The role of linguistic input in language development among children with hearing loss: a narrative review

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Abstract

Linguistic input is critical for language development, yet children with hearing loss (HL) often experience reduced auditory access. This narrative review, using a Flexible, Rigorous, and Practical (FRP) framework, synthesized studies (2014–2024) examining how input characteristics affect spoken language in children using hearing aids (HAs) or cochlear implants (CIs). From 234 records screened, seven studies met inclusion criteria. Findings indicate that high-quality, responsive input—especially caregiver behaviours like expansions and open-ended questions—supports language growth more than input quantity. Socioeconomic and contextual factors further shape outcomes, while passive input (e.g., electronic media) relates negatively to development. Early enriched environments foster cumulative, non-linear progress, underscoring the need for context-sensitive interventions and continued research on input–outcome dynamics in children with HL.

Keywords: hearing loss, language input, outcomes

Introduction

Linguistic input is a key driver of language development in typically developing children (Friedmann et al., 2015). Children with hearing loss (HL) often experience inconsistent access to auditory-linguistic input, elevating the risk for language delays (Sultana et al., 2024). Even with hearing aids (HAs) and cochlear implants (CIs), language acquisition is not guaranteed; input must be both present and accessible (Nittrouer et al., 2020; Poupore et al., 2024).

This narrative review synthesizes empirical evidence on the role of linguistic input in children with HL. It identifies key elements that promote successful spoken-language outcomes. It also highlights conceptual gaps to guide parent-focused interventions and future research.

Methods

This narrative review followed the Flexible, Rigorous, and Practical (FRP) approach (Sukhera et al., 2022) to examine how linguistic input affects spoken language outcomes in children with HL using HAs or CIs. A PubMed search (February–March 2025) targeted studies published between 2014–2024 using the Boolean string: (((language input OR quantity OR quality) AND (hearing loss

OR hard of hearing OR deaf)) AND (language development OR language outcomes)) NOT (sign language).

Eligible studies were peer-reviewed English articles on spoken-language development in children with HL that measured both linguistic input and outcomes; we excluded reviews/editorials, lab-based, and sign-language studies. Records were screened in three stages (identification; title/abstract; full text), data were extracted (design, participants, input/outcome measures, findings), quality was appraised with MMAT (2018), and results were narratively synthesized to identify input–outcome patterns (Popay et al., 2006).

Results

Study selection and characteristics

Records were screened in three phases: (1) identification of 234 records through database searches, (2) title and abstract screening after duplicate removal (n = 23), and (3) full-text eligibility assessment (n = 16). Finally, seven studies met the inclusion criteria and were included in the final synthesis. All included studies examined linguistic input—quantity, quality, or both—and spoken language outcomes in children with HL using HAs or CIs. The studies primarily focused on preschool-aged children and used quantitative, qualitative, or mixed-methods designs. Key variables included both quantity and quality of linguistic input—such as lexical diversity, syntactic complexity, caregiver responsiveness, mental-state talk—as well as socioeconomic and demographic factors. Common tools included LENA recordings, standardized language assessments (e.g., PPVT, CASL), and observational or transcription-based measures of caregiver–child interaction. Findings consistently highlighted that high-quality, responsive input—rather than input quantity alone—was more strongly associated with better receptive and expressive language outcomes.

Methodological quality

All included studies were appraised using the Mixed Methods Appraisal Tool (MMAT, 2018). Most studies met 4–5 out of the 5 criteria, indicating good methodological quality. Overall, the reviewed evidence was sufficiently robust to support reliable conclusions in the subsequent narrative synthesis.

Narrative synthesis

Across seven studies, linguistic input quality—especially caregiver responsiveness and linguistic complexity—outperformed sheer quantity in predicting spoken-language outcomes for children with HL; richer, contingent input was linked to stronger receptive and expressive skills, particularly in CI users. Early, enriched exposure further boosted acquisition, suggesting a sensitive period. Socioeconomic factors (e.g., SES, maternal education) shaped access and the input environment, but in structured auditory-driven programs (e.g., AVT)

SES itself did not consistently predict outcomes; effects appeared to operate mainly via access pathways (referrals, service availability) (Binos, Papastefanou, & Psillas, 2023). Passive input (e.g., electronic media) correlated with fewer interaction opportunities and weaker comprehension, underscoring the need for interactive, developmentally appropriate input.

Discussion

This review confirms that high-quality caregiver input is crucial for spoken language development in children with HL. Also, findings reinforce the idea that input must be not only audible but developmentally rich. Early intervention should prioritize interactive environments.

Notably, gaps remain in understanding how the beneficial elements of input interact with each other and under which environmental or acoustic conditions they effectively support children with HL. Further research is needed to explore these complex input–outcome dynamics, including the potential influence of pre-implant linguistic exposure.

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