Application of Learning to Listen Method in Articulation Disorders of Children with Dysaudia: A Single Case Study

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Abstrak

Background: Dysaudia is a speech disorder associated with auditory feedback problems, which can occur due to hearing loss. Articulation is an important part of speech, and children with hearing problem need immediate help to improve their slow pronunciation skills due to hearing loss.

Objective: One method of treating deaf children is to Learning to listen. By relying on the remaining hearing, this method aims to help children detect sounds and associate sounds with objects.

Methods: One-subject experiment, using a one-group pre-posttest design. The participant was an 8-year-old boy with hearing loss who received speech therapy. Data were collected through interviews with the client's mother, direct observation of the client, tests, and study document. Speech therapy was conducted in 10 sessions by training the client receptive language at the word level. Comparing the client's language acquisition ability before and after therapy.

Results: In the evaluation after speech therapy, there was an increase of 100%

Conclusion: The listening training method is considered effective in improving the receptive language skills of children with hearing problem

Keyword: Dysaudia, learning to listen, articulation

INTRODUCTION

Communication is a process in which a person or a group, organization, and society create and use information in order to connect with the environment or others. Sambas stated that communication is a process of sorting, selecting, and sending symbols in such a way that can help listeners in generating responsiveness or meaning of a thought that is in harmony with what the communicator means. (1) Communication can occur when there is a similarity or match between the sender of the message and the recipient of the message. Therefore, communication depends on the ability to convey messages and be able to understand each other. Usually, communication is done verbally or taught which can be understood by both sender and receiver. If you cannot communicate verbally, communication can also be done nonverbally such as using body language, showing expressions, such as laughing, nodding your head, or shrugging your shoulders. (1) The auricle captures sound energy in the form of waves to the cochlea through air or bone. This is the beginning of the listening process. These vibrations are passed through the tympanic membrane and then passed to the middle ear through a series of auditory bones. There, the auditory bone leverage amplifies vibrations, moves the foramen ovale and stapes, moves the perilymph on the vestibular scale. Then, these vibrations are passed through the Reissner membrane and push the endolymph. This process is a mechanical excitatory that triggers deflection of hair cell stereocilia, which causes ion channels to open and electrically charged ions to exit the cell body. Under these conditions, depolarization of hair cells occurs. As a result, neurotransmitters are released into the synapses, which allows action on the auditory nerves. This process then proceeds to the auditory nucleus and reaches the auditory cortex (areas 39–40) in the temporal lobe. (2) According to the 2018 Riskesdas National Report, the proportion of deaf children from birth found at the age of 24-59 months is 0.11%. According to BPS

data in 2019, Indonesia's population is 268,074,600, with a prevalence of congenital deafness of 0.1%. With an annual birth rate of 2.4%, there were an additional 268,074 cases of congenital deafness. (MOH 2018)

Disaudia is an articulation disorder that is closely related to auditory feedback difficulties, which can result from hearing loss (L. Nicolosi.2004.107). Children born with or who have hearing loss before the acquisition of language skills (before the age of three) will experience more severe articulation disorders than children whose hearing loss occurs after acquiring language skills. (3) Articulation is an important part of speaking, so children with diabetes should be given intervention as soon as possible so that they can catch up with their late skills. The Learning to listen method is one of the methods used for the therapy of children with diabetes by relying on the remaining hearing. This method focuses on the child in order to detect sounds and associate those sounds with the object.

Hearing loss causes communication difficulties that will impact social and academic skills. Children with communication disorders will have an impact on hampering all aspects of their lives. (4) As Aharon stated, children with communication difficulties will have an impact on all aspects of their child's life. Increasing self-confidence, improving interpersonal relationships, and allowing the child to express desires and articulate them, gives the child a great opportunity to be successful. So it is important for them to be able to develop their hearing abilities or maximize other senses such as visual and tactile so that they can live their daily activities more easily. (5)

RESEARCH METHODOLOGY

This study used a quantitative approach with Single Subject Experiment (SSR) research. SSR is a subject study with an experimental design to determine the effect of treatment on attitude change. The only research subject was an eight-year-old boy client in Jatisampurna sub-district, Bekasi City. This study used an experimental design, here is a group of pre-post test designs that use one subject (single case) and measure ability both before treatment or therapy (pretest) and after (after the test).(6) The following is an overview of the design:

Bagan 1. One Group D Said

Information:

T1: Experimental group before being given auditory exercise treatment (pretest)

X: Application of auditory exercises

T2: Experimental group after being given auditory exercise treatment (posttest)

Some of the techniques used in data collection are interviews, observations, various tests, and document studies. Data collection is done at the client's home. Data collection techniques during the study can be seen in table 1 below.

Table 1. Techniques, Assessment Instruments and Research Indicators

No	Data Collection Techniques	Instruments	Respond	Indicator
1	Interview	Form Interview	Client's Parents	Knowing data about client identity, causative factors, medical history
2	Observation	Observation Form	Client	Know the physical condition, speech language skills, motor skills, sonic abilities
3	Speech Tool Inspection (PAW)	PAW Form	Client	Know the structure and function of the speech organs, and the presence or absence of damage to the client's speech organs both anatomically and functionally
4	Articulation Tests	Articulation Test Form	Client	Know articulation ability at the word level, and to assess the presence or absence of articulation errors of substitution, omission, distortion, and addition (SODA)
5	Auditory Language Comprehension Test (PBSA)	Format Test PBSA	Client	Know the comprehension of spoken language at the level of nouns, verbs, and prepositions.
6	Sound Test	Sound Test Format	Client	Know the elemental abilities of sound.
7	Document Study	Results of Doctor's Examination	Doctor	Supporting data needed by therapist in strengthening the data obtained
8	Initial Test and Final Test	Initial Test and Final Test Format	Client	Know the success of that therapy Reached.

Therapy is given to clients for 45 minutes for 10 therapy sessions and 1 session for evaluation.

A. Patient Description

It is known that an eight-year-old male client (R) has hearing loss. Based on the results of interviews with the client's mother, it is known that the client's mother was pregnant at the age of 20 years, the client's mother said that during pregnancy she had never experienced events that could endanger the fetus, always took medication with a doctor's prescription, gave birth at full month which is 36 weeks, when the client's mother was large pregnant had dengue fever, but after being examined by the doctor the results were not too severe and did not need to be hospitalized. The client was born with a yellow body and was required to enter the incubator for 2 days 1 night. According to the client's mother, after the client was born the client's mother suspected that the client was deaf because he never responded to sounds and only responded to loud sounds such as lightning, horns and loud shouts. In 2015 the client underwent a hearing examination due to limited funds, the client did not directly use a Hearing Aid (ABD), and in 2019 the client carried out a hearing examination Bra instem Evoked Response Auditory (BERA) test with the results stating that the client was very severe bilateral sensorineural deaf with a degree of deafness left ear 90dB and right ear 80dB and just got (ABD). Based on the results of interviews with the client's mother, data were obtained that the client was not able to pronounce all consonants but the client understood and had to be helped with gestures, some of the words that the client had been able to teach were /mama/, /papa/,/bebe/ for /duck/, /uda/ for /already /, /mae/, for /eat/. Clients' social communication now uses sign language. The general condition of the client seems normal, able to walk without assistance. The client's receptive and expressive language skills are relatively late from their proper age. Now the client is still attending a public kindergarten.

B. Therapy Goals and Programs

1. Therapeutic Goals

In order for the client to be able to improve word-level receptive language in the words /cow/, /chicken/, /goat/, /cat/, /duck/ by connecting sounds with objects from a distance of 100cm by pointing according to the stimulus.

2. Therapy Program

Practice improving word-level receptive language in words /cow/, /chicken/, /goat/, /cat/, /duck/ by connecting sounds with objects from a distance of 100cm by pointing according to the stimulus.

3. Therapy Methods

Metode Learning to listen

Often we make associations or relationships between sounds and objects when we look at an object, hear its sound, and then store this information into memory. The process of understanding and identifying what is seen and heard is sound-object association. (7) The world is full of sounds and different sounds have different meanings. It is important for children to develop good skills and abilities in associating sounds with objects in order to understand the home, school, and community environment. (7) Sound-object associations develop early in a child's life. One of the first examples is a child's knowledge of his mother and her voice. Other early sounds that children hear and see together include animal sounds (moo, kwek-kwek, meow, etc.), vehicle sounds (brmmm, choo choo, etc.), and toy sounds (ping, kring, cip, etc.). As children grow and develop, they will have more exposure to different objects and different sounds.

Therapist chose this method based on the client's domain 2 and the client's lack of ability to detect sounds and associate sounds with objects.

4. Therapeutic Steps

For the stages of the Learning to listen (8) method, therapist use the following stages:

a. Invite the client to sit opposite the researcher.

b. Therapist present animal sounds using picture cards /Chicken/, /Duck/, /Cow/, Goat/, /Cat/, /Dog/.

c. Therapist gave the image to the client and told the sound of the animal image.

d. Therapist asked clients to show pictures of animals based on the animal's voice.

e. It is expected that the client can associate the sound with the given object.

5. Assessment Indicators

a. Response Criteria

As for the criteria for evaluating the client's receptive language skills, these criteria are:

1. The client is given a score of 1 if the client can show an image that represents the sound of the animal.
2. The client is given a score of 0 if the client cannot show an image that matches the sound of the animal.
3. Success Criteria

Three success scale to evaluate the client's success rate after therapy, as follows:

a. Success: if the client gets a total of points from the response results 5-6

b. Less successful: if the client gets a total of 3-4 points from the response results

c. Unsuccessful: if the client gets total points from response result 0-2

RESULT AND DISCUSSION

An 8-year-old boy (R), according to the data when the client was born with hyper bilirubin and had to get treatment in an incubator for 2 days. Maulida stated, hyperbilirubinemia is a condition due to blood type incompatibility which is the most common cause of hemolytic disease in newborns. In full-term infants, pathological jaundice or hyperbilirubinemia if not treated immediately can cause developmental disorders such as mental disorders, deafness, blindness, speech delays and other diseases and even death. (9) Then reinforced by Sari who stated, risk factors for hearing loss in infants who are admitted to the NICU for more than two days increase the possibility of hearing loss up to 10 times. (10) This can be the cause of the client experiencing hearing loss.

Based on the results of the document study, the client had conducted a Brainstem Evoked Response Auditory (BERA) examination in 2019 with the test results stating that the client experienced very severe bilateral sensoneural deafness with a degree of deafness of the right ear of 80dB and left ear of 90dB, after which the client wore ABD. Sensorineural deafness is deafness that occurs due to disorders of the inner ear or in the nerve pathways from the inner ear to the brain. (11) According to Froma, children with severe hearing loss or deafness (loss of >80 dB HL) have great difficulty obtaining intelligible speech, although through intervention, at greater levels of hearing loss result in more severe impairment of speech development. (3)

Table 2. Hearing Impediment Level (12)

dB	Description	Delay
15-20 dB	Very Light	Vowel sounds are clearly audible, possibly missing /f/, /s/, /sh/ sounds
20-40 dB	Light	Only hear the conversation hear the loud voice
40-60 dB	Keep	Can't hear most speech at normal conversational level
60-80 dB	Heavy	Can't hear sounds in normal conversation
>80 dB	Very Heavy	It is very difficult to hear speech or other sounds

Susyanto stated, hearing loss (deafness) that occurs in newborn (prelingual deafness) can inhibit the development of speech, language, cognitive, emotions and social communication. (13) Reinforced again by Stella et al who stated that prelingual deafness is hearing loss that occurs before speech and language skills develop or are acquired. Academically, deaf children fall behind due to the language barrier which is an important aspect of the learning process. (14) This is especially true in children with prelingual profound deafness, i.e. children whose deafness appears before language acquisition and is so severe that they cannot hear the sounds of speech at all. The language barrier in prelingual profound deaf children stems from a basic factor in the process of language development, namely vocabulary. They don't learn to recognize words by the sound of their sounds. As a result, they experience delays in developing different words, so their vocabulary is limited. (14)

Based on the results of the Speech Equipment Examination (PAW) it is known that the organs and functions are in good and normal condition, it's just that there are some cavities. Based on the results of articulation tests conducted on 62 items, it was found that the client experienced articulation failure in the form of 18 item substitution, 44 item omission, 0 item distortion and 0 item addition. This is supported by Abraham 1989 in Rubin, the production of consonants in children with hearing loss is generally characterized by omissions and substitutions. The omission and substitution of consonants usually occurs at the beginning and end of words, however, the omission of consonants at the end of words is much more common. Children with mild to moderate hearing loss tend to have fewer errors and more understandable speech than children with more severe hearing problems with most errors in the production of high-frequency consonants (e.g., s, sh, ch). (15) For syndromes related to voice, it is known that the client's tone is high and not monotonous, the quality of the client's voice seems normal and not hoarse, the client's voice seems loud when singing.

According to Raymond, children with hearing loss have difficulty controlling the quality and intonation of voice is also difficult. As a result, inconsistencies in low or high tones and rhythmic errors such as irregular breathing. (16) Based on the results of the Auditory Language Comprehension (PBSA) test on 101 items, the client was able to answer correctly on 34 items and answered incorrectly on 68 items, it can be concluded that the client's comprehension ability is still under the age of 3 years. The direct impact of hearing loss is the disruption of verbal or oral communication, both expressive (speaking) and receptive (understanding the speech of others), making it difficult to communicate with others. (17)

Based on observations related to the client's general and physical condition, everything seems normal. The client is able to walk without assistance, both hands of the client are normal, the client does not use glasses, the client uses ABD on both ears. Based on the results of interviews related to client motor development, the client was prone at the age of 4 months, crawling the client did not pass, sitting at 8 months, standing at 13 months, walking at 13 months. In the client's current motor skills, the client is able to stand, walk well and not tiptoe, the client is also able to jump when playing

with his friends. According to the Indonesian Pediatric Association (IDAI), not all babies have to go through the crawling stage before learning to stand and walk. Therefore, it is perfectly natural for your baby not to crawl as long as he shows interest and develops his ability to use his arms and legs to move. (18)

Based on the results of observations and tests related to sensory abilities, namely Hearing, Visual and Tactile, data were obtained on hearing ability (S1) when when the client was called by the client researcher turned his head while using expressions. When the therapist rang the sound of the bell from a distance of ±30cm, the client turned his head and used gestures as if indicating the presence of a sound. When the client is asked to turn his head when Therapist says /a/ behind the client, the client mimics the /a/ sound. When Therapist stimulated the chicken's voice and Therapist asked and the client answered "uuu" and pointed at the chicken in front of the client's house, when Therapist gave the stimulus the cat's voice, the client immediately uttered a verbal "au" accompanied by a gesture.

Based on the results of observations and tests related to the impression of intelligence, it was found that the client could make the shape of the building on the drawing but based on the format the client was only able to reach the age of 6 years.Basically, the intelligence of children with hearing loss is the same as normal children, some have high, medium, and low intelligence. However, because intellectual development is strongly influenced by language development, deaf children will show low intelligence due to difficulty understanding language. Therefore, it is not surprising that deaf children have poorer academic results than other deaf children. (19)

Table 3. Implementation of Therapy

Voice	**Stimulus**	**Responds**
Day 1	Opening: Therapist invite clients to sit face to face and pray Research toapproach clients by inviting clients to play Therapist er asked if the client had eaten Core activities :	Opening: The client nods his head or tells Therapist when Therapist asks if the client has eaten. Core activities :

	Therapist gave 3 pictures of animals to clients, namely /chicken, /cat, and /dog/ Therapist introduced the sounds of the animal, for example / meau. Meau.../ For cat sounds, therapist performed the activity 3 times Therapist introduced the animal sounds; Therapist mimicked the animal's sounds and asked the client to designate the appropriate sound. Therapist asked clients to listen to sounds /cat/, /chicken/, /dog/ Closing: Therapist asked clients to pray after therapy	Client response pointing /dog/ for sound /cat/ and response sound /chicken/ client pointing image /chicken/ then for sound /dog/ client pointing /cat/. Closing : client responds by praying with researcher
Day to 2 & 3	Pembukaan : Therapist invite clients to sit face to face and pray Therapist approach clients by inviting clients to play Therapist er asks if the client has eaten Core activities : Therapist gave 3 pictures of animals to clients, namely /chicken/, /cat/, and /dog/ Therapist introduced the sounds of the animal, for example / meau. Meau.../ For cat sounds, therapist performed the activity 3 times After Therapist introduced the sounds of the animal, Therapist mimicked the sound of the animal and asked the client to designate the appropriate sound Therapist asked the client to listen to the sound/cat/, /chicken/and/dog/ and asked the client to point on 3 occasions Closing: Therapist invite clients to pray after therapy	Opening: The client nods their head or tells Therapist when Therapist asks if the client has eaten. Core activities : Client response when heard picture sound / cat / client pointing to picture /cat/ for sound /chicken/ client pointing to picture /chicken/ then for sound /dog/ client able to point to picture /dog/ and imitate the sound /dog/ taught by researcher /ououou/ Closing : client responds by praying with researcher
Day to 4 & 5	Opening: Therapist invites clients to sit face to face and pray Therapist approach clients by inviting clients to play Then Therapist asks if the client has eaten Core activities : Therapist gave 3 pictures of animals to clients, namely /chicken/, /cat/, and /dog/ Therapist introduced the sounds of the animal, for example / meau. Meau.../ For cat sounds, therapist performed the activity 3 times After Therapist introduced the animal sounds, Therapist mimicked the animal's sounds and asked the client to designate the appropriate sound Therapist asked the client to listen to the sounds /cat/, /chicken/, and /dog/ and then asked the client to point to pictures of /cat/, /chicken/ and /dog/ Closing:	Opening: Therapist asked whether the client had eaten, the client responded with a head nod or the client told the researcher. Core activities : Client response pointing image /cat/ to sound /cat/, sound /chicken/ client pointing image /chicken/ and to sound /dog/ client responds by pointing to image /dog/ Closing: The client responds by praying with the researcher

	Therapist invite clients to pray after therapy	
Day 6	Opening: Therapist invites clients to sit face to face and pray Therapist approach clients by inviting clients to play Then Therapist asked if the client had eaten Core activities : Therapist gave 3 pictures of animals to clients, namely /duck/, /cow/, and /goat/ Therapist introduced the animal sounds, for example /moooo/ for the cat's voice, Therapist carried out the activity 3 times After Therapist introduced the animal sounds, Therapist mimicked the animal's sounds and asked the client to designate the appropriate sound Therapist asked the client to listen to the sounds /duck/, /cow/, and /goat/ and then asked the client to point to pictures of /duck/, /cow/ and /goat/ Closing: Therapist invite clients to pray after therapy	Opening: Therapist er asked whether the client had eaten, the client responded with a nod of the head or the client told the researcher. Core activities : When the client hears the /duck/ response sound the client points to the /duck/ image to the /cow/ response sound the client points to the /cow/ image and to the /goat/ sound the client responds by pointing to the /duck/ image Closing: The client responds by praying with the researcher
Day 7	Opening: Therapist invites clients to sit face to face and pray Therapist approach clients by inviting clients to play Then Therapist asks if the client has eaten Core activities : Therapist gave 3 pictures of animals to clients, namely /duck/, /cow/, and /goat/ Therapist introduced the animal sounds, for example /moooo/ for the cat's voice, Therapist carried out the activity 3 times Therapist introduced the sounds of the animals; the therapist mimicked the sounds of the animals and asked the client to designate the appropriate sounds Therapist asked the client to listen to the sounds /duck/, /cow/, and /goat/ and then asked the client to point to pictures of /duck/, /cow/ and /goat/ Closing: Therapist invite clients to pray after therapy	Opening: Therapist er asked whether the client had eaten, the client responded with a nod of the head or the client told the researcher. Core activities : When the client listens to the /duck/ response sound the client points to the image /goat/ to the /cow/ response sound the client points to the image /cow/ and to the sound /goat/ the client responds by pointing at the picture /goat/ Closing: The client responds by praying with the researcher
Day 8	Opening: Therapist invite clients to sit face to face and pray Therapist approach clients by inviting clients to play Therapist er asks if the client has eaten Coreactivities :	Opening: Therapist asked whether the client had eaten, the client responded with a nod of the head or the client told the researcher

	Therapist gave 3 pictures of animals to clients, namely /duck/, /cow/, and /goat/ Therapist introduced the animal sounds, for example /moooo/ for the cat's voice, Therapist carried out the activity 3 times After Therapist introduced the animal sounds, Therapist mimicked the animal's sounds and asked the client to designate the appropriate sound Therapist asked the client to listen to the sounds /duck/, /cow/, and /goat/ and then asked the client to point to pictures of /duck/, /cow/ and /goat/ Closing: Therapist invite clients to pray after therapy	Coreactivities : When the client hears the /duck/ response sound the client points to the picture /duck/ to the /cow/ response sound the client points to the image /cow/ and to the sound /goat/ the client responds by pointing to the picture /goat/ Closing: The client responds by praying with the researcher
Day 9&10	Opening: Therapist invites clients to sit face to face and pray Therapist approach clients by inviting clients to play Then Therapist asks if the client has eaten Core activities : Therapist gave 6 pictures of animals to clients, namely /chicken/, /cat/, dog/, /duck/, /cow/, and /goat/. Therapist gives the first 3 images and then outputs the next 3 images Therapist introduces the sounds of the animal, for example /moooo/ for the sound of the cow, Therapist perform the activity 3 times After Therapist introduces the sounds of the animal, Therapist mimics the sound of the animal and asks the client to indicate the appropriate sound. Therapist er asks the client to listen to the sounds /chicken/, /cat/, /duck/, /cow/, /goat/, /dog/ Closing: Therapist invite clients to pray after therapy	Opening: Therapist asked whether the client had eaten, the client responded with a nod of the head or the client told the researcher Core activities : When the client listens to the sound of /chicken/ response, the client points to a picture of /chicken/ and points to the chicken in front of the house and then mimics the sound that Therapist did /ooo/. When the client hears the sound /cat/ the client can point to the picture /cat/ and imitate the voice of Therapist /auau/, when the client hears the sound /duck/ the client points to the picture /duck/ for the sound /cow/ the client can point to the picture /cow/ and imitate the sound of the cow taught by Therapist /moo/ for the sound / goat/ the client is able to point to the picture /goat and imitate the sound of the goat /ooo/ Closing: The client responds by praying with the researcher
Day 11	Evaluation	Evaluation

After 10 sessions of therapy using the Learning to listen method, it was found that there was an increase in the success of therapy by 100% from the initial 0%. Table 4 describes the comparison between the results of the Initial Test and the Final Test to be used as evaluation material.

Table 4. Comparison of Final Test Results and Final Test Results

Initial Test		Final Test	
Material	Value	Material	Value
Cow	0	Cow	1
Chicken	0	Chicken	1
Goat	0	Goat	1
Cat	0	Cat	1
Dog	0	Dog	1
Baby	0	Baby	1

The goal of auditory training is to help children use their remaining hearing to the fullest to recognize speech and use their hearing to recognize the surrounding environment. Practicing hearing can help the brain to distinguish between sounds, recognize words, and understand meaning. Ultimately, children who receive auditory training can learn new information as it happens during conversation. Rochette and Bigand conducted a study with six subjects and used voice, music, environmental sounds, and abstract sounds as listening practice stimulus. Results from this study showed that children received a total of ten hours of listening practice divided into 20 weeks of sessions and showed that children experienced improvements in discrimination and sound identification. (20) Jarollahi et al conducted a study to train hearing in 13 children with severe to very severe hearing loss, the results of which stated that there was an increase in hearing with or without using ABD. It is proven that effectively performing hearing exercises for children with hearing loss in improving their listening skills. It is proven that effectively performing hearing exercises for children with hearing loss in improving their listening skills. (21)

CONCLUSION

After 10 sessions of speech therapy with the Learning to Listen method, there was a 100% improvement in improving the ability to identify speech sounds in this case.

SUGGESTION

It is expected that there will be further research related to the application of the Learning to listen method for articulation in children with hearing loss to provide information related to the effectiveness of this method.

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