments | Days 30, 60 and 90 | Days 30, 60 and 90 |

**Table 2. Age-based Guduchi Churna dose recorded in the study protocol**

| Age | Total Churna dose/day |
|---|---|
| 2 years | 1.5 g/day |
| 3 years | 2.75 g/day |
| 4 years | 3.0 g/day |
| 5 years | 3.75 g/day |
| 6-10 years | 4.5 g/day |

**Outcome measures**

Assessments were performed at baseline and follow-up visits on days 30, 60 and 90, with the study outcome tables primarily reporting baseline-to-day-90 comparisons. Subjective/clinical parameters included appetite using a study questionnaire, sleep, bowel habits (Mala), and urinary pattern (Mutra). Objective neurological measures included deep tendon reflex grades at the biceps, triceps, knees and ankles. Muscle power was graded using the Medical Research

Council 0-5 scale for right and left upper and lower limbs. Gross motor milestones included head holding, sitting and standing, each recorded on ordinal scales described in the study. Fine-motor/functional tasks included grasping, transferring an object, pincer grasp, self-feeding with a spoon, and button closing.

The outcome instruments should be understood in the context of the study methodology. MRC grading is widely used clinically but is an ordinal manual measure; the milestone grades were study-specific scales labeled in the study as CDC grading rather than a full standardized Gross Motor Function Measure. Consequently, the results are best treated as exploratory functional indicators rather than direct substitutes for validated CP-specific instruments such as GMFM-66.

Statistical analysis

Because the recorded outcomes were ordinal and the analyzed samples were small, the study used non-parametric statistics. Within-group baseline-to-day-90 changes were tested with the Wilcoxon signed-rank test. Between-group comparisons were tested with the Mann-Whitney U test. A two-sided p value below 0.05 was treated as statistically significant in the study analysis. The present manuscript reports medians, rank-test statistics and p values exactly as recorded in the results tables where available. No participant-level dataset was supplied for independent recalculation of confidence intervals or effect sizes; therefore, none are fabricated. Interpretation follows the randomized comparison principle recommended by CONSORT: significant improvement within one arm does not by itself prove that the intervention is superior if the between-group contrast is non-significant [30].

## 4. Results

### Recruitment and participant characteristics

Forty-five children were screened and 37 entered the randomized trial. Nineteen were allocated to the combined intervention and 18 to physiotherapy alone. Four participants in each group were lost to follow-up, leaving 15 and 14 completers respectively (Figure 1). The completion rate was 78.9% in Group A and 77.8% in Group B. Among completers, the largest age stratum was 8-10 years (60.0% in Group A and 42.9% in Group B). Boys predominated, comprising 71.4% of Group A and 85.7% of Group B. The study also notes that most participants came from lower or lower-middle socioeconomic categories, but it does not provide a sufficiently complete numeric baseline table in the extracted study summary to support additional reconstructed counts.

**Table 3. Participant flow and selected demographic characteristics.**

| Measure | Group A | Group B | Total/Comment |
|---|---|---|---|
| Allocated | 19 | 18 | 37 enrolled |
| Lost to follow-up | 4 | 4 | 8 total |
| Analyzed | 15 | 14 | 29 total |
| Completion rate | 78.9% | 77.8% | Overall 78.4% |
| Age 8-10 years | 60.0% | 42.9% | Largest age stratum |
| Male | 71.4% | 85.7% | Male predominance |

### Appetite and general physiological parameters

Appetite improved in both groups. Group A increased from a median score of 8 at baseline to 10 at day 90; 14 participants had positive ranks and one was tied, producing Z=-3.355 and p=0.001. Group B increased from 8 to 9; seven had positive ranks and seven were tied, with Z=-2.460 and p=0.014. The between-group comparison favored a higher mean rank in Group A (17.37 vs 12.46), but the difference was not statistically significant (U=69.5, p=0.101). Thus, the data support a stronger within-group appetite signal in Group A but do not establish a statistically significant randomized treatment effect.

**Sleep remained essentially unchanged:** Group A had median 0 before and after treatment (p=0.317), and Group B remained 0 (p=1.000); the intergroup p value was 1.000. Bowel and urinary scores also remained unchanged in both groups, with p=1.000 for within- and between-group comparisons. This stability is clinically relevant to tolerability because no deterioration in these basic functions was documented.

### Deep tendon reflexes

Most deep tendon reflex grades did not change materially during the 90-day period. Right biceps reflex medians remained 2 in both groups; within-group p values were 0.157 for Group A and 0.317 for Group B. Knee and ankle reflex medians were also stable. Some between-group rank tests for left biceps and triceps measures reached statistical significance despite unchanged medians in the study tables; because the direction and clinical meaning are not supported by a corresponding within-group change, these isolated rank differences should not be interpreted as evidence that Guduchi normalized pathological reflexes. Overall, the neurological reflex profile remained stable.

### Muscle power

Muscle power produced the clearest set of within-group changes. Right upper-limb power in Group A increased from median grade 3 to 4 (p=0.021), whereas Group B also had medians of 3 and 4 but the signed-rank change was not significant (p=0.180). The between-group p value was 0.161. Left upper-limb power increased from 3 to 4 in Group A with p=0.002; Group B had the same median shift but p=0.083, and the between-group p value was 0.343. Right lower-limb power increased from 3 to 4 in Group A (p=0.003) but was not significant in Group B (p=0.317); intergroup p=0.642. Left lower-limb power increased from 3 to 4 in both groups, with p=0.003 in Group A and p=0.046 in Group B; intergroup p=0.666. These results indicate consistent improvement from baseline in the combined-intervention arm but no statistically significant separation between groups at day 90.

**Gross and fine motor milestones**

Head holding was already near the top of the study scale at baseline: median 5 in both groups, remaining 5 at day 90. There was no significant change within or between groups (intergroup p=0.906). Sitting also remained at median 5 in both groups, with non-significant within-group changes (Group A p=0.157; Group B p=0.317) and intergroup p=0.666. A ceiling effect is therefore likely for these two milestones.

Standing showed greater scope for change. Group A improved from median grade 2 to 4, with nine positive ranks, six ties, Z=-2.810 and p=0.005. Group B improved from median 2 to 3, with four positive ranks, ten ties, Z=-2.000 and p=0.046. Despite the larger median increase in Group A, the between-group comparison was non-significant (U=98.0, p=0.748). Grasping, object transfer, pincer grasp, self-feeding and button closing were largely stable. For self-feeding, Group A had one negative-rank change and otherwise ties (p=0.317), while Group B was unchanged; intergroup p=1.000. Complex fine-motor skills may require longer and more task-specific occupational training than the intervention provided.

**Safety**

No adverse effects were recorded in the study during the 90-day course of Guduchi Churna and vata hara diet. Sleep, bowel habits and urinary pattern remained stable, and no serious adverse event was reported. This finding supports short-term tolerability under the study conditions, but the sample was too small to exclude uncommon adverse events and laboratory safety monitoring was not presented as an outcome.

**Table 3. Participant flow and selected demographic characteristics**

| Measure | Group A | Group B | Total/Comment |
|---|---|---|---|
| Allocated | 19 | 18 | 37 enrolled |
| Lost to follow-up | 4 | 4 | 8 total |
| Analyzed | 15 | 14 | 29 total |
| Completion rate | 78.9% | 77.8% | Overall 78.4% |
| Age 8-10 years | 60.0% | 42.9% | Largest age stratum |
| Male | 71.4% | 85.7% | Male predominance |

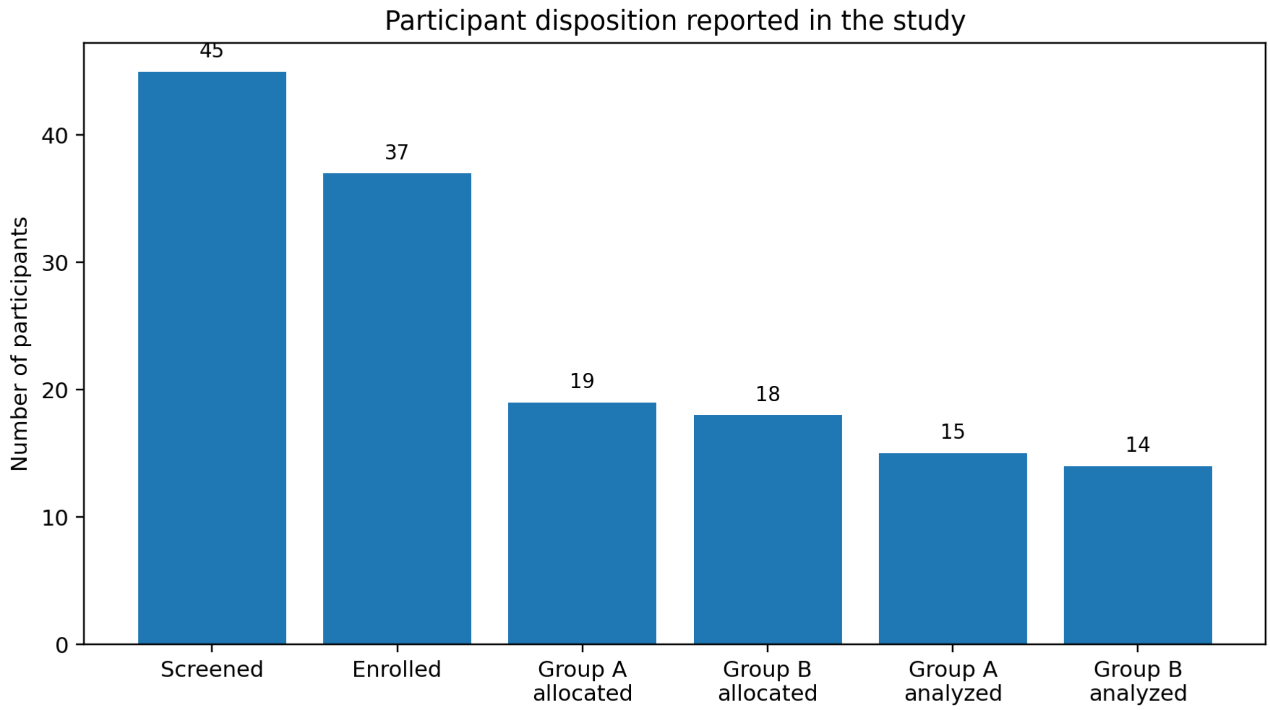


**Figure 1. Participant disposition reconstructed from the study CONSORT flow using the recorded counts on(y-axis no of participants & x-axis participant disposition)**

**Table 4. Subjective and physiological outcomes, baseline to day 90**

| Outcome | Group A median BT -> AT (p) | Group B median BT -> AT (p) | Intergroup p |
|---|---|---|---|
| Appetite | 8 -> 10 (0.001) | 8 -> 9 (0.014) | 0.101 |
| Sleep | 0 -> 0 (0.317) | 0 -> 0 (1.000) | 1.000 |
| Bowel habits | 0 -> 0 (1.000) | 0 -> 0 (1.000) | 1.000 |
| Urinary pattern | 0 -> 0 (1.000) | 0 -> 0 (1.000) | 1.000 |

**Table 5. Muscle-power outcomes using the MRC ordinal scale**

| Muscle group | Group A median BT -> AT (p) | Group B median BT -> AT (p) | Intergroup p |
|---|---|---|---|
| Right upper limb | 3 -> 4 (0.021) | 3 -> 4 (0.180) | 0.161 |
| Left upper limb | 3 -> 4 (0.002) | 3 -> 4 (0.083) | 0.343 |
| Right lower limb | 3 -> 4 (0.003) | 3 -> 4 (0.317) | 0.642 |
| Left lower limb | 3 -> 4 (0.003) | 3 -> 4 (0.046) | 0.666 |

**Table 6. Gross motor milestone outcomes**

| Milestone | Group A median BT -> AT (p) | Group B median BT -> AT (p) | Intergroup p |
|---|---|---|---|
| Head holding | 5 -> 5 (0.317) | 5 -> 5 (1.000) | 0.906 |
| Sitting | 5 -> 5 (0.157) | 5 -> 5 (0.317) | 0.666 |
| Standing | 2 -> 4 (0.005) | 2 -> 3 (0.046) | 0.748 |

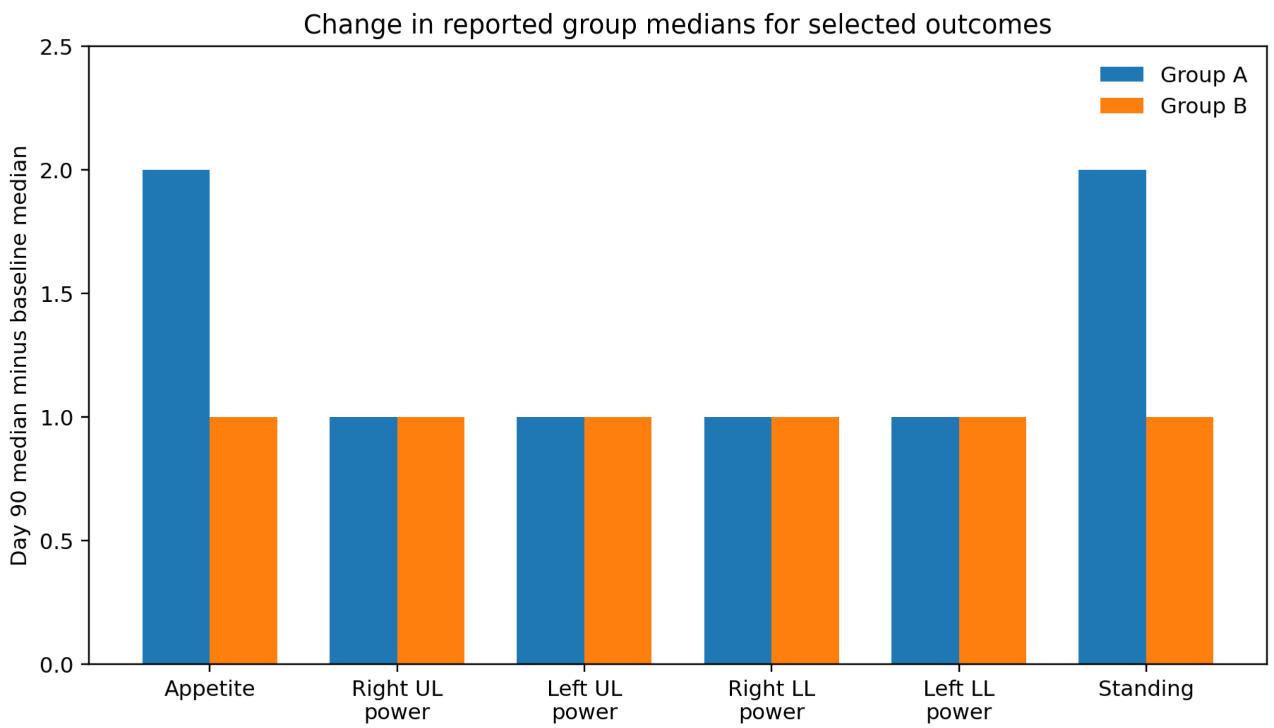


**Figure 2. Difference between the reported day-90 group median and baseline group median for selected outcomes. This is a descriptive difference of medians, not an individual-level effect size.**

**Table 7. Fine-motor and safety findings**

| Domain | Finding |
|---|---|
| Grasping / object transfer / pincer grasp | No statistically significant change reported in either group. |
| Self-feeding with spoon | Group A p=0.317; Group B p=1.000; intergroup p=1.000. |
| Button closing | No statistically significant change reported in either group. |

| | |
|---|---|
| Deep tendon reflexes | Most medians remained stable; no coherent pattern of reflex normalization. |
| Adverse effects | No adverse effects or serious adverse effects were reported during 90 days. |

**Discussion**

The present trial explored whether an Ayurvedic oral Rasayana and Vatahara dietary intervention could provide additional benefits when combined with physiotherapy in children with established cerebral palsy. The most consistent improvements observed in Group A were related to appetite, bilateral upper- and lower-limb muscle power, and standing ability. These findings are clinically relevant because adequate nutritional intake, muscle strength, weight-bearing capacity, and postural control are important components of functional activity and participation in children with cerebral palsy.

The significant within-group improvement in upper- and lower-limb muscle power, with median MRC grades increasing from 3 to 4, represents a clinically meaningful functional change. This improvement indicates progression from movement against gravity to movement against resistance and may potentially facilitate activities such as reaching, transfers, sitting, and standing. The observed improvement may reflect the combined influence of physiotherapy, Guduchi, and the

Vatahara dietary intervention. From an Ayurvedic perspective, the Balya and Rasayana properties attributed to Guduchi may support strength and tissue nourishment. Experimental studies on Tinospora cordifolia have also reported antioxidant, anti-inflammatory, and neuroprotective effects. However, these proposed mechanisms should be considered hypothesis-generating, as the present study did not evaluate biochemical, neurophysiological, or molecular biomarkers.

The Vatahara diet may have provided additional nutritional support through its Snigdha, Brimhana, and Balya components. Dietary items such as milk, wheat, rice, and dry fruits can contribute protein, calcium, healthy fats, iron, and other micronutrients, while Moong dal and non-vegetarian soups provide protein and essential amino acids required for growth and tissue repair. Sources of omega-3 fatty acids, vitamins, and minerals may further contribute to overall nutritional adequacy. Fermented foods such as idli may also support dietary diversity and gastrointestinal function. Thus, improved energy availability, digestion, and nutrient intake could potentially have supported participation in physiotherapy and muscle performance. Nevertheless, because actual dietary intake, nutrient status, and body composition were not objectively measured, this interpretation should be considered supportive rather than conclusive.

Improvement in appetite was another notable finding. Adequate appetite is important for maintaining sufficient energy and nutrient intake, particularly in children with cerebral palsy, in whom feeding difficulties and undernutrition are relatively common. Improved appetite may therefore have indirectly contributed to better nutritional intake and physical performance. However, appetite was assessed as a clinical outcome and was not accompanied by objective measurements such as calorie intake, anthropometric parameters, body composition, or micronutrient status. Future studies should therefore incorporate standardized nutritional assessments to determine whether improvement in appetite translates into measurable nutritional benefits.

The observed improvement in standing ability is also clinically important. Standing requires adequate proximal muscle strength, postural control, balance, coordination, and the ability to tolerate weight bearing. From a rehabilitation perspective, improvement in standing may contribute to greater independence in transfers and mobility and may enhance participation in daily activities. Physiotherapy likely contributed substantially through repeated task-specific practice, muscle activation, strengthening, balance training, and postural control. The Ayurvedic intervention may have provided complementary nutritional and systemic support that facilitated participation in rehabilitation.

In contrast, fine motor outcomes such as pincer grasp, object transfer, and buttoning showed relatively limited improvement. Fine motor function depends on complex sensorimotor integration, selective motor control, coordination, and repeated task-specific practice. The relatively short intervention period, baseline neurological impairment, and limited exposure to specialized occupational therapy may have restricted measurable changes in these domains. Similarly, reflex parameters showed little change. This may be expected because abnormal deep tendon reflexes in cerebral palsy are manifestations of established upper motor neuron dysfunction and are generally less responsive to short-term nutritional or rehabilitative interventions than functional motor abilities.

Importantly, the interpretation of the findings requires appropriate statistical caution. Although several outcomes showed statistically significant improvement from baseline within Group A, the major between-group comparisons did not reach statistical significance at the conventional threshold of $p < 0.05$. Therefore, improvement within Group A alone cannot establish that the Ayurvedic intervention was superior to physiotherapy alone. Both groups received physiotherapy, and improvements could also have been influenced by repeated practice, natural developmental progression, caregiver involvement, adherence to home-based exercises, or measurement variability. In a randomized controlled trial, the between-group difference in change from baseline is the more appropriate basis for determining an additive treatment effect, ideally accompanied by an effect estimate and confidence interval.

Overall, the findings should therefore be interpreted as promising clinical improvements within the combined-intervention group rather than definitive evidence of superior efficacy of Guduchi and Vatahara dietary intervention over physiotherapy alone. The observed improvements in appetite, muscle power, and standing ability provide a rationale for further investigation of this integrative approach. Future adequately powered randomized controlled trials should include longer intervention and follow-up periods, standardized functional outcome measures, objective nutritional and anthropometric assessments, adherence monitoring, and appropriate between-group effect estimates with confidence intervals. Such studies may help clarify whether Guduchi and Vatahara dietary support provide a clinically meaningful additive benefit when integrated with conventional rehabilitation in children with cerebral palsy.

## 6. Conclusion

In this 90-day randomized controlled clinical study, children receiving Guduchi Churna, a Vatahara diet and twice-weekly physiotherapy demonstrated significant within-group improvements in appetite, bilateral limb muscle power and standing. Physiotherapy-alone participants also improved on selected outcomes, particularly appetite, left lower-limb power and standing. The principal between-group comparisons were not statistically significant, so the study does not provide conclusive evidence that the combined Ayurvedic intervention is superior to physiotherapy alone. No adverse effects were reported, and sleep, bowel habits and urinary function remained stable. The findings are therefore best interpreted as preliminary evidence of feasibility, short-term tolerability and a possible functional signal. A larger, prospectively powered and transparently reported trial using validated CP-specific outcomes, quantified dietary exposure, blinded assessment and longer follow-up is warranted before routine efficacy claims are made.

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