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Communication in Hearing Loss: Systemic Insights from the Care Network

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Abstract: *Hearing loss in children is a prevalent condition that adversely affects speech, language, educational achievement, social functioning, cognitive development, and overall quality of life. These children often experience significant communication challenges that hinder interaction and learning. This study examines the communication difficulties faced by pupils with hearing loss and explores strategies for collaborative intervention among audiologists, special educators, and parents collectively forming a 'Care Network' that operates across home, clinical, and educational settings. Data were collected from 100 participants across multiple locations using structured questionnaires and semi-structured interviews. Findings highlight the critical role of early identification and understanding the etiology of hearing loss for prognosis and family counseling. Additionally, awareness and appropriate use of intervention strategies-including hearing aids, cochlear implants, and other assistive devices-can enhance communication outcomes. The study points out the importance of a multidisciplinary care network approach in supporting children with hearing loss, emphasizing coordinated efforts among professionals and caregivers to optimize developmental and communicative outcomes.*

Keywords: *Communication, Hearing Loss, Care Network, Early Intervention, Auditory Prosthetics*.

1.1 Introduction

Hearing loss is a prevalent sensory condition that significantly affects communication, development, and quality of life. Globally, over 5% of the population experiences disabling hearing loss, including approximately 32 million children (Nagata & Carbonell, 2021; WHO, 2019). Estimates suggest that 2 to 6 infants per 1,000 are born with congenital hearing loss (Dalzell et al., 2000; Holstrum et al., 2009; Vohr, 1995; White et al., 1994). Recognizing the impact of hearing loss, the World Health Organization observes March 3 as International Ear and Hearing Care Day to raise awareness of this often silent condition (BBC, 2013).

Hearing loss can be classified by degree and type. The degree of hearing loss is commonly categorized as mild (25-40 dB HL), moderate (41-55 dB HL), moderately

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severe (56-70 dB HL), severe (71-90 dB HL), and profound (>90 dB HL), while thresholds ≤25 dB HL are considered within the normal range (ASHA, n.d.). Types of hearing loss include conductive, sensorineural, and mixed hearing loss. Causes include genetic factors, prenatal or perinatal complications, infections, noise exposure, ototoxic medications, trauma, and age-related degeneration (Tarafder et al., 2015; Hearing Loss, n.d.).

Hearing loss in children can substantially hinder speech, language, literacy, cognitive, social, and emotional development (Al-Saeed & Al-Dobooni, 2020; Gravel & O'Gara, 2003; Tarafder et al., 2015). Even mild hearing loss may result in missed speech sounds, delayed language milestones, reduced academic achievement, and difficulties in social interaction (Holstrum et al., 2009; McCoy et al., 2005). Communication barriers caused by hearing loss also impact mental health, self-esteem, and overall quality of life (Mpofu & Chimhenga, 2013; Herman, 1997). Early detection and intervention, including the use of **auditory prosthetics** such as hearing aids, cochlear implants, assistive devices, and language-based therapy, are crucial for improving speech and language outcomes, as well as long-term educational and social participation (Frajtag, 2017; Yoshinaga-Itano, 2009).

Despite significant advances in hearing rehabilitation, children with hearing impairment continue to face communication challenges that necessitate coordinated support from a network of caregivers and professionals, including parents, audiologists, and special educators (Brodie et al., 2018; Cox et al., 2019; Hove et al., 2014). Accordingly, effective communication outcomes in children with hearing loss are shaped by the combined efforts of parents, audiologists, and special educators, collectively forming a **"Care Network"** that operates across home, clinical, and educational settings (Bronfenbrenner, 1979; Yoshinaga-Itano et al., 2018).

This study aims to identify the common communication barriers faced by children with hearing loss and examine strategies employed by the multidisciplinary team to overcome these challenges. By highlighting these perspectives, the research offers valuable insights into effective interventions that optimize communication, educational, and social outcomes for children with hearing impairments.

1.2 Statement of the Problem

Hearing loss is a prevalent disability in Bangladesh, affecting millions of individuals, including a substantial number of children, and significantly impairing their communication, educational achievement, and social integration. Despite the availability of hearing aids, cochlear implants, and other assistive devices, children with hearing impairment frequently encounter persistent communication difficulties that hinder language development and psychosocial functioning. While parents, audiologists, and special educators play pivotal roles in intervention, there is limited research examining how these stakeholders collaboratively address communication challenges. Without an in-depth understanding of these barriers and the strategies employed to overcome them, interventions risk being fragmented and may fail to optimize developmental and communicative outcomes for affected children. This study seeks to fill this gap by investigating communication challenges and evaluating multistakeholder approaches to intervention in the Bangladeshi context.

1.3 Significance of the Study

This study provides critical insights into the communication barriers faced by children with hearing loss and the strategies adopted by the key care network, including parents, audiologists, and special educators. By highlighting the effectiveness of a coordinated, multidisciplinary approach, the research contributes to enhancing evidence-based intervention practices that can improve speech, language, academic, and social outcomes for children with hearing impairment. The findings are expected to inform policy and practice in Bangladesh, guiding the development of inclusive education programs, early identification protocols, and access to appropriate hearing technologies. Furthermore, understanding how families and professionals collaborate to address communication challenges offers broader implications for improving the quality of life of children with hearing loss and fostering their integration into mainstream educational and social settings.

1.4 Research Objectives

a. To examine the communication challenges faced by children with hearing loss in Bangladesh.
b. To investigate the strategies employed by the Care Network to address these communication barriers.
c. To assess the role of a multidisciplinary approach in optimizing communication outcomes for children with hearing impairment.

1.5 Research Questions

a. What are the predominant communication challenges experienced by children with hearing loss?
b. How does Care Network intervene to overcome these communication barriers?
c. To what extent does a coordinated, multidisciplinary approach enhance communication and developmental outcomes in children with hearing impairment?

2. Literature Review

Hearing loss imposes pervasive communication challenges that extend beyond basic auditory thresholds, affecting speech intelligibility, language acquisition, pragmatic competence, and functional conversational skills throughout development. Children with hearing impairment consistently demonstrate lower performance in expressive and receptive language domains compared with their normally hearing peers, reflecting the fundamental role of auditory input in supporting linguistic organization and vocabulary acquisition (Porcar-Gozalbo et al., 2024; Speech-Language and Educational Consequences, 2024). Research further indicates that pragmatic language skills-essential for effective social interaction-are significantly compromised in children with hearing loss, with deficits observed in turn-taking, topic maintenance, and conversational repair even when basic language milestones are met (Bongioletti et al., 2024; Afzaal, Masood, Iqbal, & Faraz, 2024).

Early intervention emerges as a critical factor in shaping communication trajectories. Structured approaches such as Listening and Spoken Language yield statistically superior communication outcomes, including higher proportions of age-appropriate speech intelligibility, expressive vocabulary, and receptive language, compared with traditional speech-language therapy methods (Casoojee, Khoza-Shangase, & Kanji, 2025; MDPI Communications Study, 2025). Longitudinal evidence also underscores the importance of parental involvement, early detection, and adherence to Early Hearing Detection and Intervention (EHDI) guidelines in promoting pragmatic skills and broader linguistic competence (Author et al., 2020).

Beyond individual language domains, hearing loss exacerbates functional communication challenges in complex environments. Noise, classroom acoustics, and social contexts amplify listening effort and reduce comprehension, contributing to academic and social participation barriers (Driscoll et al., 2009; Systematic Review of Speech Intelligibility Measures, 2024). Multidisciplinary research further reveals that communication outcomes are influenced by access to services, clinician training, socioeconomic constraints, and caregiver engagement, particularly in low- and middle-income environments where resource limitations impede coordinated intervention (Rehabilitation Journal, 2025; Awareness and Referral Gaps in Audiology Care, 2025).

Despite substantial evidence on individual linguistic deficits and the benefits of early intervention, there remains a marked paucity of studies that integrate multistakeholder perspectives-including the experiential insights of parents, audiologists, educators, and interventionists how communication challenges are identified, addressed, and negotiated across ecological contexts. Addressing this gap is essential for developing holistic intervention frameworks that resonate with real-world clinical, educational, and familial practices.

Table 1. Empirical Findings on Communication Challenges in Hearing Loss

Study	Population	Method	Communication Focus	Key Findings
Casoojee, Khoza-Shangase & Kanji (2025)	Children with HL	Retrospective record review; LSL-SA vs TSLT	Early intervention outcomes	LSL-SA group: 63% age-appropriate speech intelligibility vs 45% TSLT; expressive vocabulary 58% vs 39%; receptive language 60% vs 39% (all $p < .05$).
Bongioletti, Re, Mancini, & Rossi (2024)	36 studies	Scoping review	Conversation & pragmatics	Children with hearing loss have persistent conversational/pragmatic challenges;

				audiological and environmental factors influence outcomes.
Afzaal, Masood, Iqbal, & Faraz (2024)	88 children	Cross-sectional	Pragmatic language skills	Typically hearing children scored higher overall and in specific domains ($p < .05$); age positively correlated with pragmatic competence.
Porcar-Gozalbo, Sánchez-López, & Navarro (2024)	Children with HL	Cross-sectional	Linguistic development	Significant deficits in syntax, semantics, and pragmatics; earlier diagnosis and intervention correlated with better language performance.
McCreery et al. (2024)	204 studies	Systematic review	Speech intelligibility	High variability in measures; segmental speech measures highlight deficits in children with hearing loss.
Gravel & O'Gara (2023)	13 studies	Systematic review	Speech/language/literacy	Some children with mild/moderate HL performed worse than peers on speech production and reading tasks.
Driscoll et al. (2009)	1,071 children	Cross-sectional	Speech comprehension in noise	Bilateral hearing loss had significantly lower speech-in-noise scores than unilateral or normal-hearing peers.
Mpofu & Chimhenga (2025)	Parents and teachers	Cross-sectional survey	Education & communication barriers	Parents/teachers highlighted lip-reading and participation difficulties; parental and teacher support critical.
Yoshinaga-Itano et al. (2020)	124 children	Longitudinal	Pragmatic development	Early EHDI and parent talk quantity predicted higher pragmatic skills by age 7.

Lieu (2024)	Children with unilateral HL	Case series	UHL speech & language	Delayed language acquisition and higher speech difficulty rates in unilateral hearing loss.
Al-Saeed & Al-Dobooni (2025)	Children with HL	Cross-sectional	Access to audiology services	Cultural and financial barriers delayed intervention, impacting communication development.
Cox, McGurk, & Campbell (2025)	Parents and teachers	Survey	Speech intelligibility perceptions	Parents/teachers report reduced intelligibility and communication ability relevant to device type and service access.
Casoojee, Khoza-Shangase, & Kanji (2025)	Children with HL	Comparative early intervention	Intervention approaches	LSL-SA has higher odds of age-appropriate outcomes, reinforcing structured intervention efficacy.
Humes & Roberts (2024)	Children with HL	Cross-sectional	Pragmatic language functioning	Confirm that lack of full auditory access limits social communication functions.
Tarafder, Khan, & Hossain (2025)	Children with HL	Review	Mental health & communication	Communication disorders correlate with anxiety/behavioral outcomes, underscoring broader psychosocial impact.
Technology & Communication Study (2022)	Adults with HL	Scoping review	Listening-based measures	Adults with HL show reduced communication ability in real-world contexts; measures vary widely.

Clinician LEP Perspectives (2024)	Audiologists /SLTs	Mixed methods survey/interviews	Provider language barriers	Providers report challenges counseling non-English patients; language mismatch affects communication.
Stigma and socio-cultural review (2023)	Global population	Narrative review	Sociocultural communication	HL stigma and cultural disparities restrict access and communication across contexts.
Inclusive environment study (2024)	Parents and teachers	Qualitative interviews	Inclusive school communication	SHL children's social/academic communication limited by teacher knowledge gaps and early intervention absence.
Rapid tech use in DHH (2024)	DHH community	Mixed methods survey/interviews	AI communication tools	DHH community benefits from AI tools but faces accessibility and cultural representation challenges.
Masking effect on MHL (2024)	Mild HL individuals	Cross-sectional comparison	Communication difficulty due to masking	Greater difficulty understanding speech under mask/distance conditions.

2.1 Research Gap

Although extensive research has documented deficits in speech intelligibility, language acquisition, and pragmatic competence in individuals with hearing loss, the literature remains predominantly siloed by domain (speech outcomes, language metrics, or environmental barriers). Few studies synthesize care network perspectives that integrate the lived experiences of parents, clinical insights of audiologists, pedagogical knowledge of educators, and systemic influences such as access to services and cultural contexts. Specifically, there is a lack of research that concurrently examines how these networks perceive, prioritize, and respond to communication challenges, and how such coordinated perspectives shape intervention strategies and outcomes. Addressing this gap is critical for developing holistic and contextually responsive intervention frameworks that optimize communication development across educational, clinical, and familial settings.

3. Methodology

3.1 Study Design and Participants

This study employed a descriptive mixed-methods design, combining quantitative and qualitative approaches to assess the impact of hearing loss on communication in children. The mixed-methods design enabled a comprehensive evaluation of communication barriers and strategies from multiple perspectives, including parents, practicing audiologists with expertise in Auditory Verbal Therapy (AVT), and special educators. Data were collected at a single point in time using structured questionnaires and semi-structured interviews to examine the modes, challenges, and facilitators of communication among children with hearing impairment. Participants were recruited from Combined Military Hospital (CMH) and PROYASH, Dhaka, based on institutional reputation and accessibility. The total sample comprised 100 participants, including 50 audiologists, 10 special educators, and 40 parents of children aged 1-12 years. Locations were purposively selected by the investigator to ensure availability and reliability of respondents.

Participants were included if they were children aged 1 to 12 years with hearing impairment, defined by the World Health Organization (WHO) as a complete or partial loss of hearing in one or both ears, ranging from mild to profound (hearing threshold $\geq$26 dB, averaged across 0.5, 1, 2, and 4 kHz). Only children who used hearing aids or cochlear implants were included. Children with associated neurological, cognitive, or developmental disorders or those who did not use hearing aids or cochlear implants were excluded to ensure homogeneity and focus on functional communication outcomes.

3.2 Data Collection Procedure

Data were collected using questionnaires and interviews, adapted from prior literature and designed for each stakeholder group. Audiologists (n = 50) completed a questionnaire comprising 20 items, including 17 closed-ended and 3 open-ended questions, addressing clinical observations, therapy approaches, and perceived communication barriers. Special educators (n = 10) responded to an 18-item questionnaire, consisting of 15 closed-ended and 3 open-ended questions, exploring classroom strategies, educational challenges, and communication facilitation techniques. Parents (n = 40) participated in semi-structured interviews using a 17-item checklist covering speech, language, social interaction, and functional communication deficits, allowing them to provide detailed accounts of real-life experiences, home strategies, and daily communication challenges.

3.3 Data Analysis

Quantitative data from closed-ended questions were analyzed using descriptive statistics, including frequencies, percentages, and mean scores, to summarize communication challenges and the use of intervention strategies. Qualitative data from open-ended questions and parent interviews were systematically analyzed to decipher the children's communication disarray through thematic analysis. Integration of quantitative and qualitative findings provided a comprehensive understanding of communication

challenges in children with hearing loss and clarified the roles of parents, educators, and audiologists in mitigating these challenges.

4. Result

The results presented below are derived from data collected from Care Network (parents, audiologists, and special educators). Responses from 100 participants were systematically pooled and analyzed to identify communication patterns, barriers, and functional outcomes in children with hearing loss. The findings reflect integrated care network perspectives on pediatric communication challenges.

4.1 Care Network Survey: Perspectives of Audiologists and Special Educators

Quantitative data from closed-ended questionnaire items were analyzed using descriptive statistics, while qualitative data from open-ended questions and parent interviews were analyzed through thematic analysis. The results are presented below, structured according to stakeholder perspectives.

4.1.1 Most Common Types of Hearing Loss

During analysis, responses from audiologists, and special educators were examined to determine the prevalence of hearing loss types among participants. Data were systematically organized and converted into percentages for clarity. Findings indicated that 34.6% of cases were unilateral, affecting a single ear, while 65.4% were bilateral, involving both ears. These results suggest that bilateral hearing loss was more prevalent within the study population.

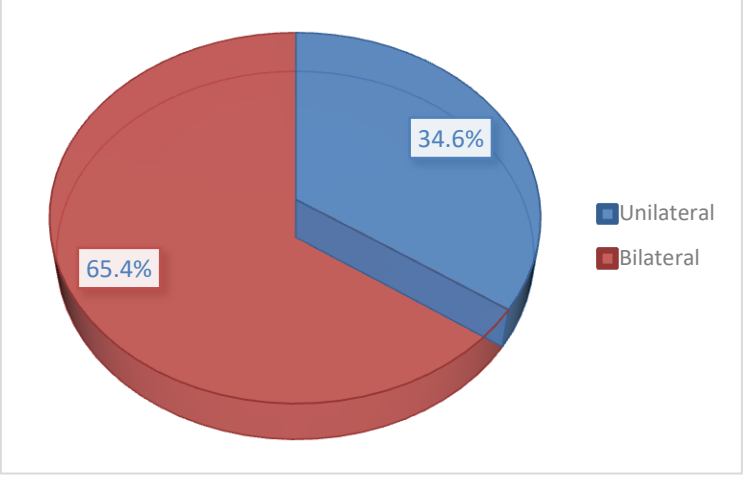

Figure 1: Prevalence of Unilateral and Bilateral Hearing Loss among Children

4.1.2 Modes of Communication

Responses from audiologists, and special educators were analyzed to examine the communication methods used by children with hearing loss. Data were systematically

reviewed, categorized, and expressed as percentages. Results showed that 40% of children relied on nonverbal communication, whereas 60% used verbal or vocal methods. These findings indicate that verbal communication was the predominant method among the participants.

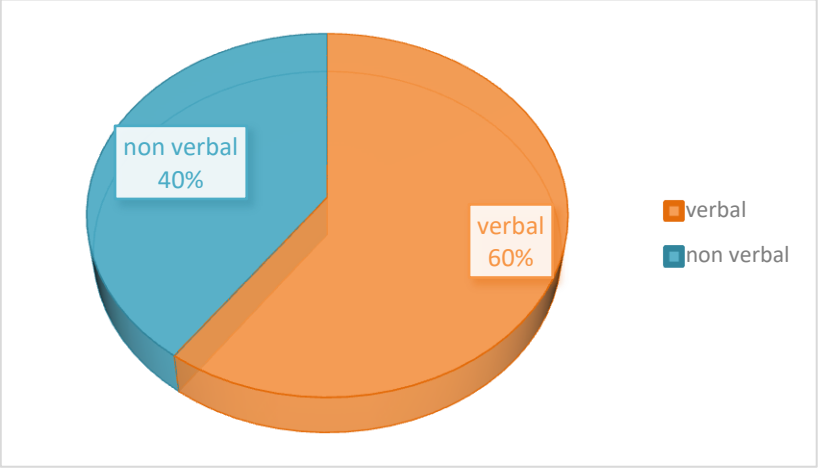

Figure 2: Communication Methods Used by Children with Hearing Loss

4.1.3 Nonverbal Communication Strategies in Children with Hearing Impairment

Data on nonverbal communication strategies used by children with hearing impairment were collected and analyzed. Results showed that lip reading was the most frequently used strategy (40%), followed by body language (25%), sign language (21%), and gestures or posture (14%). These findings demonstrate the diverse nonverbal communication methods employed, with lip reading being the predominant approach among participants.

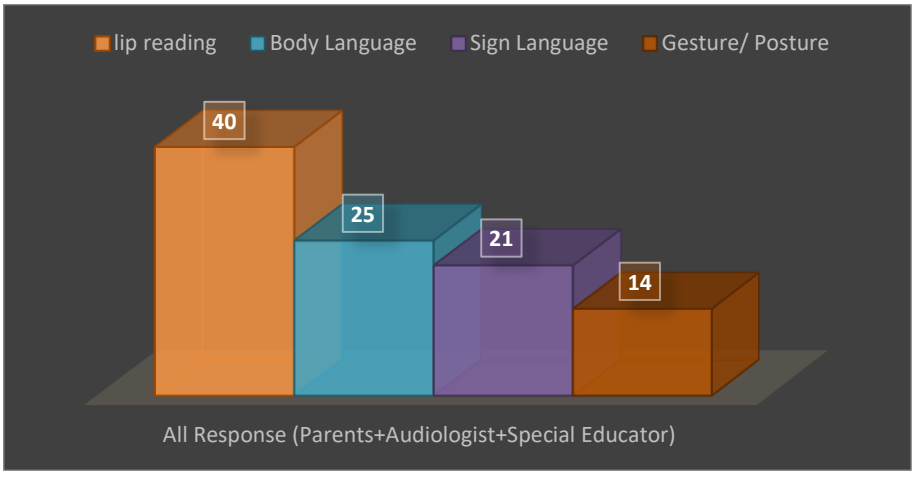

Figure 3: Nonverbal Communication Strategies Used by Children with Hearing Impairment

4.1.4 Impact of Background Noise on Communication in Children with HI

Responses regarding communication difficulties in the presence of background noise were analyzed. Findings indicated that 66.7% of children experienced challenges, while 33.3% did not report difficulties. These results suggest that background noise is a significant barrier to effective communication for the majority of children with hearing impairment.

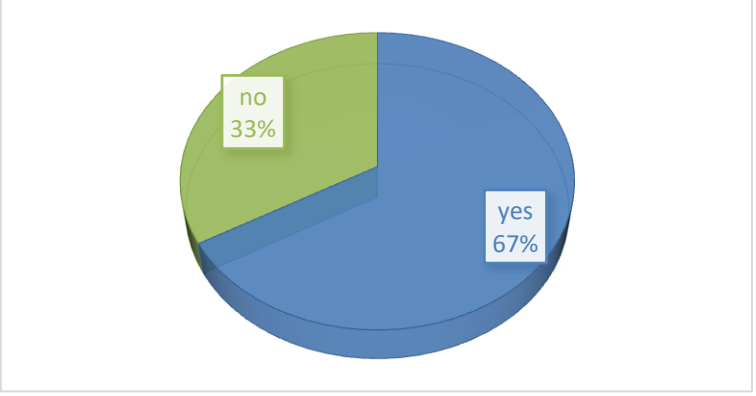

Figure 4: Impact of Background Noise on Communication in Children with Hearing Loss

4.1.5 Ability of Children with Hearing Loss to Follow Multi-Person Conversations

Responses on children's ability to follow conversations involving multiple speakers were analyzed. Results showed that 53.8% of children sometimes experienced difficulty, 11.5% consistently faced challenges, and 34.6% reported no difficulty. These findings highlight the variable impact of multi-speaker environments on communication among children with hearing impairment and are illustrated in the accompanying bar graph.

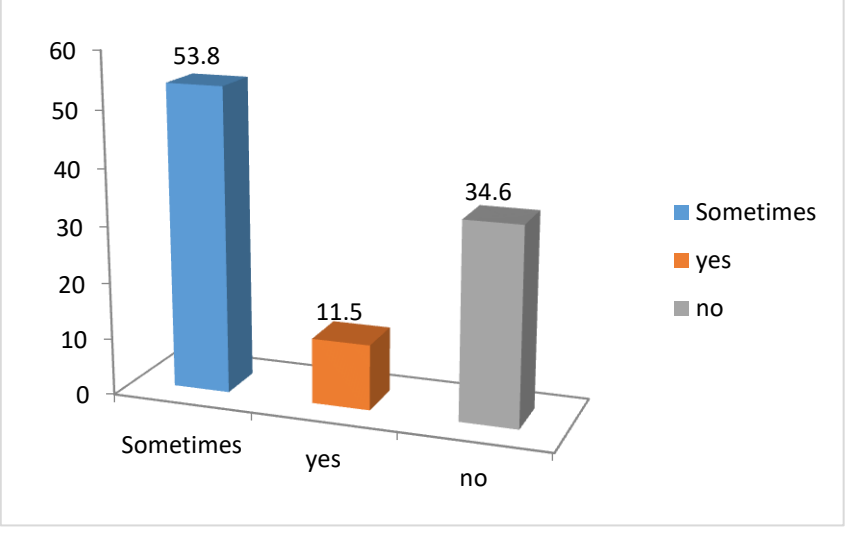

Figure 5: Children's Ability to Follow Multi-Speaker Conversations

4.1.6 Impact of Hearing Loss on Speech Intelligibility

Data were collected to assess the impact of hearing loss on speech intelligibility among children. Analysis revealed that 96.2% of participants experienced difficulties, while 3.8% faced challenges only occasionally. These findings indicate that speech intelligibility is a major concern for the majority of children with hearing impairment and underscore the need for targeted interventions to enhance clarity and effectiveness in spoken communication.

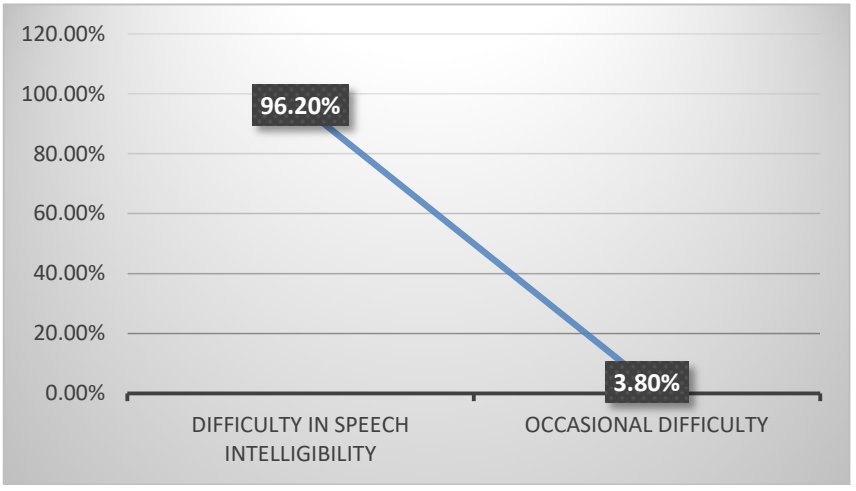

Figure 6: Impact of Hearing Loss on Speech Intelligibility

4.1.7 Effect of Hearing Loss on Speech Sound Perception

Data were collected to evaluate the ability of children with hearing loss to discriminate speech sounds. Analysis showed that 92% of participants experienced difficulty, while 8% faced challenges only occasionally. These findings indicate that speech sound perception is a prevalent issue among children with hearing impairment, highlighting the need for specialized auditory training and targeted intervention strategies.

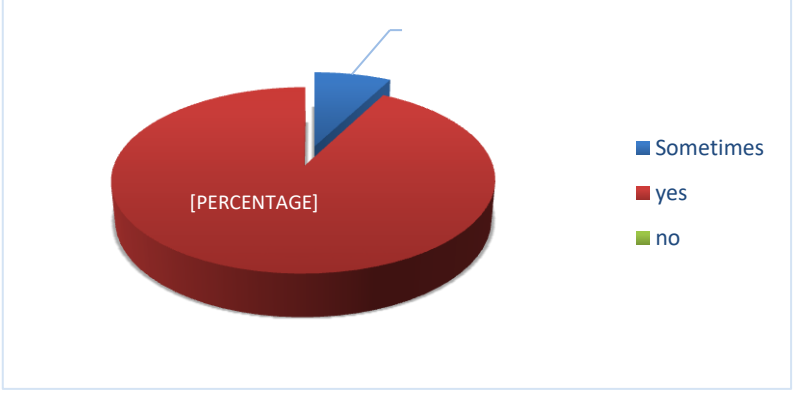

Figure 7: Effect of Hearing Loss on Speech Sound Perception

4.1.8 Impact of Mild Hearing Loss on Communication

Responses were collected to assess the perceived impact of mild hearing loss on children's communication. Findings indicated that 57.7% of participants believed it sometimes affects communication, 30.8% considered the impact definite, and 11.5% reported no perceived effect. These results highlight varying stakeholder perceptions regarding how mild hearing loss influences a child's ability to communicate effectively.

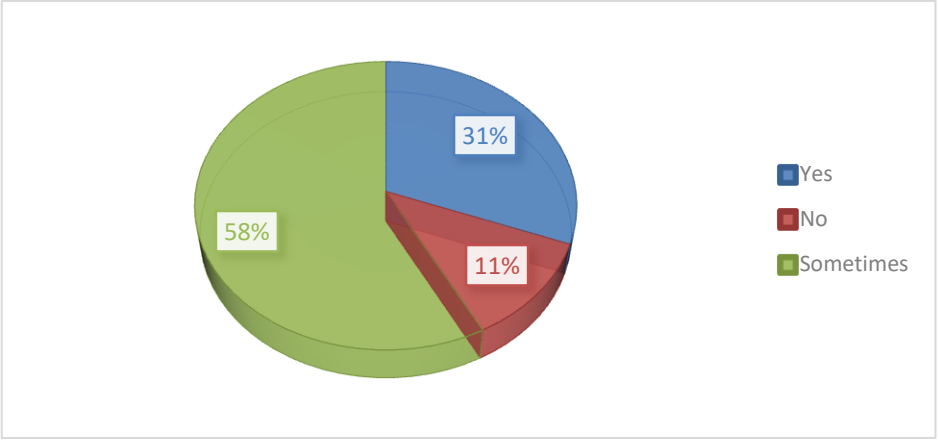

Figure 8: Impact of Mild Hearing Loss on Communication

4.1.9 Most Used Hearing Devices by Children with Hearing Loss

Data were collected to examine the types of hearing devices used by children with hearing loss. Results showed that 52% of children used cochlear implants, 43% used hearing aids, and 5% relied on Bone-Anchored Hearing Aids (BAHA). These findings provide an overview of the distribution of assistive hearing technologies among the participants.

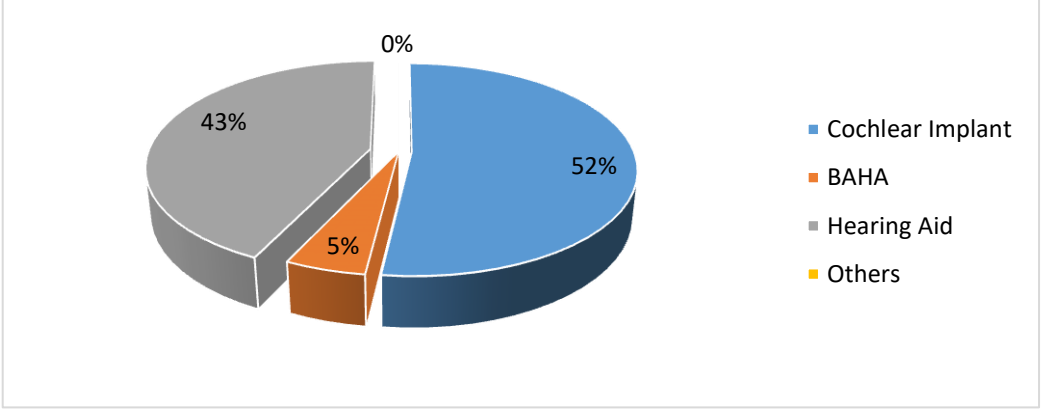

Figure 9: Distribution of Auditory Prosthetics among Children with Hearing Loss

4.1.10 Impact of Hearing Loss on Academic Performance

Data were collected to assess the academic challenges experienced by children with hearing impairment. Results indicated that 71.4% of children consistently faced academic difficulties, while 28.6% experienced challenges occasionally. These findings underscore the substantial impact of hearing loss on educational outcomes and highlight the need for targeted support to facilitate learning among children with hearing impairment.

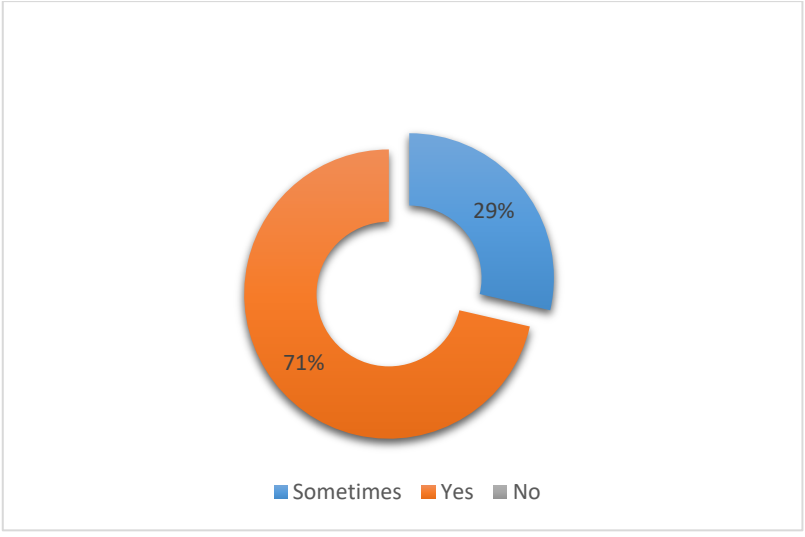

Figure 10: Impact of Hearing Loss on Academic Performance of Children

4.2 Care Network Interviews: Perspectives of Parents

To complement the study results, in-depth interviews were conducted with parents of children with hearing loss (n = 40) to capture experiential insights into communication challenges across home, school, and social contexts. The analysis revealed consistent themes related to speech intelligibility, listening in complex environments, reliance on compensatory strategies, and the broader academic and psychosocial implications of hearing loss.

Table 2. Parental Interview Responses on Communication Challenges in Children with Hearing Loss (n = 40)

Thematic Domain	Key Parental Observations	Interpretive Implications
Type of Hearing Loss	Parents of children with bilateral hearing loss reported more persistent and pervasive communication difficulties than those with unilateral loss.	Indicates a greater functional communication burden associated with bilateral impairment.

Speech Intelligibility	Most parents described reduced speech clarity, frequent requests for repetition, and difficulty being understood by unfamiliar listeners.	Identifies speech intelligibility as a core area of concern requiring targeted intervention.
Background Noise	The majority of parents reported substantial communication breakdowns in noisy environments such as classrooms and social gatherings.	Highlights the critical role of environmental acoustics in effective communication.
Multi-Speaker Conversations	Parents noted that children often struggled to follow group discussions and missed key information in multi-speaker settings.	Suggests limitations in auditory attention and speech-in-noise processing.
Nonverbal Communication Strategies	Lip reading was the most frequently reported compensatory strategy, followed by facial expressions and body language.	Demonstrates reliance on visual cues to supplement auditory input.
Use of Sign Language	Sign language was used selectively, primarily as a supportive rather than dominant mode of communication.	Reflects preference for oral or spoken communication when auditory access permits.
Impact of Mild Hearing Loss	Parents emphasized that even mild hearing loss resulted in missed information and increased listening effort.	Challenges assumptions that mild hearing loss has minimal functional impact.
Academic Communication	Parents consistently reported difficulties with classroom understanding, participation, and attention.	Reinforces the link between communication barriers and academic challenges.
Hearing Devices	Although hearing aids and cochlear implants improved sound access, communication difficulties persisted.	Indicates that amplification alone does not fully resolve communicative limitations.
Support and Guidance Needs	Parents highlighted the need for coordinated input from audiologists, educators, and therapists.	Supports a multidisciplinary, family-centered intervention approach.

Overall, parental interview findings demonstrate that communication challenges in children with hearing loss extend beyond auditory thresholds to encompass

environmental, linguistic, academic, and social dimensions. These insights underscore the importance of integrated, care network intervention strategies that actively incorporate parental perspectives alongside clinical and educational support.

4.3 Key Findings

This study examined communication challenges in children with hearing loss from care network perspectives, including parents, audiologists, and special educators. Analysis revealed significant barriers in speech, language, social interaction, and academic performance, reflecting both individual and environmental factors. The following key findings summarize the most critical insights from the study:

1. Bilateral hearing loss was more common (65.4%) than unilateral hearing loss (34.6%), indicating higher risk for widespread communication difficulties.
2. Verbal communication was the predominant method (60%), while 40% of children relied on nonverbal strategies.
3. Among nonverbal cues, lip reading (40%) was most frequently used, followed by body language (25%), sign language (21%), and gestures/posture (14%).
4. Background noise was a significant barrier, with 66.7% of children experiencing difficulty communicating in noisy environments.
5. Following conversations with multiple speakers posed challenges, with 53.8% sometimes struggling and 11.5% consistently having difficulty.
6. Speech intelligibility was impaired in 96.2% of children, emphasizing the need for targeted speech interventions.
7. Difficulty distinguishing speech sounds affected 92% of children, highlighting the importance of auditory training.
8. Mild hearing loss was reported to affect communication sometimes or definitely by 88.5% of respondents, showing that even minor impairment can impact interaction.
9. Cochlear implants (52%) were the most used hearing devices, followed by hearing aids (43%) and BAHA (5%).
10. Academic performance was consistently affected, with 71.4% of children experiencing learning difficulties.

4.4 Care Network Interventions to Overcome Communication Barriers

Parents, audiologists, and special educators employ complementary and interrelated intervention strategies to mitigate communication barriers in children with hearing impairment. Parents play a central role by reinforcing consistent hearing device use, facilitating structured communication routines at home, and employing multimodal strategies such as lip reading, gestures, and visual cues to support comprehension. Audiologists and AVT therapists contribute through early identification, precise audiological assessment, fitting and optimization of hearing aids or cochlear implants, and the delivery of structured auditory training aimed at improving speech intelligibility and sound discrimination. Special educators focus on classroom-based adaptations,

including instructional modifications, visual supports, individualized education plans, and strategies to reduce environmental noise and enhance access to spoken language. Collectively, these interventions target both auditory and functional communication domains, addressing speech clarity, listening in noise, and participation in multi-speaker interactions, as reflected in the high prevalence of care network-reported challenges identified in the present study.

4.5 Impact of a Coordinated Multidisciplinary Approach on Communication and Developmental Outcomes

The findings of this study indicate that a coordinated, multidisciplinary approach substantially enhances communication and developmental outcomes for children with hearing impairment. When parents, audiologists, and special educators collaborate through shared goal-setting, consistent intervention strategies, and regular communication, children demonstrate improved speech intelligibility, better discrimination of speech sounds, and increased functional participation in academic and social contexts. The integration of audiological management with educational accommodations and home-based reinforcement creates continuity across clinical, classroom, and familial environments, reducing fragmentation in service delivery. Stakeholder convergence was particularly evident in addressing environmental barriers such as background noise and multi-speaker settings, where coordinated strategies yielded more effective communication support. Overall, the evidence suggests that multidisciplinary collaboration not only mitigates communication barriers but also promotes broader developmental gains, including academic engagement and social interaction, underscoring its critical role in optimizing outcomes for children with hearing loss.

5. Discussion

This mixed-methods study examined communication challenges in children with hearing impairment through the perspectives of Care Network, including parents, audiologists, and special educators. The findings reveal the complex interplay between the type and severity of hearing loss, the communication methods adopted by children, the role of assistive devices, and environmental and educational factors in shaping communication outcomes. By synthesizing quantitative and qualitative data, the study provides a comprehensive overview of the multifaceted barriers these children face, while also highlighting the strategies used by caregivers and professionals to mitigate them.

The predominance of bilateral hearing loss (65.4%) observed in this study aligns with previous findings indicating that bilateral impairment often results in more pronounced language and social deficits compared with unilateral loss (Driscoll et al., 2009; Lieu, 2024). Similarly, the reliance on verbal communication by 60% of children, complemented by nonverbal strategies such as lip reading (40%), body language (25%), sign language (21%), and gestures (14%), corroborates earlier reports emphasizing the importance of multimodal communication in supporting linguistic competence

(Bongioletti et al., 2024; Afzaal et al., 2024; Mpofu & Chimhenga, 2025). The present study extends these findings by quantifying the distribution of specific nonverbal cues among Bangladeshi children with hearing loss, highlighting cultural and contextual influences on strategy adoption.

Environmental factors, particularly background noise, were reported as a significant barrier, with 66.7% of participants experiencing communication difficulty. These findings are consistent with systematic reviews indicating that classroom acoustics and ambient noise exacerbate comprehension challenges in hearing-impaired children (Driscoll et al., 2009; McCreery et al., 2024). Additionally, difficulty following conversations involving multiple speakers-experienced sometimes by 53.8% and consistently by 11.5% of children-reflects the real-world challenges noted in prior pragmatic language studies (Bongioletti et al., 2024; Yoshinaga-Itano et al., 2020). The current research contributes uniquely by linking these difficulties to multistakeholder observations, demonstrating how parents, educators, and audiologists perceive and prioritize such challenges differently.

Speech intelligibility and phonemic perception emerged as critical areas of concern. In this study, 96.2% of children had difficulties with speech clarity, and 92% struggled to distinguish speech sounds. These results align with prior literature showing that early auditory deprivation significantly impacts both segmental and suprasegmental aspects of speech (Casoojee, Khoza-Shangase, & Kanji, 2025; McCreery et al., 2024; Gravel & O'Gara, 2023). Moreover, even mild hearing loss was reported to affect communication in 88.5% of cases (57.7% sometimes, 30.8% definitely), underscoring the need for early detection and proactive intervention to prevent cumulative linguistic and academic deficits (Holstrum et al., 2009; Al-Saeed & Al-Dobooni, 2025).

The study also highlights the importance of hearing devices in mitigating communication challenges. Cochlear implants were used by 52% of children, hearing aids by 43%, and BAHA by 5%. These figures reinforce prior findings that appropriate amplification significantly enhances speech and language outcomes, particularly when combined with structured therapy approaches (Casoojee, Khoza-Shangase, & Kanji, 2025; MDPI Communications Study, 2025). Furthermore, the high prevalence of academic challenges (71.4%) among children with hearing loss aligns with evidence demonstrating that communication deficits have cascading effects on literacy, classroom participation, and learning outcomes (Mpofu & Chimhenga, 2025; Rehabilitation Journal, 2025).

Compared with prior studies, this research uniquely integrates care network perspectives to reveal both convergent and divergent observations on communication difficulties. While previous literature often focuses on either child outcomes or clinical interventions, the current study synthesizes parental insights, professional observations, and educational experiences, offering a holistic understanding of real-world communication barriers. Differences in stakeholder perspectives-for example, the varying perception of mild hearing loss impact-highlight the need for coordinated communication strategies, joint

training, and continuous dialogue among professionals and caregivers to optimize intervention.

6. Recommendations

Based on the study's findings and supported by prior literature, the following recommendations are proposed to enhance communication and educational outcomes for children with hearing loss:

- Implement early detection programs and adhere to Early Hearing Detection and Intervention (EHDI) guidelines for timely identification of hearing loss.
- Develop individualized communication strategies according to the child's hearing loss type, preferred communication mode, and nonverbal cues.
- Encourage collaboration between parents, audiologists, and educators to ensure consistent and coordinated interventions.
- Incorporate structured auditory training to improve speech sound discrimination and intelligibility.
- Modify environments, such as classrooms and homes, to reduce background noise and enhance listening conditions.
- Ensure proper fitting, usage, and maintenance of hearing devices, with training for caregivers and teachers.
- Integrate pragmatic language skill-building in therapy and educational settings to improve social communication.
- Provide education and support for parents and caregivers to reinforce communication strategies at home.
- Train teachers in inclusive education practices, classroom accommodations, and strategies for hearing-impaired students.
- Advocate for policies that enhance access to audiology services, assistive devices, and inclusive educational programs.

7. Conclusion

This study demonstrates that children with hearing loss face pervasive communication and academic challenges, influenced by hearing type, communication methods, nonverbal strategies, and environmental factors. The findings highlight the importance of early detection, individualized interventions, and care network collaboration to optimize communication, educational, and social outcomes. Implementing targeted auditory and pragmatic training, ensuring proper hearing device use, and fostering coordinated efforts among parents, educators, and audiologists can significantly improve the developmental trajectory of children with hearing impairment. Policy support and inclusive educational practices are essential to ensure equitable opportunities and enhance the quality of life for these children.

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