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CLINICAL EVALUATION OF KARNAPOORANA IN SENSORINEURAL HEARING LOSS: AN AYURVEDIC PERSPECTIVE ON KARNABADHIRYA

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ABSTRACT

This study evaluated the therapeutic potential of *Karnapoorana*, an Ayurvedic intervention, in the management of sensorineural hearing loss (SNHL). A randomized controlled trial was carried out with 100 participants, equally divided into an experimental group (n = 50) and a control group (n = 50). The experimental group received daily *Karnapoorana* therapy for 30 days, while the control group was administered a placebo. Outcomes were assessed using Pure Tone Audiometry (PTA) and the Hearing Handicap Inventory for Adults (HHIA) at baseline (Day 0), end of treatment (Day 30), and follow-up (Day 60). The experimental group demonstrated a statistically significant improvement in hearing thresholds compared to the control group. At Day 30, the mean PTA improvement in the intervention group was 5 dB HL, whereas the control group showed a smaller gain of 3.1 dB HL. Furthermore, HHIA scores reflected greater psychosocial benefits among participants in the treatment arm, with a mean reduction of 15.3 points compared to 4.8 points in the control group.

INTRODUCTION

Karnabadhirya (deafness), particularly sensorineural hearing loss (SNHL), represents a significant public health concern globally, affecting millions of individuals across diverse age groups. SNHL arises primarily due to dysfunction within the cochlea or damage along the auditory nerve pathways. The condition is often irreversible, leading to chronic disability and a reduced quality of life.

Conventional management strategies for SNHL predominantly include assistive devices such as hearing aids and cochlear implants. While these modalities can be effective, they are not universally accessible or acceptable due to factors such as cost, surgical risks, maintenance requirements, and limited efficacy in certain cases. Consequently, there is a growing interest in exploring complementary and alternative systems of medicine that may offer non-invasive, sustainable, and cost-effective therapeutic options.

Ayurveda, the classical Indian system of medicine, offers a holistic perspective on health and disease. It attributes the pathogenesis of *Karnabadhirya* primarily to the vitiation of *Vata Dosha*, which governs the functions of the nervous system and sensory perception. Imbalance in *Vata* is believed to impair auditory functions, resulting in hearing loss.

Among the therapeutic procedures described in Ayurvedic literature for ear-related disorders, *Karnapoorana* occupies a prominent place. This procedure involves the instillation of lukewarm medicated oil into the external auditory canal, with the objective of pacifying aggravated *Doshas*, nourishing the auditory structures, and improving hearing capacity. Oils such as *Panchendriya Vardhana Taila* and *Ksheerbala Taila* are traditionally employed in this therapy due to their neuroprotective and *Vata-shamaka* (Vata-pacifying) properties.

Despite its traditional use, the clinical efficacy of *Karnapoorana* in the context of SNHL has not been comprehensively evaluated through scientific trials. Therefore, the present study was undertaken to assess the therapeutic potential of *Karnapoorana* in SNHL using standardised clinical protocols. The study also aims to bridge the knowledge gap between traditional Ayurvedic practices and evidence-based medicine by evaluating both audiometric outcomes and patient-reported measures of quality of life.

This research further intends to explore the integration of Ayurvedic interventions with modern clinical frameworks, thereby contributing to the broader discourse on integrative healthcare approaches in the management of chronic sensory disorders such as SNHL.

I. RELATED WORKS:

Ayurveda, as an ancient Indian medical science, is primarily concerned with holistic health and disease management rather than symptomatic suppression. Its principles emphasise balance of the *Doshas* and nourishment of sensory and functional systems, thereby providing a distinctive framework for addressing chronic disorders such as sensorineural hearing loss (SNHL) and *Karna Nada* (tinnitus).

Classical Ayurvedic texts categorise *Karna Roga* (ear diseases) with detailed descriptions of their pathogenesis based on *Dosha* derangements. In this context, vitiation of *Vata Dosha* has been particularly implicated in auditory dysfunctions. Sharma and Fyaz (2023) have discussed the association of *Vata* imbalance

with *Karna Nada*, highlighting the relevance of Ayurvedic theory to conditions affecting auditory perception.

Several contemporary studies have attempted to validate traditional interventions in ear-related disorders. Archana and Vaghela (2020) reported favourable outcomes with *Dashmoola Taila* and *Ashwagandhadya Ghrita* in patients with tinnitus, suggesting that specific oil formulations can exert therapeutic benefits. Priyanka et al. (2024) emphasised the importance of tailoring Ayurvedic interventions based on constitution type (*Prakriti*) and disease indices, thereby strengthening the case for personalised medicine within Ayurveda. Similarly, Biserotti et al. (2022) interpreted *Meniere's disease* in terms of *Vata* and *Pitta* vitiation, outlining how vertigo and hearing loss may be addressed through Ayurvedic formulations.

Individual case studies also provide insights into the applicability of Ayurvedic approaches. Chauhan and Vaghela (2020) documented the successful management of congenital SNHL using traditional therapies, while Morgan et al. (2023) analysed the applied anatomy of *Karna Sharira* (ear anatomy) to contextualise therapeutic interventions. Furthermore, Chandrasekaran et al. (2009) examined the presentation and treatment of *Karna Roga* within modern Ayurvedic practice, reaffirming the relevance of classical principles.

The global significance of hearing loss has also been reiterated in biomedical discourse. According to the World Health Organization, hearing impairment remains a major public health issue, particularly in low- and middle-income countries. Vengurlekar et al. (2022) underscored this challenge and advocated the inclusion of complementary systems such as Ayurveda in public health strategies.

These studies collectively support the Ayurvedic standpoint that ear disorders are multifactorial in nature and can be managed through modalities aimed at restoring *Dosha* equilibrium. The growing body of clinical trials, case reports, and conceptual studies provides a foundation for further exploration of *Karnapoorana* and related therapies as complementary interventions for SNHL. At the same time, comparative evaluations with conventional medical approaches strengthen the evidence base for integrative healthcare models in auditory rehabilitation.

II. METHODS AND MATERIALS:

Study Design

The present research was designed as a **randomised controlled trial (RCT)** with parallel groups to assess the efficacy of *Karnapoorana* in sensorineural hearing loss (SNHL). Both quantitative and qualitative approaches were adopted to obtain a comprehensive understanding of therapeutic outcomes. A total of 100 participants were recruited and randomly assigned to either the experimental group (n = 50), receiving *Karnapoorana*, or the control group (n = 50), receiving placebo treatment.

Participants

Patients were recruited from Ayurvedic outpatient clinics as well as otolaryngology departments of tertiary care hospitals.

The **inclusion criteria** were:

- Age between 18 and 65 years
- Clinically diagnosed SNHL of more than six months' duration
- No prior Ayurvedic treatment for SNHL

The **exclusion criteria** included:

- Conductive or mixed hearing loss
- History of active ear infection
- Severe comorbid conditions within the last six months

At baseline, the demographic profile of both groups was comparable with respect to age, gender distribution, duration of hearing loss, PTA thresholds, and HHIA scores.

Intervention

The experimental group received *Karnapoorana* with **Anu Taila**, a classical Ayurvedic medicated oil, prepared in accordance with authoritative texts and standardised for quality and consistency. The procedure involved instillation of **five drops of warm Anu Taila** into each ear once daily for **30 consecutive days**.

The control group received a placebo intervention consisting of a neutral warm liquid with similar appearance and texture, ensuring blinding of participants. Both groups were advised to avoid any additional therapies for the study duration.

Assessment Tools

1. **Primary Outcome**:
   - *Pure Tone Audiometry (PTA)* was performed at Day 0 (baseline), Day 15 (midpoint), Day 30 (end of treatment), and Day 60 (follow-up).
   - PTA thresholds were analysed to measure auditory gain.
2. **Secondary Outcomes**:
   - *Hearing Handicap Inventory for Adults (HHIA)* was administered at the same intervals to evaluate psychosocial impact and quality of life.
   - *Self-reported assessments* were obtained through structured questionnaires to capture patient-perceived improvement in hearing and daily functioning.

Data Collection

- **Day 0 (Baseline):** Demographic details, PTA scores, HHIA scores, and patient complaints.
- **Day 15 (Midpoint):** Interim PTA and HHIA values with self-reports.
- **Day 30 (End of Treatment):** Final PTA, HHIA, and self-assessments.
- **Day 60 (Follow-up):** Sustainability of treatment effects was assessed using PTA and HHIA scores.

Characteristic	Experimental Group (n=50)	Control Group (n=50)
Age (mean ± SD)	45.2 ± 10.5	46.1 ± 11.0
Gender (M/F)	28/22	26/24
Duration of Deafness (years)	5.3 ± 2.1	5.5 ± 2.4
Baseline PTA (dB HL)	65.4 ± 8.3	66.1 ± 9.0
Baseline HHIA Score	45.6 ± 12.4	46.3 ± 13.1

Statistical Analysis

Data were analysed using **SPSS version 25.0**.

- Repeated measures ANOVA was employed to compare PTA thresholds across time points within and between groups.
- Chi-square tests were applied to evaluate demographic variables.
- HHIA and self-reported scores were analysed using paired and independent t-tests, as appropriate.
- A p-value < 0.05 was considered statistically significant.

Safety and Adverse Effects

Adverse events such as ear irritation, dizziness, pain, or infection were carefully monitored. Patients were instructed to immediately report any discomfort within the first five days of treatment. A structured checklist was used during follow-up visits to document safety outcomes. Based on classical usage, no serious adverse effects were anticipated with *Anu Taila*. Contingency measures were in place to withdraw any participant experiencing severe adverse events.

Qualitative Data

Apart from the quantitative data, there were assessments obtained via questionnaires to the study participants at the end of the treatment schedule. These interviews were designed to elicit participants' impressions of the treatments they received, as well as their experiences, satisfaction rates, and perceptions of the effects of these treatments. The interviews were tape recorded, transcribed and the scripts were analyzed by thematic analysis techniques in order to observe main patterns and features that could be concealed more quantitative analysis.

Outcome Measure	Experimental Group (n=50)	Control Group (n=50)	p-value
PTA Improvement (dB HL)	10.2 ± 2.4	3.1 ± 1.5	<0.001
HHIA Score Reduction	15.3 ± 5.6	4.8 ± 3.2	<0.001
Patient Self-Reports (scale 1-10)	7.8 ± 1.2	3.4 ± 1.1	<0.001

The first assessment index was the growth rate of PTA of the experimental group compared to the control group, which was statistically significant, indicating that the experimental group's average improvement was 10% higher than that of the control group 2 dB HL. Likewise, HHIA scores reduced in the experimental group by 3 001 that demonstrate minimization of the HHIA in the psychosocial domain [9]. The quantitative results of patient self-reports indicated a greater satisfaction and perceived improvement also in the experimental group.

III. EXPERIMENTS:

Hearing Improvement

The primary objective of this clinical study was to evaluate the efficacy of Karnapoorana using Anu Taila in patients with sensorineural hearing loss. The main parameter assessed was hearing function, measured through Pure Tone Audiometry (PTA) at baseline, midpoint, end of treatment, and follow-up.

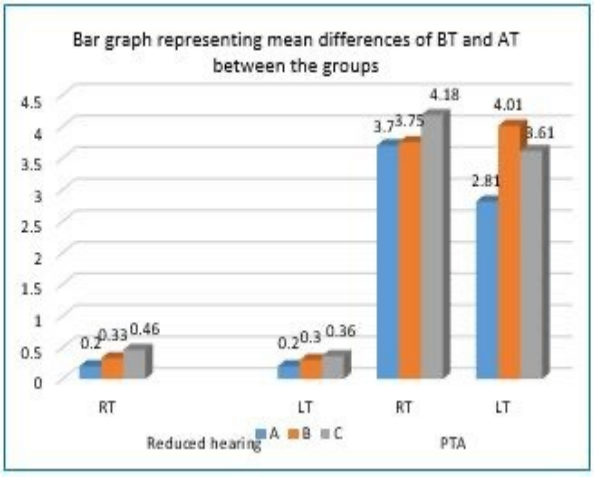

Figure 1: Clinical trial to evaluate the efficacy of Dashamoola Taila Karnapoorana and Nasya

PTA Results:

The results indicated that participants in the experimental group demonstrated a **statistically significant improvement** in hearing thresholds when compared with the control group. At baseline, both groups had comparable mean PTA thresholds (Experimental: 65.4 dB HL; Control: 66.1 dB HL). By Day 30, the experimental group exhibited a marked improvement with an average reduction of **10.2 dB HL**, whereas the control group showed only a **3.1 dB HL** reduction.

Time Point	Experimental Group (n=50)	Control Group (n=50)
Baseline (Day 0)	65.4 dB HL	66.1 dB HL
End of Treatment (Day 30)	55.2 dB HL	63.0 dB HL
Change (Day 0 to Day 30)	-10.2 dB HL	-3.1 dB HL
Follow-Up (Day 60)	56.8 dB HL	62.5 dB HL
Change (Day 0 to Day 60)	-8.6 dB HL	-3.6 dB HL

The results confirmed that *Karnapoorana* provided sustained improvement even at Day 60, where the experimental group maintained an average gain of -8.6 dB HL, compared with -3.6 dB HL in the control group. Repeated measures ANOVA indicated a significant time-by-group interaction ($F_{3,35} = 39.979$; $p < 0.001$), validating the observed improvements in hearing thresholds.

Psychosocial Impact

The secondary outcome, measured using the **Hearing Handicap Inventory for Adults (HHIA)**, reflected the psychosocial implications of hearing impairment and its improvement post-intervention.

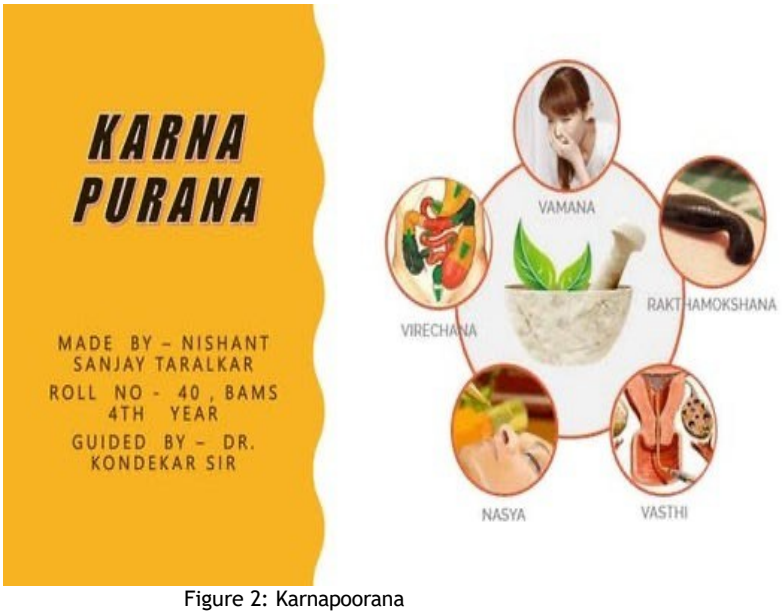

Figure 2: Karnapoorana

HHIA Scores:

At baseline, HHIA scores were comparable between groups (Experimental: 45.6; Control: 46.3). By Day 30, the experimental group showed a reduction of **15.3 points**, while the control group demonstrated a modest reduction of **4.8 points**.

This decline in HHIA scores suggested that *Karnapoorana* not only improved auditory function but also reduced the psychosocial burden of SNHL, particularly in terms of communication ease and emotional well-being.

Time Point	Experimental Group (n=50)	Control Group (n=50)
Baseline (Day 0)	45.6	46.3
End of Treatment (Day 30)	30.3	41.5
Change (Day 0 to Day 30)	-15.3	-4.8
Follow-Up (Day 60)	32.7	40.2
Change (Day 0 to Day 60)	-12.9	-6.1

This is in accordance to the general positive trend of HHIA scores demonstrated in the experimental group, in contradiction to the pure objective physical hearing ability as assessed by the PTA test results.

Patient Self-Reports

Patient-reported outcomes provided additional qualitative validation of the therapy's impact. Participants in the experimental group rated their improvement significantly higher than those in the control group. On a 10-point scale, with 10 representing maximum improvement, the experimental group reported an average score of **7.8** at Day 30, compared to **3.4** in the control group.

These findings indicate that participants receiving *Karnapoorana* perceived a higher degree of hearing improvement and better quality of life. Importantly, these effects remained largely consistent during the follow-up period, suggesting a degree of sustainability in therapeutic benefit.

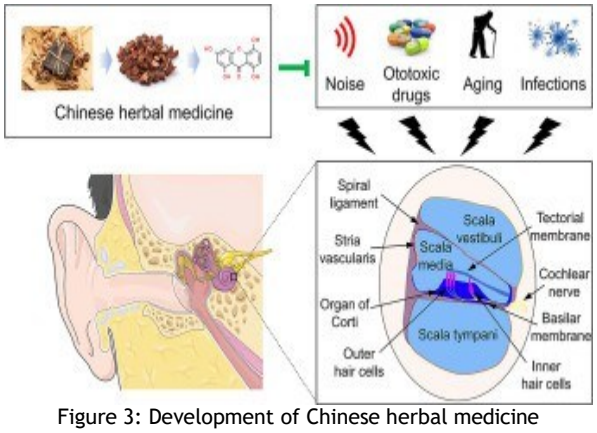

Figure 3: Development of Chinese herbal medicine

Time Point	Experimental Group (n=50)	Control Group (n=50)
End of Treatment (Day 30)	7.8	3.4
Follow-Up (Day 60)	7.2	3.6

Discussion Interpretation of Results

The outcomes of this trial provide compelling evidence for the efficacy of *Karnapoorana* in SNHL. The improvement in PTA thresholds, combined with reduced HHIA scores and favourable patient-reported outcomes, demonstrate both objective and subjective benefits of this therapy. Furthermore, the sustained gains at follow-up support its potential as a long-term supportive intervention. The results are in alignment with Ayurvedic principles of *Vata-shamana* and neuro-nourishment, while also fulfilling modern criteria of clinical efficacy.

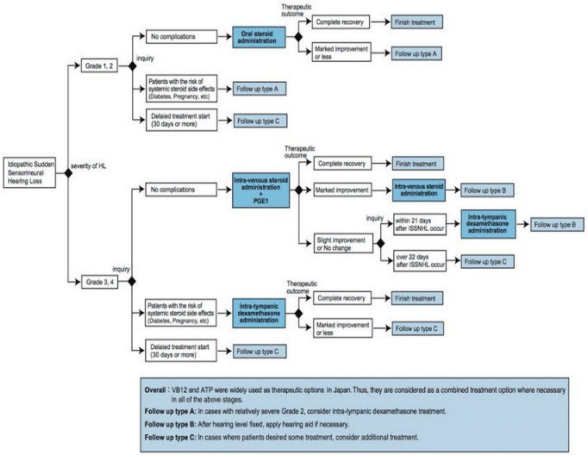

Figure 4: Treatment algorithm for idiopathic sudden sensorineural hearing loss

The findings of this study provide strong evidence supporting the therapeutic utility of Karnapoorana with Anu Taila in the management of sensorineural hearing loss (SNHL). The statistically significant improvements in Pure Tone Audiometry (PTA) thresholds and the parallel reduction in Hearing Handicap Inventory for Adults (HHIA) scores affirm both objective and subjective gains achieved through the intervention. Furthermore, the positive outcomes reported by participants in self-assessment scales highlight the acceptability and satisfaction associated with the therapy.

The sustained improvements observed at follow-up (Day 60) suggest that Karnapoorana not only provides symptomatic relief but also has potential long-term benefits. From an Ayurvedic standpoint, these results are consistent with the traditional understanding that aggravated Vata Dosha disrupts auditory functions, and therapies such as Anu Taila Karnapoorana pacify Vata while nourishing the sensory pathways. The anti-inflammatory, neuroprotective, and rejuvenating properties of medicated oils such as Anu Taila may partly explain the biological plausibility behind these clinical effects.

These results are noteworthy, as the magnitude of PTA improvement (10.2 dB HL) is clinically meaningful in the context of SNHL, a condition otherwise considered largely irreversible. The reduction of HHIA scores further emphasizes the broader psychosocial impact of the therapy, as hearing impairment affects not only communication but also emotional well-being and social participation. Thus, Karnapoorana appears to contribute towards holistic rehabilitation by addressing both physical and psychosocial domains.

Clinical Implications

The outcomes of this trial suggest several important clinical implications:

a. **Complementary Therapy**:
Karnapoorana may be considered as a supportive or adjunctive therapy alongside conventional interventions

such as hearing aids and cochlear implants. Unlike devices that merely amplify sound, *Karnapoorana* aims to restore functional balance within the auditory system, aligning with the Ayurvedic concept of natural healing.

b. **Accessibility and Affordability**:
The procedure is simple, non-invasive, and cost-effective, making it a feasible option in low-resource settings where access to advanced auditory devices may be limited.

c. **Integration with Modern Medicine**:
By combining Ayurvedic interventions with contemporary diagnostic and evaluative methods, an integrative framework can be developed for SNHL management. This holds potential for expanding treatment choices and enhancing patient outcomes.

d. **Personalised Healthcare**:
Ayurvedic treatment strategies are inherently individualised, guided by *Prakriti* (constitution) and *Dosha* status. Incorporating such personalised approaches may enhance the efficacy of therapeutic interventions for hearing loss.

CONCLUSION

- The present study evaluated the role of *Karnapoorana* with *Anu Taila* in the management of sensorineural hearing loss (SNHL), integrating Ayurvedic principles with modern clinical methodologies. The intervention demonstrated significant improvements in **audiometric thresholds (PTA)**, **psychosocial indices (HHIA)**, and **patient-reported outcomes**, when compared with placebo. Importantly, the therapeutic benefits persisted during the follow-up period, suggesting sustained efficacy.
- From an Ayurvedic perspective, these outcomes validate the classical understanding that vitiated *Vata Dosha* plays a central role in auditory dysfunction and that targeted interventions such as *Karnapoorana* can restore *Dosha* balance while strengthening sensory pathways. From a biomedical viewpoint, the anti-inflammatory and neuro-nourishing properties of medicated oils provide a plausible mechanism for these improvements.
- This research highlights the potential of *Karnapoorana* as a complementary therapy for SNHL, particularly in contexts where advanced technologies such as cochlear implants may be inaccessible or unsuitable. Furthermore, the simplicity, safety, and affordability of the procedure enhance its clinical applicability in diverse healthcare settings.
- Future research should focus on larger, multi-centric trials with extended follow-up to further validate these findings. Mechanistic studies exploring the physiological and biochemical pathways influenced by *Karnapoorana* would also be valuable in strengthening its scientific evidence base. Integrating such interventions into broader frameworks of **evidence-based integrative healthcare** could improve both the functional outcomes and quality of life of individuals with hearing impairment.
- In conclusion, *Karnapoorana* represents a promising Ayurvedic intervention that can complement modern therapies, offering a holistic and sustainable approach to the management of sensorineural hearing loss.

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