The Effectiveness of a Speech Program to Improve Phonological Awareness in Reducing Speech Disorders in Children with Autism Spectrum Disorders

Hossam Abass Khalil Sallam [1*] **, *Samy Mohamed Hussien*** [2]

[1] *Associate professor, Department of Special Education, Faculty of Education, Qassim University, Al-Malida District, Kingdom of Saudi Arabia*

[2] *Phoniatrics physician at Hearing and speech institute Embaba Egypt*

*Corresponding author e-mail h.sallam@qu.edu.sa Orcid 0009-0007-6228-6840

Abstract

Purpose: Building a program to develop phonological awareness in alleviating the severity of some speech disorders in autistic children. Methods: The study sample consists of (30) autistic boys and girls. Their average age is 7-10 years. The average IQ of the sample ranges from (60-70) and the average degree of autism disorder from (33-39). the study sample of autistic children belong to the same speech disorders and belong to a similar economic level. They were divided into two equal groups, experimental and the control, (15) in each group. The program was implemented over (three months) at a rate of (three days) per week, with an average of (35) minutes per session on experimental group. The study tools consist of: A measure of phonological awareness, speech disorders scale, a proposed communication program for autistic children (All of them prepared by the researchers). The Statistical methods were used are the Mann-Whitney test, a two-way ANOVA and a t-test and. Results: The results of the study revealed that there is a significant effect of the treatment (experimental/control) on the variance of the scores obtained by sample members in the post and follow-up measurements, while there is no significant effect of both gender and the interaction of treatment with gender on the variance of the scores obtained by individuals in the dimensional and subsequent measurement. Conclusion: the training program for developing phonological awareness that was applied in this study is characterized by a high degree of efficiency and effectiveness, and that it is suitable for reducing the severity of speech disorders in an autistic child.

Keywords: Autistic Children, speech disorders, phonological awareness

Introduction

Caring for autistic children represents a major challenge to the world. This interest requires a lot of capabilities to meet needs and provide services that help them achieve social participation and integration with others. Autism has a significant impact on many developmental processes, especially linguistic development. (Ten Hoopen et al., 2022). There is no doubt that autistic people have deficiencies in verbal communication skills, which leads to poor psychological and social adjustment. Speech disorders are among the most common linguistic disorders among autistic people, which may negatively affect their communication and the pursuit of their lives. (Félix et al, 2022).

The results of surveys on language disorders indicate that autistic children have clear deficiencies in verbal communication skills and that speech disorders represent the most common language disorders among autistic children. Statistics from the US National Institute of Neurological Diseases indicate that speech disorders represent (5%) of language disorders and that they are more common among males than females. (Maemonah et al., 2021).

Because of the importance of language in communication; The methods of treating speech and language problems have varied, and the risk of these problems increases if they are left and neglected without intervention, especially in the stage of childhood, as they not only become more desirable for examination, and result in other consequences that impact the child's good psychological adjustment (Lee et al., 2023).

Phonological awareness is linked to a series of distinct experiences in processing the structure of sound in the comprehensive language, manipulating sounds independently of the meaning involved, dividing the word into the sounds included in it, and dealing with those sounds. (Vogindroukas et al., 2022).

Where the child's speech acquires two processes (construction - disappearance), construction is the continuous acquisition of the sound of the word step by step, until the spoken verbal language is completely built. As for disappearance, it refers to the vanishment of phonological disorders such as deletion, distortion, substitution, and addition, which can be used to facilitate the pronunciation of the word in A stage acquiring or constructing language. (Tomasello and Michael 2000).

Therefore, the child understands speech. Words must be divided into syllables and phonemes, and children cannot pronounce correctly unless they are able to recognize the vowel and the word, distinguish it later when they hear it, and be able to combine its syllables into a word, without error by deleting, adding, or removing, or substitution, and this is called phonological awareness (Gathercole 2006).

Autistic children can perform some phonological awareness skills; However, they are less able than normal children to perform word segmentation tasks; Because these skills develop along with reading acquisition skills, by the age of six, children can easily be segmenting words and name objects. (Dynia et al., 2019).

Also, autistic children can discover naming and produce speech and produce sounds, but this ability does not improve with age compared to normal children. The sequential order in understanding phonological awareness begins with early acquisition of language, such as naming objects first and representing the word, and progresses to the naming objects task and then the sound level task (Pomper et al., 2019).

Autistic children suffer from speech disorders, which are the result of their failure to form consistent phonological images based on a sound linguistic repertoire, while autistic children are capable of verbal and non-verbal imitation, dividing words into syllables, and are also able to be aware of the naming of things and the beginning, but Not phonemes (Prescott et al., 2022).

Phonological awareness skills develop sequentially from simpler to more difficult phonological processing in parallel with other aspects of linguistic awareness. It progresses from larger linguistic units, such as the word, to the syllable, then units with implicit syllables for the beginning and naming of things (rhyme), and finally to phonological units. Thus, we find that mental retardation is significantly linked to linguistic abilities. As it is capable of extremely complex, structure, sequence and classification, this calls for the study of language for all categories of mental disability (Gabig and Cheryl 2010).

Phonological awareness develops through the acquisition of three different and diverse skills: phonemic awareness, pronunciation, and phonological awareness. Phonemic awareness is the ability to have clear awareness between the sounds of speech, while pronunciation is the ability to produce linguistic sound correctly. As for phonological awareness, it is the clear knowledge of spoken words (Pye et al., 2017).

Procedurally, we find that there are several sub-skills that represent phonological awareness, and these skills increase in complexity as the child ages, which means that the earlier the intervention is to treat speech and language problems, the better the outcome will be, for children in general and autistic children in particular. (Choo et al., 2022).

The term phonological disorder refers to any problem in the speech production process that impairs pronunciation and phonological organization, and weak phonological production is linked to a deficit in phonological awareness, and training in phonological awareness, rather than traditional pronunciation training, increases the chance of treating speech disorders. (Dockrell and Howell 2015).

Also, children with linguistic deficiencies have less mature phonemic awareness abilities than their peers of the same age, and children with weak phonemic awareness have relatively more difficulty with phonological awareness tasks. There is no doubt that the child's ability to phoneme awareness is related to his ability to speak. He is unable to understand the sounds of letters and is likely to have obvious difficulty in pronunciation. (Mary Grantham O'Brien 2020)

Children who suffer from delayed pronunciation skills have variable awareness of letter sounds such as (l, r), (l, w), (r, w). This differs if they are unable to pronounce them, and children who have speech disorders have less accuracy. In matching and distinguishing \and\, \t\ from children with normal speech, some children with speech disorders have a defect in speech awareness, which leads to the production of their errors (Krueger and Breanna 2019).

The concept of speech disorders is one of the concepts that has sparked widespread controversy among scientists, as it is shared within communication disorders and is considered an essential dimension of it. Therefore, psychologists have provided certain definitions from a psychological point of view for these disorders, and medical scientists have also provided definitions for them from a medical point of view. (Heidi M. Feldman 2005).

Children's pronunciation develops with the development of their verbal vocabulary. Nouns constitute the majority of the vocabulary, followed by verbs and pronouns. Then nouns begin to gradually decrease, pronouns increase, and the proportion of nouns compared to verbs decreases as the child's age increases. Girls' linguistic development is

faster than boys', especially in the first years of life. The speech process goes through three main stages: reception, processing, and expression. These stages connect the speaker's brain with the listener's brain. Therefore, the process of producing speech is extremely difficult compared to the process of studying understanding and awareness of speech. Therefore, language psychologists resort to indirect methods to study it, relying on two sources: speech errors and disfluency. (Dockrell and Marshall 2015).

Speech disorders are divided into sub-dimensions, and each dimension has multiple forms of the disorder and causes. Some of them are due to an organic illness, such as injury to one of the parts of speech, breathing, or the nervous system. Either the causes are of a psychological and educational nature, due to the family, upbringing, and socialization factors, or due to Deep psychological and emotional factors, such as severe emotions, fears, and psychological trauma, and there may be reasons specific to a particular individual and not others, and therefore it is necessary to study the case of each individual individually to determine the type, degree, nature, and causes of his disorder so that appropriate treatment programs can be prepared for him. (Shriberg et al., 2010).

Hearing is considered the first stage of the speech process in humans. A person receives from others through hearing, then hearing experiences and processes through the brain, the brain gives a signal to the speech muscles, which carry out the process of transmission or practice in speech. The listener must be able to detect subtle differences that reflect the phonological properties of speech, so individuals with hearing loss will find it difficult to interpret the incoming phonological signal, and will perceive words differently than individuals with normal hearing. (Kroeger et al., 2020).

Discrimination and auditory awareness also have a clear impact on the speech process in children. A child who suffers from hearing loss finds it difficult to distinguish sounds that are close together, and there is a close relationship between the inability to be aware of auditory discrimination and speech disorders, and that speech awareness depends on the ability to distinguish between... Phonemes (sounds) as the basic and primary phonological units of speech that determine distinctions in meaning (Asad et al., 2018)

Types of mental impairment also cause speech problems, due to injury to the brain centers that limit the ability to control and move the muscles responsible for speech, including the muscles of the jaws, palate, tongue, and lungs, or injury to the nerves that end in these muscles. One of the most important forms of this type of disorder is Paralysis of speech muscles, defects in choosing and sequencing words, and loss of pronunciation. (Hancock et al., 2023).

The therapeutic program that focuses on phoneme awareness skills leads to a noticeable improvement in speech ability, and the interactive education and speech evaluation system has a significant impact on treating speech awareness in children with speech disorders. Therefore; Phoneme awareness skills have a direct impact on pronunciation skills, which demonstrates the direct causal relationship between these two variables (Singe et al., 2022).

The current study attempts to identify the effect of a proposed program to develop phonological awareness and reduce speech disorders in autistic children. It also reveals the presence of differences in the statistical results about the variable of gender and the variable of disability.

The study Problem

With the increasing number of experimental and controlled children with mental impairment, family and school anxiety increases, which prompts them to exert more effort to improve the health, educational and social services provided to them. The two groups also share some linguistic characteristics related to speech and speech and weak linguistic ability. Where sentences are short and incorrect in structure.

There is a relationship between autism on the one hand and delayed speech on the other hand, and this delay takes many forms. It may be in the form of sounds without meaning, or the use of facial and body gestures as a means of communication, which makes it difficult to speak in a sound and familiar voice, and use language that is spoken with vocabulary. It is unique to him without significance or meaning, and the level of language and speech delay varies according to the degree of autism.

The primary goal of developing a child's linguistic skills is to improve his ability to communicate clearly and correctly. Language skills are interconnected and represent the pillars of linguistic communication. Speech and communication programs are not an end, but they are

considered an important means of modifying the child's linguistic behavior. It interacts with the activities and experiences included in those programs.

There is a relationship between autism on the one hand due to the importance of pronunciation in language and communication, many researchers have been interested in providing appropriate improvement and therapeutic activities for those with linguistic disorders because pronunciation is a complex process; Since many body parts are involved, these programs had to be built by specialists in speech-language pathology and special education. To complete the construction of the program and achieve its goal correctly, therefore, providing specialized programs in reducing speech disorders, which are characterized by exciting activities for the child, whether mentally disabled or autistic, contributes to the development of the skills necessary for daily life.

In light of the previous presentation, we note that phonological awareness is important in the development of pronunciation skills. Children who suffer from weak phonological awareness are vulnerable to speech disorders, and phonological awareness skills are affected by other aspects such as phoneme perception and pronunciation abilities, the importance of the problem of speech disorders in autistic children, and the frequent complaints from parents, and that some specialists are not sufficiently trained to deal with them. These children and these problems correctly and effectively, which prompted us to design a treatment program to develop phonological awareness, and verify its effectiveness to reduce speech disorders in autistic children.

The study questions

The problem of the study is determined by the following two questions:

1. How effective is the proposed program in developing phonological awareness in autistic children?
2. What is the impact of the proposed program in reducing speech disorders in autistic children?

The importance

1) The scarcity of joint studies between the educational and medical aspects in the field of speech and communication, targeting autistic children and those with speech disorders.

2) Study pronunciation problems such as substitution, deletion, and distortion; The most common problems that children suffer from are autistic children.
3) Building a tool to diagnose speech disorders and reveal their psychometric properties.
4) Building a tool to detect the level of phonological awareness and verifying its psychometric properties.
5) Build a program to improve phonological awareness, and verify its effectiveness in reducing speech disorders in autistic children.
6) Enriching the educational library with specialized knowledge and arriving at results that open the way for scholars to conduct more specialized and joint research between complementary specializations to achieve a common goal, and this is evident in the interpretation of the results.

Terminology of study

- Speech therapy program:

It is defined procedurally as "a group of communication activities and educational exercises provided to autistic children, with an average age of (7-10) years, who suffer from a deficiency in phonological awareness as one of the causes of speech disorders, and who frequent the clinics of the Institute of Hearing and Speech. These activities include breathing exercises." And training speech organs and other linguistic exercises, through several communication sessions, to develop their auditory and phonological awareness, and achieving correct pronunciation."

- Phonological awareness:

It is defined procedurally as "the ability of a controlled and experimental child to understand letter sound, awareness of naming things, consistency of word beginnings, phonetic analysis of the word, segmentation of the beginnings of words, and the extent of his ability to segment the endings of words, and it is determined by the degree that the autistic child obtains, on the phonological awareness scale used."

- Speech disorders:

Speech disorders defines speech disorders as failure to use developmentally expected speech sounds that are appropriate for the individual's age, intelligence, and accent, as evidenced by poor sound production or inappropriate pronunciation. Speech disorder consists of errors in Making a sound, substituting a sound for another sound,

deleting sounds such as consonants at the end of a word, or distorting the pronunciation of a word, which gives the impression of childish speech (Shakeel A. et al., 2022).

The most important speech disorders are:

Substitution: which is making a sound instead of a sound, or replacing a letter instead of a letter.

Deletion: It is the deletion of one of the sounds of the word, and the pronunciation of the word is incomplete. Deletion defects often appear in the pronunciation of consonants at the end of the word more than at its beginning or middle.

Distortion: It is a distortion in the way a letter is pronounced or pronounced incorrectly. The distortion does not reach the point of confusion. As the letter still maintains a degree of its auditory distinction, this may occur due to differences in dialects, or congenital defects in the lips or teeth.

- Autism:

The study adopts the Diagnostic and Statistical Manual V of the American Psychiatric Association (DSM.V) definition; He defined autism as "a comprehensive developmental disorder defined by the accompanying deficiency in mutual social interactions, communication deviation, and limited repetitive behavioral patterns, provided that the functional disorder appears in the areas of social and linguistic communication and behavioral aspects before the age of three years." (Zeidan et al., 2022)

Study hypotheses:

1- 1- There is no statistically significant relationship between the two treatment variables (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of the skill of naming objects.

2- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of letter-sound skill. communication and behavioral aspects before the age of three years

3- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variation of the scores obtained by sample members in the post-measurement of word beginning rhythm skill.

4- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variation of the scores obtained by sample members in the post-measurement of the skill of phonological analysis of words.
5- There is no statistically significant relationship between the treatment (control/experimental) and gender (male/female) in the variation of the sample members' scores in the post-measurement of word segmentation skills.
6- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of sentence completion skill.
7- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variation of the scores obtained by sample members in the post-measurement of overall skills on the phonological awareness scale.
8- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variation of the sample's scores on the post-measurement pronunciation scale.
9- There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variation of the sample's scores on the follow-up measurement on the speech scale.

Aim of the study

The current study aims to:
1. Building a program to develop phonological awareness in alleviating the severity of some speech disorders in autistic children.
2. Verifying the effectiveness of a program to develop phonological awareness in alleviating the severity of some speech disorders in autistic children.
3. Detecting the extent of the continuing effectiveness of the therapeutic program in treating some speech disorders in autistic children, after it has stopped.

Method:

Participants

The study sample in its final form consists of (30) autistic boys and girls who attend the clinics of the Institute of Hearing and Speech. Their average age is 7-10 years. The sample was divided into two equal

groups: one experimental and the other control. All children have the following criteria:

- The average IQ of the sample ranges from (60-70) according to the scores of the Drawing the Man test (for Good Enough), according to the records of children at the Institute of Hearing and Speech. And the average degree of autism disorder from (33-39) according to CARS test.
- All members of the study sample of autistic children belong to the same speech disorders, which are caused by a defect in phonological awareness.
- All members of the study sample belong to a similar economic level (according to the socio-economic and cultural level form developed for the Egyptian family), according to the records of children at the Institute of Hearing and Speech.

Design

The program was implemented over (three months) at a rate of (three days) per week, with an average of (35) minutes per session, during the period from 5/23/2023 to 8/28/2023.

The study tools consist of:

- A measure of phonological awareness for autistic children (prepared by the researchers)
- Speech disorders scale for autistic children (prepared by the researchers)
- A proposed communication program for autistic children (prepared by the researchers).

These tools are:

1- A measure of phonological awareness for autistic children:

The scale aims to reveal the level of phonological awareness among autistic children, and for this purpose, studies and research related to language measures, audiometry, and phonological awareness were reviewed.

The scale consists of six dimensions, and each dimension consists of several items, and these dimensions are (naming things, letter sounds, phonetic analysis of the word, rhythm of the beginning of the word, word segmentation, sentence completion). These dimensions and their items were constructed and selected in light of reviewing Standards and tests related to the subject of measurement. The number of test items reached (81) items, and after presenting it to the arbitrators, it reached (68) items in its final form. Then its psychometric efficiency was

verified. The correct response is given two marks, and the incorrect response is given one mark. Whenever The score decreased, it indicated a decrease in the phonological level of the autism condition.

Psychometric efficiency of the scale:

Scale stability:

The scale was applied to (30) autistic children aged (7-10) years and then re-administered after (21) days. The reliability coefficient for re-administration reached (0.781), and the reliability coefficient using Cronbach's alpha reached (0.919). By half division (0.679).

Validity of the scale:

The scale, in its initial form (81) items, was presented to several (17) arbitrators in the speech-language pathology departments at the Institute of Hearing and Speech, the Speech Language Department at Al-Qasr Al-Aini, and the Department of Special Education at Qassim University and Port Said University. In light of their opinions, the wording of some items was modified. Some of them were transferred from one axis to another, and (13) items were deleted due to repetition and not belonging to the dimension or measurement. The percentage of agreement on all items of the scale ranged between (89 - 100) %.

The hypothesis formation validity method was also used to estimate the validity of the scale, where the correlation coefficient of the score of each dimension with the total score of the scale was estimated, and all of these values were significant at the significance level of 0.01. The following table shows the results.

Table No. (1)

The correlation coefficient of the total score of the dimension with the total score of the phonological awareness scale

The dimension	Correlation coefficient with the total score of the scale
Naming things	0.92
Letter sound	0.91
The rhythm of the beginning of a word	0.94
Phonetic analysis of the word	0.91
Segmentation of the word	0.90
Sentence completion	0.93

Also, all the values of the correlation coefficients between the score of each item and the total score of the dimension to which it belongs were significant at the significance level of 0.01, and the following table shows this.

Table No. (2)

The correlation coefficient of the score of each item of the test dimensions with the total score of the test

Correlation coefficient	Phrase	Correlation coefficient	Phrase	Correlation coefficient	Phrase	Correlation coefficient	Phrase
0.721(**)	52	0.643(**)	35	0.643(**)	18	0.711(**)	1
0.562(**)	53	0.719(**)	36	0.719(**)	19	0.662(**)	2
0.693(**)	54	0.643(**)	37	0.643(**)	20	0.656(**)	3
0.701(**)	55	0.619(**)	38	0.619(**)	21	0.712(**)	4
0.689(**)	56	0.716(**)	39	0.716(**)	22	0.646(**)	5
0.673(**)	57	0.615(**)	40	0.615(**)	23	0.723(**)	6
0.708(**)	58	0.593(**)	41	0.593(**)	24	0.598(**)	7
0.683(**)	59	0.643(**)	42	0.643(**)	25	0.743(**)	8
0.639(**)	60	0.815(**)	43	0.815(**)	26	0.779(**)	9
0.659(**)	61	0.753(**)	44	0.753(**)	27	0.709(**)	10
0.711(**)	62	0.768(**)	45	0.768(**)	28	0.661(**)	11
0.596(**)	63	0.731(**)	46	0.731(**)	29	0.666(**)	12
0.645(**)	64	0.643(**)	47	0.689(**)	30	0.705(**)	13
0.553(**)	65	0.719(**)	48	0.673(**)	31	0.613(**)	14
0.681(**)	66	0.643(**)	49	0.708(**)	32	0.731(**)	15
0.732(**)	67	0.619(**)	50	0.683(**)	33	0.672(**)	16
0.552(**)	68	0.716(**)	51	0.689(**)	34	0.632(**)	17

2- Picture Speech Scale for Autistic Children:

The speech assessment scale for autistic children was prepared in light of reviewing studies and standards related to speech and language, especially those conducted on autistic children. It includes two Parts (a) and (b), where Part (a) includes an evaluation of the child in his pronunciation of the sounds of the letters of the alphabet with short movements. In syllables (Fatha, Kasra, Dammah) and long ones (madd with alif, madd with waw, madd with ya'), and the appearance of the child's pronunciation responses are recorded on a pronunciation card designed for this purpose, to identify and identify speech disorders, such as deletion, substitution, addition, and distortion. The location of the disorder is also recorded, whether in the beginning, middle, or end of a word.

The scale consists of two Parts: Part (A), which is applied to autistic children, and Part (B), which is applied to the teacher or guardian. The following is a presentation of these two images:

This scale includes two images, Part (A) and is applied to the child. It consists of two sections to measure the child's speech disorder. The first section evaluates the pronunciation of the sound alone with different movements. In it, the sound of the letter is pronounced in front of the child using different movements in syllables (fatah, kasra, and dhammah), and the child's pronunciation of it is recorded on the card prepared for that.

It aims to evaluate the autistic child's pronunciation of alphabetical sounds, by speaking in phrases, by talking about an arranged picture story, and the areas of disorder in each word are identified, the location and type of the disorder, and the picture story, which brings together all the Arabic letters, is narrated in three Stories, then the child is asked to retell the story, and record the type of disorder and its location on the card.

While Part (b) aims to estimate the degree of speech disorder in an autistic child, it is done through the response of the teacher or guardian to (15) items covering the two sections in Part (A).

Psychometric properties of the pictorial speech scale for autistic children:

First: (Part A)

The reliability of part (A) was verified using Cronbach's alpha equation, and the reliability coefficient for Part (A) of the scale reached (0.87), which is a high value, indicating confidence in using the measurement. The validity of Part (A) was also verified using the validity of the hypothesis formation. The correlation coefficient was obtained between the score of each statement and the total score of the scale. The results showed that all of these values were statistically significant at the significance level (0.01), and the following table shows those results.

Table No. (3)

The correlation coefficient for the score of each item with the overall scale score of Part (A) for Picture Speech Disorders for Autistic Children

Correlation coefficient with the total score	Phrase	Correlation coefficient with the total score	Phrase	Correlation coefficient with the total score	Phrase
0.643(**)	11	0.643(**)	6	0.611(**)	1
0.654(**)	12	0.589(**)	7	0.572(**)	2
0.673(**)	13	0.593(**)	8	0.636(**)	3
0.623(**)	14	0.613(**)	9	0.675(**)	4
0.645(**)	15	0.585(**)	10	0.623(**)	5

Second: (Part B)

The reliability of Part (B) was verified using Cronbach's alpha equation, and the reliability coefficient for Part (A) of the scale reached (0.84), which is a high value, indicating confidence in using the measurement. The validity of Part (b) was also verified using the validity of the hypothesis formation. The correlation coefficient was obtained between the score of each statement and the total score of the scale. The results showed that all of these values were statistically significant at the significance level (0.01), and the following table shows those results.

Table No. (4)

The correlation coefficient for the score of each item with the total scale score for Part (B) of pictorial speech disorders for autistic children

Correlation coefficient with the total score	Phrase	Correlation coefficient with the total score	Phrase	Correlation coefficient with the total score	Phrase
0.543(**)	11	0.593(**)	6	0.571(**)	1
0.619(**)	12	0.619(**)	7	0.642(**)	2
0.593(**)	13	0.603(**)	8	0.616(**)	3
0.583(**)	14	0.623(**)	9	0.645(**)	4
0.555(**)	15	0.615(**)	10	0.553(**)	5

Program application procedures:

When diagnosing and evaluating speech disorders, it should be ensured that the person performing the measurement is a speech pathologist, and the treatment of speech disorders cannot be generalized to all children. Sometimes a child learns to pronounce a sound in a certain way, but the same sound is not pronounced by another child with the same training method. Therefore, the specialist must be innovative with other techniques and methods that ultimately achieve the desired goal of modifying a disorder in the pronunciation of a specific sound in a child.

Through the work of the medical researcher as a speech pathologist and treatment of speech and speech disorders, the first stage he performs is assess the speech muscles and ensure their safety, as any organic defect in the tongue, for example, or loose teeth, or other things, may cause no results to be achieved, regardless of what they are. The therapist does the training because the speech organ that forms the sound is defective. After that, we begin training the speech muscles of the tongue, lips, throat, lower jaw, soft and hard palate, and breathing training, since exhaled air is the raw material for the speech process.

Then begin to improve the process of awareness and auditory discrimination for the autistic child, where the specialist and the child sit in front of the mirror, for example, where the specialist pronounces the sound and the child thinks about what he saw of the opening of the mouth, the sticking out of the tongue, the position of the tongue, etc. Here, visual awareness must be developed, and sound must be heard. Developing excellence and auditory awareness, then after that, the specialist begins verbal training of sounds, at this stage, there are different trends in the training process, as there are those who rely in training on the place of pronunciation of the sound, and in it, the specialist teaches the patient, child, or case how to produce the sound that he suffers from. From its pronunciation, and the organs involved in its production, there are some sounds in which more than one organ is involved, such as the ta', for example, "the lower lip with the edges of the upper teeth."

Sometimes the sound is pronounced in front of the child in detail, that is, the sound is cut into simple clips and recorded on a cassette tape, for example, or on a special device that, is present in schools of intellectual education in every classroom designated for this purpose. The child becomes aware of and distinguishes between the incorrect pronunciation of the sound, and repeats the repetition until he pronounces the sound. Correct, and in this direction as well, the specialist provides training through several levels, which are:

- Training on the pronunciation of the sound separately.
- Practice pronunciation of sounds in meaningless syllables.
- Training to pronounce the sound in words at the beginning, middle and end.
- Training to pronounce the sound in gradual words, a sentence of two or three words, etc.

The child may be asked to pronounce one of the easy, whispered sounds that he knows has no disturbance. When the child pronounces, he receives a positive reinforce. This is then an introduction to training in pronouncing difficult sounds.

The basic error in a speech disorder may be due to a defect in the pronunciation of a specific sound or several sounds. Therefore, the wrong sound must become the subject of attention and treatment. It is difficult for the person suffering from the disorder to identify and isolate the wrong sound on his own because sound production comes within... verbal context, and therefore, basic steps are taken, including:

- Auditory training, where the sound is pronounced several times loudly and clearly so that the child or sick person can understand it auditory.
- Self-listening training, in which the individual is trained to pronounce the correct sound in isolation and to listen to himself and distinguish between the correct sound and the wrong sound.
- Establishing correct pronunciation, i.e. placing the sound in a syllable with another sound, then two syllables, then a simple word, then a sentence, and so on.
- Stabilizing the target sound, that is, preserving the voice productions, that is, strengthening the sound before generalizing it in the context of spontaneous speech that the individual speaks with others in various life situations.

Fourth: Exploratory study:

An exploratory study was conducted to test the tools and measures used in the current study. They applied them to different schools, including a sample of (20) autistic boys and girls, the aim of the exploratory experiment was the following:

1- Knowing the suitability of the tools used.

2- Training on implementing program activities with autistic children.

The following was achieved through the exploratory experiment:

1- Modification of the phonological awareness scale and the speech disorders scale as follows:

• In the beginning, we were going to apply the scale traditionally, where the child was asked about single-toned things simply by pronouncing it and showing the picture, but through the exploratory study he concluded that this caused boredom for the child, and therefore he used child puppets to apply the test items.

• The print quality of the scale has changed, as it was initially in black and white, but we found that printing the scale in color is more attractive to children.
• Also, in the beginning, we were going to apply (68) test items to the child once, but through the exploratory experiment he concluded that this causes boredom for the child, and therefore he divided the application three times.
• In the beginning, we were displaying four pictures from which autistic children could choose one correct picture, but during the application, we found that choosing from among four pictures was difficult for the children and that choosing from among three pictures was sufficient to ensure autistic child's response.

Fifth: Statistical method:

The Mann-Whitney U test was used for the significance of the differences between the ranks of the experimental sample and the control sample in the level of intelligence. Then results were processed statistically using a two-way ANOVA, followed by a t-test according to the small groups model to confirm the significance of the differences between the experimental and control samples and determine the direction of these differences.

Sixth: Study steps:

Autistic children who frequent the speech clinics at the Institute of Hearing and Speech and who have speech disorders were identified. Several (30) autistic children were selected and divided into two groups: one experimental group and the other a control group. Each group included (15) boys and girls. Verifying the equality among them in terms of speech disorders, cultural and social level, chronological age, and degree of disability, and after the criteria for selecting the two study samples were applied, the speech disorders measure was applied to the two groups, and the equality of the members of the two groups was verified in the cultural, social and economic level, and also The IQ score is as follows:

1- Verifying the equality of the two study groups in terms of intelligence:

The following table shows the results of the Mann-Whitney U test for the significance of the differences between the ranks of the experimental sample and the control sample in the level of intelligence.

It is clear from it that there are no statistically significant differences between the two samples in the level of intelligence.

Table No. (5)

Results of the Mann-Whitney test for the significance of differences between the ranks of the experimental sample and a control sample in Intelligence and Autism disorder

statistical variable	sample	number	Average rank	Total ranks	U	Z	Significance level
Intelligence	Experimental	15	66.97	1004.55	82.00	1.002	0.203
	Officer	15	67.53	1012.95			
Autism	Experimental	15	37.5	562.5	81.40	1.019	0.213
	Officer	15	36.5	547.5			

2- Verifying the equality of the two study groups at the social/economic/cultural level:

The following table shows the results of the Mann-Whitney test for the significance of differences between the ranks of the experimental sample and a control sample at the social/economic/cultural level. There are no statistically significant differences between the two samples at the social/economic/cultural level.

Table No. (6)

Results of the Mann-Whitney test for the significance of differences between the two samples, experimental and control, on the social/economic/cultural level

The level	sample	number	Average rank	Total ranks	U	Z	Significance level
social	Experimental	15	14.16	212.4	102.00	0.031	0.894
	Officer	15	14.35	215.25			
economic	Experimental	15	11.89	178.35	63.15	1.32	0.111
	Officer	15	13.13	196.95			
cultural	Experimental	15	13.72	205.8	76.83	0.981	0.278
	Officer	15	14.54	218.1			
College degree	Experimental	15	13.94	209.1	88.39	0.973	0.337
	Officer	15	14.67	220.05			

1- Implementing the training program for phonological awareness.

2- Applying the tools after the training program.

3- Interpreting and analyzing the results.

Results

1- Regarding the first hypothesis

There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of naming objects. To verify the validity of this hypothesis, the study used a two-way analysis of variance, and the following table shows these results.

Table No. (7)

Results of analysis of variance for the effect of gender and treatment on the posttest measurement of object naming

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	493.98	1	493.98	202.978	000.
Sex	7.299	1	7.299	2.997	0.939
Treatment × sex	5.843	1	5.843	2.003	0.135
The error	60.164	26	2.314		
the total	2396.00	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 202.978, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

2- Regarding the second hypothesis:

There is no statistically significant relationship between the treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of letter-sound skill. To verify the validity of this hypothesis, the study used a two-way analysis of variance. The following table shows these results.

Table No. (8)

Results of analysis of variance for the effect of gender and treatment on the post-measurement of letter-sound skill

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	463.984	1	463.984	407.00	0.000
Sex	4.010	1	4.010	3.601	0.070
Treatment × sex	4.511	1	4.511	4.001	0.058
The error	29.614	26	1.139		
the total	2573.000	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 407.00, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

3- Regarding the third hypothesis:

There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by the sample members in the post-measurement of word onset rhythm. To verify the validity of this hypothesis, the study used a two-way analysis of variance. The following table shows these results.

Table No. (9)

Results of analysis of variance for the effect of gender and treatment on the posttest measurement of word onset rhythm

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	172.300	1	172.300	96.000	0.000
Sex	6.700	1	6.700	3.730	0.063
Treatment × sex	4.400	1	4.400	2.500	0.130
The error	46.800	26	1.800		
the total	1400.000	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio

reached 96.000, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.
While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.
4- Regarding the fourth hypothesis:
There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by the sample members in the post-measurement of the phonetic word analysis skill. To verify the validity of this hypothesis, the study used a two-way analysis of variance. The following table shows these results.

Table No. (10)
Results of analysis of variance for the effect of gender and treatment on the post-measurement of phonological word analysis skill

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	168.480	1	168.480	94.339	0.000
Sex	4.199	1	4.199	2.351	0.138
Treatment × sex	2.440	1	2.440	1.370	0.254
The error	46.540	26	1.790		
the total	1414.00	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 94.339, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.
While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.
5- Regarding the fifth hypothesis:
There is no statistically significant relationship between the treatment (control/experimental) and gender (male/female) in the variation of the sample members' scores on the post-measurement of word segmentation. To verify the validity of this hypothesis, the study used a

two-way analysis of variance, and the following table shows that. Results.

Table No. (11)
Results of analysis of variance for the effect of gender and treatment on the word segmentation posttest

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	320.000	1	320.000	357.000	0.000
Sex	0.217	1	0.217	0.239	0.630
Treatment × sex	0.217	1	0.217	0.239	0.630
The error	23.426	26	0.901		
the total	1330.107	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 357.000, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

6- Regarding the sixth hypothesis:

There is no statistically significant relationship between the treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of sentence completion skill. To verify the validity of this hypothesis, the study used a two-way analysis of variance. The following table shows these results.

Table No. (12)
Results of analysis of variance for the effect of gender and treatment on the post-measurement of sentence completion skill

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	312.000	1	312.000	411.501	0.000
Sex	0.011	1	0.011	0.014	0.913
Treatment × sex	0.011	1	0.011	0.014	0.913
The error	19.760	26	0.760		
the total	1330.985	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 411.501, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

7- Regarding the seventh hypothesis:

There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by sample members in the post-measurement of total skills on the phonological awareness scale. To verify the validity of this hypothesis, the study used a two-way analysis of variance. ANOVA and the following table show these results.

Table No. (13)

Results of analysis of variance for the effect of gender and treatment on the post-measurement of the total scale of phonological awareness

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	2833.985	1	2833.985	441.39	0.000
Sex	23.340	1	23.340	3.640	0.70
Treatment × sex	16.400	1	16.400	2.560	0.123
The error	166.894	26	6.419		
the total	15167.967	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 441.39, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

To verify the significance of the differences between the experimental and control samples and the direction of these differences, a "t" test was used according to the small groups model. The results of the post-measurement of the overall measure of phonological awareness, the following table shown the results of.

Table No. (14)
Results of the "t" test for the significance of the differences between the two samples (experimental/control) in the post-measurement of the total scale of phonological awareness

Significance level	"t" value	standard deviation	Average	the sample	Phonological awareness
0.01	28.35	1.29	4.33	Officer	Naming things
		1.03	11.26	Experimental	
0.01	17.78	1.50	3.86	Officer	Letter sound
		1.23	8.67	Experimental	
0.01	32.35	9.15	2.53	Officer	The rhythm of the beginning of a word
		.76	9.00	Experimental	
0.01	32.00	1.46	4.31	Officer	Phonetic analysis of the word
		1.82	13.20	Experimental	
0.01	23.43	1.61	3.49	Officer	Segmentation of the word
		1.16	7.47	Experimental	
0.01	18.03	1.06	2.46	Officer	Sentence completion
		1.01	8.93	Experimental	
0.01	32.65	2.69	20.98	Officer	Total marks
		1.57	58.53	Experimental	

It is clear from the previous table that there are statistically significant differences between the means of the experimental and control samples regarding the results of the overall measurement of phonological awareness skills in the post-application, and these differences are in favor of the experimental sample, as these values exceeded the threshold value required for "t" to become significant at a significance level of 0.01.

8- Regarding the eighth hypothesis:

There is no statistically significant relationship between the treatment (control/experimental) and gender (male/female) in the variance of the scores obtained by the sample members in the post-measurement of pronunciation. To verify the validity of this hypothesis, the study used a two-way analysis of variance, and the following table Explains these results.

Table No. (15)
Results of analysis of variance for the effect of gender and treatment on the post-measurement of pronunciation

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	1153.400	1	1153.400	28.000	0.000
Sex	18.440	1	18.440	0.481	0.509
Treatment × sex	2.601	1	2.601	0.64	0.802
The error	1073.826	26	41.301		
the total	51721.000	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 28.000, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.
While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.
To verify the significance of the differences between the experimental and control samples and the direction of these differences, a "t" test was used according to the small groups model. With regard to the post-pronunciation results, the following table shows the results of that.

Table No. (16)
Results of the "t" test for the significance of the differences between the two samples, experimental and control, in the post-measurement of pronunciation

Significance level	"t" value	standard deviation	Average	the sample
0.01	8.29	5.422	34.322	Experimental
		6.976	46.859	Officer

It is clear from the previous table that there are statistically significant differences between the means of the two experimental and control samples with regard to the post-pronunciation results, and these differences are in favor of the experimental sample, as this value exceeded the threshold value required for "t" to become significant at a significance level of 0.01.
9- Regarding the ninth hypothesis:
There is no statistically significant relationship between treatment (control/experimental) and gender (male/female) in the variance of the

scores obtained by sample members in the speech tracking measurement. To verify the validity of this hypothesis, the study used a two-way analysis of variance, and the following table Explains these results.

Table No. (17)

Results of analysis of variance for the effect of gender and treatment on speech tracking measurement

Source of variance	Sum of squares	Degrees of freedom	for the mean of squares	"F"	Significance level
Processing	889.001	1	889.001	21.801	0.000
Sex	40.859	1	40.859	1.001	0.327
Treatment × sex	8.569	1	8.569	0.211	0.650
The error	1062.10	26	40.851		
the total	50029.983	29			

It is clear from the previous table that there is a significant effect of the F ratio for the treatment effect (experimental/control), as this ratio reached 21.801, and this value exceeds the threshold value required for "F" to become significant at a significance level of 0.01.

While it is clear from the same table that the F-ratio for the variance of both genders and the interaction of treatment with gender is not statistically significant, none of these ratios reached the threshold value required to become significant at a significance level of at least 0.05.

In an effort to verify the significance of the differences between the two samples, experimental and control, and the direction of these differences, a "t" test was used according to the small groups model. With regard to the results of traceable pronunciation, the following table shows the results of that.

and the following table Explains these results.

Table No. (18)

Results of the t-test for the significance of the differences between the two samples, experimental and control, in the tracking measurement of pronunciation

Significance level	"t" value	standard deviation	Average	the sample
0.01	7.36	5.539	34.471	Experimental
		6.801	45.529	Officer

It is clear from the previous table that there are statistically significant differences between the means of the experimental and control samples

regarding the results of consecutive pronunciation, and these differences are in favor of the experimental sample, as this value exceeded the threshold value required for "t" to become significant at a significance level of 0.01.

Discussion

Caring for autistic children represents an important aspect of care and human rights, and this concern reflects the degree and advancement of the quality of life in societies. It is also - concern - linked to the educational, pedagogical, social and health needs of these children. The current study came to represent a research extension of the field of autism; It aimed to build a program to develop phonological awareness in alleviating the severity of some speech disorders in autistic children, and to verify its effectiveness through the phonological awareness scale and the speech disorders scale. There is no doubt that autistic people have a deficiency in phonological awareness, which was shown by the results of the current study, and that it is closely related to the degree of speech disorders, and that any improvement in the level of phonological awareness is greatly reflected in the improvement in the level of speech in autistic children, and that programs based on diversity Activities and their integration lead to good results, which is consistent with many studies such as Hobson et al., (2021) and Lloyd-Esenkaya et al., (2021) The results of this study showed the effect of the proposed speech program on improving phonological awareness and reducing speech disorders in autistic children. These results showed that there were statistically significant differences between the experimental group and the control group in favor of the experimental group. This may be due to the effectiveness of the exercises included in the sessions and activities of the proposed speech program. It included strengthening the speech system and the respiratory system, and inhalation and exhalation exercises, which are required to produce the letter's movement sound and pronounce it correctly. The exercises also focused on strengthening the autistic child's vocal system, increasing the flexibility of his vocal cords, and strengthening the lower muscles of the jaw, so that it is easier for the autistic child to produce the letter sound. Correctly, the muscles of the uvula were strengthened, as well as the tongue muscle, and the ability of the tongue to take the appropriate position to produce the sound of the letter. As for the lips, they were trained to control the rate of air coming out of them, thus giving them the flexibility necessary to

take the desired shape to produce the sound of the oral letter. Thus, these exercises in the proposed program led to an increase in the flexibility of the speech organs, and the adoption of different and appropriate positions for each letter to perform the movement and shape required to produce the sound of the letter with its desired movement. These results are consistent with Van den et al, (2018) who regard the importance of training the vocal system members in autistic children.

What increased the effectiveness of the proposed communication program was its inclusion of toned pronunciation exercises, to attract the attention of autistic children to pronounce the letter movements in a correct manner and rhythm. What supports the effectiveness of the proposed communication program is the use of sequential formation to pronounce the letter sounds correctly. The autistic children were trained to pronounce the sound alone, then pronounce the letter with its three movements, then move on to pronouncing the letter in a picture-word, then in a sentence of words containing the letter sounds with small and large movements, where the sentence is read and we ask the autistic child to repeat it while providing support, this result is consistent with studies of Sullivan et al., (2016)

The effectiveness of the proposed communication program may also be due to its use of several senses during the training of the autistic children in the experimental group, which supports the autistic child's ability to pronounce the letter sound by modeling, through phonemic awareness exercises for letter sounds. The auditory comparison between the child's wrong speech and the therapist's correct speech, where the child's wrong speech is recorded and then re-heard. This research opinion is consistent with what studies have found such as Menzies et al., 2008 and Lloyd-Esenkaya et al., 2021

Autistic children were also trained on the correct positions of the speech organs, where the autistic child stands next to the speech pathologist in front of the mirror, so that he can see the shape of the positions of the speech organs for the sound of a letter to emerge, such as the lips closing together to block the air from escaping, then suddenly opening them to produce the "ba" sound, and the autistic child tries to imitate it. The autistic child is also trained to see the tongue for the sound of the lingual letters. The speech pathologist also places the autistic child's hand in front of the specialist's mouth and then in front of his mouth, so that he can feel the exhalation coming out to pronounce the sound of the letter

(b). Sensory stimulants have also been used, such as mint liquid and placed on the tip of the child's tongue. And the tip of the palate so that the autistic child can feel the sound coming out. This result is consistent with the results of both Davidson & Ellis (2014) and Fleury& Lease (2018)

Nutritional and moral reinforcements were also used, and arts and activities popular with autistic children were used. The computer was also used in the program's activities, which increases the degree of attention and concentration of the autistic child. We also found during the application that improving phonological awareness reduces the child's psychological tension and reduces his shyness. This makes autistic children remain calm and relaxed during application. The skill has also been divided into small sub-skills, which are formed sequentially, and each successful step is reinforced. The activities have also been characterized by flexibility and gradual transition from one skill to another. In this direction, the study agrees with the results of the study of Justice et al (2015) and the recommendations of the studies of Westerveld et al., (2017)

Some related studies have indicated the importance of modeling, reinforcement, and role-playing techniques in improving phonological awareness in autistic children and reducing their speech disorders, among those studies, Smith Gabig (2010) and Dynia et al., (2019).

These differences may be due to the effectiveness of the training program to develop phonological awareness, which contributed to the growth of the level of phonological awareness, and thus improved their level of pronunciation. Such results are generally consistent with the results of the study by Layes et al., (2020)

This improvement may also be due to the reciprocal relationship between phonological awareness and the level of pronunciation, as speech disorders in children are accompanied by a weakness in phonological awareness, and this is confirmed by the results of studies of Jokel et al., 2020

The existence of these differences also supports the impact of the phonological awareness training program, which effectively contributed to improving the level of pronunciation among the children of the experimental sample, in addition to the continuation of this improvement when applying the sequential measurement.

The study emphasizes the importance of continuing to provide such programs for children who suffer from speech disorders because of the contribution they provide to improving their level of speech, including the educational tasks and activities that help in this.

Conclusion

By extrapolating all the previous indicators, it can be concluded that the training program for developing phonological awareness that was applied in this study is characterized by a high degree of efficiency and effectiveness, and that it is suitable for reducing the severity of speech disorders in an autistic child, if all the necessary conditions and specifications are taken into account for its application in a correct, accurate, and even interesting manner that is appropriate to Characteristics of the child at this age stage. There is no doubt that the children's direct interaction with the program's activities, their actual participation, and their desire to attend the program sessions is material evidence that we noticed during the program's implementation of the quality of the activities and their suitability for children of that stage.

Recommendations

- Providing integration schools and health units in villages and cities with speech pathologists to improve the language of autistic children.
- Providing training courses to qualify speech-language pathologists to work with autistic children.
- Paying attention to language and speech programs for autistic children and with the participation of their families.
- Holding training courses on phonological awareness in teaching and rehabilitating autistic children.
- Developing easy and advanced programs based on phonological awareness activities.
- Conducting workshops to train parents and teachers on phonological awareness skills in treating language and speech disorders in autistic children.
- Interest in detailed and specialized studies on language acquisition among autistic children.
- Interest in research and studies that aim to build diagnostic standards and tests for autistic children in various areas of development, especially language.

Conflict of interest

The authors declare that there is no conflict regarding the publication

of this paper.

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