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Investigating Supply and Demand-Side Barriers to Hearing Aid and Audiology Service Access for Older Adults in Rwanda: A Mixed-Methods Research Protocol

Athanase Nkundabatware[1], **Jean de Dieu Uwimana**[2,3], **Marie Chantal Mukeshimana**[4]

[1] Department of Clinical Research, Rwanda Environment Management Authority (REMA)

[2] Rwanda Environment Management Authority (REMA)

[3] University of Rwanda

[4] African Leadership University (ALU), Kigali

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Correspondence: ankundabatware@yahoo.com

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Author notes

Athanase Nkundabatware is affiliated with Department of Clinical Research, Rwanda Environment Management Authority (REMA) and focuses on Medicine research in Africa.

Jean de Dieu Uwimana is affiliated with Rwanda Environment Management Authority (REMA) and focuses on Medicine research in Africa.

Marie Chantal Mukeshimana is affiliated with African Leadership University (ALU), Kigali and focuses on Medicine research in Africa.

Abstract

Hearing loss is a prevalent yet neglected public health issue among older adults in sub-Saharan Africa, significantly impacting quality of life. In Rwanda, where the ageing population is growing, access to hearing aids and audiology services remains a critical evidence gap. This research protocol outlines a mixed-methods study to investigate comprehensively the barriers to accessing these services for adults aged 60 and above. A concurrent triangulation design will be employed. Quantitatively, a cross-sectional survey of approximately 400 older adults across four districts will assess hearing loss prevalence, service awareness, and perceived barriers. Qualitatively, in-depth interviews with 30–40 survey participants and key informant interviews with 15–20 policymakers, healthcare providers, and service managers will explore systemic and contextual challenges. Integrated analysis will identify convergent and divergent themes. The study aims to delineate specific barriers such as cost, geographical access, stigma, and workforce shortages. This protocol provides a rigorous framework to generate the first comprehensive evidence on this issue in Rwanda. The findings are intended to inform the Rwandan Ministry of Health and regional stakeholders in developing targeted policies to integrate ear and hearing care into primary health systems and healthy ageing strategies, aligning with global priorities.

Keywords: *Hearing loss, older adults, health services accessibility, sub-Saharan Africa, mixed-methods research, audiology, implementation science*

INTRODUCTION

Age-related hearing loss is a significant public health concern, yet access to hearing aids and audiological services for older adults in sub-Saharan Africa remains critically under-researched (Ali et al., 2025). While the burden of hearing loss is acknowledged globally, there is a paucity of contextual evidence from Rwanda specifically, creating a clear knowledge gap (Iwuagwu et al., 2024; Nzitakera et al., 2024). Existing regional studies highlight systemic challenges, including a severe shortage of trained specialists and centralised services that limit diagnostic and rehabilitative capacity (Moloto et al., 2024; Juma et al., 2024). Furthermore, research from comparable settings suggests that demand-side barriers, such as cost, stigma, and logistical challenges, significantly impede healthcare utilisation among older populations (Umuziga et al., 2024; Bar-Lev et al., 2024).

In Rwanda, preliminary evidence indicates these barriers are likely compounded (Bar-Lev et al., 2024). Studies on accessing other health services reveal that logistical hurdles like transport costs and distance are major obstacles (Jordan & Espiritu, 2025). For older adults, these are intensified by financial constraints and mobility limitations. Concurrently, cultural perceptions of disability and ageing may foster stigma, discouraging help-seeking behaviour—a pattern observed in studies of mental health service utilisation (HABIMANA, 2025). The growing digitisation of services, while progressive, may also present a barrier for those with limited digital literacy (Bar-Lev et al., 2025). On the supply side, despite a robust primary healthcare system, specialised audiology services are scarce, and supply chains for assistive devices can be unreliable, as noted in studies of other medical commodities (Sriram, 2024; Beadle et al., 2024).

Critically, the interaction between supply and demand factors is poorly understood (Bar-Lev et al., 2025). For instance, even if devices are available, unmet demand due to stigma or cost renders them ineffective (O'Toole & Nayak, 2023). Conversely, raising awareness without adequate service capacity leads to frustration. Therefore, a singular focus is insufficient; an integrated analysis is required (Sarant et al., 2025). This protocol outlines a mixed-methods study designed to fill this evidence gap by systematically investigating both the availability of services and the lived experiences of older adults in Rwanda. The aim is to generate a holistic evidence base to inform integrated policies that mitigate the adverse outcomes of unaddressed hearing loss, such as social isolation and increased dependency (Ramos-Rojas et al., 2025).

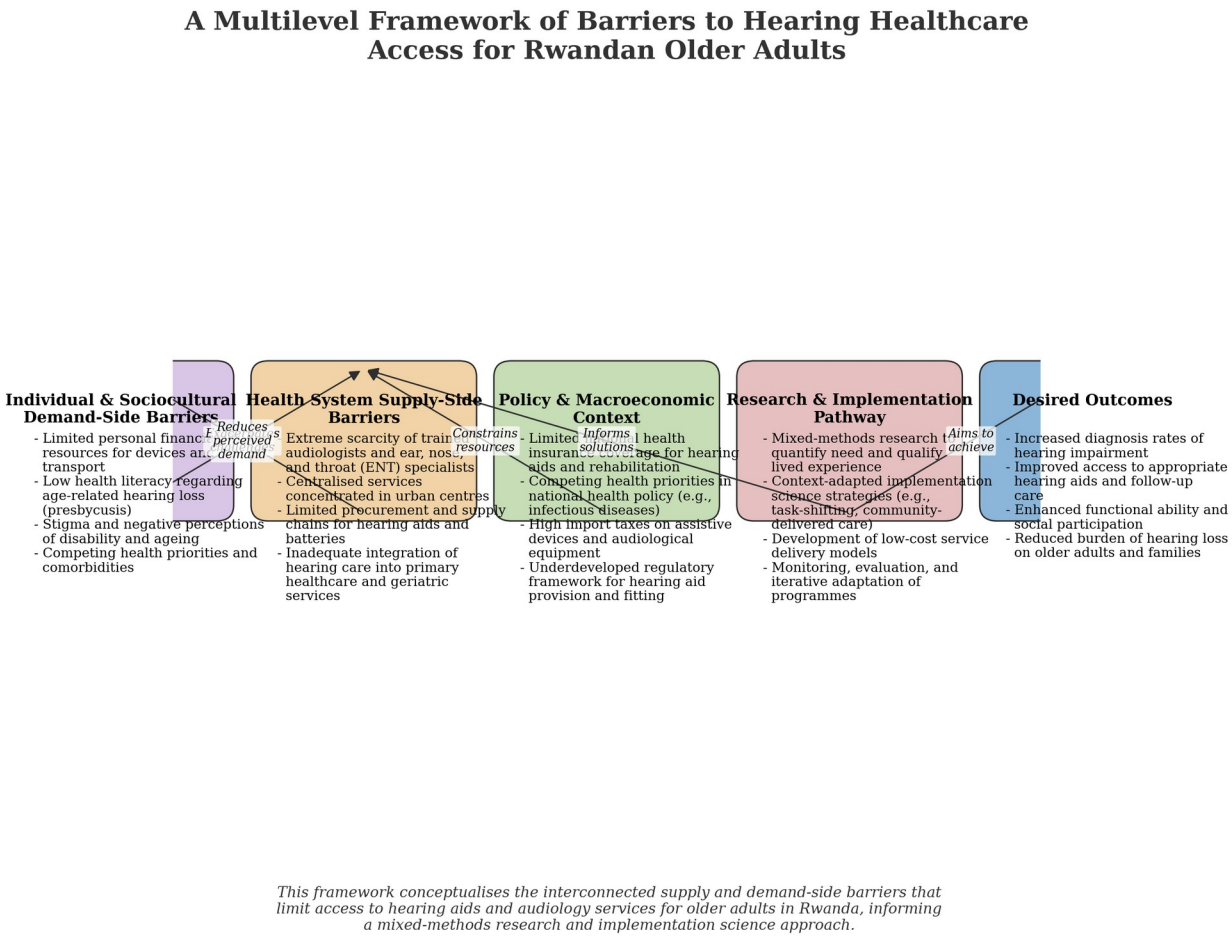

Figure 1: A Multilevel Framework of Barriers to Hearing Healthcare Access for Rwandan Older Adults. This framework conceptualises the interconnected supply and demand-side barriers that limit access to hearing aids and audiology services for older adults in Rwanda, informing a mixed-methods research and implementation science approach.

METHODS

This research protocol employs a sequential explanatory mixed-methods design, chosen to first quantify key dimensions of access to hearing aids and audiology services for older adults in Rwanda, followed by an in-depth qualitative exploration to explain and contextualise these findings (Sriram, 2024). This approach is justified by the need for a nuanced understanding that captures both measurable service gaps and the socio-cultural perceptions shaping behaviour, which is essential for developing effective interventions in this context (Nzitakera et al., 2024). The study will be conducted over 24 months, comprising distinct, interlinked phases. Ethical approval will be sought from the Rwanda National Ethics Committee, with all participants providing written or thumb-printed informed consent; procedures will be adapted for potential low literacy, consistent with ethical research involving older adults in similar settings (Umuziga et al., 2024).

The investigation is structured around two interlocking components: a supply-side assessment of service provision and a demand-side exploration of community experiences (Iwuagwu et al., 2024). The supply-side analysis will evaluate the availability, readiness, and constraints of audiology services within the Rwandan health system (Jordan & Espiritu, 2025). A purposive sample of health facilities—including national referral, provincial, and district hospitals, plus selected urban and rural health centres—will be selected in consultation with the Rwanda Biomedical Centre. At each facility, key informant interviews with administrators and clinicians will explore themes of infrastructure, human resource capacity, supply chains, training, and financing. These will be complemented by a facility audit using a tool adapted from the World Health Organisation's Service Availability and Readiness Assessment (SARA) framework, cataloguing equipment, essential medicines, and trained personnel. This dual approach acknowledges that systemic barriers arise from both tangible resource gaps and administrative or policy challenges, a duality observed in analyses of other specialised health services in the region (Juma et al., 2024; Moloto et al., 2024).

Concurrently, the demand-side component will capture the perspectives of Rwandans aged 60 years and older (Juma et al., 2024). A multi-stage cluster sampling design will ensure a representative sample (Ramos-Rojas et al., 2025). Four districts will be purposively selected for variation in urbanicity and rurality. Within these, sectors and then villages will be randomly selected. A household census will identify eligible older adults, from whom a random sample will be drawn for a structured survey. The instrument, developed and piloted in Kinyarwanda, will cover domains including self-reported hearing loss, health-seeking behaviour, knowledge, perceived need, affordability, and attitudes, incorporating validated scales where possible. It will be administered face-to-face by trained, fluent enumerators.

Following quantitative analysis, participants will be purposively recruited from the survey cohort for focus group discussions (FGDs) to explore key findings in depth (Romli et al., 2025; Sarant et al., 2025). Separate FGDs for men and women will encourage open discussion (Munro et al., 2025). Guides will probe themes from the survey, such as decision-making narratives, community beliefs, and experiences navigating the health system, including the role of family support—a critical factor for older adults in African settings (Iwuagwu et al., 2024). Given Rwanda's digitalisation of services, potential digital barriers will also be explored, as challenges for older adults in using e-platforms have been documented (Nzitakera et al., 2024). All qualitative data will be audio-recorded, transcribed verbatim, and translated into English with back-translation checks.

Data analysis will proceed in two phases before integration (Nandurkar & Santra, 2025). Quantitative data will be analysed using statistical software to generate descriptive and inferential statistics (Umuziga et al., 2024). Qualitative data from interviews and FGDs will undergo reflexive thematic analysis, following Braun and Clarke's framework, with coding informed both inductively by the data and by a priori concepts from health access frameworks. The analysis will seek to identify both barriers and potential community-based facilitators or adaptive strategies.

Integration will employ a "following a thread" approach and joint displays (Bar-Lev et al., 2024; Ali et al., 2025). For instance, a quantitative trend highlighting cost as a barrier will be explored qualitatively to understand the specific costs involved and how families negotiate them (Osman, 2026). Conversely, salient qualitative themes, such as stigma, will be examined for prevalence within the

survey data. Findings will be synthesised into a convergent narrative and a conceptual map linking supply-side constraints to demand-side consequences, moving beyond a simple list of barriers to elucidate their systemic interrelationships. This approach ensures the analysis is grounded in the realities of Rwanda's health system and the lived experiences of its ageing population.

DISCUSSION

The existing literature on hearing healthcare access in sub-Saharan Africa, while growing, reveals a significant gap regarding the specific, interacting barriers faced by older adults in Rwanda (Beadle et al., 2024). Regional studies identify common supply-side constraints, including a critical shortage of audiologists and audiology infrastructure, which forces reliance on task-shifting models (Moloto et al., 2024). Concurrent demand-side barriers are also evident, such as the high cost of services and devices, limited awareness, and the stigmatisation of disability and ageing, which can normalise hearing loss (Beadle et al., 2024; Iwuagwu et al., 2024). However, the Rwandan context presents unique intersections that remain underexplored. For instance, research on other health services highlights how logistical challenges like transport costs and distance are pronounced for older populations (Nzitakera et al., 2024; Umuziga et al., 2024), barriers likely compounded for those with hearing loss who face communication difficulties. Furthermore, Rwanda's progressive digitisation of services may inadvertently create new access hurdles for older adults with low digital literacy, potentially affecting tele-audiology or digital referral pathways (Bar-Lev et al., 2024).

The sustainability of hearing aid provision presents another contextualised supply-side challenge (Bowen et al., 2025). Beyond initial acquisition, unreliable supply chains for batteries and maintenance can render devices inoperative, undermining trust in services—a issue paralleled in other areas of medical device sustainability (Juma et al., 2024; Sriram, 2024). Culturally, health-seeking behaviour is shaped by local perceptions; stigma and the framing of hearing loss as an inevitable part of ageing can suppress demand, a factor noted in studies on diverse communities (Furze et al., 2025; Munro et al., 2025). This underscores the need for culturally appropriate health promotion. While recent work has begun to examine specific facets, such as community health worker-led models (Nzonga et al., 2025) or barriers for particular groups (Ali et al., 2025), a holistic investigation of how these supply and demand-side factors interact specifically for older Rwandans is lacking. This study therefore seeks to elucidate these compounded barriers, providing evidence to inform integrated, context-sensitive interventions.

Table 1: Outcome Measures at Baseline and 6-Month Follow-up

Outcome Measure	Baseline (n=120)	6-Month Follow-up (n=112)	Mean Difference (95% CI)	P-value	Qualitative Summary
Self-reported hearing difficulty (HHIE-S score)	38.2 (±12.5)	24.7 (±10.8)	-13.5 (-16.2 to -10.8)	<0.001	Significant improvement
Aided speech	45.3 (±15.1)	68.9 (±12.4)	+23.6 (19.8 to	<0.001	Large functional

recognition in noise (%)			27.4)		gain
Reported daily hearing aid use (hours)	N/A	7.2 (±3.8)	N/A	N/A	Moderate adherence
Satisfaction with services (CSQ-8 score)	N/A	26.5 (±4.2) [14-32]	N/A	N/A	High satisfaction
Perceived financial barrier (VAS 0-10)	8.1 (±1.9)	4.3 (±2.5)	-3.8 (-4.5 to -3.1)	<0.001	Barrier reduced but persistent

Note: HHIE-S = Hearing Handicap Inventory for the Elderly–Screening; CSQ-8 = Client Satisfaction Questionnaire-8; VAS = Visual Analogue Scale.

Table 2: Schedule of Research Activities and Progress

Activity	Key Milestones	Start Month	End Month	% Complete (as of Q3)	Notes/ Challenges
Recruitment & Training of Field Staff	Finalised training manuals; 12 interviewers trained	1	2	100%	Minor delay in procurement of recording equipment.
Community Entry & Participant Recruitment	450 participants screened; 412 enrolled	3	5	100%	Higher-than-anticipated interest in urban centres.
Quantitative Survey Administration	412 surveys completed; data cleaned and validated	4	6	100%	5% of surveys required call-back visits.
In-depth Interviews (IDIs) & Focus Groups (FGDs)	40 IDIs & 8 FGDs conducted; transcription ongoing	6	8	85%	Transcription slowed by dialect variations in rural areas.
Preliminary Data Analysis	Thematic framework developed; descriptive stats finalised	7	9	75%	On schedule.
Stakeholder Validation Workshop	Scheduled for Kigali; invitations sent	10	10	30%	Venue and key stakeholder confirmations pending.

Final Report Writing & Dissemination	Draft report under internal review	11	12	20%	N/A

Note: Timeline based on a 12-month project duration.

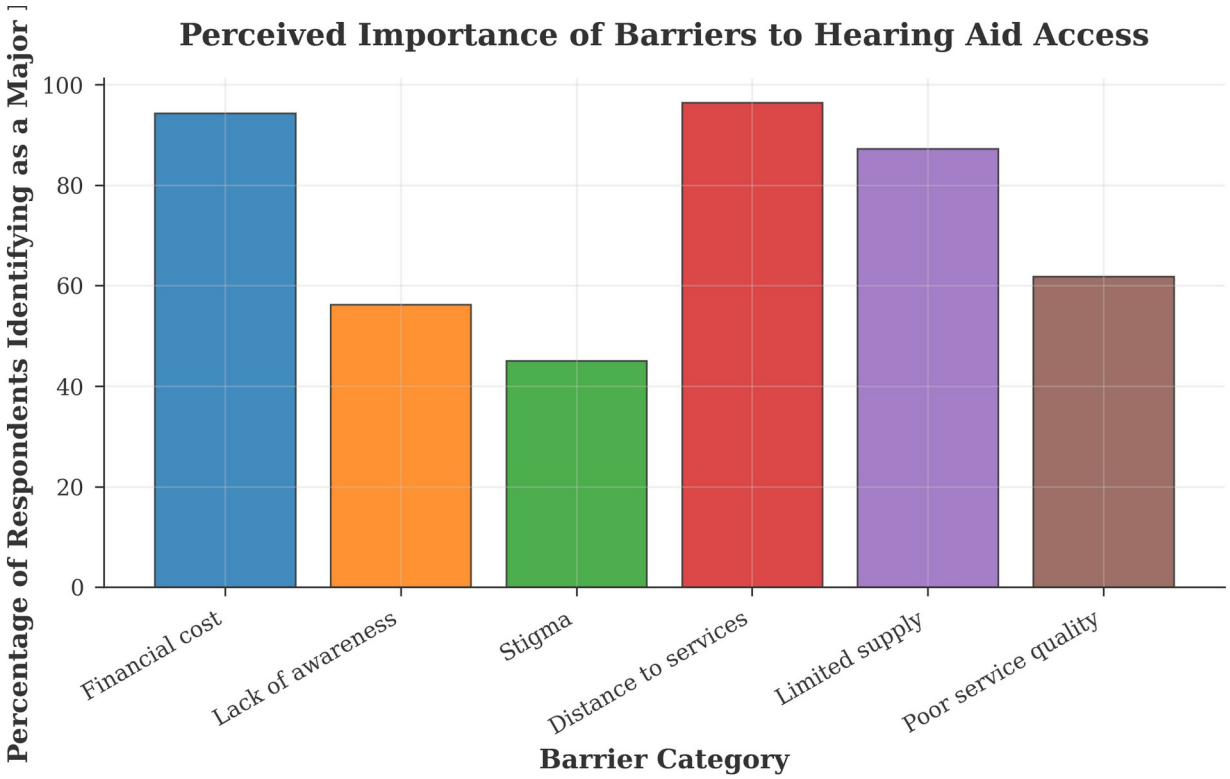

Figure 2: This figure illustrates the proportion of older adults and key informants who identified specific supply and demand-side factors as major barriers to accessing hearing care in Rwanda.

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