Nusantara Journal of Behavioral and Social Science. 2026; 5(4): 219-228
ISSN 2828-1039 (print), ISSN 2828-0733 (online)
https://doi.org/10.47679/njbss.202620354

RESEARCH ARTICLE

Rehabilitating Academic Success for Deaf and Hard-of-Hearing (DHH) Adolescents in Nigeria: An Integrative Review and Conceptual Framework

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Published online: 09 November 2026

Abstract: Deaf and hard-of-hearing (DHH) adolescents may encounter educational barriers arising from inaccessible instruction, limited communication access, inadequate support services, and exclusionary school environments. This integrative review develops an evidence-informed, seven-pillar conceptual framework for strengthening educational participation and academic outcomes among DHH adolescents in Nigeria. Informed by the social model of disability, the framework treats rehabilitation and assistive supports as options that can expand access and agency when selected in partnership with learners, rather than as attempts to "normalise" deafness. The review draws on 21 sources whose bibliographic details were verified against publisher or database records: four Nigerian empirical studies, one Nigerian descriptive review, one sub-Saharan African systematic review, three international studies or reviews, six policy or institutional documents, three theoretical or review works, and two methodological works. Evidence is labelled by source type and geographical relevance, and ten of the 21 sources date from 2020–2026. Directly applicable Nigerian evidence is limited for most pillars, and no verified source was found for family involvement or community-based rehabilitation in DHH adolescents. The review was not a systematic search and did not include a formal quality appraisal. The proposed framework is a conceptual contribution, not a validated intervention model. It identifies implementation priorities and research questions for participatory development and empirical testing in Nigerian secondary schools.

Keywords: Deaf and hard-of-hearing adolescents, educational rehabilitation, inclusive education, integrative review, conceptual framework

INTRODUCTION

Educational participation during adolescence is shaped by the interplay of learners' communication needs, instructional accessibility, school resources, family support, and broader social conditions. For deaf and hard-of-hearing (DHH) learners, barriers may arise when instruction relies primarily on auditory information, communication access is inconsistent, or assessment procedures do not accommodate linguistic and access needs. These barriers should not be interpreted as evidence of limited learning potential. Longitudinal data from United States students in grades 2 to 8 show that both DHH and hearing students continued to build reading and mathematics skills over five years, and that DHH students did not necessarily plateau in the elementary grades (Cawthon et al., 2023). The World Health Organization's World Report on Hearing emphasizes the importance of accessible hearing care and coordinated responses across the life course (World Health Organization [WHO], 2021). The Global Burden of Disease study estimates that the burden of moderate-to-complete hearing loss is concentrated in countries with low health-care quality and access (GBD 2019 Hearing Loss Collaborators, 2021).

In Nigeria, Eleweke (2002) described longstanding challenges in deaf education, including personnel preparation, facilities, implementation, and funding. That source is a descriptive review and provides historical context, not current national estimates. More recent Nigerian studies are limited in scale and geography. Fieldwork in deaf communities in Abuja and Imo State reported late entry to school, the absence of early intervention services in the study areas, and a shortage of trained teachers (Asonye et al., 2018). A cross-sectional study of 110 students in all four secondary schools for the Deaf in Ibadan found poor quality of life in 57.8% of participants (Jaiyeola & Adeyemo, 2018). A correlational survey of 224 students with hearing impairment in seven schools in Oyo State examined sign language interpreters and self-efficacy as predictors of achievement in biology (Oyawole & Isaiah, 2022), and a mixed-methods study of 45

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Submitted: 20 July 2026 Revised: 21 October 2026 Accepted: 01 November 2026

teachers and 60 senior secondary students in Ilorin, Kwara State, reported that 2.2% of teachers consistently used digital learning applications (Aderoju et al., 2026). These studies are limited to specific states and cannot be generalised to all Nigerian DHH adolescents. Nigeria's Discrimination Against Persons with Disabilities (Prohibition) Act (Federal Republic of Nigeria, 2019) and General Comment No. 4 on the right to inclusive education (United Nations Committee on the Rights of Persons with Disabilities [CRPD Committee], 2016) provide a rights framework; implementation needs to be assessed through current, setting-specific evidence. The present review therefore distinguishes Nigerian evidence from broader African, international, theoretical, and policy sources and avoids generalising findings from one context to all DHH adolescents.

Delineation of Research Gaps

The existing literature reveals four interrelated research gaps that limit the development of comprehensive, contextually appropriate, and scalable interventions for deaf and hard-of-hearing (DHH) adolescents in Nigeria. First, an empirical gap is evident in the limited availability of Nigerian studies directly examining academic outcomes among DHH learners, particularly those evaluating integrated, multi-component rehabilitation approaches for secondary-school-aged adolescents. Although the evidence identified in this review does not include such evaluations, this observation should not be interpreted as confirmation that no relevant studies exist. Second, an integration gap arises from the tendency of existing research to examine educational accessibility, language and communication support, audiological services, psychosocial well-being, and family involvement as separate domains. Consequently, the relationships among these components and their potential contributions to academic success remain insufficiently integrated within a coherent framework. Developing a conceptual model that explicitly connects these domains may facilitate coordinated educational and rehabilitation planning, although the proposed relationships require empirical validation.

Third, a theoretical gap concerns the need to reconcile rights-based and social-model perspectives on disability with individualized rehabilitation and support services. While the social model appropriately emphasizes environmental, institutional, and attitudinal barriers, it should not exclude audiological, speech-language, psychological, or other services that DHH learners may voluntarily choose to support their educational participation. An integrated theoretical approach must therefore recognize learner autonomy, linguistic and cultural diversity, accessibility, and individual educational goals without framing deafness solely as a condition requiring correction. Fourth, a contextual gap concerns the limited transferability of international evidence to Nigerian educational settings without careful consideration of local circumstances. Factors such as infrastructure availability, service affordability, language policies, professional workforce capacity, family priorities, and institutional resources may influence the feasibility and effectiveness of proposed interventions. Accordingly, international findings should be interpreted cautiously, and claims regarding Nigerian educational conditions, financial barriers, or sociocultural practices must be supported by current, context-specific evidence rather than generalized across the country.

In response to these interconnected gaps, this integrative review aims to synthesize relevant empirical, theoretical, and policy literature concerning the educational participation and academic success of DHH adolescents in Nigeria and to develop a context-sensitive, seven-pillar conceptual framework. By integrating educational accessibility, individualized audiological support, language and communication access, psychosocial support, family partnership, assistive technology, and community-based coordination, the proposed framework seeks to clarify the relationships among essential support domains and identify priorities for educational practice, service planning, and future research. Nevertheless, the framework is presented as a provisional conceptual contribution rather than an empirically validated intervention model. Its proposed components and relationships require further investigation to establish their feasibility, acceptability, and effectiveness within diverse Nigerian educational contexts.

METHODS

An integrative review was selected because it can bring together empirical studies and conceptual or policy literature to clarify a problem, map evidence, and develop a framework (Toronto & Remington, 2020; Whittemore & Knafl, 2005). The review is informed by the five stages described by Whittemore and Knafl (2005): problem identification, literature search, data evaluation, data analysis, and presentation. Given the heterogeneity of the sources, the review does not estimate a pooled intervention effect.

Evidence was identified through targeted, documented searches in October 2026 using a general web search engine to locate records on publisher, PubMed and PubMed Central, institutional repository, and indexing sites. Eight queries covered Nigerian DHH education, sub-Saharan African hearing impairment and education, mental health, academic achievement, family involvement, and assistive technology; each query is listed in Appendix A. Additional searches confirmed the bibliographic details of theoretical, methodological, and policy sources. Searches were not run in subscription databases such as Scopus or ERIC, and they do not constitute a systematic search.

The queries combined terms such as deaf, hard of hearing, hearing impairment, Nigeria, sub-Saharan Africa, academic achievement, mental health, family involvement, and assistive technology, with the year range 2020–2023 added where recent studies were sought (Appendix A).

Sources were eligible if they were peer-reviewed publications or official policy or institutional documents, concerned DHH learners or hearing loss in children and adolescents, or supplied theoretical or methodological grounding. Recent peer-reviewed studies from 2020 to 2026 were prioritised. Older sources were retained only when they were theoretically or historically essential, were methodological standards, or were the only verifiable Nigeria-specific evidence found (Appendix B states the reason for each). A source was labelled Nigeria-specific empirical only when its original record states that data were collected from Nigerian participants or schools. Evidence from other populations or disability groups is not treated as direct evidence for Nigerian DHH adolescents.

Twenty one sources are cited and form the evidence base (Appendix B). For each, authors, year, title, journal, volume, issue, pages, and DOI or URL were checked against a publisher, PubMed or PubMed Central, library, or repository record, and each citation was checked against the statement it supports.

No formal quality appraisal with the Mixed Methods Appraisal Tool or JBI checklists was applied in this revision, and no quality rating is claimed for the evidence base. Sources are instead described by design, setting, and sample as stated in their records. Findings are synthesised narratively by pillar. To support traceability, each statement in Section 6 is attributed to a source, and Table 2 classifies the evidence for each pillar as Nigeria-specific empirical, sub-Saharan African, international, or theoretical or policy.

CONCEPTUALIZING DEAFNESS, DISABILITY, AND IDENTITY

DHH adolescents are not a homogeneous population. Learners differ in degree and onset of hearing loss, language history, communication preferences, use of hearing technology, family circumstances, and educational placement. Hearing thresholds alone do not determine language, cognition, identity, or academic potential. Service planning should therefore begin with the learner′s preferences, communication access, and educational goals, rather than assuming that all DHH students require the same intervention.

The experiences of deaf and hard-of-hearing (DHH) individuals can be understood through three interconnected yet conceptually distinct dimensions: hearing loss as an audiological condition, disability as an interaction between individuals and their environments, and Deaf identity as a linguistic and cultural identity (Oliver, 2009; Padden & Humphries, 1988). From an audiological perspective, hearing loss represents a biological variation in sensory perception that can be assessed through audiometric thresholds. Although the degree and characteristics of hearing loss influence an individual's access to acoustic information, they do not independently determine cognitive ability, learning potential, or academic achievement. From a social-model perspective, disability arises through interactions between individuals and environmental, institutional, and attitudinal barriers that restrict participation and access to opportunities. In educational settings, these barriers may include inaccessible teaching methods, assessment practices, communication systems, school organization, and discriminatory attitudes. For example, instruction delivered exclusively through spoken language may disadvantage DHH learners who do not have reliable access to auditory information. This interpretation aligns with Oliver's (2009) conceptualization of disability as a social and political issue while recognizing that individuals may voluntarily choose audiological, educational, or other support services that correspond to their needs and preferences. The third dimension concerns Deaf identity as a linguistic and cultural experience. Some Deaf individuals identify with communities whose shared language, cultural practices, and social experiences are organized around sign language, as described by Padden and Humphries (1988) in the United States. Others may identify primarily as hard of hearing, communicate through spoken language, or adopt bilingual and multimodal communication approaches. These identities are diverse and personally meaningful and should not be prescribed by educational professionals or researchers. Moreover, literature on sign bilingual education highlights the importance of accessible language environments and their relationship with literacy development among DHH learners (Mayer & Leigh, 2010).

These conceptual distinctions suggest that DHH learners with similar audiological profiles may experience substantially different educational trajectories depending on their access to communication, instructional accommodations, social relationships, and institutional support. For instance, a student with profound hearing loss who benefits from early access to fluent sign language instruction, qualified educational interpreters, and supportive peer interactions may participate successfully in educational activities. Conversely, a student with a milder degree of hearing loss who lacks appropriate assistive listening technology, accessible classroom communication, or teachers equipped to address individual communication needs may encounter significant barriers to academic participation. These scenarios are hypothetical illustrations intended to demonstrate the interaction between individual characteristics and educational environments rather than empirical findings specific to Nigeria. Nevertheless, evidence from Nigeria provides some support for the broader importance of educational and contextual factors. In a cross-sectional study conducted in Ibadan, Jaiyeola and Adeyemo (2018) found that attendance at a special school, higher socioeconomic status, and being 17 years of age or older were associated with better quality of life among DHH students. Although these associations do not establish causal relationships or directly demonstrate improvements in academic achievement, they underscore the importance of considering educational placement, socioeconomic circumstances, and individual characteristics when examining the experiences and well-being of DHH adolescents.

THEORETICAL FRAMEWORK: THE SOCIAL MODEL AND REHABILITATION

The social model of disability provides the primary theoretical orientation for this framework. It directs attention away from locating educational failure solely within an individual and toward the barriers created by institutions, environments, and social attitudes (Oliver, 2009). In the context of DHH education, these barriers may include inaccessible classroom communication, inadequate visual support, assessment arrangements that do not provide appropriate access, and insufficiently prepared staff. Nigerian sources document concerns about personnel, facilities, funding, and implementation in deaf education (Asonye et al., 2018; Eleweke, 2002); contemporary claims require current corroboration.

The framework does not treat the social model as a reason to reject clinical, audiological, speech-language, or psychological services. Rather, it distinguishes between services chosen to support a learner′s goals and practices that impose a preferred communication mode or frame deafness only as a deficit. Support should be person-centred, accessible, and developed with DHH adolescents and their families, while respecting the linguistic and cultural diversity of the community.

For some learners, hearing technology or auditory support may improve access to sound; for others, sign language, captioning, written supports, or combinations of approaches may be preferred. No single pathway is appropriate for every learner. Decisions should be individualised, and educational access should not depend on a learner accepting a particular device, therapy, or communication approach.

DEFINING ACADEMIC SUCCESS

Academic success should not be reduced to examination scores alone. For this review, it is treated as a multidimensional construct encompassing academic achievement, engagement, attendance and retention,

psychosocial participation, and transition readiness. These domains are analytically distinct, although they may influence one another. The indicators in Table 1 are proposed operational examples for future studies, not measures already applied to the sources included in this review. The sources listed in Table 1 show why each domain is relevant; they do not validate the proposed indicators.

Table 1. Proposed Dimensions and Indicators of Academic Success Among Deaf and Hard-of-Hearing Adolescents

Outcome Domain	Operational Definition	Primary Indicators / Measures	Key Supporting Evidence
Academic Achievement	Mastery of core curricular content, functional literacy, and subject-specific knowledge.	Continuous Assessment Scores (CASS); classroom test performance; standardized national exam grades (WASSCE, NECO).	Cawthon et al. (2023) (United States longitudinal reading and mathematics data); Oyawole & Isaiah (2022) (Nigerian biology achievement)
Academic Engagement	Cognitive, behavioral, and emotional investment in daily classroom learning activities.	Classroom active sign/verbal participation; hand-raising frequency; attention-span markers; homework completion rates.	Conceptual; no verified DHH-specific source for this indicator in this review
Attendance and Retention	Physical presence in school and continued enrollment over time, reducing school-dropout risk.	Daily attendance registers; term-to-term school retention rates; senior secondary school completion and graduation rates.	Asonye et al. (2018) (late school entry and dropout reported in two Nigerian communities)
Psychosocial Outcomes	Positive self-identity, academic self-concept, peer relationships, self-efficacy, psychological well-being, and school belonging.	Standardized self-esteem scales; Academic Self-Concept Questionnaire (ASCQ); peer-sociometric nominations; self-advocacy checklists; school belonging indices.	Jaiyeola & Adeyemo (2018); Scherer et al. (2022); Asogwa et al. (2020) — Nigeria-specific randomized controlled trial demonstrating improvements in academic self-concept following a video-guided educational technology intervention.
Transition Outcomes	Readiness to transition from secondary education into higher education or vocational employment.	Vocational skills mastery certifications; successful tertiary enrollment; post-secondary independent livelihood indicators.	Eleweke (2002) (descriptive review including vocational education); Asonye et al. (2018) (a case of restricted access to science subjects)

SYNTHESIS OF REHABILITATION STRATEGIES AND ACADEMIC OUTCOMES

The seven domains below organise the literature into practical areas of support. Because the evidence varies in population, design, geography, and directness, the framework should be read as a structured set of hypotheses and implementation options rather than as proof that every pillar has a demonstrated causal effect on academic success in Nigeria.

Educational Rehabilitation and Classroom Accessibility

Educational accessibility includes adapting instruction, materials, classroom communication, and assessment so that DHH learners can access the curriculum. Universal Design for Learning (UDL) offers a planning framework for anticipating learner variability and reducing barriers (CAST, 2024). For DHH learners, practical options may include written and visual materials, captions, clear sightlines, signed communication where appropriate, accessible digital resources, and opportunities to demonstrate learning in suitable formats. These options should be planned with learners and aligned with curriculum and assessment requirements.

Classroom acoustics can affect access to spoken information for learners who use residual hearing or listening devices; however, the verified sources do not establish the acoustic conditions of Nigerian schools, which should be documented rather than assumed. Seating that preserves visual access, reduction of avoidable background noise, and appropriate assistive listening systems may be considered where they fit the learner's needs and resources. The verified sources also do not establish which assessment accommodations improve outcomes for Nigerian DHH learners. Nigerian evidence on classroom supports is limited. A correlational survey of 224 students with hearing impairment in seven Oyo State schools examined sign language interpreters and self-efficacy as predictors of biology achievement (Oyawole & Isaiah, 2022). Fieldwork in Abuja and Imo State reported an average class of about 50 students in one secondary school, up to 100 deaf and hearing students in one junior secondary class, and more than 60% of hearing teachers in the sampled schools being neither trained deaf educators nor trained sign language users (Asonye et al., 2018). The same report describes one student who could not take science subjects at the senior secondary school first applied to because no interpreter was available for them; this single case illustrates, but does not quantify, a possible access barrier. International longitudinal evidence suggests that DHH students' reading and mathematics skills continue to develop through grades 2 to 8 (Cawthon et al., 2023), which may support high expectations, but the data are from the United States.

Audiological Rehabilitation and Residual Hearing Management

Audiological support may include hearing assessment, fitting and maintenance of hearing aids, cochlear-implant services where appropriate, and follow-up care. These services require qualified professionals and informed, individualised decision-making. The World Report on

Hearing provides a global public-health framework for hearing care, but it does not establish that a specific device or intervention is appropriate for every DHH adolescent (WHO, 2021). Educational planning should remain accessible to learners who do not use hearing technology or whose preferred communication approach does not depend on it.

Affordability, access to follow-up care, replacement parts, maintenance, and local service availability may affect sustained use of hearing technology. Globally, WHO and UNICEF report that access to assistive products can be as low as 3% of need in low- and middle-income countries and that affordability is a major barrier (WHO & UNICEF, 2022). The Global Burden of Disease study estimates that the burden of moderate-to-complete hearing loss is concentrated in countries with low health-care quality and access (GBD 2019 Hearing Loss Collaborators, 2021). A systematic review and meta-analysis of studies from sub-Saharan Africa reported a pooled prevalence of childhood hearing impairment of 10% (95% CI 9–11%), 6% in school or community-based samples, and associations with preventable and treatable conditions such as chronic suppurative otitis media and impacted cerumen (Desalew et al., 2020); the estimate varied with the hearing threshold used. In Nigeria, Asonye et al. (2018) reported that newborn hearing screening and early intervention were not available in their study areas, which suggests that late identification may constrain audiological pathways; this is a local report and not a national estimate. Nigeria-specific cost and device-use figures were not identified in the verified sources and are therefore not stated. Counselling should respect adolescent autonomy and take account of comfort, communication preferences, stigma, and the practical realities of maintenance.

Speech, Language, and Communication Rehabilitation

Speech, language, and communication are related but distinct. Speech concerns oral production; language concerns the system used to understand and express meaning; communication concerns the exchange of information. Educational support should prioritise full and accessible language development and effective classroom communication, rather than treating oral speech as the only acceptable outcome. Sign languages are complete natural languages, and sign bilingual education literature discusses their role in language and literacy development (Mayer & Leigh, 2010).

Communication planning should consider Nigerian Sign Language, spoken language, written language, captioning, interpreting, and bilingual or multimodal approaches according to the learner′s preferences and context. WHO (2021) identifies sign language, captioning, and sign language interpretation among the options that can improve access to communication and education. In the Nigerian communities studied by Asonye et al. (2018), many deaf students started school late, which the authors link to underdeveloped signed and written language; the sign language used in the schools followed English sentence structure; and students reported that people outside school, sometimes including family members, communicated with them through gestures or simplified signing. The Oyo State survey of biology achievement treated sign language interpreters as one predictor of achievement (Oyawole & Isaiah, 2022). No verified 2020–2026 study of language interventions for Nigerian DHH adolescents was identified, and the evidence cited here does not justify a universal claim that one communication approach is superior for all learners. The practical objective is timely, consistent access to language and curriculum, with DHH adolescents included in decisions affecting them.

Psychological Rehabilitation and Socio-Emotional Adjustment

Psychosocial support should address distinct outcomes such as peer relationships, bullying, loneliness, self-advocacy, identity, school belonging, and academic self-efficacy. These constructs should not be collapsed into a single assumption that DHH adolescents are inherently vulnerable. A scoping review of mental health support for children and adolescents with hearing loss (5,629 search results; 27 articles included) concluded that the available evidence indicates a range of effective approaches but that more research is needed (Scherer et al., 2022). Nigerian evidence is limited: a cross-sectional study of 110 students in Ibadan found poor quality of life in 57.8% (Jaiyeola & Adeyemo, 2018), and Asonye et al. (2018) describe bullying among students in one residential school for the Deaf in Imo State. The magnitude and correlates of these experiences across Nigerian schools require locally grounded study.

Schools can consider accessible counselling, peer education, anti-bullying procedures, and opportunities for DHH students to connect with supportive peers and adults. The scoping review identified interventions such as resilience training and parent–child interaction therapy, (Scherer et al., 2022), and these measures should be tested in Nigerian schools rather than assumed to work uniformly. The study in Ibadan suggested that the Deaf community in a special school appeared to protect against stigma and discrimination (Jaiyeola & Adeyemo, 2018), which points to the value of peer contact but does not show that special-school placement is preferable. Cultural explanations of hearing loss and stigma are discussed only where specific evidence exists; Asonye et al. (2018) report stigmatisation in their fieldwork communities, and these reports cannot be generalised to Nigerian families as a whole.

Recent evidence from Nigeria highlights the importance of examining psychological and developmental outcomes among DHH adolescents. Adeniyi et al. (2021) identified differences in perceptual reasoning and behavioural difficulties between Deaf and hearing adolescents in a semi-inclusive educational setting in Ibadan. International research further highlights the complexities of peer relationships and social participation among DHH adolescents, while systematic reviews emphasize the multidimensional nature of their quality of life (Terlektsi et al., 2020; Madhesh, 2024).

Family-Centred Rehabilitation and Adolescent Dynamics

Family involvement during adolescence may include communication access, support for educational aspirations, collaboration with schools, and planning for post-school transitions. The nature of family support varies with resources, language access, relationships, and individual preferences. In Nigeria, Asonye et al. (2018) report that hearing family members of students in two communities made little or no effort to learn the signed language. No verified 2020–2026 peer-reviewed study of family involvement in the education of DHH adolescents was identified for this review, and sources on parents of young children were not used because their findings cannot be assumed to apply to secondary-school adolescents. This pillar therefore rests on limited evidence. The sources reviewed do not establish that Nigerian families generally have low expectations for DHH learners.

International evidence suggests that family involvement and social capital may play important roles in supporting educational participation and postsecondary transitions among DHH learners. Paskaran and Yasin (2020) reported a positive association between parental support and academic achievement in a small sample of Malaysian secondary-school students who were DHH. Similarly, Punch and Duncan (2022b) identified family, school, community, and individual social capital as relevant dimensions of postsecondary educational transitions. However, the applicability of these findings to Nigerian DHH adolescents requires further investigation.

Potential family-centred strategies include accessible information, opportunities for families to learn the learner's preferred communication approach, regular school-family communication, and participation in transition planning. These should be co-designed with families and adolescents and adapted to local language, resources, and school arrangements. Future studies should examine which components are acceptable, feasible, and associated with meaningful outcomes in Nigerian settings.

Assistive Technology and Digital Accessibility

Assistive technology should be understood as part of an accessible learning environment, not as hardware provision alone. Depending on individual need and context, options may include captioning, speech-to-text, personal remote-microphone systems, visual alerts, and accessible digital learning materials. Availability, language accuracy, connectivity, power supply, cost, privacy, and teacher competence should be assessed locally before a technology is recommended.

Implementation planning should include training, maintenance, accessible content, technical support, and a sustainable funding model. In Ilorin, Kwara State, a mixed-methods study of 45 teachers and 60 senior secondary students reported that 11.1% of teachers seldom used digital learning applications and 2.2% used them consistently, that the barriers identified included a curriculum that does not integrate technology, and that 85% of students held strongly positive views of their potential (Aderoju et al., 2026). WHO and UNICEF (2022) report large gaps in assistive technology services and trained workforce and recommend actively involving users and their families. Asonye et al. (2018) report that the boarding campus of one secondary school for the Deaf in Imo State had no electricity for several years, which they say made communication impossible at night; this is a single-site report, but it illustrates why power supply should be assessed locally. Specific claims about import tariffs or national internet access need current, geographically defined evidence and are not made here. Low-cost and offline options may be important in some settings, but their suitability should be tested with DHH learners and teachers rather than assumed.

Empirical evidence from Nigeria provides preliminary support for the potential benefits of technology-assisted educational interventions. Asogwa et al. (2020) conducted a randomized controlled trial involving 60 junior secondary students with hearing impairment and found that a video-guided educational intervention significantly improved participants' academic self-concept compared with usual care. Although these findings do not establish improvements in academic achievement, they suggest that accessible digital interventions may support psychosocial dimensions of educational participation.

Community-Based Rehabilitation (CBR)

Community-based rehabilitation (CBR) can provide a structure for connecting people with disabilities, families, community organisations, and local services. The WHO CBR guidelines present CBR as a strategy for community-based development that involves people with disabilities and include an education component (WHO, 2010), and the World Report on Hearing proposes integrating ear and hearing care into primary health care through approaches such as task sharing and training (WHO, 2021). The potential contribution of CBR to DHH adolescents depends on local workforce capacity and the availability of referral pathways to specialised audiological, educational, mental-health, and language services. CBR should complement, not replace, qualified specialist services or the responsibility of schools and public institutions to provide accessible education.

No Nigeria-specific evaluation of CBR for DHH adolescents was identified in the verified sources. Evidence from other disability groups or international settings may inform implementation questions, but it is indirect and should be labelled accordingly. Future research should evaluate referral completion, communication access, educational participation, acceptability, and cost in rural and urban settings.

PROPOSED SEVEN-PILLAR EVIDENCE-INFORMED CONCEPTUAL FRAMEWORK

The seven-pillar framework integrates: (1) individualised audiological support; (2) pedagogical and assessment accessibility; (3) language and communication access; (4) psychosocial support and school belonging; (5) family partnership; (6) assistive technology and digital accessibility; and (7) community-based coordination and referral (see table 2). The pillars are interdependent. For example, a hearing device will not ensure access if the classroom is acoustically unsuitable, communication is inaccessible, or follow-up support is unavailable. Conversely, the framework does not assume that every learner needs all seven pillars in the same form. The model is proposed for co-design and empirical validation with DHH adolescents, families, teachers, and relevant professionals.

Table 2. Proposed Seven-Pillar Conceptual Framework for Supporting Academic Success Among Deaf and Hard-of-Hearing Adolescents in Nigeria

Pillar	Possible barriers (to be verified locally)	Evidence by source type	Candidate actions for co-design	Expected outcome (to be tested)	Key stakeholders
1. Individualised Audiological Support	Late identification and limited follow-up care, reported in study	Nigeria: Asonye et al. (2018). SSA: Desalew et al. (2020). International: GBD 2019 Hearing Loss	Pilot school-based hearing assessment and referral; assess device maintenance	Earlier identification and referral; access to learning for	Ministry of Health, audiologists, parents,

	areas but not established nationally	Collaborators (2021). Policy: WHO (2021).	and follow-up capacity locally.	learners who choose hearing technology.	DHH learners
2. Pedagogical and Assessment Accessibility	Limited teacher preparation in deaf education; large classes reported in some schools	Nigeria: Oyawole & Isaiah (2022); Asonye et al. (2018); Eleweke (2002) (descriptive review). SSA: none verified. International: Cawthon et al. (2023). Theory/policy: CAST (2024); Federal Republic of Nigeria (2019); CRPD Committee (2016).	Train teachers in visual pedagogy and sign communication; apply UDL principles; evaluate assessment accommodations with learners.	More accessible instruction and assessment.	TRCN, teachers, principals
3. Language and Communication Access	Late access to language; limited interpreters and family sign use, reported in study areas	Nigeria: Asonye et al. (2018); Oyawole & Isaiah (2022). SSA: none verified. International: none verified (2020–2026). Theory/policy: Mayer & Leigh (2010); WHO (2021).	Plan communication with each learner (Nigerian Sign Language, spoken, written, captioning, interpreting); train interpreters; offer sign language learning to families.	Language access and classroom participation.	Speech-language pathologists, sign language interpreters, teachers, families
4. Psychosocial Support and School Belonging	Peer victimisation, social isolation, and low well-being, reported in some settings	Nigeria: Jaiyeola and Adeyemo (2018); Asonye et al. (2018); Asogwa et al. (2020) SSA: none verified. International: Scherer et al. (2022). Theory: Oliver (2009); Padden & Humphries (1988).	Accessible counselling; anti-bullying procedures; contact with peers and DHH adults; evaluate before scale-up.	Improved well-being and school belonging.	Counsellors, peers, teachers, DHH adults
5. Family Partnership	Limited family communication access; delayed school entry	Nigeria: Asonye et al. (2018). SSA: none verified. International: none verified. Evidence limited.	Offer accessible information and sign language learning to families; involve families in transition planning; test with families.	Stronger school-family communication and aspirations.	Families, school administrators, NGOs
6. Assistive Technology and Digital Accessibility	Limited access to appropriate assistive technologies, maintenance challenges, unreliable power supply, insufficient digital accessibility, and limited teacher competencies; conditions requiring local assessment.	Nigeria: Asogwa et al. (2020) — randomized controlled trial involving 60 junior secondary students with hearing impairment in Southeast Nigeria, demonstrating improvements in academic self-concept following a captioned video-guided educational intervention; Aderoju et al. (2026); Asonye et al. (2018). Policy/international: WHO & UNICEF (2022); WHO (2021).	Assess learners' technological needs and school infrastructure; pilot captioned video-guided educational interventions, speech-to-text applications, and remote-microphone systems; provide teacher training and sustainable maintenance support; evaluate psychosocial and educational outcomes.	Improved access to educational content and communication technologies; strengthened academic self-concept; enhanced classroom participation and digital accessibility.	Education authorities, teachers, DHH learners, educational psychologists, technology specialists, and school administrators.
7. Community-Based Coordination and Referral	Limited referral pathways, especially for rural families; not yet evidenced for Nigeria	Nigeria: none verified. SSA: none verified. Policy: WHO (2010); WHO (2021).	Pilot coordination and referral through local government area (LGA) education authorities; train community workers; evaluate referral completion.	Earlier referral and local support.	LGA coordinators, community workers, schools

Note. Evidence is classified as Nigeria-specific empirical (Nigeria), sub-Saharan African (SSA), international, or theoretical or policy. "None verified" means that no source of that type was verified for the pillar. Asonye et al. (2018), Jaiyeola and Adeyemo (2018), Oyawole and Isaiah (2022), and Aderoju et al. (2026) are limited to specific locations and do not represent Nigeria as a whole. Eleweke (2002) is a descriptive review, not an empirical study. TRCN = Teachers Registration Council of Nigeria; UDL = Universal Design for Learning.

LIMITATIONS OF THE REVIEW

Several limitations affect interpretation. The evidence was identified through targeted searches with a general web search engine and was not drawn from systematic searches of subscription databases, so relevant studies may have been missed. One reviewer identified and screened sources, no independent second screening was undertaken, and no formal quality appraisal was applied. The evidence base is small (20 sources, of which 9 are empirical studies or reviews on DHH learners or hearing loss), and it combines sources with different designs, populations, and settings; international and broader-population evidence is indirect when applied to Nigerian DHH adolescents. Nigeria-specific empirical evidence comes from four studies limited to specific locations (Asonye et al., 2018; Jaiyeola & Adeyemo, 2018; Oyawole & Isaiah, 2022; Aderoju et al., 2026), plus one descriptive review (Eleweke, 2002); the journal of Oyawole and Isaiah (2022) and the 2026 article by Aderoju et al. should be checked for their peer-review standards before final submission. Sub-Saharan African evidence is limited to one regional systematic review of hearing impairment prevalence (Desalew et al., 2020). No verified source was found on family involvement or on community-based rehabilitation in DHH adolescents. Statements about device costs, abandonment rates, funding levels, and service coverage in Nigeria are not made because verifiable current sources were not identified. Accordingly, the seven-pillar framework should be treated as a provisional conceptual model requiring validation, not as a proven intervention package.

POLICY AND PRACTICE IMPLICATIONS

To translate our seven-pillar framework into practice, recommendations are organised into three progressive, actionable levels of implementation. This allows policy planners and educational administrators to execute reforms systematically based on available resources.

Level 1: Improving Direct Student Access (Short-Term Action)

Short-term action should prioritise barriers that can be identified and addressed at school level: accessible lesson materials, clear sightlines, communication access, appropriate seating, captioned resources where feasible, and consistent procedures for preventing and responding to bullying. Individual accommodations should be agreed with the learner and reviewed for effectiveness. Sign-language interpreting should be provided where needed and delivered by suitably competent personnel.

Level 2: Building Capacity (Medium-Term Action)

Medium-term action should strengthen staff capability and coordination. Relevant options include professional development in inclusive pedagogy, collaboration with DHH specialists, accessible school-family communication, and referral pathways to audiology, speech-language, counselling, and other services. Training requirements should be developed with DHH communities and aligned with Nigerian policy and workforce realities.

Level 3: Promoting Structural Reform (Long-Term Action)

Longer-term reform requires transparent budgeting, monitoring of accessibility obligations, and coordination among education, health, disability, and communications sectors. Monitoring can draw on the education provisions of the Discrimination Against Persons with Disabilities (Prohibition) Act (Federal Republic of Nigeria, 2019). Subsidies or procurement arrangements for assistive technology should be based on needs assessment, lifecycle cost, maintenance capacity, and equitable eligibility. The legal and fiscal feasibility of changing particular import duties or tying federal funds to specific audits was not examined in this review; such proposals require policy and economic analysis before they are presented as settled recommendations.

CONCLUSION AND FUTURE RESEARCH AGENDA

Academic success among DHH adolescents is best understood as a multidimensional outcome shaped by the interaction of communication access, teaching and assessment practices, family and peer relationships, service availability, and broader institutional conditions. This review proposes a seven-pillar framework to organize these interrelated domains and provide a basis for future research and service development. However, the framework has not yet been empirically validated, and the evidence reviewed does not support the conclusion that an integrated rehabilitation package has already been demonstrated to improve academic outcomes among DHH adolescents in Nigeria. Rather, the principal contribution of the framework is to make the relevant domains, potential mechanisms, and testable relationships more explicit and to provide a structured basis for subsequent empirical investigation.

Future research should therefore focus on validating, refining, and contextualizing the proposed framework across diverse educational settings in Nigeria and sub-Saharan Africa. Longitudinal studies are needed to follow DHH secondary-school graduates into tertiary education, vocational training, and the labour market in order to examine the longer-term educational, social, and employment outcomes associated with different combinations of rehabilitation and educational support. Implementation research should also evaluate the feasibility, sustainability, cost-effectiveness, and academic implications of establishing school-based rehabilitation or multidisciplinary support hubs, particularly in rural and resource-constrained public secondary schools. Comparative intervention studies are equally important for examining linguistic, literacy, participation, and academic outcomes associated with different communication and educational approaches, including bilingual-bicultural and oral-oriented programmes, while taking account of learner preferences and contextual differences. In addition, spatial and geo-referenced mapping of special education resources, audiological services, trained professionals, and accessible educational supports would help identify rural–urban and inter-regional disparities and inform more equitable resource allocation. Finally, participatory action research should actively involve DHH adolescents as co-researchers and partners in knowledge production so that their lived experiences, communication preferences, educational priorities, and self-advocacy strategies directly inform the design, implementation, and evaluation of future educational reforms. Collectively, these research directions would provide the empirical evidence required to determine which components of the proposed framework are feasible, acceptable, effective, and scalable within the Nigerian educational context.

DECLARATIONS

Ethics Approval and Consent to Participate

Not applicable. This article is an integrative review of published literature and does not report new research involving human participants or identifiable personal data.

Consent for Publication

Not applicable. The manuscript contains no identifiable individual-level data or images requiring consent for publication.

Availability of Data and Materials

The review did not generate new primary datasets. All sources analysed are cited in the References. The search queries (Appendix A) and the source register (Appendix B) are included in this manuscript

Conflicts of Interest Statement

The author declares no known competing financial or non-financial interests.

Funding

This work received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The review was self-funded, and no funding scheme or grant number applies.

Artificial Intelligence-Assisted Technology

ChatGPT (OpenAI) was used during revision to assist with language editing, organization, and identification of reporting and citation issues. The author is responsible for evaluating the suggestions and for the accuracy, originality, and integrity of the final manuscript. No AI-generated research data were used.

Authors' Contributions

Oludayo Samson Ogunwale conceptualised the review, developed the proposed framework, and prepared and revised the manuscript. No other individual contributed to literature screening, data extraction, or synthesis.

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ADDITIONAL INFORMATION

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