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Speech Sound Disorders in children with Hearing impairments: A Scoping Review

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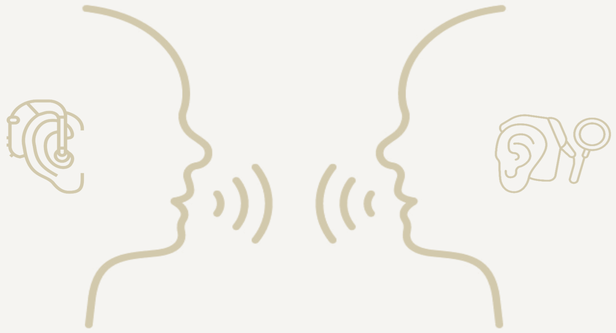


Aims

- To collate evidence from research across different types of hearing loss in childhood and establish patterns of speech sound disorder in this diverse range of children.
- To examine the extent, range and nature of research activity to identify research gaps in existing literature involving children with hearing impairments and speech sound disorder.

Introduction

It is assumed that children with hearing impairments will likely have speech sound disorders as they have limited exposure to the different speech sounds in their native language. However, this is not always what is seen in practice.

Both '*speech sound disorder*' and '*hearing impairment*' are broad terms which include diverse populations so the nature of these difficulties together are not well understood. This can affect the level of support these children receive.

Understanding what literature exists in this area allows more research to be done.

Methods

A protocol was developed using JBI Manual for Evidence Synthesis and the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for scoping reviews (2018) which included an eligibility criteria in a PCC framework (population, concept, context) framework.

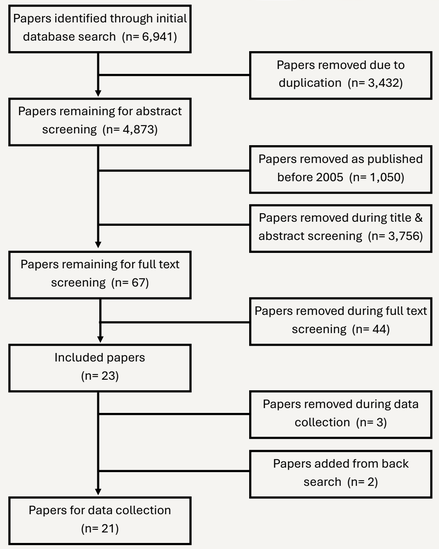
Databases searched:

- Cochrane Library
- MEDLINE
- EMBASE
- PsycINFO
- CINAHL
- ERIC
- Scopus
- Web of Science

Inclusion criteria:

- Participants aged 3-16 with English as their native language
- Papers include detail on severity and type of both hearing impairment and SSD

Papers were uploaded onto the software Rayyan to manage duplicates and screening.

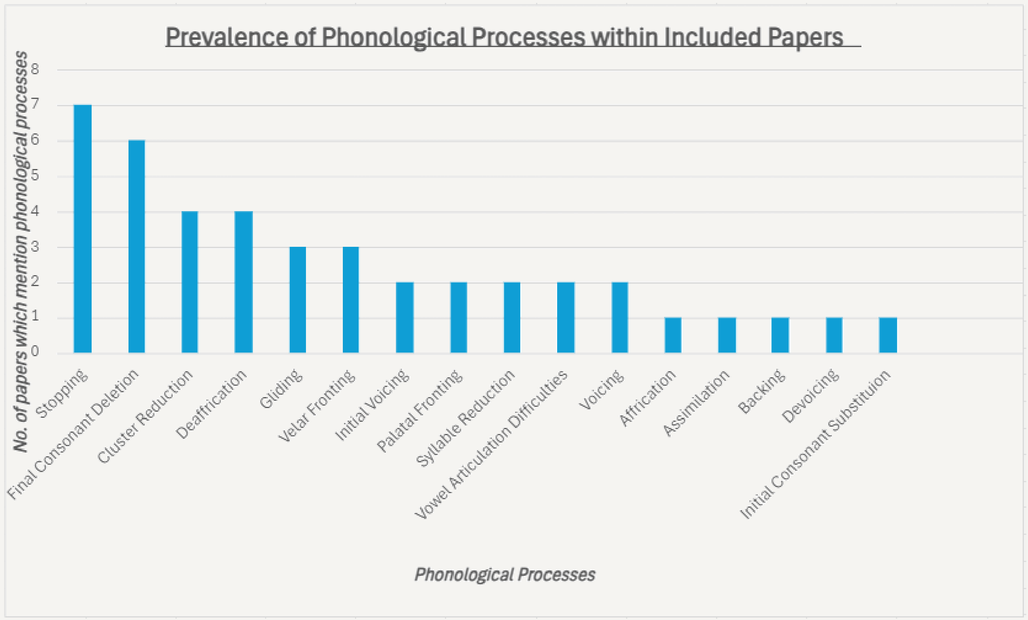


Results

In this scoping review, 21 studies met the inclusion criteria, representing a total of 999 children with hearing impairments. The average participant age across the studies was 66.92 months (5.58 years).

Key findings- *Phonological processes*

- The most common phonological processes (found in 11 studies) were stopping, final consonant deletion, gliding and cluster reduction (shown in figure 1)
- Some studies also highlighted specific difficulties with fricatives and final consonants, although they did not provide further detail.



What information did included papers report?

- 11 studies reported *phonological processes*
- 4 studies reported on the order *of consonant acquisition*, excluding detail on speech errors
- 3 studies presented *percentage of consonants correct* (PCC), specifying consonant types
- 2 studies found *no significant differences* in children with HI compared to typically hearing peers
- 1 study identified *types of speech sound disorder* (e.g. phonological delay, articulation disorder)

Limitations and inconsistencies

- Inconsistencies in phonological terms were noted across studies, with different terms used to describe the same processes (e.g. 'liquid simplification' and 'gliding')
- Several studies did not specify the type and severity of hearing impairments, particularly in studies including children with cochlear implants
- Many studies focused on children with more severe hearing impairments (e.g. bilateral severe-profound sensorineural hearing loss) or on children with prelingual or congenital impairments.

Conclusions

This scoping review found that research on speech sound disorders in children with hearing impairments is limited. While many studies do provide information on phonological processes, variability in how speech sounds are reported in children with hearing impairments as well as inconsistent terminology makes it challenging to compare results across studies. However, common phonological processes identified include: stopping (e.g. 's' -> 'd'), final consonant deletion, gliding (e.g. 'r' -> 'w') and cluster reduction (e.g. 'tr'-> 't').

Gaps in Research

The findings highlight several gaps in the research:

- A lack of research detailing the type and severity of hearing impairments, especially in children with cochlear implants
- Inconsistent terminology and reporting of phonological processes and speech errors
- Limited studies addressing the full range of hearing impairments, particularly mild cases.

Implications for Future Research

Future research should focus expanding research to include children with a wider range of hearing impairments, especially mild to moderate hearing loss cases. Standardized terminology for phonological processes and detailed reporting of speech errors will improve consistency in reporting phonological processes and SSDs. This will enable a clearer understanding of the relationship between hearing impairments and speech sound disorders in children.