



Faculty of Cognitive Sciences and Human Development

**EARLY LANGUAGE INTERVENTION FOR YOUNG CHILDREN
WITH HEARING IMPAIRMENT: A COMPREHENSIVE REVIEW**

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**Bachelor of Science with Honours
(Cognitive Science)
2022**

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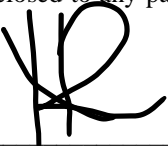
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**EARLY LANGUAGE INTERVENTION FOR YOUNG CHILDREN WITH
HEARING IMPAIRMENT: A COMPREHENSIVE REVIEW**

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**This project is submitted
in partial fulfillment of the requirements for a
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The project entitled 'Early Language Intervention for Young Children with Hearing Impairment: A Comprehensive Review' was prepared by Nurbalqis binti Mohd Kusni 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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TABLE OF CONTENT

ACKNOWLEDGEMENT	i
TABLE OF CONTENT	ii
LIST OF FIGURE	iii
LIST OF TABLE	iv
ABSTRACT	v-vi
CHAPTER ONE: INTRODUCTION	1-7
CHAPTER TWO: METHOD	8-18
CHAPTER THREE: FINDINGS	19-24
CHAPTER FOUR: DISCUSSION.....	25-27
REFERENCES	28-37

LIST OF FIGURES

FIGURE 1	1
FIGURE 2	3
FIGURE 3.....	4
FIGURE 4	4

LIST OF TABLES

TABLE 1	9-10
TABLE 2	11-18

ABSTRACT

Hearing problems can occur in 2 classifications, namely from birth or hearing problems that occur after birth at any time for certain reasons. These hearing problems will affect the effects in the long run if left untreated from the beginning of exposure to the diagnosis of hearing problems. Among the effects experienced by individuals with hearing problems are language development delays, learning difficulties and social difficulties. Nevertheless, if early intervention is carried out between age 0 and 3 years old, this hearing problem can be overcome well in the future. Various early interventions can be done to improve hearing for children with these hearing problems. Researchers have gathered information that involves appropriate early interventions practiced by children with hearing problems. more effective between parent and child. Therefore, this study is to focus on a comprehensive survey which examines the problems faced by infants with hearing problems and looks at the impact of early interventions conducted in the development of audiology, speech, and language.

***Keywords:** hearing impairment, early intervention, language development, sign language, maternal education, audiology, newborn screening, speech-language development, social behavior, emotional behavior, cochlear implants, hearing aids*

ABSTRAK

Masalah pendengaran boleh berlaku kepada 2 klasifikasi iaitu sejak daripada lahir ataupun masalah pendengaran yang berlaku selepas waktu kelahiran pada bila-bila masa atas sebab-sebab tertentu. Masalah pendengaran ini akan mempengaruhi kesan pada jangka masa yang panjang sekiranya tidak dirawat daripada awal pendedahan diagnoses masalah pendegaran. Antara kesan yang dialami oleh individy yang mempunyai masalah pendengaran adalah kelewatan perkembangan bahasa, menghadapi masalah pembelajaran dan kesukaran bersosial. Namun begitu, sekiranya intervensi awal dijalankan seawall usia 0-3 tahun, masalah pendengaran ini dapat diatasi baik pada masa akan datang. Pelbagai intervensi awal yang dapat dilakukan untuk menambahbaikkan pendengaran bagi kanak-kanak masalah pendengaran ini. Pengkaji telah mengumpul maklumat yang melibatkan kebersanan intervensi awal yang sesuai dipraktikkan oleh kanak-kanak yang mempunyai masalah pendengaran. Walaubagaimanapun, ibu bapa dalam membangunkan kemahiran-kemahiran daripada intervensi awal diberikan juga perlu melibatkan usaha daripada hasil didikan ibubapa agar dapat membentuk perkembangan bahasa dan komunikasi yang lebih berkesan antara ibubapa dan anak. Oleh hal demikian, kajian ini adalah untuk memfokuskan dalam tinjauan secara menyeluruh dimana untuk mengkaji masalah yang dihadapi oleh bayi yang mempunyai masalah pendengaran dan mengkaji kesan perkembangan intervensi awal yang dijalankan dalam membentuk perkembangan audiologi, percakapan dan bahasa.

Kata kunci: Masalah pendengaran, Intervensi Awal, Perkembangan Bahasa, Bahasa Isyarat, Pendidikan Ibu, Audiologi, Pemeriksaan Bayi Baru Lahir, Perkembangan Bahasa pertuturan, Tingkahlaku Sosial, Tingkahlaku Emosi, Koklea Implan, Alat Bantu Pendengaran

CHAPTER 1: INTRODUCTION

Hearing impairment is one of the most common types of disability, and it can be risky in everyday life because it makes it hard to recognise voices, communicate, and learn languages. Hearing impairment impairs the internal representation of sound stimuli (Humes & Roberts, 1990). Children with hearing impairment are part of a small group of people with disabilities, and many of them have trouble learning language skills on par with their typically developing peers (Barker et al., 2009; Niparko et al., 2010); These delays in language development can cause several problems in other areas of development (Antia et al. 2009; Dammeyer, 2010; Hintermair, 2006).

A patient who consults a specialist in the hospital for ongoing hearing problems will have his/her hearing level evaluated based on the degree of hearing loss. The levels of hearing loss kinds are listed in the table below: -

Figure 1

Degree of hearing loss	Hearing loss range (dB HL)
Normal	-10 - 15
Slight	16 – 25
Mild	26 – 40
Moderate	41 – 50
Moderate severe	56-70
Severe	71-90
Profound	91+

Source: *Clark, J. G. (1981). Uses and abuses of hearing loss classification*

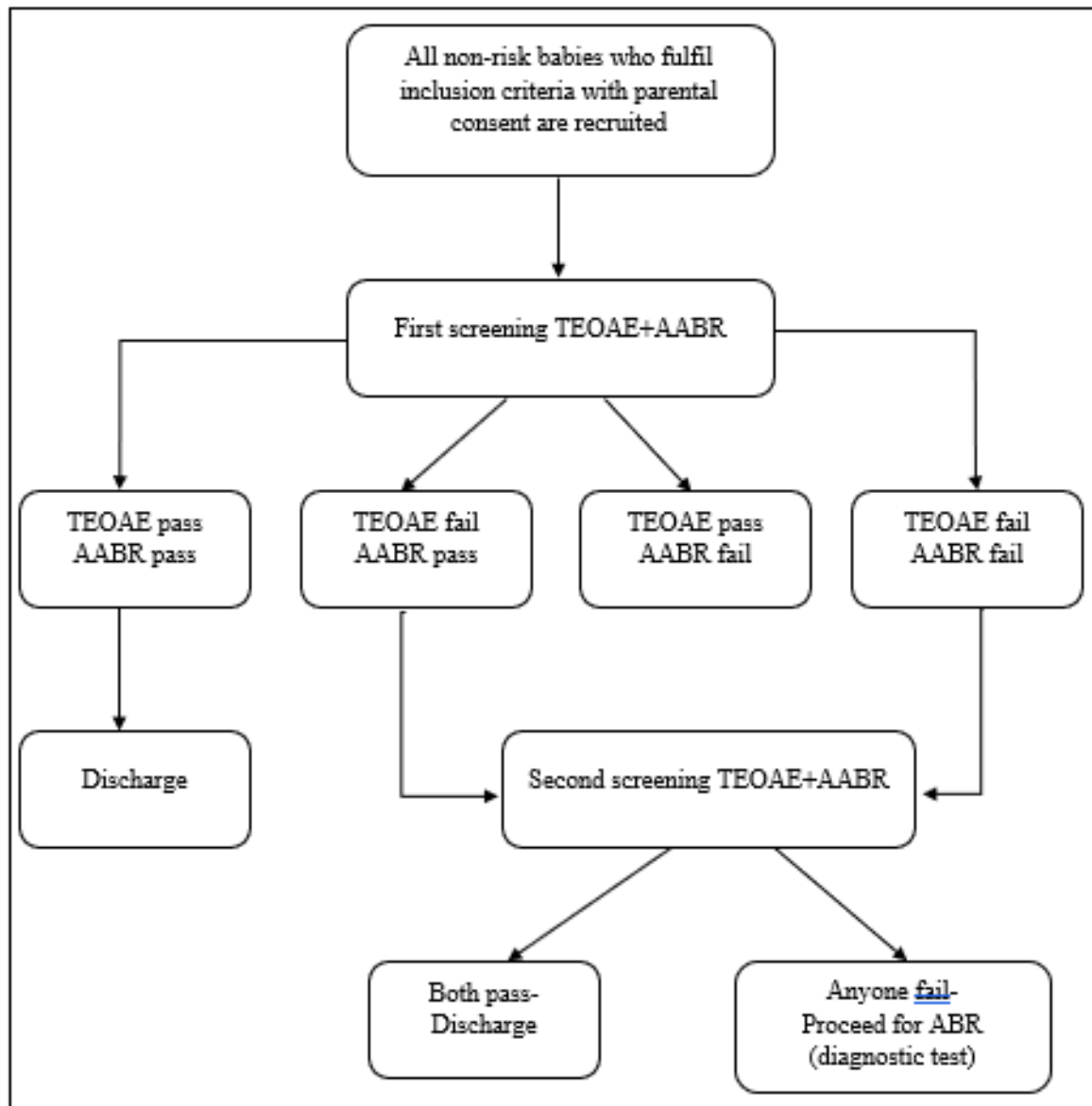
According to an explanation by Ropper et al. (2017), Peripheral hearing loss is typically classified as conductive (induced by outer or middle ear damage) or sensorineural (caused by

inner or middle ear damage) (caused by dysfunction in the cochlea or spiral ganglion). Thus, children born with severe to profound deafness, or those who experience it between the ages of 0 and 5 years, fail to master spoken language, impairing their communication and reading abilities (Kulkarni & Gathoo, 2017). Thus, hearing impairment in young children is a recognised cause of poor speech and language development because it makes it harder for a child to get information about speech and language (Tromblin et al. 2014).

The most important effect of a child's hearing impairment is on how well they learn language to speak and communicate. (Davis,2009). If hearing problems are identified early and intervention is started right away, hard of hearing children can learn to speak and understand language just like their peers with normal hearing (Meyer,2014). However, early intervention is the provision of services and support to young children and their families when the child has or is at risk of developing a disability. (Odom, Hanson, Blackman, & Kaul, 2003).

However, technologies nowadays that babies can now be given hearing screening tests from birth. According to Lochowska et al. (2014), the high neonatal incidence of congenital hearing loss is attracting the attention of national health management organisations across the country, with one in every three thousand healthy newborns and two in every four hundred neonates at high risk of causing hearing loss. Among the newborns' hearing screening tests that may be performed are the Automated Auditory Brainstem Response (AABR) and Transient Evoked Otoacoustic Emissions (TEOAE). The process by which the hearing nerve and brain react to sound is AABR. Clicks or tones are played into the baby's ears through tiny earphones. Three electrodes are put into the babies to measure how the hearing nerve and brain respond. OAE is also a way to measure the sound waves that are made in the inner ear. A small probe is inserted into the baby's ear canal. When clicks or tones are played in the baby's ears, this is what he or she does (echo). While the baby slept, both tests were done in 5 to 10 minutes.

Figure 2

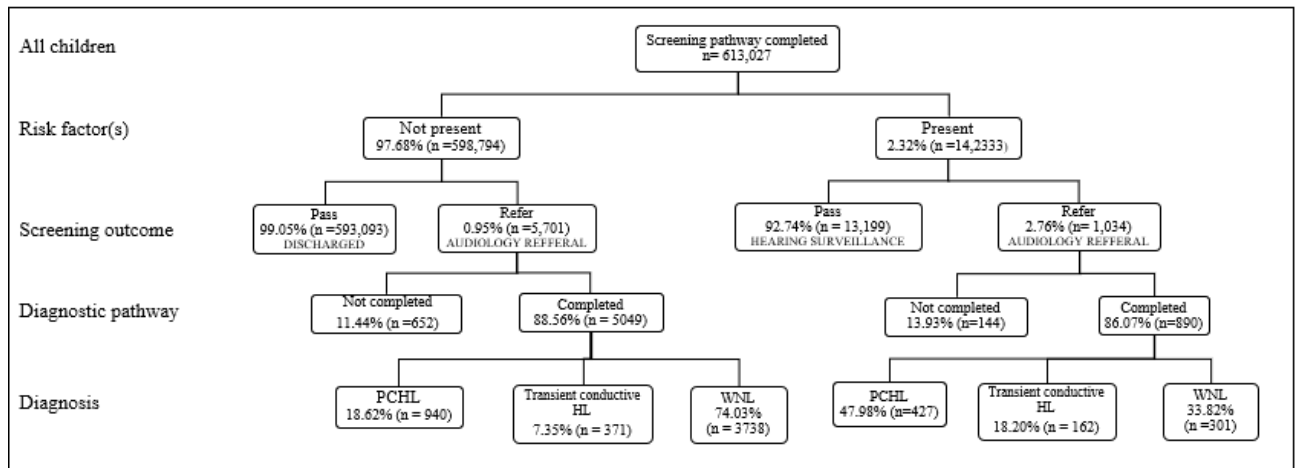


Source: *Comparison of Two-Step Transient Evoked Otoacoustic Emissions and One-Step Automated Auditory Brainstem Response for Universal Newborn Hearing Screening Programs in Remote Areas of China* (Sheng et al., 2021)

Referring to Figure 2, it is a protocol process that must be followed to undergo the test hearing process on both methods. According to Sheng et al. (2021), to experience the process of hearing rescreening screening tests and hearing diagnostic tests were performed by professional audiologists and otolaryngologists. According to the figure in Figure 3, it has

undergone research on hearing screening tests on 613,027 babies in Queensland, Australia. This demonstrates the necessity of having infants undergo hearing screening tests to ensure that they can receive the intervention after being identified with hearing loss, which eventually numbered 6735 out of 613,027 babies born between 2007 and 2006 (Fitzgibbons et al., 2021).

Figure 3



Source: *Predicting hearing loss from 10 years of universal newborn hearing screening results and risk factors (Fitzgibbons et al., 2021)*

Figure 4

Referral type	Permanent childhood hearing loss, n (%)	Normal hearing or transient conductive hearing loss, n (%)	No diagnostic outcome, n (%)
Bilateral refer (n = 1701)	644 (37.86)	881 (51.79)	176 (103.5)
Right refer (n = 1686)	268 (15.59)	1218 (72.24)	199 (11.80)
Left refer (n = 2978)	305 (10.24)	1336 (78.44)	337 (11.32)
Bypassed screening (n = 370)	149 (40.27)	137 (37.03)	84 (22.70)
Total (n = 6735)	1367 (20.30)	2572 (67.88)	796 (11.82)

Source: *Predicting hearing loss from 10 years of universal newborn hearing screening results and risk factors (Fitzgibbons et al., 2021)*

The findings of the diagnosis after undergoing hearing screening test may be shown via a statistic of the results of the data on 613,027 newborns should be referred to the hearing screening test department of 6735 babies, according to the statistical data in Figure 4 above. Finally, 20.20 percent of newborns with persistent childhood hearing loss and 67.88 percent of

infants with normal hearing or temporary conductive hearing loss were identified in the audiology department by referral type from bilateral refer, right refer, left refer, and avoided screening. There was no diagnosis of the result of the hearing test for the remaining 11.82 percent of babies.

According to Ahmad et al. (2011), in research done on neonates in Malaysia, 98 percent of infants were screened for hearing using the OAE method. The research included 16,100 newborns chosen at random. The first referral rate after screening was 25.5%. At the second and third screenings, the default frequencies were, respectively, 33.9% and 40.7%. The mean (SD) age at which hearing impairments were identified was 3.3 months (0.86). The average (standard deviation) age at hearing aid implantation was 13.6 (4.8) months. Hearing impairment is prevalent at a rate of 0.09 percent.

However, the primary purpose of newborn hearing screening is to avoid the negative effects of hearing loss on a child's linguistic, cognitive, social, emotional, and academic development by early diagnosis (Lochowska et al., 2014). Therefore, parents of infants with hearing impairments need not be concerned about the state of their children if they get early intervention for hearing impairments to minimise obstacles and develop in terms of linguistic, cognitive, emotional, social, and educational development.

Hearing loss is a tough condition to cure. Children with hearing problems will struggle in the future with language development and socialization. This is due to hearing difficulties making it difficult to participate and understand what is going on around them. However, if these children had a test to detect hearing problems at an early age, the issue may be resolved. As a result, children with hearing problems should begin therapy or early age interventions as soon as possible between the ages of 0 and 3 years to improve language abilities with other children.

Consequently, the purpose of this research is to look at early intervention for young children. The purpose of this study was to look at the hearing challenges that hearing children encounter, as well as the effectiveness of early interventions done as early as the age of 0-3 years. The study was carried out to parents establish an area for young children with hearing impairment who may be educated in early intervention to acquire specific abilities from the young children ages. This indirectly allows parents to understand and organize actions to give early assistance to children with hearing impairments based on their age.

RESEARCH OBJECTIVE

The importance of conducting this study is to identify problems in terms of language development and understanding an early intervention for young children with hearing impairment. Based on the problem statement, the objectives of this study are:

Research objective 1: To identify language problems faced by young children with hearing impairment.

Research objective 2: To investigate whether an early language intervention is effective for young children with hearing impairment.

RESEARCH QUESTION

The two primary research questions raised in this study are:

Research question 1: What are the language problems faced by young children with hearing impairment?

Research question 2: What is the effectiveness of early intervention for young children with hearing impairment?

CHAPTER 2:

METHOD

The articles mentioned in this paper are those which have been found through a few websites that can be found namely, Research Gate, Science Direct, National Centre for Biotechnology Information, BMC Paediatrics, and Pub Med. The keywords used for searching the articles such as “hearing impairment”, “language development faced”, “early intervention”, “early intervention program for hearing impairment children”, “hearing aid intervention”, “cochlear implant intervention”, and “language therapy intervention among hearing impairment children”, “type of early intervention”, “verbal auditory program”. Findings from these articles are published between 1999 and 2022. The information from the selected articles will be used to identify additional studies. The research that is related to the topic will be chosen as a trial.

Table 1: Language problems faced by young hearing impairment children

Article	Methodology	Age	N	Finding
Abdelmalek et al. (2022)	Quantitative study	2.5 years – 15 years old	80 children	Children with hearing impairments will suffer significant emotional, social, behavioural, and cognitive challenges throughout adults.
Geers et al. (2003)	Comparative study	8-9 years old	181 children	Once children were 8-9 years old, half of them effectively acquired language abilities and were able to listen.
Martinez-Cruz et al. (2009)	Cross-sectional study	Median age: 7 years	81 children	Compared to their peers with binaural normal hearing, children with unilateral hearing loss performed worse on examinations of receptive and expressive language.
Nicholas et al. (2006)	Correctional study	Children who had a cochlear implant for at least 7 months	76 children	The use of cochlear implants in deaf children as early as three years old has an influence on their

				accomplishments, especially in the identification of previously recognised spoken speech.
Psarommatis et al. (2001)	Retrospective study	12-16 months	726 children	Children with conductive hearing losses who participated in the research did not have any other problems; their expressive language delay may be ascribed to their hearing disability.
Werfel et al. (2021)	Qualitative study	4 years old	72 children	Children with hearing loss acquired difficult syntax and some complex structures more slowly than their peers of the same age, as well as later than younger children.
Yoshinaga-Itano et al. (2017)	Cross-sectional study	8-39 months	448 children	Children with hearing impairments fail to attain exponentially high vocabulary development after they reach 18 months of age, when they may produce between 9 and 40 new words each month on average.

Table 2: The impact of early language intervention on young children with hearing impairment

Article	Methodology	Age	N	Findings
Alkhamra & Abu Dahab (2020)	Quantitative study	3-10 years	90 children	Children with cochlear implants or hearing aids are more susceptible to auditory processing problems. Children with cochlear implants are more likely to have balance, multisensory processing, social-emotional, and fine motor difficulties. Greater age at implantation increased the probability of sensory processing issues.
Bruijnzeel et al. (2016)	Systematic review	Compared infants implanted before 12 months with children implanted between 12-24 months	N/A	A speech perception score indicates that cochlear implantation before the age of two is helpful. Before the age of 12 months, implantation enhanced voice production, auditory performance, and receptive language scores.
Bubbico et a. (2007)	Retrospective study	17 children aged 0-12 months were enrolled.	70 children 53	Early recognition of hearing loss at an early age, installation of hearing aids at an early age, and early intervention within the first 12 months of life may assist children with prelingual

			children joined after 12 months of age	hearing issues do well in terms of their perceptual language abilities.
Caselli et al. (2021)	Cross-sectional study	8 - 68 months	78 children	Children who are exposed to sign language by their parents during the first six months will have an age-appropriate and expressive vocabulary. Whereas children with late exposure to sign language will have a lesser expressive vocabulary, but not a smaller receptive vocabulary.
Downs & Yoshinaga-Itano (1999)	Experimental study	10 months-2 years	56 children	The most efficient approach for encouraging normal language development in infants and toddlers with hearing loss is early intervention implementation of effective care.
Fitzpatrick et al. (2013)	Systematic review	N/A	N/A	Early detected children with hearing loss who benefit from a combination of sign language and oral language treatment for the development of spoken language.

Geers A. E. (2004)	Longitudinal study	8 to 9 years in children that were implanted before the age of 5	181 children	Children who got implantation at the age of two were more likely than children who received implantation at the age of four to develop comprehensive speech and language skills relative to their age-matched peers with normal hearing.
Harris et al. (2013)	Longitudinal study	N/A	66 children	Cochlear implants may be as useful as a normal child, but it takes a long time to train memory growth in speech and language in terms of communication.
Havenga et al. (2017)	A comparative pilot study	30-79 months	10 children and parent	Tele-intervention is advantageous for communication intervention and may be a solution to typical obstacles such as distance and the lack of experienced interventionists.
Johnson et al. (2011)	Longitudinal study	18-24 months	31 children	Children that participate in an early intervention programme as early as 3 months will have significant language progress. Before 11 months, children who received early intervention. There have been reports of delays in speech-language, cognitive, vocabularies, linguistic, and reasoning skills for

children who begin an early intervention programme late, between the ages of 18 and 24 months.

Maluleke et al. (2019)	Descriptive study	5-7 years	8 children	The fact that all of the children received speech-language therapy and audiology treatments highlights the significance of these professionals in the treatment of children with hearing impairment.
Meinzen-Derr et al. (2011)	Retrospective study	2-4 years	328 children	Enrolment in early intervention was crucial for developing age-appropriate language abilities in children who did not get an implant. Children enrolled before or after the age of 6 months had significant language development, however this was impacted by their language level at the time of enrolment; children with lower language levels had the greatest language gains at arrival.
Moeller M. P. (2000)	Longitudinal study	5 years old	112 children	Infants who enrolled later, and children who entered EIP before the age of 11 months had an improved vocabulary

and verbal reasoning skills at the age of 5 years. Strong family contributions, on the other hand, indirectly enhance the communication development of deaf children by increasing the strength of maternal communication with deaf/hard-of-hearing children. As a families must emphasize size the relevance of vocabulary and verbal reasoning abilities for language developed to reinforce the necessity of recognizing and enrolling children early in life.

NICD (2016)	N/A	N/A	N/A	Parents choose ASL (American Sign Language) to communicate with hearing impaired children and they know with ASL is also a language complete with unique syntax and grammar.
O'Donoghue et al. (2000)	A prospective longitudinal study	3-5 years after cochlear implantation	40 children	Early age at intervention and oral communication style are the two most influential known characteristics for speech perception in young children after cochlear implantation.

For the early identification of prospective newborns, it is necessary to implement universal newborn screening programmes for hearing impairment.

Patterson et al. (2003) Longitudinal study 7.8 months to 11.1 months 32 infants

Young infants are more likely to be exposed to female faces and sounds than male faces and voices; hence, if the matching effect is based on an arbitrary but natural learning connection, one may anticipate that male stimuli will have a weaker influence than female stimuli.

Shojaei et al. (2016) Experimental 6-7 years 30 children

Providing hearing-impaired children with early language development intervention before the age of 6 months may have a positive impact between the ages of 6-7 years. Early intervention may use hearing-impaired children's linguistic progress in visual vocabulary, grammatical complements, word distinction, phonological analysis, and word production.

Vohr et al. (2008)	Longitudinal study	12-16 months	30 infants	Three-month-old hearing-impaired infants who started early intervention scored much better in terms of the number of words they comprehended, the number of phrases they produced, and the actual number of signs.
Vohr et al. (2014)	Prospective Longitudinal study	7-8 years	23 children	Children with hearing impairments may benefit from parents that focus communication from an early age in order to encourage language development, enhance consciousness in speech listening, and enhance conversational learning.
Wiggin et al. (2021)	Longitudinal study	9-36 months	210 children	With many early intervention sessions per month, better expressive vocabulary scores are expected to significantly enhance vocabulary development in young children with bilateral hearing loss.
Wie et al. (2020)	Longitudinal study	5 – 18 months	21 children	The use of early intervention developmental results in cochlear implantation in the early 4-year-old phase showed that their language performance was increasingly similar to

that of normal-hearing children. After 6 years of cochlear implant development shows still speech recognition of language that needs to be further educated and trained in a speech by parents for language and speech improvement.

Yoshinaga- Itano et al. Longitudinal study (2020)

4-7 years

124 children

The importance of early intervention is to give parents with strategies to increase both the amount and quality of their communications with their children, a criterion shown in this investigation as a predictive of greater pragmatic language skills.

CHAPTER 3:

RESULT

Overview

Young children who have been identified with hearing difficulties at a young age will have some of the challenges observed later in life. The hearing response of newborns or babies, which is difficult to judge subjectively, is one of the challenges that children with hearing impairments will encounter in the long term. Early intervention is one of the programs that provide resources and support to both children with special needs and their parents. Early access to excellent early intervention (EI) services, according to Yoshinaga-Itano (2013), is a crucial component of this effective system. As young as three years old, early intervention can aid in the development of hearing-impaired children. There are a variety of methods/early steps that can be taken in early intervention for the development of children with hearing problems, such as cochlear implant installation, sign language training, communication, and language training, and parents play a key role in training their young children in language development and speech development.

Problems faced by young children hearing impairment

Speech and language problems. According to Tomblin et al. (2008), hearing impairment in infancy and early childhood is a well-known factor in poor speech and language development because it limits a child's availability to speech and language inputs. The hearing-impaired children often have trouble with spoken language because many of them still don't speak at the right level for their age (Moeller, 2000). Compared to hearing children, they often function in a low average range (Lederberg et al., 2013). But children with hearing problems will also have shorter reaction times, which shows that they must listen harder and are more tired. This is probably because processes like understanding speech and recognizing emotions require more brain power than they used to. However, early intervention may prevent children

from the possibility of poor speech and language development and has a substantial long-term influence on the quality of life of adults at risk of poor communication development (Ruben, 2000).

Social and emotional. According to Clair et al. (2019), language and the signs that accompany it help children in the typical development process get knowledge of the social environment and begin to engage in it (such as tone of voice, facial expressions, and gestures). This is because children with hearing impairments realise that difficulties such as understanding and regulating emotions may be hindered by a lack of emotional language and restricted linguistic capacity to discuss these emotions (Fujiki et al., 2008).

Behaviour. Among other problems that will be experienced by young children with hearing problems are behaviour problems. According to Parasnis et al. (2003), particularly recognized among the behavioural issues connected with hearing impairment are challenges with attention/focus. This is because studies have shown that children with hearing problems are more easily distracted than children with normal hearing (Dye & Hauser, 2014). Thus, young children with hearing impairment have a harder time getting their hearing parents' attention or responding to them than their hearing peers. Depowski et al. (20015) found that parents who listened to a kid with hearing impairments were always more likely to approach the child in order to obtain or keep their attention.

Impact of early language interventions on young children with hearing impairment

Early Intervention and hearing impairment. According to the American speech-language-hearing society (2011), identifying and treating hearing loss before the age of six months enables hearing-impaired neonates to learn language in the same approach as typically

hearing children, hence decreasing lingual anomalies in these infants. The factors that have the greatest influence on speech and language development are early identification and intervention. Other relevant factors include hearing impairment severity, intelligence quotient (IQ), other impairments, gender, family communication style, socio-familial/cultural background, and maternal education (Kasai et al., (2012); Fulcher et al., (2012)). Hearing impairment children who received early detection and intervention in the first two months of infancy (or between the ages of three and four or five and six months) had equivalent language development. (Shojaei et al., 2016). This implies that detecting and treating hearing loss in infants younger than six months enables good language development in hearing-impaired young children. (Kasai et al., 2012).

Effectiveness of Cochlear Implants. Cochlear implants are small and advanced electronic devices that can help someone who is deaf or has a hearing impairment (National Institute on Deafness and Other Communication Disorders, March 2021). As a result, cochlear implants in newborns are particularly beneficial in young children and can be used as an early intervention. Children who were implanted within the first 24 months of life have better speech comprehension (Habib et al., 2010). Children who get an implant in infancy, followed by proper rehabilitation, have enhanced speech and language skills compared to profoundly deaf children using hearing aids. Thus, infants who get an implant early in infancy, followed by adequate intervention, ability to establish speech and language skills compared to profoundly deaf children who use hearing aids (Geers et al., 2004). Meaning that cochlear implant intervention still requires certain additional early interventions and rehabilitation to improve in terms of language development and cannot help with hearing only.

Kirk et al. (2000), revealed that two-year-olds that get implantation may not need early implantation for the development of spoken word recognition abilities. All the passages by the three articles that stated effectiveness in the early intervention of the use of cochlear implants

can also be supported by Matthew et al. (2015), the use of cochlear implants has significantly improved speech recognition and enhanced receptive and expressive language development among young cochlear implant recipients with less severe hearing loss and recognition scores already better than 30%.

Speech and language development interventions. According to Yoshinaga-Itano (2003), shown that Early identification and rehabilitation of hearing loss before the age of six months ensures normal lingual/cognitive development in hearing-impaired children, regardless of their degree of hearing impairment, gender, race, socioeconomic situation, or communication capabilities. His research illustrates that children with early detected/intervened hearing loss have higher scores in expressive language, that the first 36 months of life are crucial for language acquisition, and that language development rarely increases after this period. (Kushalnagar et al, 2010).

Sign language. According to Kushalnagar (2010), The strengthening of sensorimotor pathways involved in sign language development (that is, forming linguistic hand shapes and movements to convey meanings of words or sentences) may aid in the early development of spatial attention and receptive understanding of the visual communication modality in deaf infants who are exposed to sign language at an early age. According to researcher Hrastinski (2016), "Bimodal Bilingualism," the Deaf community's educational paradigm views sign language as the primary language of deaf/hearing impaired children, although the majority spoken language is taught in a primary school setting. Such an approach is founded on the notion of bilingualism, which argues that babies and young children are capable of imprinting two or more distinct languages on their developing brains. It has been shown that babies' directional attention is essential for the early development of language, whether spoken or sign, and for fostering a strong parent-infant relationship (Baldwin et al., 1995).

Thus, infants rapidly acquire any natural human language (spoken or signed) to which they are repeatedly exposed (Chomsky, 1986; William et al., 1994; Yang, 2006; Lenneberg,1967); however, the acquisition of a first language must occur before the critical period, which can begin as early as age five. (Kushalnagar et al.,2010).

Parents contribution/ family involvement. Infant-directed (ID) speech, a strongly intonated speech pattern used by caregivers to communicate with infants, is an essential component of early mother-infant interactions. ID speech has a higher average fundamental frequency (F0), F0 range, and emotional salience than AD speech, in addition to a slower tempo and hyperarticulated vowels (Burnham, Kitamura, & Vollmer- Conna, 2002; Fernald & Simon, 1984; Kitamura & Burnham, 2003; Stern, Spieker, Barnett, & MacKain, 1983). Based on the study, children's growth appears to be impacted by their age at three years of age, the degree of hearing loss, and the quantity of maternal education, according to the study.

Most synthetic and syntactic abilities are taught during critical phases of language development, according to Alpiner et al. (2000), elements such as the mother's voice, the intricacy of the words heard, and the repetition-communicative situation have an influence on them. Maternal education may be a comprehensive component with a range of components. While according to Calderon and Greenberg (2003), the presence of a father at home increases linguistic and academic development in children with hearing impairments. More educated parents, for example, may engage in reading activities with their children more frequently than less-educated parents, and children from more educated households may be more interested in the reading process than their peers (Bornstein and Bradley, 2003; Bracken and Fischel, 2008).

According to the findings of Geers et al. (2011)'s study, families with hearing-impaired children tend to be in the relationship between parents in the engagement of young children in family activities. According to Calderon and Greenberg (2003), the presence of a father at

home increases linguistic and academic development in children with hearing impairments. This is because the amount of education of parents/mothers has no direct influence on language results, but rather indicates variations in access to resources, linguistic input, or parent-child contact (Halliday et al., 2017).

In addition, by uniting hearing parents with Deaf partner organizations and experienced sign language activists with early intervention and statewide advocacy programmes, it is anticipated that language development and parental acceptance of their child's condition would improve (Yoshinaga-Itano et al., 2017). However, current video and Internet technologies have made sign language education more accessible, even though 90 percent of deaf or hard-of-hearing children are born to hearing parents with no experience with sign languages. (Kral et al.,2010).

CHAPTER 4

DISCUSSION

Summary

The based on the conclusions overall, there are several techniques or beginning initiatives that may be performed to decrease or enhance the treatment for children with hearing issues. On the other hand, infants must undergo a hearing test in terms of healthcare hearing screening to see whether they have any hearing abnormalities. Thus, the early phases of commencing may make space for parents to plan the best early steps in the best intervention or recovery plans for their children, as well as emotional space for parents to feel that children with hearing difficulties can be treated as early as early infancy.

Children with hearing impairments may take several measures, including receiving cochlear implants, wearing hearing aids, completing sign language training, attending speech and language intervention sessions, and receiving parents support and education. However, it is impossible to provide a hearing-impaired child with the same level of development as a typically developing child. Moreover, through early intervention, hearing-impaired children can develop skills such as language fluency, improved behaviour, and positive social interaction to prepare them for later life. Therefore, the process of early exposure to the intervention takes a very long period for them to be able to teach themselves effectively at a later age, like typical children. Furthermore, when used from the beginning, it is possible to create children who can interact with typical youngsters.

Limitations

The researcher conducts the study in the form of a complete survey in which it is required to study by reading articles from the study's publication in the current database. Thus, the limitation of the study that the researcher faced throughout the conduct of this study was the

difficulty of reviewing the limited articles. This signifies that the article retrieved by the researcher was published in a lengthy year, and no article was published in the previous year. Furthermore, locating publications with the same objective as the researcher is quite challenging. In this instance, the researcher needs a limited amount of time to investigate and comprehend the issue under consideration. Moreover, the difficulties in obtaining certain papers make it increasingly difficult to read and study comprehensively.

Conclusion

Hearing loss from birth will have long-term consequences. Language and communication issues, for example, will be affected if not impact outcomes. This will have an impact on the current situation and make engaging and comprehending with the citizens more difficult. However, these hearing issues may be addressed early with the use of early intervention programs that can be used and practiced from infancy, such as cochlear implant installation, sign language training, and communication training. Furthermore, parents are one of the major contributors to early training exposure by training and attempting to teach such word pronunciation from the start so that it may be practiced similarly to young children with hearing impairments. Thus, children with hearing impairments might spend a lot of time with their parents from birth, which can be adjusted early in the first early intervention that can be done.

Recommendation on Future Research

In future research, it may be feasible to evaluate the information acquired in this study as a reference database on early intervention and hearing impairment among these young children. Nevertheless, to give appropriate guidance between the hospital division and experts, parents, and the community for people with hearing impairments, improving the diversity of early treatments suitable for hearing children must yet be maintained and expanded.

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