Jurnal Keterapian Fisik
Vol. 9, No. 1, May 2024
https://doi.org/10.37341/jkf.v9i1.416

Original research

Effect of Auditory Perception Training on Speech Ability and Hearing Impairment in Children

Sudarman Sudarman[1*], Roy Romey Daulas Mangunsong[2]

[1,2] Department of Speech Therapy, Poltekkes Kemenkes Surakarta, Indonesia

ABSTRACT

Background: *Hearing is one of the five senses that plays an important role in early childhood development. With hearing, a child can learn to speak, socialize, and increase their intellectual development. Hearing impairment is a problem that can occur at any age and makes it difficult for someone to communicate verbally. Apart from this, hearing impairment can also result in delays in speech and language skills in children, which are also associated with difficulties in reading, writing, paying attention, and social interaction.*

Methods: *The subjects of this research were children with hearing impairments. An experimental research design was used to determine the effect of certain treatments, with a one-group pre- and post-test design and a sample size of 30 people. bivariate test analysis with different tests to determine the effect of auditory perception training on improving the speaking ability of hearing-impaired children in Surakarta using the paired test technique.*

Results: *The results of the analysis using the Wilcoxon rank test showed a statistical significance value of 0.000 ($p \leq 0.05$), so there was a significant influence between auditory perception training and speaking ability in children with hearing impairment.*

Conclusion: *The results of the study showed that the speaking ability of deaf children improved after auditory perception training was carried out. There is a significant effect of auditory perception training on the speaking ability of deaf children (p-value 0.000 < 0.05).*

ARTICLE HISTORY
Received: December 1st, 2024
Accepted: July 5th, 2024

KEYWORDS
auditory perception, hearing impairment, speech ability;

CONTACT
Sudarman
✉
darman_poltekkes@yahoo.com
Department of Speech Therapy, Poltekkes Kemenkes Surakarta. Jl. Letjend Sutoyo, Mojosongo, Indonesia.

Cite this as: Sudarman, S. ., & Mangunsong, R. R. D. (2024). The Effect of Auditory Perception Training on Speech Ability and Hearing Impairment in Children . *Jurnal Keterapian Fisik*, 9(1), 24–30. https://doi.org/10.37341/jkf.v9i1.416

INTRODUCTION

Hearing is one of the five senses that plays an important role in early childhood development (Jauhari, 2020). Hearing is a very important organ for children. With hearing, a child can learn to speak, carry out socialization, and increase intellectual development. Hearing impairment can affect any one or both ears, so the sufferer has difficulty hearing conversation (Lieu et al., 2020).

Hearing impairment is a problem that can occur at any age and makes it difficult for someone to communicate verbally. This disorder can be categorised as conductive,

sensorineural hearing impairment or both (Griffin et al., 2019). There are three types of hearing impairments that humans can experience based on the transmission of sound waves received by the ear: conductive deafness, sensorineural deafness, and mixed deafness.

In conduction deafness, the outer and middle ear are disturbed so that the conduction of sound waves does not reach the inner ear properly. Sufferers will experience difficulty hearing low-pitched sounds and those whispered at a distance of 5 meters when a hearing test is carried out (Wardhani & Mukono, 2020). Sensorineural hearing impairment occurs due to problems in the inner ear and can also be caused by functional problems with the auditory nerve. One of the causes is due to continuous exposure to noise for eight to ten years.

Sensorineural deafness appears gradually. From the audiometric test, it was found that the hearing threshold increased with a frequency of 4000 Herzt and continued to experience a permanent increase in the hearing threshold with an intensity of 3000 to 6000 Herzt if continued to be exposed to noise. Mixed hearing impairment is a combination of conductive-type hearing impairment and sensorineural-type hearing impairment. His condition of hearing impairment can begin with problems with sound transmission, which then becomes sensorineural in further conditions.

The condition can also be reversed, where sensorineural disturbances occur and progress to conduction disturbances. It does not rule out the possibility that sufferers experience this disorder simultaneously, such as experiencing a severe head impact resulting in injury to the inner ear and middle ear (Wardhani & Mukono, 2020). Based on WHO data, it is estimated that around 360 million (5.3%) people in the world suffer from hearing loss, 328 million (91%) of whom are adults (183 million men and 145 million women), and 32 million (9%) are children.

Hearing impairment in children can cause difficulties in receiving lessons at school. This can happen because the hearing system plays a big role in learning activities at school. Based on the research results, it is stated that by listening, the information absorbed is 20% of the information, while the information absorbed by reading is 10%. Apart from this, hearing impairment can also result in delays in children's speech and language skills, which are also associated with difficulties in reading, writing, paying attention, and social interaction (Jauhari, 2020).

Improving speech abilities in children with hearing impairments requires appropriate intervention. One of the intervention methods for children with hearing impairments is auditory perception training. Auditory perception is obtained from the sense of hearing, namely the ear: hearing is the ability to recognize sounds.

This was done primarily by the auditory system, which consists of the ears, nerves, and brain. Perception is the experience of objects, events, or relationships obtained by inferring information and interpreting messages. Perception is a process where sensory cues and relevant past experiences are organized to give us a structured and meaningful picture of a particular situation (Halliday et al., 2017).

The term perception is usually used to express the experience of an object or an event that is experienced. This perception is defined as a process that combines and organizes our sense data (vision) to be developed in such a way that we can be aware of our surroundings, including being aware of ourselves (Gillis et al., 2022). From the perspective of communication science, perception can be said to be the core of communication, while interpretation is the core of perception, which is identical to reverse encoding (decoding) in the communication process. Perception can be defined

as the process by which we interpret sensory data, namely data received through the five senses: “Perception is the process by which organisms interpret and organize transactions to produce meaningful experiences about the world” (Fontan et al., 2017).

Auditory perception disorder is a breakdown in a person’s ability to receive and sort out internal stimuli in the form of thoughts and external stimuli, where something is occupied without any actual objects or stimuli. Usually, what is heard is thought to be there, but basically, it doesn’t exist (Kusuma et al., 2022). Based on the background above, there needs to be appropriate training to improve the language and speech abilities of children with hearing impairments.

Auditory perception training is very beneficial for hearing-impaired children who use hearing aids because it can develop listening attention. In this study, we wanted to find out the effectiveness of auditory perception training in improving speech abilities in children with hearing impairments.

MATERIALS AND METHODS

This research uses an experimental design to determine the effect of certain treatments, with a one-group pretest and posttest design. This research was conducted in Kota Surakarta. The research sample consisted of 30 deaf child respondents. The sampling technique uses purposive sampling by considering the research objectives based on inclusion criteria.

Before the client's intervention was carried out, a pre-test was carried out to determine the child's initial speaking ability, then the intervention was carried out for 10 meetings using the auditory perception method, and then a post-test was carried out to determine whether there was an increase in the speech ability of the child with hearing impairment. After carrying out the post-test, a bivariate analysis was carried out to determine the effect of auditory perception training on improving the speaking abilities of deaf children in Surakarta using the Wilcoxon test technique.

RESULTS

Respondent Characteristics

The following are the results of the characteristics of the respondents who have been studied.

Table 1. Sample Distribution Based on Gender

Gender	Number of Respondents	Percentage
Man	15	50.0%
Woman	15	50.0%
Total	**30**	**100.00%**

Table 1 shown that 15 respondents were male (50.0%) and 15 female respondents (50.0%). So there is no dominant gender of respondent.

Table 2. Sample Distribution Based on Age Level

Age	Number of Respondents	Percentage
6	1	3.3%
7	2	6.7%
8	1	3.3%
9	5	16.7%

Age	Number of Respondents	Percentage
10	3	10.0%
11	12	40.0%
12	2	6.7%
13	4	13.3%
Total	**30**	**100.0%**

Table 2 shown that the majority of respondents were 11 years old, namely 12 people (40.0%).

Table 3. Comparison of Speaking Ability Before and After Treatment

	N	Min	Max	Mean	SD
Pretest	30	17	75	60.10	14.733
Posttest	30	50	75	65.83	6.460

From Table 3 above, it can be seen the comparison of speaking abilities before and after using auditory perception training. Speaking ability before treatment had a mean of 60.10 and after treatment had a mean of 65.83. The minimum score before treatment was 17 and after treatment was 50, while the maximum score before treatment was 75 and after treatment was 75. The standard deviation value before treatment was 14.733 and after treatment was 6.460.

The Effect of Auditory Perception Training on Speaking Ability

Table 4. Normality Test Results

Variable	Statistics	Df	Significance
Pretest Value	0.735	30	0.000
Posttest Value	0.908	30	0.013

The results of the normality test used the Shappiro-Wilk test showed that the pretest value was Sig. 0.000 is smaller than 0.05, which means the data is not normally distributed. Meanwhile, the posttest value obtained Sig. 0.013 which is smaller than 0.05, which means the data is not normally distributed.

Table 5. Test Results

Speaking Ability	Average	Std Deviation	Sig p value
Before	60.10	14.733	0.000
After	65.83	6.460	

Table 5 shows that the average value of speaking ability before auditory perception training is 60.10 and the average speaking ability after auditory perception training is 65.83. So it can be said that providing auditory perception training can improve the speaking abilities of hearing-impaired children in Surakarta City. Based on the analysis results, the Wilcoxon Rank Test obtained a statistical significance value of 0.000 ($p \leq 0.05$), so there was a significant effect of auditory perception training on the speaking ability of hearing-impaired children in Surakarta City.

DISCUSSION

The aim of this research is to determine the effect of using the auditory perception method on speaking ability. The research results showed that the speaking ability of hearing-impaired children in Surakarta City before treatment had a mean of 60.10 and after treatment had a mean of 65.83. The minimum value before treatment was 17 and after treatment was 50, while the maximum value before treatment was 75 and after treatment was 75.

The standard deviation value before treatment was 14.733 and after treatment was 6.460. The research results show that the speaking ability of children with hearing impairments in Surakarta City has improved after carrying out auditory perception training. Basically, all children who are born with hearing impairments will experience difficulty speaking, one of which is poor articulation skills.

The higher the hearing impairment, the weaker the articulation ability. However, children with hearing impairments have the potential to learn to speak and speak languages. Hearing-impaired children also need special services to develop their speaking abilities to minimise the impact of their hearing impairment (Kirana Dwi Witari & Hafidz Triantoro Aji Pratomo, 2022).

According to Stropahl et al., (2019), the skills of deaf children who are trained from childhood or infancy to learn to communicate, like children or babies who are able to hear, can minimise language development, which is far behind that of normal children. Speech development or speaking skills can lead children to be successful in achieving communication targets for deaf children. To achieve maximum results, there must be complete facilities and infrastructure, including adequate space and facilities. Having appropriate support and facilities also has an influence on improving children's speaking skills.

The results showed that, based on the analysis results, the Wilcoxon rank test obtained a statistical significance value of 0.000 ($p \leq 0.05$), so there was a significant effect of auditory perception training on speaking ability in hearing impairments. The results of the research are supported by research Karah & Karawani, (2022), which states that auditory training at home can improve speaking abilities and language mastery Justo, Guillén et al., (2019), also found an increase in speaking ability after attending auditory training.

Speech disorders are characterised by the child's inability to dialogue interactively, understand other people's speech, understand and use words in a continuous context, both verbal and non-verbal, read and understand what is read, and express their thoughts through the ability to speak or convey them through written language (Rahman, 2023). In an effort to overcome these limitations or disorders, appropriate training methods are needed so that later children can speak accurately and correctly. One method that can be used is the auditory perception training method.

Individuals with hearing impairments get the most benefit from using a combination of sensory rehabilitation and auditory perception exercises to enhance hearing rehabilitation (Stropahl et al., 2019). Auditory Perception Training (APT) focuses on auditory perception and sensory integration. This exercise helps a person identify and differentiate various components of sound, such as timing, tempo, duration, pitch, rhythm patterns, and speech.

APT integrates different sensory modalities (visual, tactile, and kinesthetic) during active musical practice, such as playing from symbolic or graphic notation using tactile sound transmission or integrating movement. Cognitive training areas include auditory

perception and sensory integration. Therefore, auditory perception exercises stimulate respondents to speak (Stropahl et al., 2019).

Justo, Guillén et al., (2019), stated that an auditory training approach that focuses on the basic set of spectral-temporal modulation, sound localization, and working memory components can be transferred to everyday speech tasks. The feasibility of this dynamic and entertaining environment can provide auditory training for use in the participant's home, greatly increasing the accessibility and benefits of auditory training. Additionally, these studies and interventions provide a starting point for improving the development of auditory training in search of more optimal learning paradigms.

CONCLUSION

The speaking ability of deaf children in the city of Surakarta before being given treatment was an average of 60.10, and after being given treatment, it was an average of 65.83. The results of the study showed that the speaking ability of deaf children in the city of Surakarta increased after auditory perception training was carried out. There is a significant effect of auditory perception training on the speaking ability of deaf children in Surakarta City (p-value 0.000 < 0.05).

REFERENCES

Fontan, L., Ferrané, I., Farinas, J., Pinquier, J., Tardieu, J., Magnen, C., Gaillard, P., Aumont, X., & Füllgrabe, C. (2017). Automatic speech recognition predicts speech intelligibility and comprehension for listeners with simulated age-related hearing Impairment . *Journal of Speech, Language, and Hearing Research*, *60*(9), 2394–2405. https://doi.org/10.1044/2017_JSLHR-S-16-0269

Gillis, M., Decruy, L., Vanthornhout, J., & Francart, T. (2022). Hearing Impairment is associated with delayed neural responses to continuous speech. *European Journal of Neuroscience*, *55*(6), 1671–1690. https://doi.org/10.1111/ejn.15644

Griffin, A. M., Poissant, S. F., & Freyman, R. L. (2019). Speech-in-noise and quality-of-life measures in school-aged children with normal hearing and with unilateral hearing Impairment . *Ear and Hearing*, *40*(4), 887–904. https://doi.org/10.1097/AUD.0000000000000667

Halliday, L. F., Tuomainen, O., & Rosen, S. (2017). Language development and impairment in children with mild to moderate sensorineural hearing Impairment . *Journal of Speech, Language, and Hearing Research*, *60*(6), 1551–1567. https://doi.org/10.1044/2016_JSLHR-L-16-0297

Jauhari, J. (2020). Deteksi Gangguan Pendengaran pada Anak Usia Dini. *Genius*, *1*(1), 61–71. https://doi.org/10.35719/gns.v1i1.8

Justo-Guillén, E., Ricardo-Garcell, J., Rodríguez-Camacho, M., Rodríguez-Agudelo, Y., Lelo de Larrea-Mancera, E. S., & Solís-Vivanco, R. (2019). Auditory mismatch detection, distraction, and attentional reorientation (MMN-P3a-RON) in neurological and psychiatric disorders: A review. *International Journal of Psychophysiology*, *146*, 85–100. https://doi.org/10.1016/j.ijpsycho.2019.09.010

Karah, H., & Karawani, H. (2022). Auditory Perceptual Exercises in Adults Adapting to the Use of Hearing Aids. *Frontiers in Psychology*, *13*(May), 1–14. https://doi.org/10.3389/fpsyg.2022.832100

Kirana Dwi Witari, & Hafidz Triantoro Aji Pratomo. (2022). Hubungan Level Gangguan Pendengaran pada Kemampuan Artikulasi Anak Usia Sekolah di Surakarta. *Jurnal Terapi Wicara Dan Bahasa*, *1*(1), 68–78. https://doi.org/10.59686/jtwb.v1i1.22

Kusuma, N. E., Politeknik, W., Kementerian, K., & Surabaya, K. (2022). Pengaruh Kejadian Stunting Terhadap Tingkat Perkembangan Bahasa Pada Balita the Effect of Stunting on the Level of Language Development in Toddlers. *Jurnal Voice of Midwifery*, *12*(2), 61.

Lieu, J. E. C., Kenna, M., Anne, S., & Davidson, L. (2020). Hearing Impairment in Children: A Review. *JAMA - Journal of the American Medical Association*, *324*(21), 2195–2205. https://doi.org/10.1001/jama.2020.17647

Rahman, H. (2023). *DALAM MENYUSUN SKRIPSI Peminatan Epidemiologi , Fakultas Kesehatan Masyarakat , Universitas Muslim Indonesia*. *4*(4), 567–577.

Stropahl, M., Besser, J., & Launer, S. (2019). Auditory Training Supports Auditory Rehabilitation. *Ear and Hearing*, *Publish Ah*, 697–704.

Wardhani, D. K., & Mukono, J. (2020). Sensorineural Hearing Impairment Due to Exposure of Noisy Trains on Populations Around Turirejo Train Railroad Cross. *Jurnal Kesehatan Lingkungan*, *12*(1), 59–68. https://doi.org/10.20473/jkl.v12i1.2020.59-68