



Faculty of Cognitive Sciences and Human Development

**THE EFFECTS AND EARLY INTERVENTIONS IN
LANGUAGE DEVELOPMENT AMONG CHILDREN WITH
HEARING IMPAIRMENTS: A COMPREHENSIVE REVIEW**

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**THE EFFECTS AND EARLY INTERVENTIONS IN LANGUAGE
DEVELOPMENT AMONG CHILDREN WITH HEARING
IMPAIRMENTS: A COMPREHENSIVE REVIEW**

AMIRA KHAIRUNISSA BINTI ZULKARNAIN

**This project is submitted
in partial fulfilment of the requirements for a
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**Faculty of Cognitive Sciences and Human Development
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The project entitled ‘The Effects and Early Interventions in Language Development among Children with Hearing Impairments: A Comprehensive Review’ was prepared by Amira Khairunissa Binti Zulkarnain and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Science with Honours (Cognitive Science).

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ABSTRACT

Hearing impairment means a person has a problem with hearing, which is either permanent or fluctuating. Hearing impairment causes a person to become a stranger in this world. They become isolated because what is said is not understood or misinterpreted. Therefore, such hearing impairment should be given attention and take an early intervention from an early age. Hearing impairment can affect language development, especially for children with disability. Children's language development is very important to apply from birth. This is because the language allows them to interact well with the people around them. Besides that, language development is the most important aspect of life so that the child does not become slow in learning and lag behind other children. Therefore, this study is a comprehensive review that focuses on the impact of language development for children with hearing impairment and early intervention for such children in language development.

Keywords: hearing impairment, language development, effect, early intervention, and hearing-impaired children.

ABSTRAK

Kecacatan pendengaran bermaksud seseorang itu mengalami masalah pendengaran, sama ada kekal atau turun naik. Masalah pendengaran menyebabkan seseorang menjadi asing di dunia ini. Mereka menjadi terasing kerana apa yang diperkatakan tidak difahami atau disalah tafsir. Oleh itu, masalah pendengaran sebegini perlu diberi perhatian dan mengambil intervensi awal sejak dari kecil lagi. Kecacatan pendengaran boleh menjejaskan perkembangan bahasa, terutamanya bagi kanak-kanak kurang upaya. Perkembangan bahasa kanak-kanak amat penting untuk diaplikasikan sejak lahir. Ini kerana bahasa membolehkan mereka berinteraksi dengan baik dengan orang sekeliling. Selain itu, perkembangan bahasa merupakan aspek terpenting dalam kehidupan agar kanak-kanak tidak menjadi lambat dalam pembelajaran dan ketinggalan daripada kanak-kanak lain. Oleh itu, kajian ini merupakan tinjauan menyeluruh yang memfokuskan kepada kesan perkembangan bahasa bagi kanak-kanak bermasalah pendengaran dan intervensi awal bagi kanak-kanak tersebut dalam perkembangan bahasa.

Kata kunci: gangguan pendengaran, perkembangan bahasa, kesan, intervensi awal, dan kanak-kanak bermasalah pendengaran.

CHAPTER ONE

INTRODUCTION

People use their senses to suit their needs and to interact with their surroundings. One of the most important senses in every human being is the sense of hearing. According to the definition by Ussenova et al. (2022), hearing is a fundamental tool that allows people to think, communicate, transfer their thoughts, perceive their environment, and socialise. Hearing is crucial in language acquisition and development. Therefore, given the field of communication, hearing impairment might be regarded as a key biological component causing significant delays in child development (Oliveira et al., 2015). Hearing impairment means a person has a problem with hearing, which is either permanent or fluctuating. It will affect the educational performance of children. Even so, it is not included in the definition of “deaf” (Center for Parent Information and Resources, 2019). But deafness can be known as a hearing impairment. This is because hearing impairments occur only due to some parts of the ear.

Children with hearing impairments stem from a variety of factors. Among the factors that cause hearing impairments are genetic factors, premature birth, having syndromes, taking medications in serious situations, and so on (Cincinnati, 2019). Meanwhile, hearing impairments can affect many different aspects. One of them is language development. Language development is a higher-level cognitive skill that entails measuring a person’s aptitude and language ability to communicate with individuals (Goldstein & Naglieri, 2020). It is particularly important since it enhances the ability to communicate, express, and understand one's feelings. It also enhances the ability to think and assists in the development and maintenance of relationships with others (Cement Answers, 2021). Language is a complex system with many components. Language components include phonology, semantics, syntax, and pragmatics. By the end of the ninth year of their lives, most developing children have

acquired skills in all four components (Goldstein & Naglieri, 2020). For children with hearing problems, their language development will be impaired especially in terms of comprehension. It will allow their learning to be slow and different from normal children.

If a child's hearing impairments occur earlier, then more serious effects will occur on the child's development. Similarly, if the problem is identified and the intervention starts earlier, then the less serious the ultimate impact (American Speech Language Hearing Association, 2015). Therefore, early diagnostic approaches and language interventions are important to bring the development of children's hearing impairments to normal levels. The language development of children with hearing impairments is occurring in heterogeneous ways (Oliveira et al., 2015). However, knowledge of such developmental processes needs to be improved so as not to be detrimental to their future.

Hearing impairments are difficult to cure, but the problem can be reduced by taking early intervention. This allows children with hearing impairments to be able to hear and interact like children with normal hearing. If the intervention is not taken earlier, then the hearing impairments of the child are likely to get worse. So, it is better to take early intervention in reducing the problem so that the child can do all the desired activities indefinitely like other children.

Therefore, this study is about the effect on language development for children with hearing impairment and the early intervention needed. Studies on this problem need to be conducted. This is to extend to readers, especially parents and guardians about the effect that will occur on language development for children with hearing impairments. Most parents are not aware of the conditions that befall their children from the beginning of birth because the symptoms for newborns are slow. With this study, they will begin to take note of this problem. Not only that, but this study also discusses the early interventions needed to reduce hearing

problems. So, the readers especially those who belong to parents and guardians can take early action for their children.

RESEARCH OBJECTIVE

This study is to discuss the following objectives:

1. To examine the effects of hearing impairments on children's language development.
2. To identify early interventions for children with hearing impairments in language development.

RESEARCH QUESTION

1. What are the effects of hearing impairments on children's language development?
2. What are the early interventions for children with hearing impairments in language development?

CHAPTER TWO

METHOD

Articles were found using reliable research search engines such as PubMed, ResearchGate, Google Scholar, Semantic Scholar, Science Direct, and Connected Papers. It was searched using the full title of this study as well as the keywords such as “hearing impairment”, “language development”, “effect”, “early intervention”, and “hearing-impaired children”. Furthermore, the article search was from 2001 to 2022. It was carefully selected in relation to the research objectives and research questions for this project. The results of this study were divided into two categories, namely the effects of hearing impairments on children’s language development and early interventions for children with hearing impairments in language development.

Table 1. Literature search for the effects of hearing impairments on children's language development

Effect	Article	Methodology	Age	Findings
Limiting the listening skills	Brannstrom et al. (2020)	Quantitative	6-13 (Hearing-impaired children using CI and HA)	Because higher listening effort appears to be a result of increased cognitive resource spending, fewer resources will likely be available for these children to grasp and learn in difficult listening situations such as schools.
	Gordon et al. (2021)	Quantitative	9-10 (Children with unilateral hearing loss and bilateral CI)	Children with unilateral hearing loss are at a greater deficit than children with severe to profound deafness who utilise bilateral cochlear implants (CI).
	Mpofu & Chimhenga (2013)	Qualitative case study	All hearing-impaired students	Students with hearing impairments may struggle with certain sound frequencies and may struggle when there is a lot of background noise.
	Mutumburanzou (2018)	Review/Meta-analysis	All children with hearing problems	Children with hearing impairment become poor listeners. They are more susceptible to ear illnesses like otitis media. The fluid in the middle ear affects loss of hearing

				in this condition for weeks or even months following infection.
Poor spoken language	Cabrera & Halliday (2020)	Quantitative	8-16 (Children with mild to moderate hearing loss)	Children with sensorineural hearing loss who have more deficiencies in temporal fine structure (TFS) perception may be more vulnerable to spoken language issues than those who have stronger TFS perception.
	Mutumburanzou (2018)	Review/Meta-analysis	All children with hearing problems	A child with pre-lingual deafness has significant difficulties learning and using spoken language. This is because the infant lost hearing before acquiring language and speech, and a communication barrier may exist between the child and the hearing population.
	Zamani et al. (2017)	Quantitative	3-5 (Children with hearing loss)	Speech intelligibility may suffer as a result of hearing loss.
Lack of vocabulary development	Choudhry et al. (2021)	Quantitative	4-12 (Moderate to severe sensorineural hearing loss students)	When HI children are taught to read and write using traditional ways, they have a short, narrow vocabulary and improper sentence form that violates grammatical principles.

Halliday et al. (2017)	Quantitative	8-16 (Children with MMHL)	Children with mild to moderate sensorineural hearing loss (MMHL) performed worse than their peers who had normal hearing on standardized vocabulary tests.
Mpofu & Chimhenga (2013)	Qualitative case study	Teachers in the school	Concrete words are easier for hearing-impaired children to learn than abstract terms. They also struggle to understand words with many meanings and frequently struggle to understand complex phrases.
Persson et al. (2021)	Quantitative	18-30 months (Children with moderate hearing loss)	Vocabulary development from 18 to 24 months shows a disparity between children with hearing loss and those without, which grows further from 24 to 30 months (children with hearing loss have fewer words)
Shojaei et al. (2016)	Mixed method	6-7 (Children with bilateral hearing loss)	Hearing-impaired children have semantics deficits throughout their development. These children frequently struggle with complicated sentence formation, understanding the meaning of various concepts, and comprehending abstract terminology.

Difficulty in producing speech sounds	Smolen et al. (2020)	Quantitative	3-5 (Preschoolers with hearing loss)	Children with hearing loss, regardless of communication modality, have a limited vocabulary than children with normal hearing and have difficulty with functional word acquisition.
	Borg et al. (2002)	Mixed method	4-6 (Hearing-impaired children)	One of the boys, on the other hand, has a significantly worse sense of hearing speech-in-noise and extremely poor phoneme mobilisation.
	Briscoe et al. (2001)	Quantitative	5-10 (Children with SNH and SLI)	Difficulties encoding novel speech at the phonemic level are more problematic for individuals with Specific Language Impairment (SLI) than for those with Sensorineural Hearing Loss (SNH).

Table 2. Literature search for the early interventions for children with hearing impairments in language development

Intervention	Article	Methodology	Age	Findings
Use of sign language	Choudhry et al. (2021)	Quantitative	4-12 (Moderate to severe sensorineural hearing loss students)	Curriculum reform for deaf and hard of hearing children is recommended, and parents, examination department teachers, and schools should be skilled in sign language.
	Dzulkifli et al. (2019)	Qualitative case study	32-48 (Teachers) 50-52 (Officers)	Manual Coded Malay (KTBM) was chosen as the primary method for teaching the Quran to students with special needs and hearing impairments. This hand code is based on American Sign Language, with certain local warnings and grammatical warnings signifying new Malay nouns and verbs added.
	Nwadinobi (2019)	Qualitative case study	All	Students require sign language interpreters in the classroom, as well as support with supplemental resources.

	Wilbur & Hrastinski (2016)	Quantitative	6-11 th grade students	Deaf students who are fluent in ASL outperform their less fluent peers not only on English reading comprehension tests and English use assessments but also in other areas of academic accomplishment, such as mathematics understanding.
Speech-language therapy	Mutumburanzou (2018)	Review/Meta-analysis	Parents of hearing loss children	The parents should engage their children with hearing loss in rich linguistic surroundings. Parents then teach and strengthen the language instinctively.
	Rabelo & Melo (2016)	Quantitative	Parents of hearing-impaired children	Speech therapy can help minimize the effects of hearing problems. A speech therapist will help patients and their families. The focus of the therapy will be to improve communication skills among hearing-impaired children.
	Sheikh et al. (2021)	Quantitative	Parents of hearing-impaired children	When parents are aware of and active in the therapeutic process, speech and language therapy is more effective. The parents' viewpoint is critical in this case.

Use of hearing aids	Thida et al. (2020)	Quantitative	4-10 Burmese children	VOIS is Myanmar's first speech therapy app for hearing-impaired children, allowing them to practise language skills at their own pace. It is also useful in teaching children with hearing impairments the fundamentals of the language.
	Zamani et al. (2017)	Quantitative	3-5 (Children with hearing loss)	Hearing performance increases over time, resulting in improved speech comprehension for people who utilise cochlear implants or hearing aids.
	Lederberg et al. (2013)	Review/Meta-analysis	Deaf and hard-of-hearing children	Hearing aid auditory information may not be as detailed as it obtained by normal hearing. Some children may also not obtain access to speech.
	Oliveira et al. (2015)	Review/Meta-analysis	Hearing-impaired children and adolescents	The use of hearing aids can reduce hearing problems and assist in assessing children's oral and writing skills, as well as their modification.
	Shojaei et al. (2016)	Mixed method	6-7 (Children with bilateral hearing loss)	The assessment of lingual development in hearing-impaired children will help to determine lingual deficiencies and plan suitable auditory/verbal rehabilitative therapy before school entry.

Teaching methods	Tursunboyevich (2022)	Qualitative	Hearing-impaired primary students	The study shows the importance of ensuring that children with hearing problems are provided with hearing aids early.
	Choudhry et al. (2021)	Quantitative	4-12 (Moderate to severe sensorineural hearing loss students)	In each school, children with hearing impairments should have a carefully planned curriculum and a sign language teacher. Learning should be presented in the form of pictures, animated GIFs, or videos, as well as role-play since this will engage students in the concept of learning.
	Mpofu & Chimhenga (2013)	Qualitative case study	18 secondary school teachers	Encourage students who have a hearing impairment to sit in the front row so that their line of sight is not hindered. This is especially critical if students are lip-reading, depending on visual cues, or have limited-range hearing aids.

Cochlear implants	Tursunboyevich (2022)	Qualitative	Hearing-impaired primary students	Teaching methods are classified in several ways such as practical, visual, and oral methods. The method is used in deaf pedagogical training, with options determined based on the nature of the speech impairment.
	Ussenova et al. (2022)	Qualitative: Phenomenology design	Hearing-impaired primary students, teachers, and parents	Planning social activities at school that are supported by technology for the involvement of hearing-impaired students, as well as guaranteeing their integration and socialising through the engagement of all students.
	Bergeson et al. (2019)	Quantitative	Children using CI before 9 years of age	Children implanted at an earlier age performed better overall than children placed later in life.
	Bergeson et al. (2010)	Quantitative	16-39 months (Children with CI)	For the speech comprehension test, later implanted children scored better on the visual task solely, but earlier implanted children fared better on the auditory and audio-visual parts.
	Fitzpatrick et al. (2011)	Quantitative	4-5 using hearing aids and cochlear implant	Children using hearing aids did not outperform their counterparts with severe to profound hearing impairment who got a unilateral cochlear implant on most speech-language assessments.

Geers et al. (2009)	Quantitative	5-6 (Children with CI)	Children who received a cochlear implant at an earlier age were more likely to reach age-appropriate spoken language skills by the time they started kindergarten or first grade with hearing peers.
Gerlain et al. (2007)	Quantitative	Children using CI before 3 years of age	Many children who have cochlear implants learn to recognise words by listening alone.
Lederberg et al. (2013)	Review/Meta- analysis	Deaf and hard-of- hearing children	Cochlear implants cannot be used on deaf and hard of hearing (DHH) children who have certain cochlear or auditory nerve disorders. It is also less helpful for children who have many disabilities.
Zamani et al. (2017)	Quantitative	3-5 (Children with hearing loss)	Hearing performance increases over time, resulting in improved speech comprehension for people who utilise cochlear implants or hearing aids.