Combined Effect Of *Guduchi Satva* And *Triphala Choorna* With *Dashamoola Bala Guduchi Siddha Ksheeradhara* As Tertiary Prevention In Cancer Patients With Chemotherapy Induced Peripheral Neuropathy

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Abstract

Cancer is the second leading cause for death globally. In India, it claims more than 1300 lives daily. Chemotherapy is an important component of cancer treatment. It may be used as the primary therapeutic measure or in combination with other treatments such as surgery, radiation etc. Chemotherapy along with its therapeutic effects also poses severe side effects. Among them, one major treatment related distress is chemotherapy induced peripheral neuropathy (CIPN) affecting up to 48% of cancer patients who receive chemotherapy. It also impacts functional activity and long term quality of life of cancer patients, as up to 40% of these individuals experience painful CIPN from months to years after receiving chemotherapy.

In clinical practice, CIPN is poorly diagnosed and under-treated to the detriment of patient quality of life and there is no proven method yet for its prevention and treatment. The therapies currently used to provide symptomatic relief often lack efficacy or exhibit severe side effects. Ayurvedic texts describe various herbal formulations which may prove to be useful in managing such side effects and other complications associated with cancer.

This study evaluated the combined therapeutic potential of *Guduchi Satva* and *Triphala Choorna* administered internally alongside *Dashamoola Bala Guduchi Siddha Ksheeradhara* as a tertiary prevention strategy in cancer patients aged 40 to 65 years diagnosed with CIPN. A total of 32 participants were selected from the Outpatient Department of Cancer, Charitable Hospital, Arya Vaidya Sala, Kottakkal. Each participant received 500 mg of *Guduchi Satva* with 50 ml of cow's milk and 3 g of *Triphala Choorna* with warm water, both administered orally twice daily after meals for 30 days. In addition, *Dashamoola Bala Guduchi Siddha Ksheeradhara* was administered externally for 14 consecutive days in the form of *Sarvangadhara* and *Shirodhara* for the first 7 days, followed by only *Sarvangadhara* for the remaining 7 days.

Outcomes were assessed using the EORTC QLQ-CIPN20 and EORTC QLQ-C30 questionnaire before and after treatment. The data collected before and after intervention was analysed statistically and it revealed a significant reduction in CIPN symptoms, including sensory and motor impairments, along with marked improvements in participants' overall quality of life. These findings suggest that this integrative Ayurvedic approach offers a

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promising, well-tolerated, and effective option for managing chemotherapy-induced peripheral neuropathy in cancer patients.

Keywords: *CIPN; Quality Of Life; Guduchi Satva; Triphala choornam; Dashamoola Bala Guduchi Siddha Ksheeradhara*.

Introduction

Despite progress made in conventional treatment, needs of cancer patients remain unmet, resulting in a greater symptom burden and a reduced quality of life. This in turn affects the overall effectiveness of cancer therapy and and causes treatment related side effects. One major such treatment related distress is chemotherapy induced peripheral neuropathy (CIPN). This condition affects up to 48% of cancer patients undergoing chemotherapy. Acute CIPN may diminish after the conclusion of chemotherapy or it may cause chronicity and sequelae lasting for months or even years[1]. Studies estimate that up to 48% of patients receiving neurotoxic chemotherapeutic agents such as platinum based compounds, taxanes and vinca alkaloids develop CIPN[2]. Statistically about 68% of CIPN affected patients experience it within a month after finishing Chemotherapy with this percentage dropping to 60% at three months duration and 30% at six months or longer[2].

CIPN may present with systemic as well as local features. Patients experience a sharp pain in their limbs, along with numbness or reduced sensitivity to temperature. Motor skills can be impaired, making it difficult to perform fine tasks such as holding objects securely. Mobility and balance may be affected, increasing the risk of falls. Patients may also be affected psychologically and may exhibit emotional strain, anxiety, depression, etc. CIPN results into acute length dependent sensory neuropathy and often results in neuropathic pain. In extreme cases, the pain may progress proximately in a “glove and stocking” distribution pattern[3,4].

Management of CIPN poses a significant challenge in clinical oncology. The therapeutic measures used currently mainly focus on symptomatic management rather than addressing the underlying neuropathy. Conventional pharmacological treatments such as analgesics, anti-depressants, etc. offer limited efficacy and are accompanied by side effects. All this results in many patients having to cope with persistant discomfort. [5] The occurance rates of CIPN are rising, due to several factors such as increased incidence of cancer, improved survival rates and successful cancer therapies among others. Depending on its severity, CIPN may even necessitate dose reduction or early termination of therapy which may affect overall effectiveness of cancer treatment and negatively impact patient outcomes.

Complementary medicine systems, including Ayurveda, may offer potential approaches to address challenges in oncology. Ayurveda is traditionally aimed at supporting rehabilitation, enhancing overall well-being, and managing long-term effects, which suggests a possible role in conditions like CIPN. Operating at the level of tertiary prevention, it focuses on alleviating chronic symptoms and reducing the lasting impact of cancer and its treatment. Ayurvedic therapeutic measures, including various herbomineral formulations, warrant further exploration for their potential in managing such adverse effects and other cancer-related complications.

The present study evaluates an integrative Ayurvedic intervention comprising of *Guduchi Satva* and *Triphala Choorna* administered orally, along with *Dashamoola Bala Guduchi Siddha Ksheeradhara* applied externally, as a tertiary prevention strategy for CIPN.

Methods

Study Design

This was a prospective, interventional study conducted to evaluate the combined effect of *Guduchi Satva*, *Triphala Choorna*, and *Dashamoola Bala Guduchi Siddha Ksheeradhara* as a tertiary prevention strategy for CIPN in

cancer patients. The study was performed at the Cancer Charitable Hospital, Arya Vaidya Sala, Kottakkal over a period of 30 days per patient, with a follow-up assessment at 45 days. The study aimed to assess improvements in neuropathic symptoms and the overall quality of life in patients with CIPN.

Participants

A total of 32 cancer patients aged between 40 and 65 years were enrolled from the outpatient department (OPD) of the hospital. These participants were selected based on the following inclusion and exclusion criteria:

- **Inclusion Criteria**:
    1. Diagnosed with cancer of any stage and having undergone chemotherapy, regardless of gender, caste, religion, or economic status.
    2. Presenting with acute or chronic symptoms of CIPN
    3. Willing to participate in the study.
- **Exclusion Criteria**:
    1. Presence of metastasis.
    2. Severe complications due to multiple opportunistic infections.
    3. History of long-term sequelae of chemotherapy and/or radiotherapy such as esophageal stricture, urinary or stool incontinence.
    4. Associated complications such as chronic renal failure, hepatic disorders, mental confusion, etc.

Sampling Technique

The participants were selected using a simple random sampling technique, ensuring an unbiased selection process.

Intervention

The intervention consisted of oral administration of two Ayurvedic formulations— *Guduchi Satva* and *Triphala Choorna*—along with external *Dashamoola Bala Guduchi Siddha Ksheeradhara* therapy.

- Internal Medications:
    - *Guduchi Satva*: 500 mg per dose, taken with 50 ml of cow's milk as an *anupana* twice daily after meals for 30 days.
    - *Triphala Choorna*: 3 grams per dose, taken with lukewarm water twice daily after meals for 30 days.
- External Therapy:
    - *Dashamoola Bala Guduchi Siddha Ksheeradhara* was administered externally in the form of a medicated milk decoction. The therapy was administered as *Sarvangadhara* (full-body pouring) and *Shirodhara* (pouring on the head) for the first 7 days, followed by Sarvangadhara alone for the next 7 days, for a total of 14 consecutive days.

Assessment and Data Collection

- Case Proforma: Detailed demographic data, clinical history, and treatment response were collected using a structured case proforma.
- Outcome Measurements:
    1. EORTC QLQ-CIPN-20: A 20-item scale designed to assess the severity of Chemotherapy-Induced Peripheral Neuropathy.
    2. EORTC QLQ-C30: A validated questionnaire assessing overall quality of life in cancer patients.

The outcome measures were assessed accordingly :

1. Baseline (0th day): Before the start of the intervention.
2. Post-Treatment (30th day):

Data Analysis

Data from an individual case proforma specifying demographical data, general history, clinical history and data related with treatment and its response were collected. A consultation and examination were performed to grade the signs and symptoms. Grading and analysis was done with EORTC QLQ-CIPN-20 and EORTC OLQ-C30 before and after treatment.

Study Tools:

- EORTC QLQ-CIPN-20: This validated tool was used to evaluate the severity of Chemotherapy-Induced Peripheral Neuropathy symptoms.
- EORTC QLQ-C30: This scale was used to assess changes in quality of life.

Drug Procurement:

All drugs used in this study were procured from the Arya Vaidya Sala Factory, Kottakkal, ensuring standardization and quality control.

Ethical Consideration

Written informed consent was obtained from all participants prior to their inclusion in the study. The principles of informed consent were fully upheld, and the autonomy and rights of all participants were given the utmost respect throughout the research process. The study protocol received ethical approval from the Institutional Ethical Committee, which convened on 27/8/2022, and the proposal was sanctioned under letter number IEC 672-27/08/2022. The clinical trial was duly registered with the Clinical Trials Registry – India (CTRI) under the registration number 2023/09/057413.

Observation

Table no 1: Distribution of patients according to type of cancer

No of patients	Type of cancer
3	Non-Hodgkin's Lymphoma
1	CA Esophagus
16	CA Breast
1	CA Hypopharynx
1	CA Colon
1	Liposarcoma
1	CA Duodenum
2	CA Stomach
3	CA Rectum
1	CA Lung
1	CA Splenic Flexure
1	CA Ovary

Table no 2 : Distribution of patients according to chronicity of CIPN

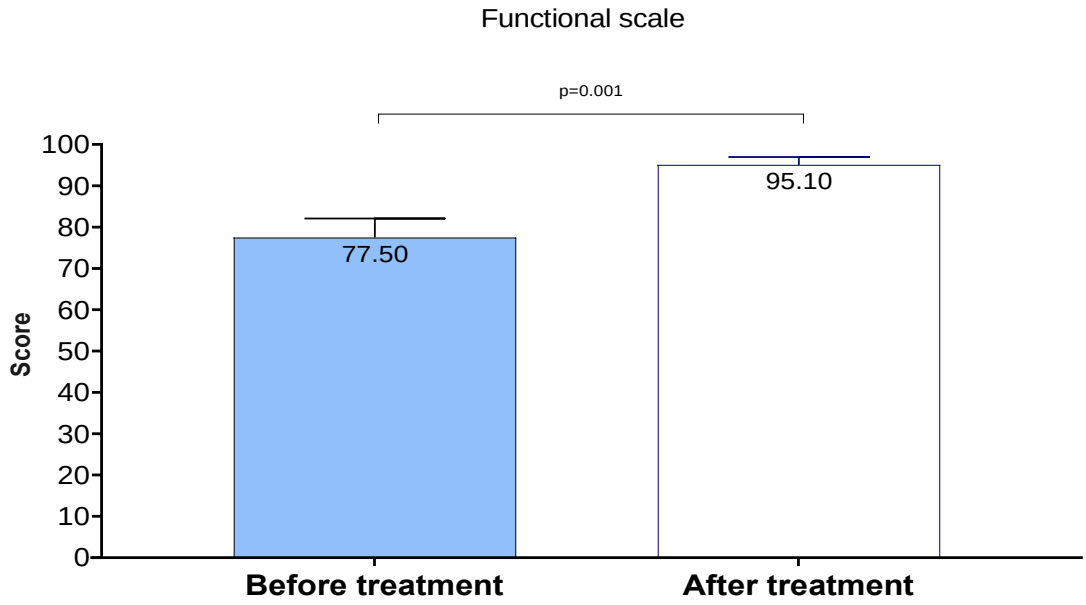
No of Patients	Chronicity OF CIPN
13	1-3 years
14	4-6 years
2	7-9 years
3	10-12 years

Functional Scale

The functional scale assessed multiple aspects of daily functioning and well-being, broadly categorized into physical (e.g., walking, self-care), emotional (e.g., worry, irritability), and cognitive domains (e.g., memory, concentration), among others. Scores showed a significant improvement following the treatment. Before treatment, the mean score was 77.5 with a standard deviation (SD) of 4.6 among 32 participants. After treatment, the mean score increased to 95.1 with a lower SD of 1.9, indicating a more consistent improvement. The p-value of 0.001 suggests that this increase is statistically significant, demonstrating the effectiveness of the intervention in enhancing functional outcomes.

Table no 3 : Functional scale score before and after treatment

	N	FUNCTIONAL SCALE		Paired difference		Paired t test	
		Mean	sd	Mean	Sd	t	p
Before Treatment	32	77.5	4.6	17.6	3.9	25.27	<0.001
After Treatment	32	95.1	1.9				



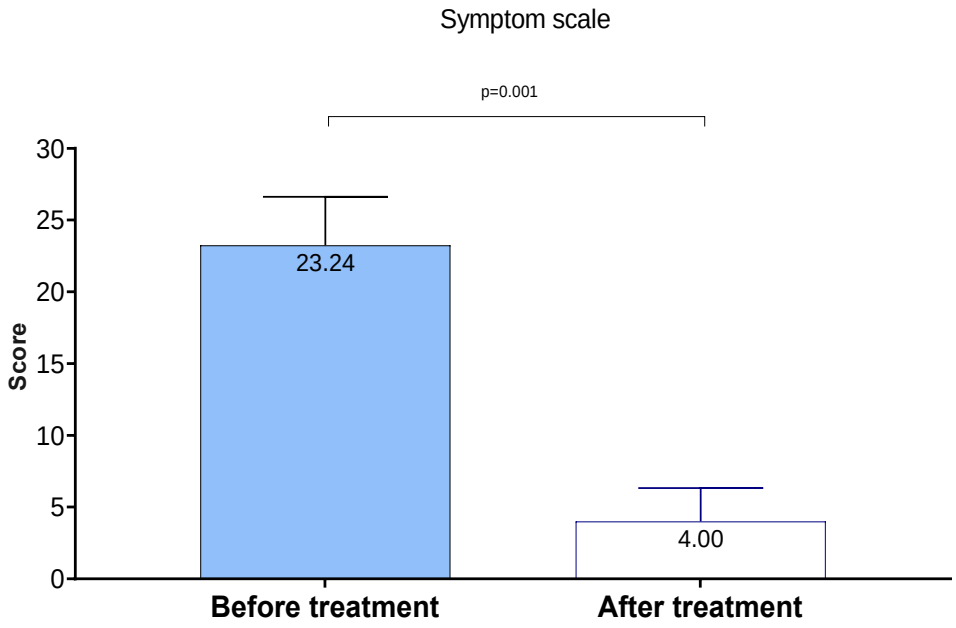
Graph no 1: Functional scale score before and after treatment.

Symptom Scale

The symptom scale measured various common symptoms experienced during cancer and its treatment which includes fatigue, nausea, vomiting, pain, insomnia, constipation, dyspnea, etc. The symptom scale scores demonstrated a significant reduction after the treatment. Prior to treatment, the mean score was 23.24 with a standard deviation (SD) of 3.38 among 32 participants. Following treatment, the mean score dropped to 4.00, with a lower SD of 2.34, indicating less variability in symptom severity among the participants. The p-value of 0.001 confirms that this decrease in symptom scores is statistically significant, highlighting the effectiveness of the treatment in alleviating symptoms.

Table no 4 : Symptom scale score BF and AF treatment

	N	SYMPTOM SCALE		Paired difference		Paired t test	
		Mean	sd	Mean	sd	t	p
Before Treatment	32	23.2	3.4	19.2	3.9	27.84	<0.001
After Treatment	32	4.01	2.34				



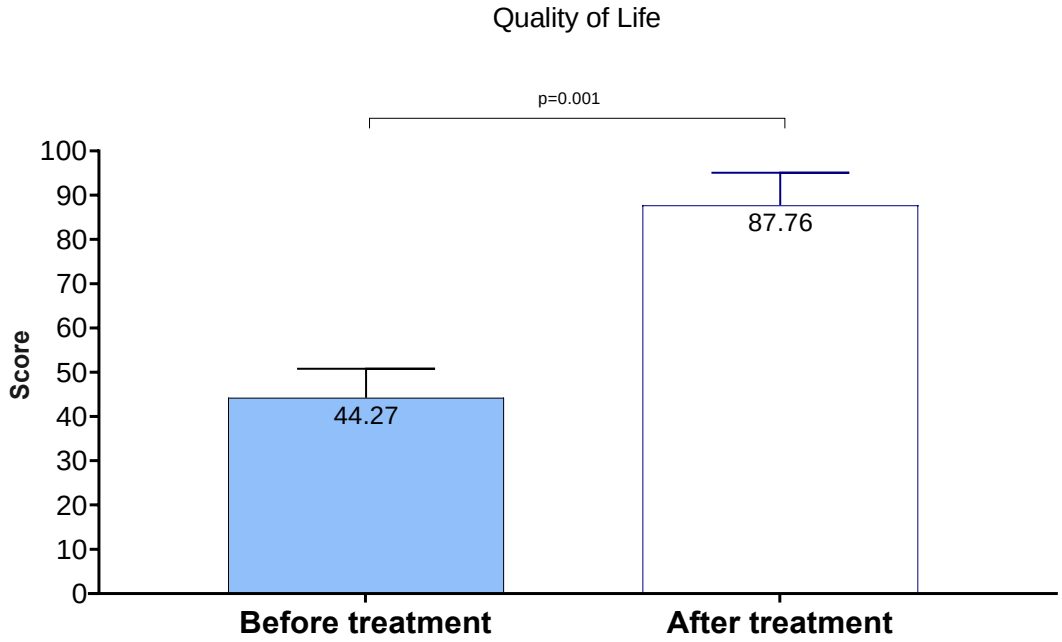
Graph no 2 : Symptom Scale Score BF and AF treatment

Quality of Life

The quality of life (QOL) scores showed a significant increase after the treatment. Before treatment, the mean QOL score was 44.27 with a standard deviation (SD) of 6.50 among 32 participants. After treatment, the mean score rose to 87.76, with a slightly higher SD of 7.33. The p-value of 0.001 indicates that the improvement in QOL scores is statistically significant, reflecting a substantial positive impact of the treatment on the participants' quality of life.

Table no 5 : Quality of Life score BF and AF treatment

	N	Quality of life		Paired difference		Paired t test	
		Mean	sd	Mean	sd	t	p
Before Treatment	32	44.3	6.5	43.5	9.4	26.16	<0.001
After Treatment	32	87.8	7.3				



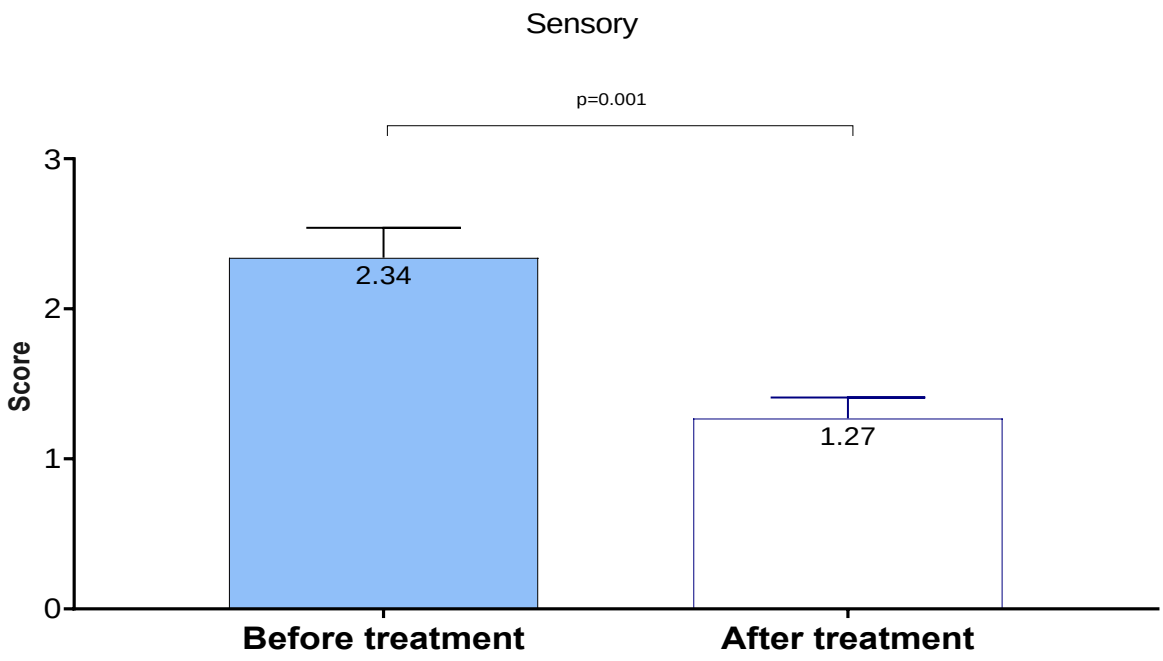
Graph no 3 : Quality of Life Scale score BF and AF treatment

Sensory scale

The sensory scale of EORTC QLQ-CIPN20 included items related to sensory neuropathy symptoms included numbness, tingling sensation, burning pain etc. The sensory scale scores showed a significant reduction after the treatment. Before treatment, the mean sensory score was 2.34 with a standard deviation (SD) of 0.20 among 32 participants. After treatment, the mean score decreased to 1.27 with a lower SD of 0.14, indicating a consistent improvement in sensory symptoms across participants. The p-value of 0.001 suggests that this reduction is statistically significant, demonstrating the treatment's effectiveness in improving sensory outcomes.

Table no 6 : Sensory Scale score BF and AF treatment

	N	Sensory Score		Paired difference		Paired t test	
		Mean	sd	Mean	sd	t	p
Before Treatment	32	2.34	0.20	1.08	0.20	29.95	<0.001
After Treatment	32	1.26	0.12				



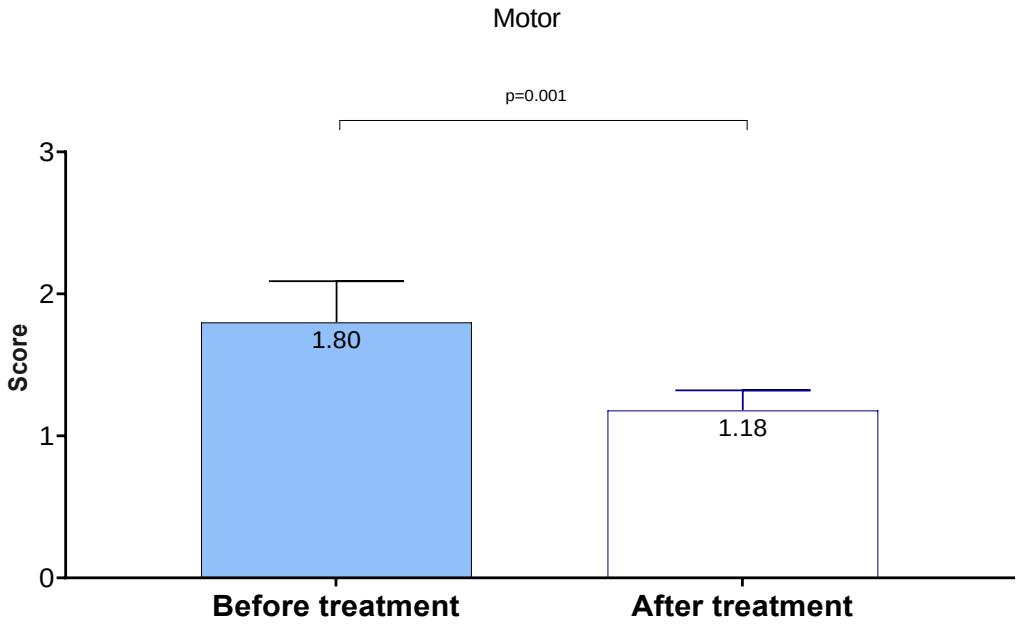
Graph no 4 : Sensory Scale Score BF and AF treatment

Motor Scale

The motor scale of EORTC QLQ-CIPN20 assessed motor symptoms related to CIPN includes difficulty in walking, difficulty in climbing, difficulty in holding objects, cramps in hands or feet, muscle pain etc. The motor scale scores showed a significant improvement after the treatment. Before treatment, the mean motor score was 1.80 with a standard deviation (SD) of 0.29 among 32 participants. After treatment, the mean score decreased to 1.18 with a lower SD of 0.14, reflecting a consistent improvement in motor function. The p-value of 0.001 indicates that this reduction is statistically significant, highlighting the positive impact of the treatment on motor symptoms.

Table no 7 : Motor scale score BF and AF treatment

	N	Motor Score		Paired difference		Paired t test	
		Mean	sd	Mean	sd	t	p
Before Treatment	32	1.86	0.19	0.68	0.19	20.2	<0.001
After Treatment	32	1.18	0.14				



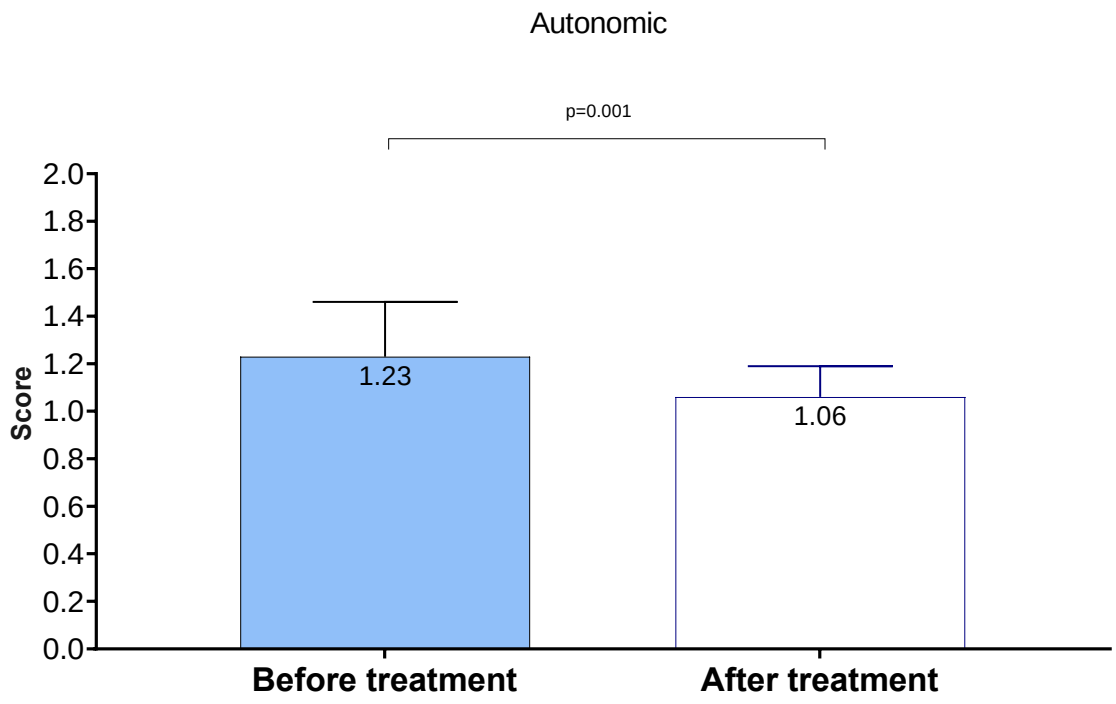
Graph no 5: Motor Scale score BF and AF treatment

Autonomic scale

The autonomic scale of the EORTC QLQ-CIPN20 measured symptoms like dizziness, blurred vision, erectile dysfunction etc. The autonomic scale scores showed a modest but significant improvement following the treatment. Before treatment, the mean autonomic score was 1.23 with a standard deviation (SD) of 0.23 among 32 participants. After treatment, the mean score reduced to 1.06 with a lower SD of 0.13, indicating a slight but consistent improvement in autonomic symptoms. The p-value of 0.001 suggests that this change is statistically significant, underscoring the treatment's effectiveness in addressing autonomic dysfunction.

Table no 8 : Autonomic scale score BF and AF treatment

	N	AUTONOMIC Score		Paired difference		Paired t test	
		Mean	sd	Mean	sd	t	p
Before Treatment	32	1.23	0.23	0.17	0.19	4.98	<0.001
After Treatment	32	1.06	0.13				



Graph no 6 : Autonomic Scale score BF and AF treatment

Discussion

The need to explore alternative therapies in oncology arises from the limitations of conventional treatments for CIPN. Standard pharmacological agents such as gabapentin and pregabalin often offer only partial relief and are associated with undesirable side effects, making long-term use challenging[12]. Moreover, CIPN symptoms vary widely among individuals, and no universally effective treatment currently exists[13]. This highlights the importance of integrative approaches that can reduce neuropathic symptoms and improve overall functional and quality-of-life outcomes in cancer patients.

In this study, participants demonstrated statistically significant improvements across all key parameters following selected Ayurvedic intervention. Functional scale score increased markedly, suggesting better physical, emotional, and cognitive functioning. Symptom scale score also improved, indicating a reduction in chemotherapy-related symptom burden. The improvement in global quality of life score was nearly double, reflecting enhanced well-being and life satisfaction. On the CIPN-specific scales, a significant reduction in sensory symptoms such as numbness and tingling was observed. Motor scale also exhibited meaningful improvement, indicating better neuromuscular coordination and reduced physical limitations. Even the **autonomic scale**, often harder to influence, demonstrated modest yet statistically significant gains.

These findings support the potential role of integrative Ayurvedic therapies as effective supportive care options for managing CIPN. By addressing both symptom relief and functional recovery, such interventions may contribute to a more holistic cancer care strategy.

Probable Mode Of Action Of Treatment

Guduchi satva [6] (Aqueous extract from the stem of *Tinospora cordifolia*)

Chemotherapy drugs such as cisplatin and paclitaxel often trigger inflammation in peripheral nerves, leading to pain and nerve damage. *Guduchi* i.e. *Tinospora cordifolia* contains compounds like tinosporide and other bioactive molecules that help suppress inflammatory responses by reducing the production of pro-inflammatory cytokines. This action helps alleviate the pain and discomfort associated with CIPN.

One of the key mechanisms of nerve damage in CIPN is the excessive generation of reactive oxygen species (ROS) and free radicals during chemotherapy, which results in oxidative stress. *Guduchi Satva* is rich in antioxidants that help neutralize these harmful molecules. Its antioxidant constituents—including phenolics and flavonoids—enhance the body's defense mechanisms and protect neurons from oxidative damage.

Chemotherapy drugs are particularly toxic to sensory neurons, resulting in symptoms such as tingling, numbness, and pain in the extremities. *Guduchi* has been shown to protect nerve cells from such damage and to support the regeneration of damaged neurons, thereby helping to restore normal nerve function over time. In addition, it acts as an immune modulator, strengthening the immune response and aiding in the healing process, which further promotes recovery from nerve injury.

Guduchi Satva targets multiple pathological pathways involved in CIPN, making it a promising therapeutic option for reducing neuropathic symptoms in patients undergoing chemotherapy.

Triphala [7,8] *:*

Triphala is composed of three herbs: *Haritaki* (*Terminalia chebula*), *Bibhitaki* (*Terminalia bellerica*), and *Amalaki* (*Emblica officinalis*). It is traditionally used for its detoxifying effects. *Triphala* helps cleanse the body of toxins, which can reduce the burden on the nervous system. This detoxification process may decrease neuropathy symptoms by preventing further nerve damage.

Chemotherapy drugs can impair mitochondrial function in neurons, reducing energy production and contributing to nerve injury. Research suggests that the polyphenols in *Triphala* help preserve mitochondrial function in neurons by supporting energy metabolism. By doing so, *Triphala* may help prevent energy deficits that contribute to nerve dysfunction and protect against further neuronal damage.

Triphala also contains anti-inflammatory compounds such as gallic acid and chebulinic acid. These compounds help reduce inflammation by inhibiting the production of pro-inflammatory cytokines. By calming inflammation in peripheral nerves, *Triphala* may help relieve the pain and discomfort associated with CIPN.

Dashamoola Bala Guduchi Siddha ksheeradhara:

Dashamoola[9] – Ingredients Of Dashamoola:

Brihat Panchamoola **:**

Bilva (Aegle marmelos), Agnimantha (Premna integrifolia), Gambhari (Gmelina arborea) Shyonaka (Oroxylum indicum), Patala (Stereospermum suaveolens)[9]

Laghu Panchamoola **:**

Brihati (Solanum indicum) , Shalaparni (Desmodium gangeticum), Kantakari(Solanum xanthocarpum), Gokshura (Tribulus terrestris), Prishnaparni (Uraria picta)[9]

The probable mode of action of *Dashamoola* is as follows:

Dashamoola, a classical Ayurvedic formulation composed of ten roots, has traditionally been used for its potent anti-inflammatory, analgesic, and neuroprotective properties. In the context of CIPN, *Dashamoola* may offer therapeutic benefits by targeting several key pathophysiological mechanisms involved in nerve damage. It is believed to reduce inflammation and alleviate nerve pain, which are hallmark symptoms of CIPN. By enhancing circulation to the affected peripheral nerves, *Dashamoola* may support improved oxygenation and nutrient delivery, aiding in tissue repair. Additionally, it promotes the regeneration and repair of damaged nerve tissues and contributes to stabilizing the nervous system, potentially reducing the frequency and severity of neuropathic symptoms. Its antioxidant properties may help protect nerves from oxidative damage induced by chemotherapy agents. Furthermore, *Dashamoola* is traditionally used to relieve muscle stiffness and cramps—common complaints among patients with CIPN—and is known for its role in cleansing and detoxifying nerve tissue, which may support overall neural health during and after cancer treatment.

Bala[10] (*Sida Cordifolia*)

It has anti-inflammatory properties, which can help decrease inflammation around the nerves. A reduction in inflammation can relieve pain and swelling associated with CIPN by mitigating oxidative stress and protecting nerve cells from damage. Bala also improves overall nerve health. This protection helps reduce further damage and aids in the repair and strengthening of nerves.

Guduchi [6] (*Tinospora cordifolia*)

Guduchi supports nerve health and repair. It's analgesic properties helps in managing pain providing symptomatic relief for those suffering from CIPN.

Ksheeradhara[11] –

Ksheeradhara is an Ayurvedic therapy involving the continuous pouring of warm medicated milk over the forehead. It may offer several supportive benefits in the management of CIPN. One of its primary effects is soothing the nervous system; the warmth of the milk can help calm irritated nerves, potentially providing symptomatic relief from the pain and discomfort commonly associated with CIPN. Additionally, the gentle, rhythmic pouring and sustained warmth enhance peripheral blood circulation, thereby improving the delivery of oxygen and nutrients to affected nerve tissues, which may promote healing and reduce neuropathic pain. Beyond its physiological benefits, *Ksheeradhara* has a deeply calming effect on the mind and body. By reducing stress and anxiety—factors known to influence the perception of pain—it may indirectly contribute to symptom relief in neuropathy. Furthermore, the therapy is traditionally believed to aid in detoxification and nourishment of the body, thereby supporting overall wellness and potentially enhancing nerve recovery and resilience.

Conclusion

This study addressed the utility of Ayurvedic therapeutic measures in the management of CIPN, a debilitating side effect of certain chemotherapeutic agents that often leads to pain, numbness, tingling, and muscle weakness—particularly in the extremities. The intervention comprised of oral administration of *Triphala Choorna* and *Guduchi Satva*, along with external application of *Dashamoola Bala Guduchi Siddha Ksheeradhara*.

Patients undergoing this integrative Ayurvedic treatment experienced notable improvements. These included a marked reduction in neuropathic pain, improved sensory perception with decreased numbness and tingling, enhanced muscle strength and mobility, and reduced fatigue, contributing to greater energy and functional independence. Additionally, improvements in emotional and mental well-being were observed, with many patients reporting reduced anxiety, improved mood, and increased motivation to continue treatment.

These outcomes collectively contributed to a significant enhancement in patients' overall quality of life, allowing greater participation in daily and social activities and fostering a sense of restored autonomy. The results align with growing evidence supporting the role of Ayurvedic therapies as effective complementary options for managing CIPN.

While these findings are promising, they warrant validation through larger, randomized controlled trials. Further research should also explore the mechanisms through which these interventions exert neuroprotective and restorative effects. Given the substantial impact of CIPN on cancer treatment adherence and patient well-being, the integration of holistic, evidence-informed approaches such as Ayurveda into standard oncology care may offer a more comprehensive and patient-centered treatment strategy.

References

Belayneh, A., Chelkeba, L., Amare, F., & et al. (2024). Investigation of non-communicable diseases prevalence, patterns, and patient outcomes in hospitalized populations: A prospective observational study in three tertiary hospitals. *Journal of Health, Population and Nutrition, 43*, 128. https://doi.org/10.1186/s41043-024-00599-z

Chang, T. W., Yang, F., Liu, Y., et al. (2024). Gabapentinoids for chemotherapy-induced peripheral neuropathy: Systematic review and meta-analysis. *BMJ Supportive & Palliative Care, 14*, 269–278.

Colvin, L. A. (2019). Chemotherapy-induced peripheral neuropathy: Where are we now? *Pain, 160*(Suppl 1), S1–S10. https://doi.org/10.1097/j.pain.0000000000001540

Jayaprakash, R., Ramesh, V., Sridhar, M. P., & Sasikala, C. (2015). Antioxidant activity of ethanolic extract of *Tinospora cordifolia* on N-nitrosodiethylamine (diethylnitrosamine) induced liver cancer in male Wister albino rats. *Journal of Pharmacy & Bioallied Sciences, 7*(Suppl 1), S40–S45. https://doi.org/10.4103/0975-7406.155791

Kerckhove, N., Collin, A., Condé, S., Chaleteix, C., Pezet, D., & Balayssac, D. (2017). Long-term effects, pathophysiological mechanisms, and risk factors of chemotherapy-induced peripheral neuropathies: A comprehensive literature review. *Frontiers in Pharmacology, 8*, 86. https://doi.org/10.3389/fphar.2017.00086

Kuldeep, Shaizi Layeeq, & Amit. (2022). An evidence-based review on Shirodhara: A unique Panchakarma therapy. *International Journal of Ayurveda and Pharma Research, 10*(7), 52–56. https://doi.org/10.47070/ijapr.v10i7.2434

Mezzanotte, J. N., Grimm, M., Shinde, N. V., Nolan, T., Worthen-Chaudhari, L., Williams, N. O., & Lustberg, M. B. (2022). Updates in the treatment of chemotherapy-induced peripheral neuropathy. *Current Treatment Options in Oncology, 23*(1), 29–42. https://doi.org/10.1007/s11864-021-00926-0

Mols, F., Beijers, T., Vreugdenhil, G., & van de Poll-Franse, L. V. (2014). The impact of chemotherapy-induced peripheral neuropathy on quality of life: A systematic review. *Supportive Care in Cancer, 22*(8), 2159–2169. https://doi.org/10.1007/s00520-014-2225-0

Nanda, G. C., & Tiwari, R. K. (2016). *Shothahara* activities of *Dashamoola* dravyas as an anti-inflammatory formulation with special reference to Charak – A review. *Ayushdhara, 1*(1). https://ayushdhara.in/index.php/ayushdhara/article/view/105

Peterson, C. T., Denniston, K., & Chopra, D. (2017). Therapeutic uses of Triphala in Ayurvedic medicine. *Journal of Alternative and Complementary Medicine, 23*(8), 607–614. https://doi.org/10.1089/acm.2017.0083

Prasad, S., & Srivastava, S. K. (2020). Oxidative stress and cancer: Chemopreventive and therapeutic role of Triphala. *Antioxidants*, *9*(1), 72. https://doi.org/10.3390/antiox9010072

Sharma, A. K. (2015). Medicinal properties of *Bala* (*Sida cordifolia* Linn. and its species). *International Journal of Ayurveda and Pharma Research*, *1*(2). https://ijapr.in/index.php/ijapr/article/view/40

Zhang, S. (2021). Chemotherapy-induced peripheral neuropathy and rehabilitation: A review. *Seminars in Oncology*, *48*(3), 193–207. https://doi.org/10.1053/j.seminoncol.2021.09.004