

Role of Hearing Aids in Tinnitus Management – A Survey Among Audiologists Working in India

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ABSTRACT

Hearing aids are an established intervention for tinnitus, particularly with coexisting hearing loss, yet data on Indian audiologists' clinical practices remain limited. This cross-sectional survey, using convenience sampling, examined perceptions and practice patterns of hearing aid use for tinnitus management among 102 practicing Indian audiologists. A purpose-developed 32-item Likert-scale questionnaire spanning seven domains (attitudes, pre-fitting assessment, fitting strategy, outcome monitoring, training, barriers, and satisfaction) demonstrated excellent content validity (S-CVI/Ave = 0.969; $k^* = 0.938$) and internal consistency ($\alpha = 0.950$). Overall, 86.4% of responses reflected agreement, indicating strongly favorable attitudes, with high confidence in counseling and early recommendation (92.2% each). Pure-tone audiometry was near-universal pre-fitting (98.0%), but standardized outcome tools (THI/TFI) were used less consistently, both before fitting (75.5%) and during monitoring (76.5%), with clinicians relying mainly on subjective patient feedback (88.2%). A notable gap emerged between self-perceived clinical competence (84.3% agreement) and completion of formal tinnitus-specific training (71.6% agreement), the latter also showing the highest disagreement rate (12.7%) in the survey. Cost of hearing aids (92.2%) and clinical time constraints (75.5%) were the leading barriers, and 96.1% of respondents endorsed the need for India-specific clinical guidelines. Findings indicate that while Indian audiologists hold favorable views of hearing aids for tinnitus management, standardized assessment and outcome-monitoring practices, formal training, and structured, cost-sensitive protocols remain priority areas for clinical and policy development.

Keywords: *Tinnitus, Tinnitus management, Hearing aids, Audiologists, Clinical practice patterns, Survey, Tinnitus Handicap Inventory (THI), Tinnitus Functional Index (TFI), Sound therapy.*

INTRODUCTION

Tinnitus is the perception of sound in the absence of an external acoustic stimulus. Tinnitus represents one of the most prevalent audiological symptoms encountered in clinical practice. Approximately 15% of the general population globally experiences tinnitus, with around 2.4% of individuals experiencing significant distress and disability as a direct consequence of their symptoms (Jarach et al., 2022).

Tinnitus is more than an auditory inconvenience; it is associated with profound psychosocial issues, including sleep disturbance, difficulty concentrating, anxiety, depression, and substantially reduced health-related quality of life (Bhatt et al., 2016).

In the Indian context, management of tinnitus is still in infancy. There are many administrative and clinical challenges. A preliminary survey by Makar et al. (2012) found that although 60% of the institutions surveyed in India provided tinnitus management services, 71.42% of service providers reported that these services were only partially helpful to patients. This evidence shows a persistent gap between the availability of services and their perceived clinical effectiveness. Given India's large, demographically diverse population, the availability of services and the skill level of clinicians may vary regionally.

Hearing aids are a treatment of choice, for tinnitus management, especially when it is associated with hearing loss. The theoretical basis for their use is grounded in the auditory amplification hypothesis i.e., by restoring hearing to environmental sounds, hearing aids reduce the perceptual salience of tinnitus and the difference between tinnitus and environmental sounds (Shekhawat et al.,

2013; Simonetti et al., 2021). Additionally, modern hearing aids offer sound therapy programs built in, and advanced signal-processing algorithms that may further reduce tinnitus-related distress.

European multicentre studies strongly supports the use of hearing aids in tinnitus management. Schiele et al. (2025) demonstrated significant clinical improvement in tinnitus-related distress as seen on PROM questionnaires, such as the Tinnitus Handicap Inventory (THI) and the Tinnitus Functional Index (TFI), within 6 to 12 weeks of hearing aid use. Patients used their hearing aids for an average of 4.8 hours per day, and symptom levels decreased, irrespective of initial tinnitus characteristics, degree of hearing loss, and hearing aid fitting parameters. This outcome has meaningful implications for audiology practice, suggesting that appropriately fitted hearing aids may benefit heterogeneous groups of tinnitus patients.

Despite the evidence base, audiology practice shows significant variability. Only 30.2% of patients using hearing aids for tinnitus management used formal tinnitus pitch and loudness matching procedures, and 16.7% reported that no formal outcome assessment protocols were used (Alkahtani et al., 2025). The audiologist's satisfaction with tinnitus management was moderate, at 3.5 out of 5 (± 0.98). This data shows the lack of evidence-based practices in audiology, even in places where hearing aids are routinely prescribed for tinnitus.

In India, this challenge is compounded by limited updated, nationally representative data on audiologists' clinical practice, decision-making, and preparedness for hearing-aid-based tinnitus management.

This study aims to assess the clinical practices and perceptions of audiologists

working in India specific to using hearing aids as an option for tinnitus management in their patients.

REVIEW OF LITERATURE

Epidemiology and burden of tinnitus

Tinnitus is one of the most common symptoms encountered in audiology and otolaryngology practice. A meta-analysis by Jarach et al. (2022), combining data from 400,000+ participants across 40 countries, found a global prevalence of 14.4%, with 2.3% experiencing tinnitus of moderate to severe impact. Prevalence increases with age and is higher in males, likely due to greater noise exposure.

The Chronic incidence of tinnitus is 1 in 100 adults per year in Western populations, with most cases resolving spontaneously within months (Bhatt et al., 2016). However, 1-3 percent of the population experiences severe tinnitus requiring professional help (Baguley et al., 2013). This group experiences reduced sleep, reduced concentration, emotional deregulation, and noticeable deterioration in quality of life, particularly in the context of co-existing hearing loss (Henry et al., 2014). Available estimates indicate a high prevalence, driven by prevalence of noise-induced hearing loss (occupational, recreational, environmental noise), otitis media with residual effects, and age-related hearing loss (Leighton, 2016). The National Sample Survey Organization data and tertiary center studies consistently identify tinnitus as one of the most common complaints in audiology and ENT clinical practice.

The cultural and access factors complicate tinnitus management in India, as help-seeking is influenced by health literacy,

limited awareness of audiological services, and urban-rural service disparities. These factors contribute to under diagnosis and under treatment, making this study's focus on audiologists' practice patterns particularly relevant.

Tinnitus assessment in clinical practice

The Tinnitus Handicap Inventory (THI; Newman et al., 1996) is the most widely used and well-validated 25-item self-report measure, with three subscales: functional, emotional, and catastrophic. Scores range from 0 to 100, with higher scores indicating greater handicap. The THI shows strong reliability (Cronbach's $\alpha > 0.90$), treatment sensitivity, and cross-cultural validity.

The Tinnitus Functional Index (TFI; Meikle et al., 2011) is a more recent 25-item measure. It covers eight domains: intrusiveness, control, cognitive interference, sleep, auditory difficulties, relaxation, quality of life, and emotional distress. The TFI is validated for treatment outcomes and is increasingly used in clinical trials (Schiele et al., 2025).

Other measures include the Tinnitus Questionnaire (TQ; Hallam et al., 1988), visual analog scales, and psychoacoustic measures such as pitch and loudness matching and minimum masking levels.

Despite the availability of these tools, clinical use remains inconsistent. For example, only 30.2% of audiologists use pitch and loudness matching, while 16.7% lack formal outcome protocols (Alkahtani et al., 2025). Such underassessment limits the ability to deliver individualized management and to objectively monitor treatment efficiency. Addressing this gap in India is the motivation for the present study.

Hearing aids in tinnitus management: mechanism and evidence

Theoretical Mechanisms of Benefits:

Hearing aids can help manage tinnitus through several mechanisms. Amplification reduces the contrast between tinnitus and environmental sounds, making tinnitus less noticeable (Shekhawat et al., 2013). By normalizing abnormal central auditory gain associated with hearing loss, they may also reduce tinnitus perception (Schaette & McAlpine, 2011). Furthermore, increased background noise shifts attention away from tinnitus, consistent with attentional models of tinnitus awareness.

Clinical Evidence:

Recent evidence supporting hearing aids as an effective option for tinnitus management is the European multicentre study by Schiele et al. (2025). The study found a significant reduction in THI and TFI scores within 6-12 weeks of fitting, with benefits observed regardless of tinnitus type, hearing loss severity, or fitting parameters. Participants used hearing aids for about 4.8 hours per day. Similarly, Simonetti et al. (2021) reported that patients with chronic tinnitus experienced reduced loudness and annoyance, with sustained improvement at three months. Interestingly, the benefit was not associated with the degree of hearing loss, suggesting that patients with mild-to-moderate hearing loss can also improve.

Fitting consideration and device selection

Choosing the right hearing aid for someone with tinnitus is more than a technical decision—it's about matching device features to the patient's needs. Open-fit hearing aids are favorites because they feel more natural and help enrich the sound

environment. Fitting gains (like NAL-NL2 or DSL v5) should be smartly set; boosting volume too much can actually worsen tinnitus. When it comes to sound therapy, let the patient's hearing profile and specific tinnitus guide the way—even though clear evidence-based guidelines are still being developed.

Audiologist clinical practice patterns

Surveys show that audiologists tackle tinnitus in many different ways, and where they train makes a real difference. As early as 2006, researchers found widely differing assessment and treatment methods, and even now, practitioners haven't caught up to the latest evidence-based recommendations.

A recent major survey (Alkahtani et al., 2025) revealed that nearly 9 out of 10 audiologists use hearing aids for tinnitus, but fewer than one-third perform detailed assessments such as pitch or loudness matching—and 16.7% report no outcome measures at all.

Studies from Australia, the UK (Hoare et al., 2012), and the US (Zaugg et al., 2016) report similar trends. Clinician confidence varies, and specialist training influences practice quality. These findings highlight a widespread need for better standardization, training, and evidence-based integration in tinnitus management.

The Indian context and research gaps

The main study on tinnitus management in India (Makar et al., 2012) reported data on prevalent practices in institutions. No data on individual practitioners were reported. The study found that 60% of institutes recommended hearing aids as a solution to tinnitus. However, most clinicians rated the outcomes as partially effective. Many

institutions didn't use standardized assessment protocols or provide training for clinicians in evidence-based management. These findings are again a decade old, and no recent information on practice patterns is available.

Since then, technology has advanced—bringing tinnitus features to hearing aids, new outcome tools such as TFI and THI-S, and even internet-based CBT into the picture. But we still don't know how widely these options are used by Indian clinicians. So far, no one has asked what truly shapes Indian audiologists' decisions when fitting hearing aids for tinnitus—factors such as training, resources, access to devices, and patients' actual needs. Solving this puzzle is crucial for developing guidelines and tools tailored to India, and it's exactly what our study sets out to do.

Need of the study

Tinnitus is a common and often distressing condition that significantly affect quality of life of an individual. Hearing aids are widely used to manage tinnitus in individuals with co-existing hearing loss, as they can reduce tinnitus perception and annoyance.

However, clinical practices, fitting strategies, and outcome monitoring for hearing-aid-based tinnitus management vary considerably among audiologists. Additionally, there is limited India-specific evidence describing how audiologists use hearing aids for tinnitus relief and the challenges they face.

So, this study helps us comprehensively document current practices and perceptions of audiologists in India regarding the prescription or fitting of hearing aids for individuals with tinnitus and coexisting hearing loss.

METHOD

Aim and objectives of the study

The present study aims to assess the role and significance of hearing aids in tinnitus management.

The objectives of the present study were:

- To develop a questionnaire to assess audiologists' perceptions of the role and significance of hearing aids in tinnitus management.
- To administer the developed questionnaire to practicing Audiologists to assess the role and significance of hearing aids in tinnitus management.
- To explore the practice-related factors influencing the choice of hearing aids as management of tinnitus with co-existing hearing loss.

Research type and design: A cross-sectional survey.

Sampling method: Convenience sampling.

Sample size: Using Cochran's formula with a 95% confidence level and a 5% margin of error, the minimum sample size was calculated to be 96. To enhance robustness and account for non-response, a larger sample was used. The final sample included responses from 102 participants.

Participants: A total of 102 audiologists aged 23 years or older with at least 3 months of work experience in clinical settings, hospitals, and institutions in India were selected based on the inclusion and exclusion criteria.

Inclusion criteria

- Audiologists currently practicing in India.

- Professional qualification in Audiology (minimum: bachelor's degree in Audiology and Speech-Language Pathology) and registered with the regulatory body.
- A minimum of 3 months of total work experience post-qualification at the time of data collection.
- Employed or practicing in one (or more) of the target settings: clinical setup, hospital, or educational/institutional settings.
- Currently providing clinical diagnostic services (Hearing Assessments and Tinnitus Assessments) and Dispensing Hearing Aids.

Exclusion criteria

- Professionals qualified but working primarily as Speech-Language Pathologists or other allied professionals.
- Audiologists not currently engaged in clinical practice (e.g., full-time administrators, managers, those on long-term leave exceeding six months).
- Professionals practicing outside India.

Procedure

The Current study was carried out in three phases:

PHASE 1: Development of the questionnaire
A questionnaire was developed to assess Audiologists' perceptions of the role of hearing aids in tinnitus management. It includes sections on demographics, work-

related factors, and the main study variables. Responses will be collected using a Likert scale from "strongly agree" to "strongly disagree" and will be administered in English to Audiologists who can read and understand English.

PHASE 2a: Validation of the questionnaire
The questionnaire was sent to 3 audiology experts for content validation. They assessed relevance, clarity, simplicity, and the structure of the responses. Feedback was used to revise the tool, ensuring its scientific and practical validity.

PHASE 2b: Pilot testing and statistical validation
A pilot study was conducted after providing informed consent with a small group of Audiologists for content validation, to assess item clarity, and to estimate the time required to complete the items.

PHASE 3: Administration and data collection
Participants were first briefed on the study's objectives and provided informed consent. After consent is obtained, the validated questionnaire was administered online via Google Forms and distributed via email, WhatsApp, and other digital channels.

Data analysis

- The developed questionnaire's content validation and reliability testing using Cronbach's alpha.
- Data collected from participants was tabulated in Microsoft Excel.
- Data analysis was performed using SPSS Version 27.

RESULTS

In this study, a 32-item, five-point Likert scale questionnaire (Strongly Disagree to Strongly Agree) was developed to assess audiologists' perceptions of the role of hearing aids in tinnitus management in India. Results were organized into four areas: (i) content validation of the questionnaire, (ii) analysis of responses regarding (a) the role of hearing aids in tinnitus management and (b) factors influencing the choice and fitting of hearing aids for individuals with tinnitus and hearing loss. Statistical analysis was conducted using IBM SPSS Statistics version 27.

Participants

A total of 102 audiologists practicing across India completed the questionnaire, exceeding the minimum sample size of 96 determined using Cochran's formula. Of the 102 participants, 59.6% were female and 40.4% were male. Regarding educational qualifications, 50% held a Bachelor's in Audiology and Speech-Language Pathology (BASLP) degree, while the remaining 50% held postgraduate qualifications (28% with a Master's in Audiology and Speech-Language Pathology [MASLP] and 22% with an MSc in Audiology). In terms of clinical experience, 2% had less than one year of experience, 35% had one to three years, 29% had four to six years, 24% had seven to nine years, and 10% had ten or more years of experience. With regard to practice setting, 56.7% were employed in clinical setups, 32.7% in hospital settings, and 10.6% in institutional settings.

Content validity of the developed questionnaire

Content validity of the 32-item questionnaire was established through expert review. Three audiology and tinnitus experts independently rated each item on a scale (1 – Not Valid, 2 – Somewhat Valid, 3 – Quite Valid, 4 – Extremely Valid). Items rated 3 or 4 were retained, while poorly rated items were revised or removed and revalidated. The final questionnaire comprised 32 items.

Scale level content validity

The 32-item questionnaire demonstrated excellent content validity (Table 1). The S-CVI/Ave was 0.969 (≥ 0.90), the S-CVI/UA was 0.906 (≥ 0.80), and the mean modified kappa (k^*) was 0.938, indicating excellent agreement (Polit & Beck, 2006). Of the 32 items, 29 (90.6%) were retained ($I-CVI \geq 0.78$), three (9.4%) required revision ($I-CVI = 0.50 - 0.78$), and none were deleted.

Domain-wise content validity

The 32 items were grouped into seven domains (Table 2). Of these, four domains (attitudes and beliefs regarding the role and efficacy of hearing aids in tinnitus management, factors influencing hearing aid selection and fitting strategy for tinnitus, outcome monitoring and follow-up practices, and knowledge, training, and professional preparedness) showed perfect agreement (mean $I-CVI = 1.000$). The pre-fitting tinnitus assessment practices domain had a mean $I-CVI$ of 0.933, driven by one lower-rated item (item 12). The perceived barriers and need for standardized guidelines domain had a mean $I-CVI$ of 0.889, primarily due to item 30, which was flagged for revision. The clinical satisfaction and future directions domain had the lowest mean $I-CVI$ of 0.833, primarily due to item 32, which was flagged for revision.

Items flagged for revision

Three items from 32 ($I-CVI = 0.67$; $k^* = 0.33$) were flagged for revision. Item 12 was simplified because it was considered overly detailed; Item 30 was clarified regarding cost as a barrier; and Item 32 was reworded to emphasize access to evidence-based protocols rather than clinician-developed ones. No items were deleted (all $I-CVI \geq 0.50$). Revisions, along with minor linguistic changes to other items, were incorporated before piloting with 30 audiologists' responses, and the finalized 32-item questionnaire was used for reliability analysis.

Reliability of the developed questionnaire

In keeping with phase 2 and the pilot testing of the procedure outlined in this study, the internal consistency of the 32-item questionnaire was examined for a pilot sample ($N = 30$) and the main sample ($N = 102$).

Pilot study

The pilot study of the questionnaire was conducted with a sample of 30 audiologists to assess item clarity and estimate the time required for completion, prior to its administration in the main study. The pilot data yielded a Cronbach's alpha of 0.956 for the full 32-item scale, indicating excellent internal consistency. Corrected item-total correlations in the pilot sample ranged from 0.044 (item 29) to 0.830 (item 18), with 31 of the 32 items demonstrating acceptable to strong item-total correlations (> 0.30). Item 29 ("I believe that the limited time in busy clinics hinders my ability to conduct thorough tinnitus-related assessments") was the sole exception, showing a markedly weak

item-total correlation ($r = 0.044$) at the pilot stage.

Pilot study vs. main study

The high Cronbach's alpha values in both the pilot ($\alpha = 0.956$) and main study ($\alpha = 0.950$) indicate that the questionnaire is a reliable tool for assessing audiologists' perceptions and practices regarding hearing aids in tinnitus management (Figure 1).

Role and significance of hearing aids in tinnitus management

Descriptive findings

Responses to the 32-item questionnaire were analyzed descriptively to examine audiologist's view on the role of hearing aids in tinnitus management and the factors influencing their selection for patients with tinnitus and hearing loss. Items were grouped into seven domains: (i) attitudes and beliefs regarding the role and efficacy of hearing aids in tinnitus management, (ii) pre-fitting tinnitus assessment practices, (iii) hearing aid selection and fitting strategies for tinnitus, (iv) outcome monitoring and follow-up practices, (v) knowledge, training, and professional preparedness, (vi) perceived barriers and the need for guidelines, and (vii) clinical satisfaction and future directions. Overall, 86.4% of responses were Agree/Strongly Agree, 11.7% were neutral, and 9.1% were Disagree/Strongly Disagree, indicating a strongly favorable orientation towards hearing aids in tinnitus management (Figure 2) (Table 3).

Domain 1: attitudes and beliefs regarding the role and efficacy of hearing aids in tinnitus management (item 1-7)

This domain returned the highest overall mean across all domains, except pre-fitting assessment practice ($M = 4.31/5$; 89.4% average agreement), reflecting a strongly favorable attitude among respondents toward hearing aids as a tinnitus management option. The strongest endorsement was for Item 5, “I feel confident counseling patients about the potential benefits of hearing aids for managing tinnitus” ($M = 4.38$, $SD = 0.72$; 92.2% agreement), followed closely by Item 6, “I recommend the use of hearing aids early in patients with tinnitus who have measurable hearing loss” ($M = 4.37$, $SD = 0.63$; 92.2% agreement). Notably, 94.1% of respondents agreed that “many tinnitus patients with hearing loss can benefit from hearing aids, but they often do not receive them” (Item 7; $M = 4.32$, $SD = 0.62$), pointing to a perceived gap between potential clinical benefit and actual hearing aid uptake among tinnitus patients in India. The comparatively lower (though still strongly positive) mean for Item 1 – current involvement in tinnitus assessment and management ($M = 4.17$, $SD = 0.87$; 77.5% agreement, 18.6% neutral) – suggests that a subset of respondents engages with tinnitus cases less routinely than with general audiological practice (Table 4).

Domain 2: pre-fitting tinnitus assessment practices (items 8-12)

This domain recorded the highest mean score of all seven domains ($M = 4.40/5$; 89.6% average agreement). Item 8, “Before recommending hearing aids for tinnitus, typically conduct a pure tone audiometry test as per the recommended guidelines,” received the highest endorsement of all 32 items in the questionnaire ($M = 4.75$, $SD = 0.57$; 98.0% agreement), confirming that pure tone audiometry is nearly universally

adopted as a pre-fitting assessment step. Discussion of tinnitus characteristics such as onset, duration, laterality, and fluctuation (Item 12) was also strongly endorsed ($M = 4.54$, $SD = 0.61$; 94.1% agreement). By contrast, the use of standardized tinnitus questionnaires ranked as the second-lowest mean across the entire scale ($M = 4.05$, $SD = 0.91$; 75.5% agreement, 17.6% neutral, 6.9% disagreement), indicating that, while basic audiometric assessment is nearly universal, the use of standardized, validated tinnitus handicap measures before hearing aid fitting is comparatively less consistent among Indian audiologists (Table 5).

Domain 3: factors influencing hearing aid selection and fitting strategy for tinnitus (item 13-19)

The domain directly addresses the study objective – exploring the factors that influence audiologists’ choice of hearing aids for patients with tinnitus and co-occurring hearing loss, and recorded an overall domain mean of $4.28/5$ (86.4% average agreement). Tinnitus was reported as a significant consideration in hearing aid type selection by the large majority of respondents (Item 13; $M = 4.33$, $SD = 0.74$; 86.3% agreement). Among specific selection and fitting factors, preference for hearing aids with built-in tinnitus-masking generators (Item 16) was the most strongly endorsed feature-related factor ($M = 4.48$, $SD = 0.59$; 95.1% agreement), followed by recommending open-fit or receiver-in- canal (RIC) hearing aids for tinnitus with high-frequency hearing loss (Item 14; $M = 4.37$, $SD = 0.69$; 88.2% agreement). Adapting the fitting strategy according to tinnitus pitch (Item; $M = 4.25$, $SD = 0.74$; 86.3% agreement) and the use of integrated sound therapy programs (Item 17; $M = 4.14$, $SD = 0.80$; 82.4% agreement) were also widely reported. Prioritizing wide-bandwidth amplification specifically for tinnitus

management (Item 15) returned the lowest mean within this domain ($M = 4.12$, $SD = 0.66$; a particular fitting parameter relative to other selection factors) (Table 6).

Domain 4: outcome monitoring and follow-up practices (items 20-24)

The outcome monitoring domain returned a mean of 4.18/5 (82.2% average agreement), the second-lowest of the seven domains. Reliance on the patient's subjective feedback to assess tinnitus improvement (Item 22) was the most strongly endorsed practice in this domain ($M = 4.27$, $SD = 0.69$; 88.2% agreement). However, the use of standardized outcome measures such as the THI or TFI to monitor change following hearing aid fitting (Item 21) showed a comparatively lower mean and the second-highest disagreement rate among all 32 items ($M = 4.09$, $SD = 0.89$; 76.5% agreement, 17.6% neutral, 5.9% disagreement). Likewise, the expectation of noticeable tinnitus improvement within 6–12 weeks of hearing aid use (Item 23) returned a relatively modest mean ($M = 4.05$, $SD = 0.69$; 78.4% agreement, 21.6% neutral) – the highest neutral response rate recorded for any item in the questionnaire. Together with the Item 10 finding in the assessment domain, this pattern suggests that while subjective, clinician judgment-based outcome tracking is common practice, the routine use of standardized, validated outcome tools across both the pre- and post-fitting stages of tinnitus management remains comparatively less consistent (Table 7).

Domain 5: knowledge, training, and professional preparedness (item 25-27)

This domain had the lowest mean of all seven domains ($M = 4.16/5$; 79.4% average agreement) and the lowest single-item mean across the entire questionnaire. While most respondents believed they had adequate knowledge to make clinical decisions about hearing aids for tinnitus management (Item 26; $M = 4.34$, $SD = 0.76$; 84.3% agreement) and reported regularly updating their knowledge of the evidence base (Item 25; $M = 4.19$, $SD = 0.81$; 82.4% agreement), completion of formal training specific to tinnitus and hearing aids (including coursework, workshops, or continuing rehabilitation education [CRE]; Item 27) was markedly lower ($M = 3.94$, $SD = 1.01$; 71.6% agreement, 15.7% neutral, 12.7% disagreement). This 12.7% disagreement rate was the highest recorded for any item in the questionnaire, indicating a tangible gap between audiologists' self-perceived competence and their actual access to or completion of formal, structured training in tinnitus-focused hearing aid management (Table 8).

Domain 6: perceived barriers and the need for standardized guidelines (item 28-30)

This domain recorded a mean of 4.33/5 (87.9% average agreement). The need for clear, evidence-based guidelines for using hearing aids to manage tinnitus in India (Item 28) was very strongly endorsed ($M = 4.49$, $SD = 0.61$; 96.1% agreement), the second-highest mean across the entire questionnaire, underscoring a strongly felt need among Indian audiologists for standardized clinical protocols in this area. The cost of hearing aids was identified as a significant barrier to access for tinnitus patients who could otherwise benefit (Item 30; $M = 4.51$, $SD = 0.64$; 92.2% agreement), the highest mean among the three barrier-related items. Time

constraints in busy clinical settings that limit thorough tinnitus assessment (Item 29) were also widely endorsed as a barrier ($M = 4.00$, $SD = 0.89$; 75.5% agreement). However, this item behaved psychometrically differently from the rest of the scale, returning the weakest item-total correlation in both the pilot and main study analyses (Table 9).

Domain 7: clinical satisfaction and future directions (item 31-32)

The final domain returned a mean of 4.31/5 (86.8% average agreement). The majority of respondents reported wanting to establish more structured, step-by-step protocols for tinnitus management with hearing aids in their own clinics (Item 32; $M = 4.44$, $SD = 0.62$; 93.1% agreement), echoing the strongly endorsed need for guidelines noted in domain 6. A large majority also reported being very satisfied with the results achieved with hearing aids for tinnitus management in their own practice (Item 31; $M = 4.19$, $SD = 0.83$; 80.4% agreement, 17.6% neutral) (Table 10).

DISCUSSION

Content validity and reliability of the developed questionnaire

The internal consistency of the finalized questionnaire was adequate ($\alpha = 0.956$, $N = 30$).

Attitudes and beliefs: strongly favourable views alongside a perceived treatment gap

Respondents held strongly positive attitudes toward hearing aids for tinnitus management, with this domain ranking second highest ($M = 4.31$; 89.4% agreement), consistent with evidence

supporting their benefit (Hoare et al., 2014; Kikidis et al., 2021; Waechter & Jönsson, 2022). High confidence in counseling and early recommendation aligns with clinical guidelines (Tunkel et al., 2014). However, strong agreement that many eligible patients do not receive hearing aids (94.1%) highlights a treatment gap, likely due to cost, limited access, and low awareness, as noted by WHO (2021).

Pre-fitting assessment: consistent basic audiometry, inconsistent use of standardised tools

The pre-fitting assessment had the highest domain mean ($M = 4.40$), driven by near-universal use of pure-tone audiometry (Item 8; 98.0%), consistent with clinical guidelines (Tunkel et al., 2014). In contrast, use of standardized tools such as THI/TFI before fitting (Item 10; 75.5%) and for outcome monitoring (Item 21; 76.5%) was less consistent. This reflects a broader gap between routine audiological testing and the use of validated outcome measures, reported internationally and not limited to the Indian context.

Factors influencing hearing aid selection and fitting strategy for tinnitus

The selection and fitting domain revealed a clear preference for features with an established rationale for tinnitus-specific amplification. Built-in tinnitus masking generators were the most strongly endorsed selection factor (Item 16; 95.1% agreement), consistent with the longstanding clinical use of integrated sound generation alongside amplification, an approach rooted in neurophysiological models of tinnitus habituation (Jastreboff & Jastreboff, 2000).

Outcome monitoring and follow-up practices

Outcome monitoring returned the second-lowest domain mean ($M = 4.18/5$), with audiologists relying predominantly on patients' subjective feedback to judge tinnitus improvement (Item 22; 88.2% agreement) rather than on standardized outcome instruments (Item 21; 76.5% agreement). While clinician-judgment-based tracking undoubtedly has clinical value, the comparatively limited use of standardized instruments such as the THI or TFI to monitor change after fitting represents a missed opportunity to generate the kind of systematic, comparable outcome data that the developers of these instruments intended them to provide (Meikle et al., 2011; Newman et al., 1996), and that would allow Indian audiologists to benchmark their outcomes (Hoare et al., 2014; Kikidis et al., 2021; Waechter & Jonsson, 2022).

The relatively high neutral-response rate for the expectation of noticeable improvement within six to twelve weeks of hearing aid use (Item 23; 21.6% neutral) is also noteworthy. Reviews of the hearing aid–tinnitus literature have highlighted considerable variability in follow-up intervals and improvement timelines reported across primary studies (Kikidis et al., 2021).

Knowledge, training, and professional preparedness

The knowledge, training, and preparedness domain had the lowest mean of all seven domains ($M = 4.16/5$) and included the item with both the lowest mean and the highest disagreement rate in the entire questionnaire: completion of formal training, coursework, workshops, or continuing rehabilitation education (CRE) specific to tinnitus and hearing aids (Item 27; $M = 3.94$; 71.6%

agreement; 12.7% disagreement). This finding stands in marked contrast to the considerably higher self-rated confidence in clinical decision-making reported for Item 26 (84.3% agreement), highlighting a tangible gap between audiologists' self-perceived competence and their documented access to or completion of structured tinnitus-specific training.

Comparable preparedness gaps have also been documented among audiologists in South Africa (Bagwandin, 2019) and Saudi Arabia, where limited training was explicitly identified as the primary driver of inconsistent tinnitus practice patterns (Alkahtani et al., 2025).

Perceived barriers and the need for standardized guidelines

The barriers domain yielded some of the study's most consequential findings for clinical and policy translation. The cost of hearing aids was identified as a significant barrier to access for tinnitus patients who could otherwise benefit (Item 30; 92.2% agreement) - the highest-rated item among the three barrier-related items and consistent with global evidence that the cost of hearing technology remains one of the most persistent obstacles to hearing-aid uptake, particularly in low- and middle-income countries such as India, where only a small minority of people who could benefit from hearing aids are currently estimated to receive them (World Health Organization, 2021). Time constraints in busy clinical settings (Item 29; 75.5% agreement) were also widely endorsed as a barrier, although, as discussed, this item behaved psychometrically as a distinct, systemic construct rather than as part of the individual attitudes and practices core of the scale. This distinction is itself clinically meaningful,

since it implies that addressing this particular barrier will require workplace- and systems-level intervention rather than efforts directed at individual practitioners alone.

Clinical satisfaction and future directions

Despite these gaps, respondents reported high satisfaction with hearing-aid outcomes for tinnitus management (Item 31; 80.4% agreement), consistent with evidence of beneficial effects on tinnitus distress and loudness (Hoare et al., 2014; Kikidis et al., 2021; Waechter & Jonsson, 2022).

Implications for clinical practice, training, and policy

The findings have several practical implications. Clinically, the limited use of standardized tools such as THI/TFI before fitting and during follow-up underscores the need to integrate these brief, validated measures into routine practice alongside pure-tone audiometry to support more systematic outcome tracking (Meikle et al., 2011; Newman et al., 1996).

In training, the gap between perceived competence and formal tinnitus-specific education indicates a need for structured continuing rehabilitation education (CRE) modules, consistent with international trends (Bagwandin, 2019; Sheppard et al., 2022).

At the policy level, the strong demand for India-specific, evidence-based guidelines (96.1% agreement) underscores the role of professional bodies in developing context-relevant protocols, potentially adapted from existing frameworks (Tunkel et al., 2014).

Finally, cost remains the primary barrier to hearing aid uptake, underscoring the need for affordable technologies, subsidy models, and accessible service delivery systems, as emphasized by WHO (2021).

Limitations

Several limitations of the present study should be acknowledged. First, the sample size was limited to 102 audiologists, which, while meeting the minimum threshold established by Cochran's formula, may restrict the generalizability of the findings to the broader population of audiologists practicing across India. Second, the study did not compare responses across demographic and professional subgroups, including age, gender, years of clinical experience, and work setup (clinical, hospital, or institutional settings). As a result, potential differences in perceptions and practices among these subgroups remain unexplored. Future studies with larger, more diverse samples and subgroup analyses across these variables would help provide a more comprehensive understanding of the factors influencing hearing-aid-based tinnitus management practices among Indian audiologists.

CONCLUSION

This study aimed to examine the role and significance of hearing aids in tinnitus management, as perceived and practiced by audiologists working across India, using a purpose-developed, psychometrically validated 32-item questionnaire. The instrument demonstrated excellent content validity, established through a structured expert panel review, and excellent internal consistency at the pilot stage ($\alpha = 0.956$), thereby confirming its reliability and validity for this purpose. Drawing on responses from 102 practicing audiologists, the study found that hearing aids are overwhelmingly regarded as a valuable and effective component of tinnitus management.

At the same time, the study identified specific, addressable gaps in clinical training and practice procedures, including limited use of standardized, validated tinnitus outcome measures such as the THI and TFI; a shortfall in formal, tinnitus-specific training relative to audiologists' self-perceived clinical competence; and persistent barriers related to cost and clinical time, alongside a near-unanimous, strongly felt need for clear, evidence-based, India-specific clinical guidelines.

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APPENDIX

Table 1.

Overall scale level content validity Index Summary

Parameter	Value	Benchmark	Status
Total items evaluated	32	-	-
Number of expert reviewers	3	≥ 3 recommended	Met
S-CVI/Ave (mean I-CVI)	0.969	≥ 0.90	Met
S-CVI/UA (Universal agreement)	0.906	≥ 0.80	Met
Mean modified Kappa (K*)	0.938	≥ 0.74 (Excellent)	Excellent
Item recommended for retention (I-CVI ≥ 0.78)	29/32 (90.6%)	Majority	-
Items flagged for revision ($0.50 \leq \text{I-CVI} < 0.78$)	3/32 (9.4%)	Minority	-
Items recommended for deletion (I-CVI < 0.50)	0/32 (0.0%)	0 preferred	Met

Table 2.

Domain-wise content validity index summary

Domain	Item (n)	Mean I-CVI	S-CVI/UA	Status
Attitudes & beliefs on hearing aids efficacy	7	1.000	1.00	Excellent
Pre-fitting assessment practice	5	0.933	0.80	Excellent
Hearing aid selection & fitting practices	7	1.000	1.00	Excellent
Follow-up & outcome monitoring	5	1.000	1.00	Excellent
Knowledge, training & Preparedness	3	1.000	1.00	Excellent
Barriers & need for standardized guidelines	3	0.889	0.67	Good
Clinical Satisfaction and Future Direction	2	0.833	0.50	Good

Figure 1.

Cronbach's alpha for the 32-Item Questionnaire for the Pilot Study vs. Main Stud

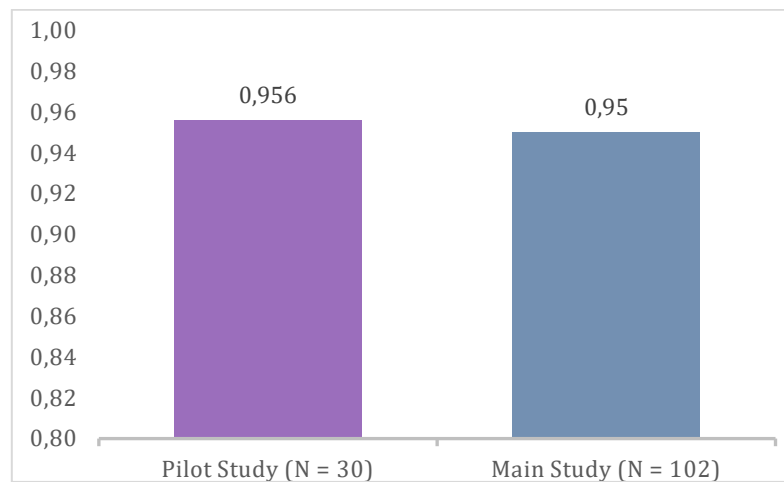


Figure 2.

Domain-wise Mean agreement scores (5-point scale) across the seven thematic domains of the questionnaire (N = 102)

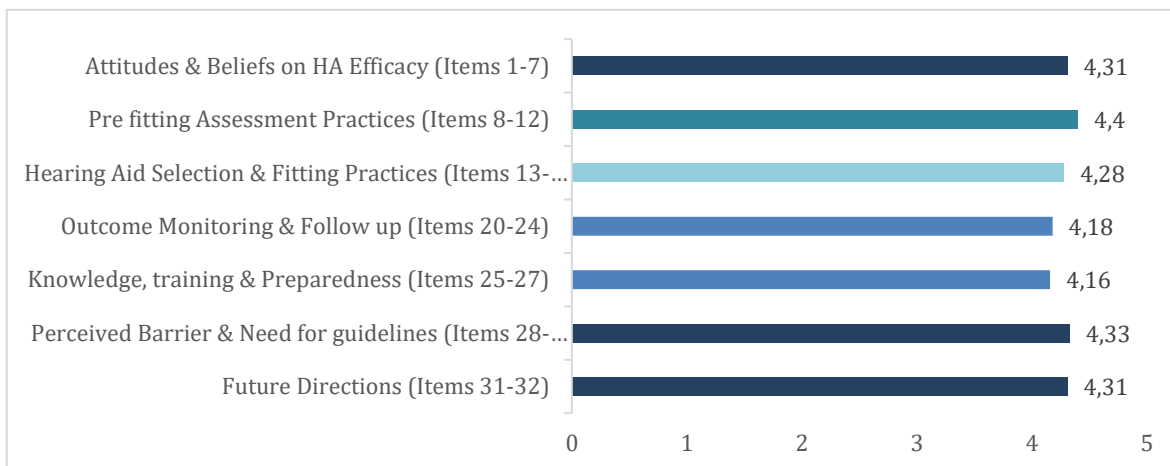


Table 3.

Domain-wise Summary of Mean Scores and Percentage Agreement

Domain	Items	Domain Mean (/5)	Avg. % Agreement
Attitude & beliefs on role/efficacy of hearing aid	1-7	4.31	89.4%
Pre-fitting tinnitus assessment practices	8-12	4.40	89.6%
Hearing aid selection & fitting Strategy for tinnitus	13-19	4.28	86.4%
Outcome monitoring & Follow up	20-24	4.18	82.2%
Knowledge, training & preparedness	25-27	4.16	79.4%
Perceived barrier & need for guidelines	28-30	4.33	87.9%
Satisfaction & future directions	31-32	4.31	86.8%

Table 4.

Domain1 - Attitudes and beliefs regarding the role and efficacy of hearing aids in tinnitus management (Item 1-7)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
1	I am currently involved in the assessment and management of tinnitus.	4.17	0.87	3.9%	77.5%
2	I usually view hearing aids as a preferred treatment option for patients with tinnitus who have accompanying hearing loss.	4.32	0.76	2.0%	89.2%
3	I believe that hearing aids effectively reduce distress related to tinnitus in suitable patients.	4.30	0.71	1.0%	90.2%
4	I believe that hearing aids can lessen the perceived loudness of tinnitus in patients with hearing loss.	4.31	0.64	0.0%	90.2%
5	I feel confident counselling patients about the potential benefits of hearing aids for managing tinnitus.	4.38	0.72	2.9%	92.2%
6	I recommend the use of hearing aids early in patients with tinnitus who have measurable hearing loss.	4.37	0.63	0.0%	92.2%
7	I think many tinnitus patients with hearing loss can benefit from hearing aids, but they often do not receive them.	4.32	0.62	1.0%	94.1%

Table 5.

Domain 2 - Pre-fitting tinnitus assessment practices (Items 8-12)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
8	Before recommending hearing aids for tinnitus, I typically conduct a pure-tone audiometry test as per the recommended guidelines.	4.75	0.57	1.0%	98.0%
9	I routinely conduct pitch and loudness matching for tinnitus patients before recommending hearing aids.	4.45	0.61	0.0%	94.1%
10	Standardized questionnaires, such as the Tinnitus Handicap Inventory (THI) and Tinnitus Functional Index (TFI), are routinely used to assess tinnitus handicap before fitting hearing aids.	4.05	0.91	6.9%	75.5%
11	I regularly document the baseline severity of tinnitus before fitting hearing aids.	4.23	0.67	0.0%	86.3%
12	I discuss the characteristics of the patient's tinnitus, including its onset, duration, laterality, and fluctuations, before fitting them with hearing aids.	4.54	0.61	0.0%	94.1%

Table 6.

Domain 3 - Factors influencing hearing aid selection and fitting strategy for tinnitus (Item 13 - 19)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
13	I view tinnitus as a significant factor when choosing the type of hearing aid for adults with hearing impairment.	4.33	0.74	1.0%	86.3%
14	I usually recommend open-fit or RIC hearing aids for patients with tinnitus and high-frequency hearing loss.	4.37	0.69	0.0%	88.2%
15	I prioritize wide bandwidth amplification when fitting hearing aids for tinnitus management.	4.12	0.66	0.0%	83.3%
16	I prefer hearing aids that include built-in tinnitus masking generators for those with tinnitus.	4.48	0.59	0.0%	95.1%
17	I often utilize sound therapy programs integrated into hearing aids for tinnitus patients.	4.14	0.80	3.9%	82.4%
18	I regularly fine-tune hearing aids during multiple follow-up visits specifically for tinnitus relief.	4.26	0.76	1.0%	83.3%
19	I adapt my hearing aid fitting strategy based on the tinnitus pitch, such as high- or low-frequency tinnitus.	4.25	0.74	2.0%	86.3%

Table 7.

Domain 4 - Outcome monitoring and follow-up practices (Items 20 - 24)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
20	I regularly schedule follow-up visits to monitor the outcomes of tinnitus after fitting hearing aids.	4.24	0.81	2.0%	80.4%
21	I utilize standardized tinnitus outcome measures, such as the THI and TFI, to monitor changes following hearing aid use.	4.09	0.89	5.9%	76.5%
22	I primarily depend on the patient's subjective feedback to assess tinnitus improvement with hearing aids.	4.27	0.69	1.0%	88.2%
23	I expect to see a noticeable improvement in tinnitus within the first 6 to 12 weeks of using hearing aids.	4.05	0.69	0.0%	78.4%
24	I regularly inquire about the daily usage hours of hearing aids when assessing tinnitus outcomes.	4.24	0.72	2.0%	87.3%

Table 8.

Domain 5 - Knowledge, training, and professional preparedness (Item 25 - 27)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
25	I update myself regularly on evidence bases for hearing aids as a tinnitus management strategy.	4.19	0.81	2.0%	82.4%
26	I believe that I have adequate knowledge to make clinical decisions on hearing aids as a tinnitus management strategy for my patients.	4.34	0.76	1.0%	84.3%
27	I have completed formal training, including coursework, workshops, and continuing rehabilitation education (CRE), on tinnitus and hearing aids.	3.94	1.01	12.7%	71.6%

Table 9.

Domain 6 - Perceived barriers and the need for standardized guidelines (Item 28 - 30)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
28	I believe there is a need for clear, evidence-based guidelines for the use of hearing aids in managing tinnitus in India.	4.49	0.61	1.0%	96.1%
29	I believe that the limited time in busy clinics hinders my ability to conduct thorough tinnitus-related assessments.	4.00	0.89	5.9%	75.5%
30	I believe the expense of hearing aids poses a significant barrier for many tinnitus patients who could greatly benefit from them.	4.51	0.64	0.0%	92.2%

Table 10.

Domain 7: Clinical Satisfaction and Future Directions (Item 31 – 32)

Item No.	Item	Mean	SD	% Disagree/ Strongly Disagree	% Agree/ Strongly Agree
31	I am very satisfied with the results I achieve using hearing aids for managing tinnitus in my practice.	4.19	0.83	2.0%	80.4%
32	I want to establish more structured, step-by-step protocols for tinnitus management using hearing aids, in my clinic.	4.44	0.62	0.0%	93.1%