

Adult Aural Rehabilitation Practices Among Audiologists in India – a Cross-sectional Survey

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Research Article

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Abstract

Background

Hearing loss in adults is a leading problem worldwide. Provision of the whole spectrum of aural rehabilitation (AR) services to adults with acquired hearing loss has been acknowledged as a global challenge, due to multiple practical constraints faced by clinicians. Its implementation varies across clinical settings.

Objective

To investigate the practices, service delivery patterns, interests, and barriers towards adult aural rehabilitation among audiologists in India.

Methods

A cross-sectional survey was conducted among 206 audiology professionals using a structured questionnaire adapted from Makhoba and Joseph (2016). Descriptive statistics and Chi-square tests were used for analysis.

Results

A majority (89.3%) reported providing adult AR services. Hearing aid support (89.8%) and informational counseling (85.9%) were most common, while psychosocial and communication partner interventions were less frequent. No significant association was found between work setting and AR provision. Key barriers included time constraints, lack of guidelines, and limited training.

Conclusion

AR is widely practiced for adults with acquired hearing loss, but remains device-centered. There is a need for standardized guidelines, training enhancement, and multidisciplinary approaches in India.

Introduction

Adult-onset hearing loss is encountered very frequently across the world. The Global Burden of Disease Study [1] measured years lived with disability and reported hearing loss to be the fourth leading cause of disability. Data from various studies across India during the last decade report prevalence of adult hearing loss to be between 8–27% [2–5]; while some studies report a prevalence of approximately 40% in a cohort of 40–59 years and up to 67% in adults over 65 years of age [6–9]. Recent data from WHO

[10] reveals by 2050, nearly 2.5 billion people are projected to have some degree of hearing loss, and more than 700 million will require hearing rehabilitation at that time.

Adults with acquired hearing loss have reduced to speech of others, making conversations difficult to understand, particularly when there's background noise. Hearing loss is known to cause psychological and social difficulties because it interferes with a person's ability to communicate effectively [10–13]. Adults with hearing loss are more likely to report symptoms of depression, dissatisfaction with life, reduced functional health and withdrawal from social activities.

Since adult hearing loss is a permanent and progressive impairment, the mainstay of its management is hearing aid fitting and aural rehabilitation. Hearing aids have been reported to provide several benefits to the adult users [14–17]. Some of these benefits are seen within a short time of hearing aid fitting, while some benefits emerge only after long-term usage, aural rehabilitation and communication training. While the hearing aid is the focal point of aural rehabilitation, counselling to shape attitudes, increase motivations, and to better understand hearing aids and the communication process, are the cornerstones of any audiological rehabilitation effort.

Aural rehabilitation has been defined by Boothroyd [18] as “reduction of hearing-loss-induced deficits of function, activity, participation, and quality of life through a combination of sensory management, instruction, perceptual training, and counseling” while Ross [19] defines it as “any device, procedure, information, interaction, or therapy which lessens the communicative and psychosocial consequences of a hearing loss”. Aural rehabilitation is important to overcome the disabling effects of adult hearing loss and is a comprehensive program [18, 20] that involves:

- Hearing Device Fitting and Orientation - Promoting an understanding of hearing devices, their care and maintenance and promoting realistic expectations regarding their capabilities.
- Understanding and resolving the psychological and social problems resulting from hearing impairment.
- Auditory Visual Integration Training – Maximizing sensory input by providing the best possible visual and auditory signal and maximizing sensory integration by making the best use of the amplified auditory signal and the visible signal.
- Communication Strategies Training - Promoting the use of cognitive processes necessary to derive meaning from incomplete sensory messages and develop within the individual assertive and interactive ways of communicating and repairing breakdowns.
- Environmental Manipulation Training - Promote an understanding of how to create a positive communication environment.
- Significant other/ Caregiver training – Training communication partners to effectively communicate with the person having a hearing loss.

Globally, there is increasing emphasis on holistic and patient-centered rehabilitation models, even though provision of the whole spectrum of aural rehabilitation services to adults with acquired hearing

loss has been acknowledged as a challenge globally, due to several reasons and practical challenges faced by clinicians [21–26]. Despite the high prevalence of adult acquired hearing loss and its penetrating impact, the status of aural rehabilitation for adults is not promising [27, 28]. India faces a severe shortage of audiologists, with ratios estimated around 1 audiologist for every 500,000 people, highlighting a huge gap between the vast population needing hearing-related services and the limited trained professionals available. This scarcity impacts timely access to essential services like hearing aid fitting, diagnostics, and provision of the complete spectrum of aural rehabilitation services. It is important to identify the challenges faced by audiologists in providing aural rehabilitation services to adults with acquired hearing loss and understand their preferences and perspectives. Therefore this survey was conducted to study the audiologists' clinical practices in the provision of aural rehabilitation services to adults with acquired hearing loss, identify gaps in service delivery, understand their areas of interest and explore barriers to comprehensive implementation.

Methods

This study employed a cross-sectional survey design to investigate aural rehabilitation (AR) practices, perceptions, and barriers from practicing audiologists across India. The study was approved by the Ethics Committee of XXXX (approval number: XXXXX/ON/DASLP/RP/Jan/26/2, date: January 3, 2026).

Tool: A structured Google Form questionnaire was used to collect the data for the study. This questionnaire was sourced from Makhoba and Joseph [26] and was minimally adapted with their permission to suit the Indian context. It comprised of four sections: 1) demographics, 2) detailed aspects related to provision of aural rehabilitation services to adults, including audiologists' interest, perception and challenges 3) technological applications in aural rehabilitation services, and 4) training for the provision of aural rehabilitation services. It consisted of 28 items including multiple-choice, Likert-scale contingent questions, checkboxes and short open-ended questions. The questionnaire was developed using a Google Form.

Participants

The survey was distributed to audiologists working across various healthcare settings in India, including individual and group private practices, government and private hospitals, academic institutions providing training in audiology, and NGOs focusing on hearing health. Audiologists a) with minimum Bachelor's degree in Audiology and Speech Language Pathology; b) with at least 1 year of clinical experience in adult hearing aid fitting and aural rehabilitation; and c) who were willing to participate and provide informed consent were included. Non-qualified personnel providing hearing aid fitting services to adults with acquired hearing loss were excluded. A Google form was shared through individual WhatsApp, professional WhatsApp groups, local and national professional association WhatsApp groups, alumni WhatsApp groups of audiologists and LinkedIn platform to more than 500 audiologists. Data was collected over a period of one month, after which the Google Form was set to stop collecting responses. Responses were returned by 206 audiologists.

Analysis: Descriptive statistics were summarized as frequencies and percentages for categorical variables. Chi-square test was used to assess associations between categorical variables, including: work setting vs service provision, gender vs service provision, service types vs decline perception, training adequacy vs service types and mode of delivery vs work setting. Kruskal–Wallis test was used for comparisons across work setting and years of experience. Mann–Whitney U test was used for two-group comparisons (e.g., gender). A p-value of < 0.05 was considered statistically significant.

Results

Participant Characteristics

A total of 206 audiology professionals participated in the survey. The majority of participants were in the 30–40 years age group (n = 76, 36.9%), followed by 20–30 years (n = 56, 27.2%) and 40–50 years (n = 44, 21.4%). Smaller proportions were observed in the 50–60 years (n = 22, 10.7%) and above 60 years (n = 8, 3.9%) categories. In terms of gender distribution, females constituted 61.2% (n = 126) of the sample, while males accounted for 38.8% (n = 80). Participants represented a wide range of professional experience. The largest group had more than 20 years of experience (n = 48, 23.3%), followed by 10–15 years (n = 42, 20.4%), 2–5 years (n = 35, 17.0%), and 5–10 years (n = 34, 16.5%). Smaller proportions had 15–20 years (n = 32, 15.5%) and less than 2 years of experience (n = 15, 7.3%). Regarding work settings, the majority of respondents were engaged in private practice (n = 96, 46.6%), followed by academic institutions (n = 52, 25.2%) and hospital settings (n = 41, 19.9%). Other settings (e.g., industrial, NGO, online consulting) were minimally represented. Respondents were predominantly from the western part of the country (51.9%), while other parts were represented to a lesser extent – (North – 18%, South – 14.6%, Central – 6.8%, East – 7.3% and North-East 1.5%). The participant characteristics are shown in Table 1.

Table 1
Participant Characteristics (n = 206)

Variable	Category	n (%)
Age Range	20–30 years	56 (27.2%)
	30–40 years	76 (36.9%)
	40–50 years	44 (21.4%)
	50–60 years	22 (10.7%)
	≥ 60 years	8 (3.9%)
Gender	Male	80 (38.8%)
	Female	126 (61.2%)
Experience	< 2 years	15 (7.3%)
	2–5 years	35 (17.0%)
	5–10 years	34 (16.5%)
	10–15 years	42 (20.4%)
	15–20 years	32 (15.5%)
	> 20 years	48 (23.3%)
Work Setting	Private practice	96 (46.6%)
	Academic	52 (25.2%)
	Hospital	41 (19.9%)
	Others	17 (8.3%)

Provision of Adult Aural Rehabilitation Services

The majority of respondents (n = 184, 89.3%) reported that they provide aural rehabilitation services to adults with acquired hearing loss, whereas 10.7% (n = 22) indicated that they do not. Of these 89.3%, a smaller proportion reported delivering a full spectrum of services, suggesting partial implementation of rehabilitation frameworks. Chi-square test revealed no statistically significant association between years of professional experience and provision of aural rehabilitation services ($p = 0.436$). This suggests that clinicians across different experience levels were equally likely to provide adult aural rehabilitation services. There was also no statistically significant association between work setting and provision of aural rehabilitation services ($p = 0.101$). However, a trend was observed, with clinicians in private practice reporting the highest provision rates (94.9%), compared to those in academic (85.2%) and hospital settings (83.7%). A Chi-square test also revealed no significant association between gender and

provision of aural rehabilitation services ($p = 0.86$), indicating similar practice patterns among male and female audiologists. Differences in AR service delivery are likely due to systemic factors (training, infrastructure) rather than demographic variables.

Type of services provided

Among the types of services, most clinicians reported providing a combination of services: hearing aid–related services, cochlear implant mapping and follow-up, auditory training, communication strategies training and counseling (informational and psychosocial). Hearing aid–related services and informational counseling were the most commonly provided, while assistive device training and communication partner training were less frequently reported, indicating gaps in comprehensive rehabilitation delivery. The number of respondents providing the various types of aural rehabilitation services is shown in Table 2.

Table 2
Types of Aural Rehabilitation Services Provided (n = 206)

Service Type	n (%)
Hearing aid fitting & support	185 (89.8%)
Informational counselling	177 (85.9%)
Auditory training	159 (77.2%)
Communication strategies training	145 (70.4%)
Psychosocial adjustment counselling	122 (59.2%)
Cochlear implant services	111 (53.9%)
Speech reading	108 (52.4%)
Communication partner training	101 (49.0%)
FM/assistive devices	80 (38.8%)

The distribution of aural rehabilitation services, shown in Fig. 1, varied across work settings, with private practitioners predominantly providing hearing aid–related services, while academic and hospital settings demonstrated greater provision of comprehensive interventions, including cochlear implant services and psychosocial counseling. A statistically significant association was observed for cochlear implant services across settings ($p = 0.033$), with institutional settings significantly more likely to provide CI services.

Analysis of type of services by years of experience (Fig. 2) reveals that clinicians with < 5 years clinical experience (early-career clinicians) focus on core services such as hearing aid fitting with lower provision of advanced rehabilitation services; while with the mid-career clinicians (5–15 years’

experience), there is an increasing adoption of counseling and communication strategies training services. Senior clinicians (> 15 years' experience) were more likely to provide advanced rehabilitation services, including psychosocial counseling and communication partner training. A significant association was observed between experience and provision of psychosocial counselling ($p = 0.019$), with more experienced clinicians significantly more likely to provide psychosocial counseling.

These results highlight that work setting significantly influences the breadth and complexity of aural rehabilitation services, with institutional settings offering more comprehensive care and that experience influences the depth and diversity of services, with senior clinicians more likely to provide comprehensive rehabilitation.

Mode of Service Delivery

Responses indicate a strong preference for individual therapy. The majority of respondents reported delivering aural rehabilitation services through individual sessions (57.3%), with limited use of group-only sessions (6.8%). Approximately one-third (35.9%) reported using a combination of individual and group approaches. Individual-based sessions were used more for technical and device-related interventions such as hearing aid fitting, cochlear implant mapping and auditory training, while group-based approaches were primarily limited to counseling and communication strategies. However, some variability was noted for counseling and training components, where both individual and group formats were utilized. Chi-square analysis did not reveal a statistically significant association between work settings and mode of service delivery ($p = 0.093$), however, a trend of private practitioners predominantly providing individual sessions, with academic and hospital settings more likely to incorporate combined individual and group approaches was observed. Similarly, no significant association was found between years of experience and mode of service delivery ($p = 0.90$), indicating that delivery patterns remain consistent across experience levels. These findings suggest that the mode of aural rehabilitation delivery is influenced more by practice setting and systemic factors than by clinician experience. Findings thus indicate that aural rehabilitation in India is predominantly individualized, with underutilization of group-based interventions, potentially due to time constraints, lack of training, and infrastructural limitations.

Interest in Providing Various Aural Rehabilitation Services

Respondents were asked to rate their level of interest for the various services on a 5-point scale, where 1 = Not interested and 5 = Highly interested.

Table 3
Interest in Providing Aural Rehabilitation Services

Service	Median (IQR)	Interpretation
Hearing aid support	5 (5–5)	Very high interest
Informational counseling	5 (4–5)	Very high interest
Auditory training	5 (4–5)	Very high interest
Communication strategies	5 (4–5)	Very high interest
Cochlear implant services	4 (3–5)	Moderate–high interest
Psychosocial counseling	4 (3–5)	Moderate interest
Speech reading	4 (3–4)	Moderate interest
Communication partner training	4 (3–4)	Moderate interest
Assistive devices (FM systems)	3 (2–4)	Lower interest

Analysis of ratings revealed high interest in providing core aural rehabilitation services, including hearing aid support, informational counseling, and auditory training (median = 5). These interests align with current practice trends. Moderate interest was observed for psychosocial counseling and communication partner training, despite being underprovided; while FM system and assistive device provision received comparatively lower ratings (median = 3), suggesting limited exposure, lower perceived importance and possible resource constraints. No significant differences in interest levels were observed across work settings (Kruskal Wallis $p = 0.13$), although a trend is evident towards more experienced clinicians showing higher interest in advanced AR services ($p = 0.09$). These findings suggest that while current practice remains focused on device-centered interventions, there is a growing inclination toward expanding comprehensive rehabilitation services.

Assessment Practices

The frequency of assessing the need for aural rehabilitation was analysed using a 5-point rating scale. The majority of respondents reported assessing the need often (39.8%) or always (35.0%), with a median score of 4 (IQR: 4–5). However, approximately one-quarter of respondents reported only occasional or infrequent assessment, indicating variability in clinical practice. No significant differences were observed across work settings or years of experience in terms of frequency of assessing the need for AR ($p > 0.05$).

Respondents were further asked to specify the tools/instruments they use to assess the need for aural rehabilitation. Based on the responses, the assessment practices can be grouped into four categories: Clinical judgment, Informal tools, Standardized tools, and Combination methods. A majority of clinicians

reported using clinical judgment and informal tools while the use of standardized instruments remains limited.

Table 4
Assessment Practices by Work Setting

Assessment Method	Private n (%)	Academic n (%)	Hospital n (%)	Others n (%)
Clinical judgment	78 (79.6%)	39 (72.2%)	32 (74.4%)	8 (72.7%)
Informal tools	61 (62.2%)	34 (63.0%)	26 (60.5%)	7 (63.6%)
Standardized tools	28 (28.6%)	21 (38.9%)	15 (34.9%)	3 (27.3%)
Combination approach	44 (44.9%)	29 (53.7%)	22 (51.2%)	6 (54.5%)

Assessment practices for aural rehabilitation were compared across work settings. Clinical judgment dominates across all settings [Private (79.6%), Academic (72.2%), and Hospital (74.4%)], indicating reliance on experience-based decision-making. Use of informal tools was the next commonly reported practice. Standardized assessment tools were used less frequently, with slightly higher adoption in academic settings (38.9%), but overall underutilization across all settings. Academic & hospital settings show higher use of mixed assessment strategies, reflecting better exposure to structured protocols.

Assessment practices were compared across years of experience. Although the use of standardized tools increased with experience, no statistically significant association was observed ($p = 0.13$). Clinical judgment remained the most commonly used method across all experience levels. A progressive increase in the use of combination assessment approaches was observed among more experienced clinicians. However, the overall limited use of standardized tools suggests that assessment practices are largely experience-based rather than guided by structured protocols.

Tele-Audiology Use

More than half (55.4%) of the respondents reported not using tele-audiology for adult aural rehabilitation. Moderate use was reported across all work settings, with no statistically significant differences observed ($p = 0.77$). Analysis by years of experience (Fig. 3) revealed a decreasing trend in adoption with increasing experience, although this was not statistically significant ($p = 0.32$). Barriers to tele-audiology, including technical challenges, lack of training, patient-related factors, and infrastructure limitations, were consistently reported across both work settings and experience levels, with no significant associations observed ($p > 0.05$). These findings suggest that tele-audiology adoption is influenced more by generational familiarity than by professional experience, and that systemic barriers limit its widespread implementation.

Frameworks guiding adult aural rehabilitation

The majority of respondents reported relying on experience-based or self-developed approaches to guide aural rehabilitation (40.8%), highlighting that practice is largely individualized and non-standardized. 25.2% indicated that they did not follow any specific guideline, which is a critical concern. Only a small proportion reported using standardized frameworks such as the International Classification of Functioning (ICF) or structured rehabilitation models (10.7%), indicating low integration of evidence-based practice. 16.5% of respondents follow institutional protocols. These findings highlight a lack of standardized theoretical frameworks guiding clinical practice, with most clinicians depending on individual experience. This aligns with the reported lack of guidelines and reliance on clinical judgment observed in other aspects of aural rehabilitation practice.

Adequacy of undergraduate training

When asked about the sufficiency of undergraduate training in aural rehabilitation, less than half (44.7%) of respondents felt their undergraduate training was sufficient, a substantial proportion (37.9%) reported insufficient training while nearly 1 in 5 (17.5%) were uncertain, possibly indicating variable training experiences. These findings indicate that a substantial proportion of clinicians perceive gaps in their foundational training. The adequacy of undergraduate training in aural rehabilitation was analyzed across years of experience (Fig. 4) using the Kruskal–Wallis test. A statistically significant difference was observed ($H = 11.26$, $p = 0.046$), with early-career clinicians reporting higher adequacy compared to those with greater experience. These findings suggest that undergraduate training in aural rehabilitation has improved over time. However, despite this improvement, the overall implementation of comprehensive rehabilitation services remains limited, indicating the influence of systemic and practice-related barriers.

The relationship between adequacy of undergraduate training and types of aural rehabilitation services revealed a positive association across all service domains. Clinicians reporting higher training adequacy were more likely to provide comprehensive services, particularly psychosocial counselling, communication partner training, and assistive device interventions. Statistically significant associations were observed for psychosocial counselling ($p = 0.011$) and assistive device provision ($p = 0.022$). In contrast, basic services such as hearing aid support were consistently reported across all groups. These findings suggest that while foundational services are widely delivered, the provision of advanced and holistic rehabilitation is influenced by the quality of undergraduate training.

Table 5
Types of Services by Undergraduate Training Adequacy

Service	Low Adequacy (%)	Moderate (%)	High Adequacy (%)
Hearing aid services	86.5%	91.0%	94.2%
Informational counseling	78.4%	87.2%	92.3%
Auditory training	68.9%	76.9%	84.6%
Communication strategies	61.0%	70.5%	79.8%
Psychosocial counseling	45.9%	56.4%	68.3%
Cochlear implant services	41.9%	52.6%	63.5%
Communication partner training	39.2%	49.4%	60.6%
Assistive devices	28.4%	37.2%	48.1%

Barriers to Service Provision

Among respondents who reported not providing aural rehabilitation services or not offering a full spectrum of services, commonly cited barriers included:

- Lack of time and workload constraints
- Limited resources or infrastructure
- Insufficient training or confidence in specific rehabilitation components
- Lack of standardized guidelines (particularly in the Indian context)

Barriers were consistently reported across all work settings (Table 5), indicating system-wide challenges rather than setting-specific issues. Time constraints and lack of guidelines were universally high. Training gaps were reported slightly more in academic and hospital settings. Resource limitations had higher reporting in hospital settings. The distribution of reported barriers was compared across work settings using Chi-square analysis. No statistically significant association was found between work setting and major barriers, including time constraints ($p = 0.54$), lack of guidelines ($p = 0.84$), and lack of training ($p = 0.27$). However, a trend toward significance was observed for resource limitations ($p = 0.076$), with higher reporting among clinicians in hospital settings. Overall, these findings suggest that barriers to aural rehabilitation are consistently experienced across practice settings, indicating systemic challenges in service delivery.

Table 6
Distribution of Reported Barriers Across Work Settings

Barrier	Private n (%)	Academic n (%)	Hospital n (%)	Others n (%)
Time constraints	72 (73.5%)	34 (63.0%)	29 (67.4%)	7 (63.6%)
Lack of guidelines	68 (69.4%)	39 (72.2%)	31 (72.1%)	8 (72.7%)
Lack of training	41 (41.8%)	28 (51.9%)	21 (48.8%)	6 (54.5%)
Resource limitations	36 (36.7%)	26 (48.1%)	25 (58.1%)	5 (45.5%)

The distribution of barriers across years of experience revealed no statistically significant associations ($p > 0.05$). Time constraints and lack of standardized guidelines were consistently reported across all experience levels, indicating persistent systemic challenges. A decreasing trend was observed in the reporting of training-related barriers with increasing experience, suggesting that clinicians develop competencies over time. However, the persistence of systemic barriers across all experience groups highlights the need for structural and policy-level interventions to support comprehensive aural rehabilitation services.

Decline in adult aural rehabilitation services

When asked whether aural rehabilitation services for adults are declining in India, nearly half (47.6%) of the respondents perceived a decline, while 31.1% reported no decline and 21.4% were unsure. Though the results indicate a substantial perception that adult AR services are reducing, the lack of consensus suggests variability in clinical experiences, settings and exposure to AR services. High uncertainty possibly reflects lack of standard benchmarks and monitoring systems. Overall, these findings raise concerns regarding the sustainability and growth of AR practices.

Responses indicate that though this perceived decline is associated with reduced provision of multiple service components, it is not uniform across the services. Clinicians reporting a decline demonstrated lower engagement across all service types, with the most pronounced differences observed in psychosocial counselling, communication partner training, and assistive device provision. A statistically significant association was observed for psychosocial counselling ($p = 0.033$), indicating that the perceived decline is particularly related to underutilization of holistic rehabilitation components. In contrast, basic services such as hearing aid support remained consistently high across all groups. These findings suggest that the perceived decline in aural rehabilitation reflects a reduction in the breadth and comprehensiveness of services rather than a decrease in overall service provision.

Perceived essentiality of AR and provision by audiologists

The perceived essentiality of aural rehabilitation services was rated highly, with a median score of 5 (IQR: 4–5). The majority of respondents (87.4%) rated AR as very or extremely essential, while only a small proportion (3.9%) considered it to be of low importance. These findings indicate a strong consensus regarding the importance of aural rehabilitation. However, when considered alongside the reported gaps

in training and service provision, they highlight a discrepancy between perceived importance and actual clinical implementation.

The majority of respondents agreed that audiologists are the best professionals to provide aural rehabilitation (70.9%), with a median rating of 4 (IQR: 3–5). However, a notable proportion of respondents were either neutral (17.5%) or disagreed (11.6%), suggesting variability in perceptions regarding professional roles. These findings indicate strong professional confidence among audiologists while also reflecting an emerging recognition of the importance of multidisciplinary approaches in delivering comprehensive aural rehabilitation.

Qualitative Insights

Open-ended responses highlighted several recurring themes, main among these are:

- The need for India-specific clinical guidelines for aural rehabilitation
- Importance of multidisciplinary collaboration, including psychologists
- Recognition of aural rehabilitation as essential but underutilized in routine clinical practice
- Interest in expanding services, though constrained by practical limitations

Discussion

The present study investigated the adult aural rehabilitation (AR) practices among audiologists in India, with a focus on service provision, scope, and barriers. A high proportion of clinicians reported providing of adult AR services (89.3%) aligns with global evidence suggesting that audiologists recognize AR as an integral component of hearing healthcare [18, 26]. The findings indicate that while aural rehabilitation is widely recognized and practiced, its implementation remains incomplete, predominantly device-centered and constrained by structural and educational limitations. This finding that only a subset delivers a comprehensive range of services is consistent with prior literature indicating that AR is often implemented in a limited or fragmented manner, creating barriers in patient-centered care [29, 30].

A key finding of the study is that 89.3% of respondents reported providing aural rehabilitation services, suggesting a high level of awareness and acceptance of AR in clinical practice. This is further supported by the respondents' high ratings for the importance of AR (median = 5). This also aligns with global trends where AR is considered an essential component of audiological care. However, this high level of awareness does not translate into comprehensive practice. Despite the high acceptance by audiologists, the scope of services provided was uneven, with a clear predominance of hearing aid-related support and informational counseling, while psychosocial counseling, communication partner training, and assistive device use were less frequently reported. This reflects a gap in holistic rehabilitation, suggesting that while core clinical services are well established, broader biopsychosocial components of AR remain under-integrated.

The analysis of interest in service provision provides important insight into this gap. While clinicians expressed very high interest in core audiological services, there was also moderate to high interest in underutilized areas such as psychosocial counseling and communication partner training. This indicates that the observed limitations in service delivery are not due to lack of motivation, but rather reflect external constraints and competency gaps. The relatively lower interest in assistive technologies may further point toward limited exposure or resource-related challenges.

The absence of significant associations between AR provision and demographic variables such as experience, gender, and work setting indicates that AR is practiced across different professional contexts and experience levels. This finding is consistent with earlier findings suggesting that clinician characteristics alone do not determine rehabilitation practices [23, 31, 32]. Instead, systemic and contextual factors, including training opportunities, infrastructure, and service delivery models, have been shown to play a more substantial role. The observed trend toward higher provision in private practice, although not statistically significant, may reflect greater flexibility and autonomy in service delivery, higher patient driven demand and fewer institutional constraints, as suggested in previous studies [33]. Inferential analyses reinforce the conclusion that AR practices are uniform across demographic and professional groups. These findings suggest that variations in AR practices are not driven by individual clinician characteristics, but rather by broader systemic factors.

The variation in types of services across work settings and experience levels aligns with existing literature indicating that institutional environments and clinician expertise influence the scope of rehabilitation [25, 34]. Senior clinicians and those in academic or hospital settings demonstrated greater involvement in comprehensive services, which may be attributed to increased exposure to complex cases and interdisciplinary practices. This progression with experience is consistent with models of clinical competence development reported in rehabilitation sciences [35].

The strong preference for individual-based service delivery observed in this study is consistent with global trends, where AR is predominantly delivered in one-on-one formats [36]). Group rehabilitation, which has been shown in previous literature [37, 38] to improve communication outcomes and psychosocial adjustment, appears underutilized in the Indian context. This underutilization has been attributed to logistical constraints, lack of training, and limited institutional support, also reflected in the past [39].

Assessment practices in this study were largely based on clinical judgment and informal tools, with limited use of standardized instruments. This finding is in agreement with previous research indicating underutilization of validated outcome measures in audiology practice [40, 41]. Although standardized tools are recommended for evidence-based practice and outcome monitoring, their adoption remains inconsistent, particularly in resource-constrained settings. The slightly higher use of structured assessment approaches in academic and hospital settings aligns with earlier reports emphasizing the role of institutional protocols in promoting standardized care [42].

The limited use of tele-audiology for AR services is another important observation, especially in the post-pandemic era where remote care has gained global importance. This limited adoption of tele-audiology contrasts with the growing body of evidence supporting its feasibility and effectiveness in AR delivery [43, 44]. While recent studies have demonstrated increased uptake of telehealth services, particularly following the COVID-19 pandemic, the underutilization of these models may reflect a combination of training limitations, logistical challenges, and lack of structured program frameworks suggesting that tele-rehabilitation remains an underdeveloped area in India, representing an opportunity for future expansion [45, 46]. The observed trend of lower adoption among more experienced clinicians is consistent with literature suggesting generational differences in technology acceptance [47].

A notable finding of this study is the limited use of standardized theoretical frameworks, with most clinicians relying on experience-based or self-developed approaches. This is consistent with previous reports highlighting a lack of structured, guideline-driven AR practices, particularly in developing countries [48], where systemic and educational barriers hinder the delivery of holistic rehabilitation services. The low adoption of frameworks such as the International Classification of Functioning, Disability and Health (ICF) reflects a gap between recommended best practices and real-world implementation [49]. Similar concerns regarding the absence of context-specific clinical guidelines have been raised in Indian audiology literature [50]. The qualitative analysis further reinforced these findings, revealing a strong demand for structured clinical protocols, enhanced training in aural rehabilitation, and multidisciplinary collaboration, particularly involving psychologists. This underscores the need to move beyond a purely audiological model toward a patient-centered, biopsychosocial approach.

Perceptions regarding the adequacy of undergraduate training revealed that a substantial proportion of clinicians consider their training insufficient, which is in line with earlier studies identifying gaps in AR education and clinical preparedness [51, 52]. The finding that early-career clinicians reported higher training adequacy suggests recent improvements in curriculum design, consistent with ongoing efforts to strengthen competency-based education in audiology [53]. However, the association between training adequacy and provision of comprehensive services reinforces the critical role of formal education in shaping clinical practice [54]. Training-related factors also play a crucial role in shaping AR practices. Respondents reported moderate confidence in providing AR (median = 4), but rated the adequacy of their training lower (median = 3). This discrepancy suggests a competency gap, particularly in areas requiring specialized skills such as psychosocial counseling and group rehabilitation. The lack of significant differences in confidence across experience levels further indicates that training gaps persist across career stages, emphasizing the need for both curricular and continuing professional development interventions.

Barriers identified in this study, including time constraints, lack of guidelines, limited resources, and insufficient training, highlight systemic factors, and are consistent with those reported in both Indian and international contexts [32, 39]. The reported barriers underscore the challenge of integrating comprehensive AR into routine clinical practice. The lack of significant variation across work settings and experience levels suggests that these challenges are systemic rather than localized. Similar findings

have been reported in low-resource healthcare systems, where structural limitations restrict the delivery of comprehensive rehabilitation services [26, 39]. Importantly, the absence of significant differences in barrier distribution across work settings indicates that these challenges are pervasive and system-wide, rather than setting-specific.

Nearly half of the respondents perceived a decline in adult AR services, particularly in holistic components such as psychosocial counseling and communication partner training. While empirical evidence on declining AR services is limited, previous studies have documented reduced emphasis on non-device-based interventions in routine practice [31, 38]. This perceived decline may reflect a shift toward technologically driven care models, potentially at the expense of comprehensive rehabilitation [47]. The analysis of factors contributing to the decline or limited implementation of AR services provides an integrated perspective. Despite high perceived importance and willingness to expand services, clinicians are constrained by time limitations, insufficient training, lack of guidelines, and resource challenges. The trend toward higher reporting of resource limitations in hospital settings further suggests that infrastructure constraints may influence the depth of service delivery, even when overall provision rates remain similar.

Despite the gaps in service delivery, the strong consensus regarding the essentiality of AR services is consistent with global literature emphasizing its critical role in improving communication outcomes and quality of life [55, 56]. The majority agreement that audiologists are best suited to provide AR aligns with traditional professional roles, although the presence of neutral and dissenting views supports the growing recognition of multidisciplinary approaches in rehabilitation [57].

Overall, the findings of this study are largely consistent with existing literature, reinforcing the notion that while awareness and perceived importance of adult AR are high among audiologists in India, its implementation remains constrained by systemic, educational, and infrastructural factors. This gap is driven not by lack of interest or demographic differences, but by systemic, educational, and infrastructural barriers. These discrepancies between recommended best practices and real-world service delivery highlight the need for standardized guidelines, enhanced training, and policy-level interventions to support comprehensive aural rehabilitation.

Strengths

1. This study provides one of the few comprehensive overviews of adult aural rehabilitation (AR) practices among audiologists in India, addressing an important gap in the literature. The relatively large sample size ($n = 206$) and inclusion of participants across diverse work settings (private, academic, and hospital-based) and varying levels of professional experience enhance the representativeness and generalizability of the findings within the Indian context.
2. The study adopts a multidimensional approach by examining not only service provision but also types of services, modes of delivery, assessment practices, training adequacy, tele-audiology use, and perceived barriers. This allows for a holistic understanding of AR practices and facilitates identification of both clinical and systemic factors influencing service delivery.

3. The use of inferential statistical analyses strengthens the rigor of the findings by enabling examination of associations and predictors of AR provision. Additionally, the inclusion of both quantitative and qualitative responses provides complementary insights, particularly in understanding contextual challenges such as lack of guidelines and infrastructural constraints.
4. Another key strength is the exploration of training adequacy and its association with service provision, which offers valuable implications for curriculum development and professional training in audiology.
5. The study also highlights emerging areas such as tele-audiology and framework-based practice, contributing to contemporary discussions in rehabilitation service delivery.

Limitations

Despite its strengths, the study has several limitations that should be considered when interpreting the findings. First, the use of a self-reported survey design introduces the possibility of response bias, which may result in overestimation of service provision or adherence to best practices. Second, the cross-sectional nature of the study limits the ability to establish causal relationships between variables such as training adequacy, experience, and service provision. Observed associations should therefore be interpreted with caution. Third, although the sample included audiologists from different work settings, the distribution was skewed toward the western part of the country and toward private practitioners, which may influence the overall trends observed. Additionally, participation was voluntary, raising the possibility of selection bias, where clinicians with greater interest in aural rehabilitation may have been more likely to respond. Fourth, the study relies primarily on quantitative survey responses, and while qualitative inputs were included, in-depth qualitative methods (e.g., interviews or focus groups) could have provided richer insights into contextual barriers and decision-making processes. Fifth, the study did not assess patient outcomes or perspectives, which limits understanding of the effectiveness and impact of the reported AR practices. Finally, while the study identifies gaps in the use of standardized tools and frameworks, it does not explore specific reasons for their underutilization in depth. Future research incorporating mixed-method or longitudinal designs could address these gaps and provide a more detailed understanding of implementation challenges.

Clinical and Research Implications

The findings of this study have several important implications for clinical practice, training, and service delivery in adult aural rehabilitation (AR).

1. The predominance of device-centered interventions, with limited incorporation of psychosocial counseling, communication partner training, and assistive device use, highlights the need to shift toward a more holistic, patient-centered rehabilitation model. Clinicians should be encouraged to integrate biopsychosocial components of AR into routine practice to improve functional communication outcomes and quality of life.
2. The strong reliance on clinical judgment and underutilization of standardized assessment tools indicate a need to promote evidence-based assessment practices. Incorporating validated outcome

measures into routine clinical workflows can support structured decision-making, goal setting, and monitoring of rehabilitation outcomes.

3. The limited adoption of standardized frameworks and guidelines underscores the urgent need for India-specific clinical guidelines and protocols for adult AR. Development and dissemination of such guidelines could enhance consistency in practice and support clinicians in delivering comprehensive rehabilitation services.
4. The association between training adequacy and provision of advanced AR services suggests that strengthening undergraduate and continuing professional education is critical. Curricula should emphasize practical training in psychosocial counseling, communication strategies, and use of assistive technologies, while continuing education programs can address gaps among practicing clinicians.
5. The underutilization of group-based interventions and tele-audiology highlights opportunities to improve service accessibility and efficiency. Expanding training and infrastructure for group rehabilitation and telehealth delivery could help address time constraints, workforce limitations, and geographic barriers, particularly in resource-limited settings.
6. Finally, the consistent reporting of systemic barriers such as time constraints, lack of resources, and absence of guidelines indicates the need for policy-level and institutional support. Integration of AR services into routine hearing healthcare pathways, allocation of dedicated time and resources, and promotion of multidisciplinary collaboration can facilitate more comprehensive and sustainable service delivery.
7. Integration of multidisciplinary teams can enhance patient outcomes.

Conclusion

While adult aural rehabilitation services are widely reported among audiologists in India, it remains largely restricted to device-oriented interventions. The findings indicate a predominance of device-oriented interventions, with limited implementation of comprehensive, multidisciplinary rehabilitation approaches due to systemic, training-related, and infrastructural barriers. Addressing these gaps is essential to advancing adult AR practice toward a more holistic and patient-centered model of care.

Declarations

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Ethics approval and consent to participate

Ethics approval for the study was obtained from the Institutional Ethics Committee. Informed consent was obtained from every participant after explaining the procedures involved in the data collection.

Disclosure statement

No potential conflict of interest is reported by the author.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Figures

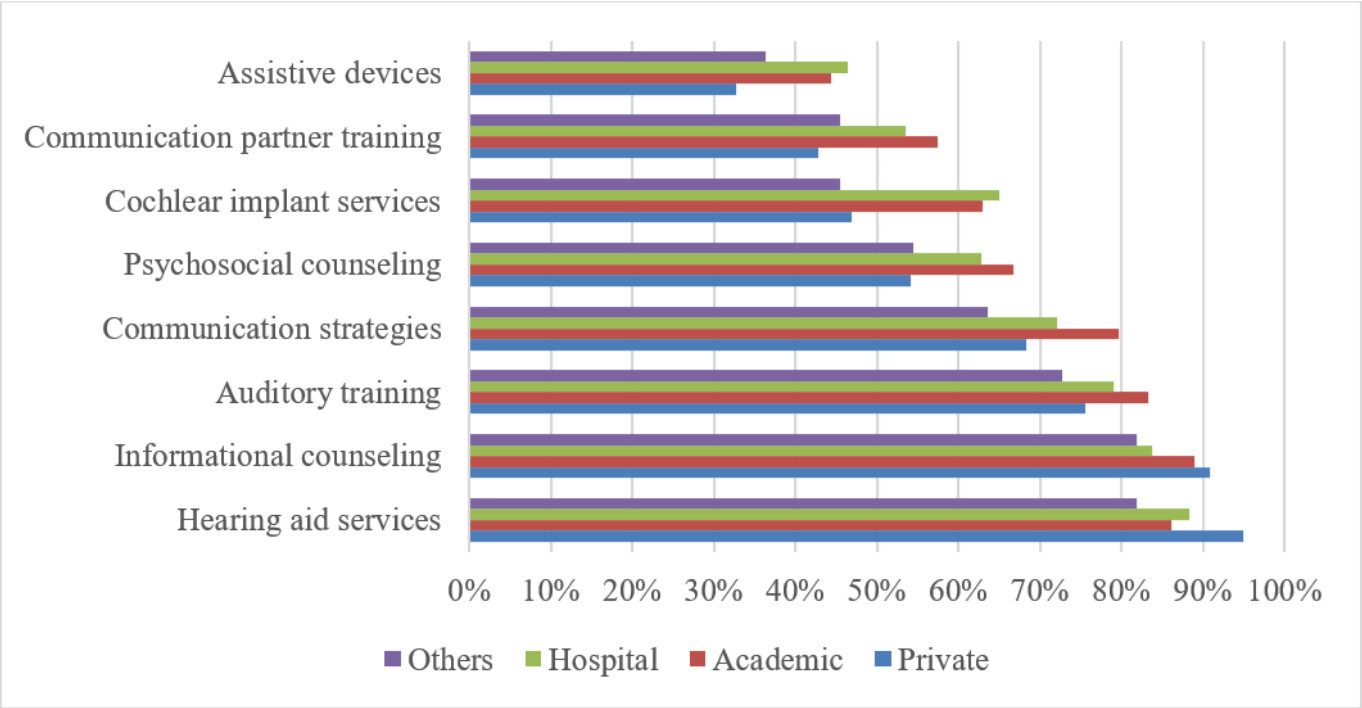


Figure 1

Types of services by work setting

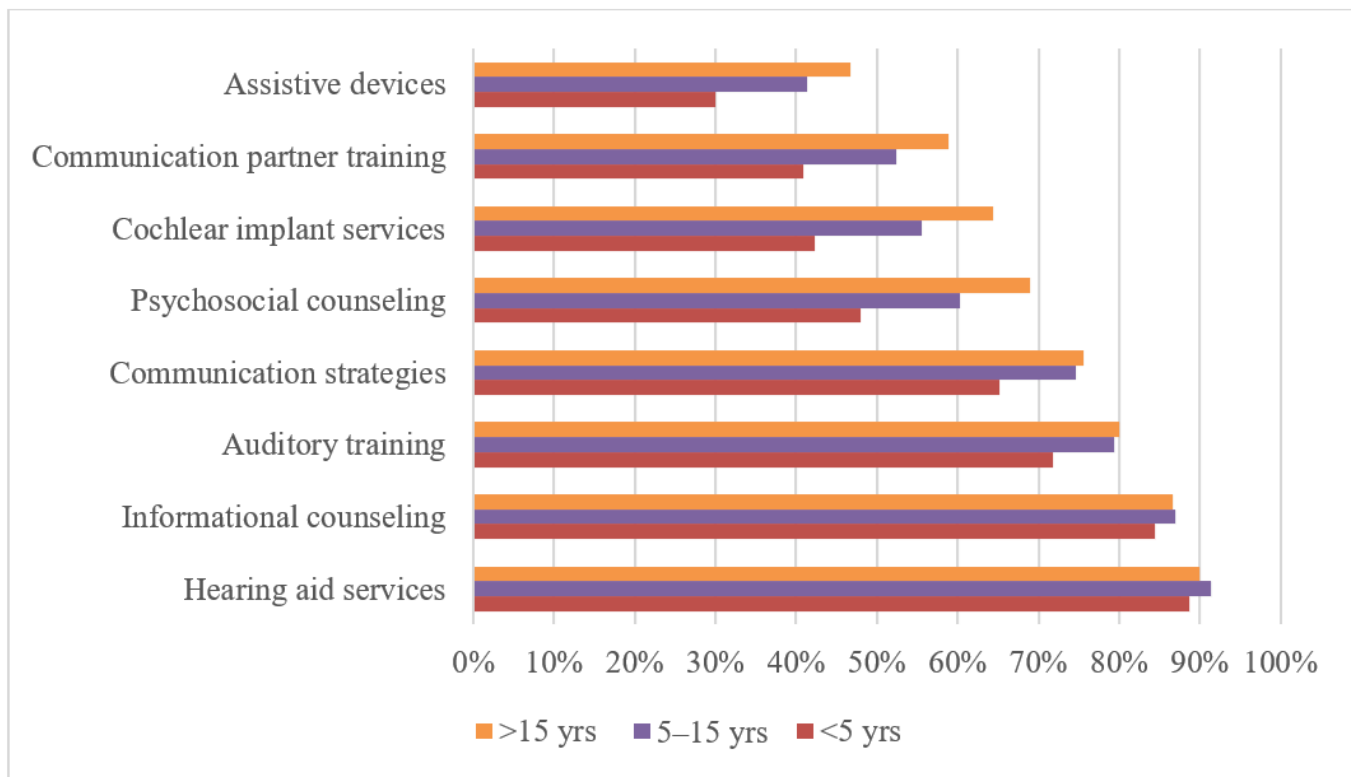


Figure 2

Types of services provided by years of experience

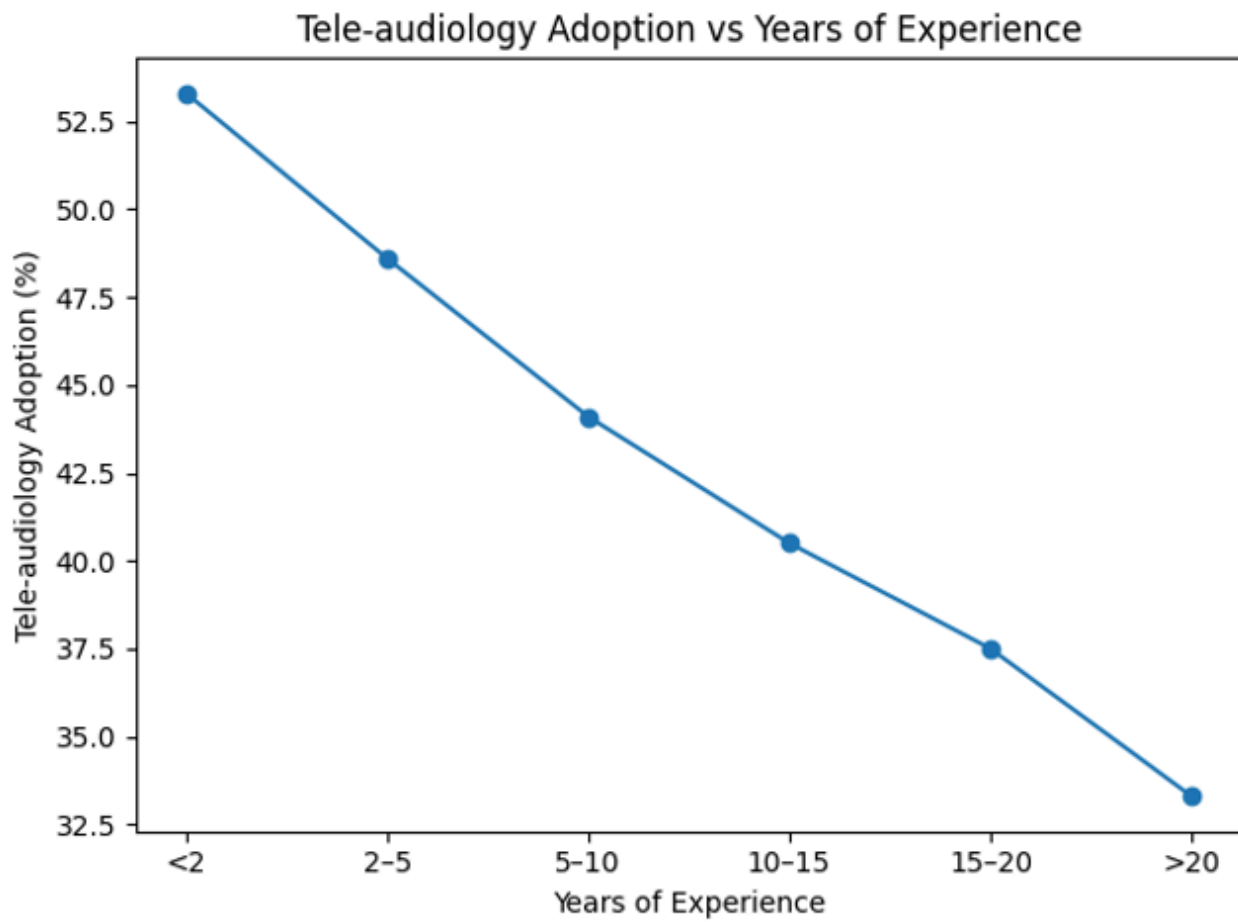


Figure 3

Tele-audiology use vs years of experience

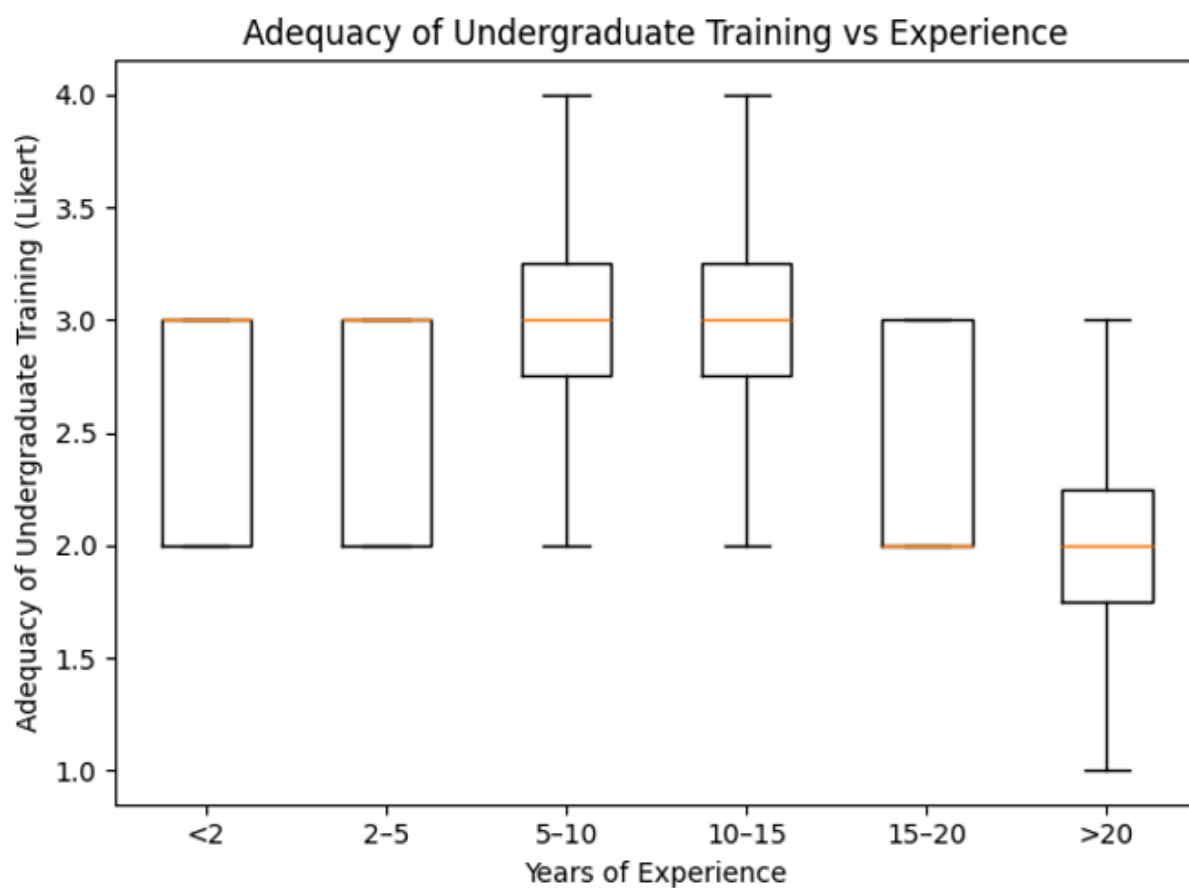


Figure 4

Adequacy of undergraduate training vs years of experience