# Effectiveness of Cognitive-Behavioural Training Program on the Enhancement of Affective Communication Skills for Autistic Children

**Heba Kedees Marzouk[1], Faransa Ali Ahmed[2] & Rasha Shawky Elashry[3]**

[1.] Lecturer of Psychiatric Mental Health Nursing, Faculty of Nursing - Assiut University, Egypt

[2.] Assistant Professor of Pediatric Nursing, Faculty of Nursing, Assiut University, Egypt

[3.] Lecturer of Pediatric Nursing, Faculty of Nursing, Tanta University, Egypt

## Abstract

**Background:** Autism is a syndrome that manifests itself in the first three years of life and is characterized by communication difficulties and recurrent interests and behaviours. **The aim of the study:** To identify the effectiveness of cognitive-behavioural training program on the enhancement of affective communication skills for autistic children. **Subjects and Method:** Quasi-experimental research design was used. The study subjects were consisted of (62) autistic children randomly distributed equally between the experimental and control groups. The study conducted at the child psychiatric outpatient clinic of the psychiatric mental health hospital in Assiut city, Egypt. Two tools were utilized in this study; **Tool I:** A structured interview questionnaire, which includes two parts, **part I:** personal data of autistic children, **part II:** socioeconomic evaluation scale to determine the family's socioeconomic position. **Tool II:** Autistic behavioural rating scale. **Results:** There was an equivalent in the mean scores of the studied sample (experimental & control groups) in the four dimensions (social, communicative, behavioural, and motor-sensory) of the autistic behavioural rating scale before the cognitive training program, while there was increasing in the four dimensions among the experimental group with a statistically significant difference post the cognitive behavioural training program. **Conclusion:** The cognitive-behavioural training program was very effective for improving social, communicative, behavioural and motor-sensory skills of autistic children. **Recommendation:** Continues educational family programs regularly are suggested to increase the capacity of autistic children to engage, communicate, utilize multiple senses and employ different techniques of interactions with others, as well as increase parental perception and care of the autistic children .

*Keywords: Affective, Autistic Children, Behavioural, Cognitive, Communication & Training Program*

## Introduction

Autism spectrum disorders (ASD) are a highly varied neurodevelopment illness that is one of children's most significant mental development problems. This trinity of symptoms includes social interaction issues, communication difficulties, and an inclination to engage in just a few or a restricted number of behaviors. There is a significant difference between children with severe challenges who do not talk, who have mental disabilities and a low degree of sociability (low-functioning autism), and individuals with normal intellect, who communicate vocally and can live independently (high-functioning autism) **(Thorová, 2019) .**

Social and communication difficulties in autism spectrum disorders are basic and prognostic indicators **(Howlin & Moore, 2018).** Social–communicative issues such as abnormal communication initiation, mutuality in contact, social/affective communication, shared attention, representational behavior, motor imitation, and conventional gestures distinguish ASD from usually developing and developmental delays **(Rogers et al., 2019).** A child's ability to communicate and express themselves verbally or in writing is critical for early detection and understanding of autism. Early delays or regressions in speech acquisition are the most common cause of worry for parents of children with autism spectrum disorder **(Short et al., 2019).** Much effective communication in the daily lives of autistic children as attentive listening, straight-forward taking, nonverbal communication, stress management, and mood control **(Valene & Kristina, 2020).**

Social difficulties for an autistic child include a lack of direct eye contact, a failure to follow others' gaze, a tendency to repeat phrases or actions of others, a non-traditional play routine, difficulties joining others' play, and difficulty gauging the level of interest in a situation. Recognizing nonverbal social signals, the belief that social interactions always have the same shape, and difficulties in understanding popular phrases are all examples of difficulties in understanding social interactions **(Wetherby et al., 2020).**

A comprehensive approach is essential to maximize the potential of patients with autism. It is possible to enhance long-term results using natural treatments, such as psychology, occupational therapy and speech therapy **(Rutter et al., 2016)**.

A decade of comprehensive early intervention programs has shown that these social and communicative issues may be improved in young children with deficits in shared attention, imitative play, and other activities that can be done jointly **(Greenspan et al., 2018)**. Consequently, if these deficiencies are not addressed, they are likely to persist, possibly resulting in adverse long-term outcomes and/or maladaptive behaviors (e.g., depression and somatic disorders) **(Hartley et al., 2017)**. Recent studies have highlighted the need to offer therapeutic chances for cooperative processing of self-other encounters within supplied information engagements for those with autism spectrum disorder **(Koegel et al., 2017)**.

The shared processing of one's actions and objects of attention with those of others, as described by **Mundy et al. (2019),** suggests that automaticity is essential for developing symbolic and social cognitive abilities. The early treatments that promote socially engaged imitation, shared attention and emotion sharing may thus significantly influence speech, interaction, and social capabilities in the future.

In this categorization system, the ultimate orientation is pragmatic or developmental. Functional communication is the purpose of these technologies, not speech. Since these behaviors are crucial prerequisites for speech production, they promote the development of a wide variety of speech skills such as gesture and eye contact and expression of emotion and vocalization **(Rogers et al., 2019)**.

Nursing activities provide a variety of possibilities and incentives for communication; the adult reacts to every child's initiative by giving enjoyable activities. The kid is in charge of the pediatric nursing encounter and selects subjects and resources from a list provided by the adult. By following the child's guide and responding positively to any communicative engagement, teachers hope to create an affectively pleasant atmosphere (even if it was not intended in that way) **(Wetherby et al., 2020)**.

The most significant role of a pediatric nurse in autism is education. The family and siblings need to be educated on various aspects of autism and autistic disorders. Important areas of education include symptoms, treatment options, expected and potential outcomes, and available support resources. A pediatric nurse needs to serve as an educator to ensure a favorable result. Nurses caring for children with autism are expected to be accessible, available, and educated as an educator and a connection **(Dunlap & Filipek, 2020).**

## Significance of the study:
Autistic disorder is estimated to occur in as many as one in 500 individuals. Autism is four times more prevalent in boys than girls. Its prevalence rate now places it as the $3^{rd}$ most common developmental disability than down syndrome**(The Egyptian autistic society, 2022)**.

Autism, Asperger's syndrome, and pervasive developmental disorder–not otherwise specified (PDD-NOS) are all childhood-onset conditions marked by communication and social interaction impairments as well as stereotyped or repetitive behaviours that may be difficult to change **(American Psychiatric Association, 2019).** Children with ASDs benefit from early and intensive cognitive intervention programs that focus on developing cognitive and behavioural skills as well as social and adaptive behaviours **(Dawson et al., 2019).**

## Aim of the study:
This study aimed to identify the effectiveness of cognitive- behavioural training program on the enhancement of affective communication skills for autistic children.

## Hypotheses of the research:
**H 0:** Cognitive-behavioural training program will not affect on developing social, communicative, behavioural, and motor-sensory skills of autistic children.

**H1:** Cognitive-behavioural training program will affect on developing social, communicative, behavioural,and motor-sensory skills of autistic children.

## Research design:
A quasi-experimental research design two groups (experimental and control).

## Setting:
The study was conducted at the child's psychiatric outpatient clinic of Psychiatric Mental Health Hospital at Assiut city; this hospital is affiliated to the Ministry of Health. The clinic receives autistic children three days weekly (Sunday, Thursday, and Tuesday) from 9AM to 12 PM.

## Subjects:
The study included 62 children randomly distributed equally between the experimental and the control groups (31& 31 respectively). According to the following equation:

N = required sample size

t = confidence level at 95 % (standard value of 1.960)

*p* = estimated prevalence of autistic children at Psychiatric Mental Health Hospital of Assiut's Child Psychiatric Outpatient Clinic (0.042)

m = margin of error at 5 % (standard value of 0.050)

$$N = \frac{t^2 x\, p(1-p)}{m^2}$$

$$N = \frac{(1.96)^2 x\, 0.042(1-0.042)}{0.05^2}$$

N= 62 autistic children. These children had the following inclusion criteria:
- Diagnosed as autistic according to Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (all types of autism)
- Both sexes
- Age: 6-12 years
- Agreed to participate in the program.

**Exclusion criteria:**
- Children with a history of psychiatric or gross mental illness.
- I.Q. Score less than 80 ( the low average of intelligence 80-89)
- Other types of learning disabilities as dyslexia, non verbal learning disorders which diagnosed by doctors in the out patient clinic when the autistic child referred to the hospital.

**Tools of the study:**
Data was collected through the utilization of two tools:

**Tool I: A structured interview questionnaire:**
**Part I:** Personal data: It included child's name, age, and gender

**Part II: Socioeconomic evaluation scale:** It was developed by **El-Gilany et al. (2012)** to determine the family's socioeconomic level. It scores the family's situation using a seven-term grading system. It takes into account the father's education, work, and monthly income, as well as crowding and cleanliness.The scales scoring was divided into four categories: high (64- 84), middle (43- 63), low (42-22), and very low(<22) socioeconomic status.

**Tool II: Autistic Behaviour Rating scale:**It was developed by **Theo (1997)** in an English language, the Arabic version of the autistic behavior rating scale was modified  by **Al-Jowayyan (2008).**This tool was used to evaluate social, communicative, motor-sensory and behavioural skills in autistic children .  It included 104 items and was divided into four dimensions, social dimension (47 items), communicative dimension (15 items), motor- sensory dimension (18 items), and behavioural dimension (24 items).

**The scoring system:**
Five points Likert scale was used, which the very highly applicable (5), highly applicable (4), moderate applicable (3), little applicable (2), very little applicable (1).

| Dimensions | No. of items | Min-max | Unable | Moderate ability | High ability |
|---|---|---|---|---|---|
| Social | 47 | 47- 235 | 94 | 95- 141 | >142 |
| Communicative | 15 | 15- 75 | 30 | 31- 45 | >46 |
| Motor-sensory | 18 | 18- 90 | 36 | 37 – 54 | >55 |
| Behavioural | 24 | 24- 120 | 48 | 49- 72 | >73 |
| Total | 104 | 104-520 | 208 | 209-312 | >313 |

The reliability of Autistic Behaviour Rating scale was assessed and Cronbach's alpha values to be 0.94 obtained by **AL- Jowayyan (2008).**

**Content  validity**
The tools were tested for content validity by a jury of three experts in paediatric and psychiatric  nursing. Each of the expert panels was asked to examine the instrument for content coverage, clarity, wording, length, format, and overall appearance.

**Methods of data collection:**
- An official letter from the dean of faculty of nursing, Assiut University, was delivered to the director of the Psychiatric Mental Health Hospital, requesting permission to perform the study.
- The study was conducted in collaboration with the medical personnel and supervisors of a children's outpatient clinic for a period of one year and nine months from 1ˢᵗ December 2019 to 30ᵗʰ  Augest 2021.
- At the start of the research, a pilot study was undertaken. It contained 10% (6 autistic children) of the total sample to look into clarity and feasibility of the tools. The pilot study results demonstrated that the tools employed correctly and assessed the study's four domains. The autistic children that took part in the pilot study were not included in the study subject.
- After being reassured about the confidentiality of the information gathered, a written informed consent was obtained from the parents.
- Use a tool created for the study to collect data about autistic children.
- The socioeconomic status of each family was determined using the socioeconomic evaluation scale.
- The  child's autistic behavioural rating scale was used in the experimental and control groups (62 autistic children) before the application of the program, which took around two  months and half , it  includes the following:
  o   The social skills dimension
  o   The communicative skills dimension
  o   The behavioral skills dimension
  o   The motor-sensory dimension

- The program was implemented for autistic children in the experimental group (31 autistic children). The program lasted  about 16 months, and children were interviewed three times/ week for two hours each time.
- Story activity, coloring, symbolization, shadowing, and the pyramid approach are some of the program's applications.
- The Autistic Behavior Rating Scale was used immediately post implementing the cognitive-behavioural training program in the experimental and control group ,which took around two months and half .
- For the control group the researcher used the behavioural rating scale  at the beginning of the study and after they took the usual care in the psychiatric outpatient clinic  to evaluate the social , communicative , motor- sensory  and behavioural dimensions

**Development of the training program:**
Based on the experts' opinions, the program content was updated by a committee of experts for content quality and relevancy. To implement the program, the following actions were taken:

**First: Assessment phase:**
This phase aimed to use techniques to identify the most frequent characteristics of autistic children

**Second: Planning phase:**
The program strategy was part of the planning process (time, number of sessions, and interaction methods). The total number of sessions was 12, with three sessions each week lasting two hours each. The program's training session took place in a separate room in the child's psychiatric outpatient clinic of Psychiatric Mental Health Hospital**.**

**Third: Implementation phase:**
- The researcher interviewed the individuals to gather their personal data for each experimental and control groups  and apply the pre-test tools , which took about one month and half .
- The program was then implemented for 31 autistic children in the experimental group , around two children every day, and lasted two hours. The program's total hours are 24 hours for each child ;thus, implementation took about  sixteen months
- The program applied in specialized room in the out patient clinic under supervision of responsible doctors who deal with any sudden problems, used special equipements suitable for the content of the program (as  bread paste, pudding, dry legumes, fresh fruits and vegetables, bowls shag, velvet, flax and cotton materials)  to enhance four ergent levels (reflective, reactive, proactive and pre- symbolic levels).

**The content of the cognitive behavioural training program was as follows:**
**Session 1-3: Strategies for improving shared attention (Reflective Level)**
**(6 hours) through**
1. Touching objects with different attributes.
2. Gripping objects with different attributes.
3. Walking on objects with different attributes.

The trainers distributed the foods in large bowls and set the child face to face on a table. The trainers say "touch" while touching the food. The trainers encouraged the child to touch various food varieties (bread paste, pudding, dry legumes, fresh fruits, and vegetables). The trainers first touch several foods and invited the autistic child to touch them. The trainer eats with the autistic child while holding his hand. The initial effort had a two-minute timetable. It is then increased to 10 minutes for each subsequent contact. Preparation of various tracks (rope, felting, plastic, emery, carpet, sand). The trainers walk the track as an example for the child. The autistic child is then instructed to walk the course from start to end.

The trainers walked beside the autistic child, holding his hand. The exercise continues until the child can walk the track unaided. The trainers face the child on the ground. Their hands and faces are touched with gloves made of shag, velvet, flax, and cotton. The teacher counts from 1 to 10 while touching the child and then ends the session. The trainers employed new material. They then touch metal, plastic, emery, and glass things. A box with circular holes on the front teaches the child to reach inside and grasp items (hard, ragged, soft) without seeing. First, two objects (a toy or a ball) are put in the box.

**Session 4-6: Strategies for improving self-regulation (Reactive Level)**
**(6 hours) through:**
1. Imitating fine motor movements.
2. Imitating objects and movements.
3. Forming shapes using blocks.
4. Stringing beads.
5. Using the scissors.
6. Placing screws on the board.
7. Copying symbols.

The child was asked to reach inside the box and locate things with multiple variations (hard, ragged, and soft). The child was verbally and physically prompted to discriminate between the things. Trainers reach inside the box with the child, touch the things, and describe them. The trainers may point out the items' distinguishing features. In the first stage, the child's conduct was continually reinforced. Later, assistance and incentives are decreased. Incentives were only given when the child did it right.

The trainers sat on a table with the child face-to-face and demonstrated motor activities (tipping on the table, clapping, stomping). The trainer then told the child to "do this." Encourage the child verbally and physically to act. The trainers rewarded the child (well done) for imitating the actions and answers. The training session's assistance thereafter progressively reduced.

Incentives were given until the child's imitations were automatic. The autistic child was free to wander in a quiet setting. A thick line was painted on the ground (using colored adhesive tape). The trainer instructed the child to "walk." The trainers waited for the child to walk the line without straying. The trainers next taught the child the rhythmic walking, tip-toe walking, heel-top walking, walking outdoors, walking indoors, and walking to a specified item (trainer commands "walk to the door").

The child was urged to do the right thing. Incentives should be given to the child. Later sessions focused on good actions. A big and thick line draw a circle on the ground (using the rope, tape, or chalk). Before leaving the line, the child was told to step by step and side by side. Encourage the child to walk (the trainer first sets an example and provides physical and oral tips). The trainer should reward the child's actions. After a while, the assistance and rewards should be limited and only given when the child meets the objective.

The trainers sit down face-to-face with the autistic child, in front of the child therewas plastic bottles of water, cold, warm, and hot. Trainers helped the child to touch bottles of various temperatures. Then huge glasses of water with varying temperatures are added. The trainer dips down within the water containers of varying temperatures with the youngster. The trainer verbally and physically encourages the child to contact the water. Next, the trainers set heat tablets of varying degrees on the table and encouraged the child to gaze at them. While physically holding the child, the trainer touches the child and various temperature tables to promote touching behavior.

**Session 7-9: Strategies for improving eengagement (Proactive Level)**

**(6 hours).**

1. Imitating gross motor actions.
2. Participating in walking exercises.
3. Participating in running exercises.
4. Ball game.
5. Riding on a swing.

The trainers sat facing the child and model the activity then the child is told to "do it" (clapping, opening and closing hands, tipping with index fingers). If the child could not do the activity, the trainer should physically assist (for example, holding the child's hands). The trainers reduced the child's

physical support. The instruction continues until the child can do the activity independently.

The trainers and the child face each other on a table. On the table, therewas two identical things (e.g., two bells). The trainers grab one of the bells and ring it when the child was paying attention to them. "You do it," the trainers told the child. If the child could not accomplish the activity, the trainer assistedhim. The action was then repeated. Slowly, the trainers eased off the help. The trainers then had the child practice with various things similarly (e.g., placing blocks in a bucket).

Trainers and children face each other on a table. On the table are similar blocks (e.g., two triangles, two cylinders). Trainer builds using bricks. Then the child was taught to use the block sets. The child received physical direction while making structures using blocks. Initially, one block was put (for example, five blocks on the table to the child's right). Bring one block to the table's center. They are to choose a block and place it in the table's center. The trainers used various block forms and instructed the youngster to copy them.

**Session 10-12: Strategies for improving Two-way Communication-complex                    Two-way Communication(Pre- Symbolic Level) (6 hours ) through**

1. Distinguishing between objects with different attributes,
2. Rolling,
3. Climbing

The trainers and children face each other on a table. The trainers take the scissors and urge the child to use them. When the child learns the scissors, the trainer helps him practice on cardboard or paper. Trainers advise children on cutting techniques such as slicing and picture cutting. The child was told to "do it like this during the exercise." Oral and tactile cues encouraged the child to cut. The child was rewarded.

The trainers sit beside the child atthe board. When the child was ready, the trainers hand them a screw, telling them, "You do it." The child was encouraged to act. Then the child was helped to insert various sized screws on the board. When the child can insert various-sized screws on the board, the trainer has them try making patterns with the screws. Initially, use large screws.

Trainers set sketching supplies in front of the child. Practice sketching on huge sheets. The child was encouraged to duplicate patterns, numbers, and letters on various materials (finger paint, shaving foam, and sand). Encourage the child to sketch and praise him for his efforts. Simple visual cues (dots, etc.) should help. The dots were later removed, and the child was taught to copy the example. Allowing the child to draw from the top down or left to right was a good

idea. Trainer work with the child on drawing lines (horizontal, vertical, plus, x, writing letters on a straight line, numerals, figures, a child's face, flowers, automobiles, homes, labyrinths, and human figures). Training continues until the child can draw lines on his own.

**Fourth: Evaluation phase**

After implementation of the cognitive behavioural training program ,the autistic behavioural rating scale was used for the experimental and the control groups , which took about two month and half .Following that, a comparison was made between the experimental and the control autistic children to see how far the cognitive behavioural training program had effect on autistic children progress .

**Statistical analysis:**

The data were tabulated and statistically analyzed using SPSS (Statistical Package for Social Science) version 28 to computerize and verify them. Quantitative data were represented using mean and standard deviation, whereas qualitative factors were defined using frequency and percentages. Several statistical tests were used to analyze the information gathered. An independent t-test and correlation were performed between the two groups.

# Results

**Table (1): Distribution of Personal Data of the Studied Sample (n= 62)**

| Personal data | Experimental group(n=31) | | Control group (n= 31) | | Test of significance | |
|---|---|---|---|---|---|---|
| | **No** | **%** | **No** | **%** | $X^2$ | *P*-value |
| **Age** | | | | | | |
| 6 - | 5 | 16.2 | 11 | 35.5 | 11.073 | 0.095 |
| 8- | 13 | 41.9 | 13 | 41.9 | | |
| 10- 12 | 13 | 41.9 | 7 | 22.6 | | |
| Mean ± SD (range) | 9.33 ± 2.02 (6-11) | | 9.5 ± 2.0(6-11) | | | |
| **Gender** | | | | | | |
| Boys | 25 | 80.6 | 26 | 83.9 | 0.111 | 0.740 |
| Girls | 6 | 19.4 | 5 | 16.1 | | |
| **Socioeconomic Level** | | | | | | |
| Low Social Class | 11 | 35.4 | 13 | 41.9 | 6.932 | 0.921 |
| Middle Social Class | 10 | 32.3 | 9 | 29.0 | | |
| High Social Class | 10 | 32.3 | 9 | 29.0 | | |

*Chi-square test for qualitative data between the two groups*

**Table (2):The Mean and Standard Deviation of the Autistic Behaviour Domains among the Studied Sample in the Pre and Post Cognitive Behavioural Training Program (n= 62)**

| Autistic Behaviour Dimension | Pre cognitive-behavioural training program | | Post cognitive-behavioural training program | |
|---|---|---|---|---|
| | **Experimental group** | **Control group** | **Experimental group** | **Control group** |
| | **Mean ± S.D.** | **Mean ± S.D.** | **Mean ± S.D.** | **Mean ± S.D.** |
| **Social dimension** | 74.6 ± 10.2 | 77.9 ± 6.6 | 120.9 ± 29.2 | 78.7 ± 6.9 |
| t (*P*-value) | 1.447 (0.077) | | 7.829 (<0.001)** | |
| **Communicative** | 30.3 ± 4.6 | 32.1 ± 5.8 | 41.6 ± 10.2 | 33.5 ±1.9 |
| t (*P* - value) | 1.366 (0.088) | | 4.317 (<0.001)** | |
| **Behavioral** | 30.5 ± 11.2 | 29.5 ± 7.8 | 83.5 ± 20.8 | 30.4 ±7.3 |
| t (*P* - value) | 0.395 (0.347) | | 13.423 (<0.001)** | |
| **Motor-sensory** | 32.9 ± 8.1 | 33.8 ± 8.0 | 63.0 ± 15.9 | 35.1 ±5.8 |
| t (*P* - value) | 0.442 (0.330) | | 9.184 (<0.001)** | |
| **Total Autistic Behaviour Rating scale** | 168.2 ± 25.6 | 173.3 ± 14.5 | 308.9 ±67.4 | 177.8 ±12.1 |
| t (*P* - value) | 0.959 (0.171) | | 10.661 (< 0.001)** | |

*- Independent T-test Fore quantitative data between the two groups*          *\*\*Significant level at P value < 0.01*

**Table (3): Distribution of the Levels of Autistic Behaviour Rating Scale Dimensions among Children in the Experimental and the Control Groups in the Pre and Post-Cognitive Behavioural Training Program (n = 62).**

| Dimensions | Pre-cognitive training program | | | | Test of significance | | Post- cognitive training program | | | | Test of significance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Experimental group | | Control group | | Fisher test | P. Value | Experimental group | | Control group | | Fisher test | P. Value |
| | No. | % | No | % | | | No. | % | No | % | | |
| **Social dimension** | | | | | | | | | | | | |
| Unable to interact and play appropriately | 29 | 93.5 | 30 | 96.8 | | | 8 | 25.8 | 30 | 96.8 | | |
| Moderate ability to interact and play appropriately | 2 | 6.5 | 1 | 3.2 | 0.50 | 0.554 | 14 | 45.2 | 1 | 3.2 | 35.218 | <0.001** |
| High  ability to interact and play appropriately | 0 | 0.0 | 0 | 0.0 | | | 9 | 29.0 | 0 | 0.0 | | |
| **Communicative dimension** | | | | | | | | | | | | |
| The child is unable to communicate with others appropriately | 23 | 74.2 | 28 | 90.3 | 26.496 | <0.001** | 6 | 19.4 | 28 | 90.3 | 2.296 | <0.03* |
| Moderate ability to communicate with others appropriately | 8 | 25.8 | 3 | 9.7 | | | 25 | 80.6 | 3 | 9.7 | | |
| **Motor-sensory dimension** | | | | | | | | | | | | |
| The child unable to use different senses appropriately in a different situation | 23 | 74.2 | 21 | 67.7 | | | 2 | 6.5 | 21 | 67.7 | | |
| The child moderate use different senses appropriately in a different situation | 8 | 25.8 | 10 | 32.3 | 0.313 | 0.576 | 11 | 35.5 | 10 | 32.3 | 33.743 | 0.001** |
| The child uses different senses appropriately in a different situation | 0 | 0.0 | 0 | 0.0 | | | 18 | 58.0 | 0 | 0.0 | | |
| **Behavioral dimension** | | | | | | | | | | | | |
| To the child unable to act appropriately in a different situation and have odd behaviours | 30 | 96.8 | 30 | 96.8 | | | 4 | 12.9 | 29 | 93.5 | | |
| To the child moderate act appropriately in a different situation and have odd behaviours | 1 | 3.2 | 1 | 3.2 | ……. | 1.000 | 3 | 9.7 | 2 | 6.5 | 44.882 | 0.001** |
| The child has appropriate behavior and uses different methods of interaction with others | 0 | 0.0 | 0 | 0.0 | | | 24 | 77.4 | 0 | 0.0 | | |

*- fisher test  for qualitative variables between the two groups *statistically significant differences*
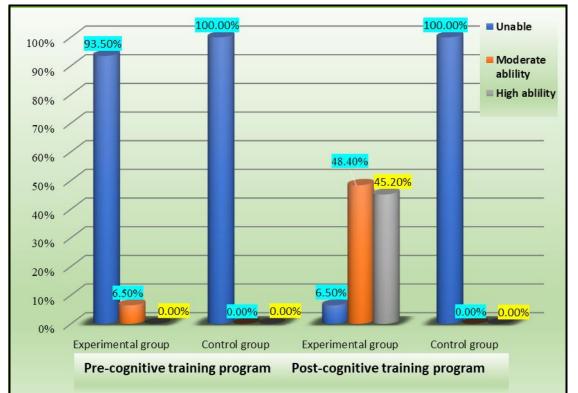
**Figure (1): Levels of Total Autistic Behavioural Rating Scale among Children in the Experimental and the Control Groups Pre and Post Cognitive Training Program (n = 62)**

**Table (4): Relation between Total Mean Scores of Autistic Behavioural Rating Scale for Children in the Experimental and the Control Groups at the Pre and Post-Cognitive Behavioural Training Program with their Gender (n = 62).**

| Gender | Pre-cognitive behavioural training program | | Post- cognitive behavioural training program | |
|---|---|---|---|---|
| | **Experimental group** | **Control group** | **Experimental group** | **Control group** |
| | **Mean ± S.D.** | **Mean ± S.D.** | **Mean ± S.D.** | **Mean ± SD** |
| Male | 158.2 ± 9.7 | 173.0 ±14.8 | 301.5 ± 58.9 | 177.6 ± 11.9 |
| Female | 210.0 ± 9.8 | 174.8 ± 14.2 | 339.7 ± 95.8 | 178.8 ± 14.8 |
| t (*P*-value) | 7.490 (0.001)** | 0.251 (0.402) | 2.257 (0.05)* | 0.203 (0.434) |

   *- Independent T-test  For quantitative data between the two groups*
   *-*Significant level at P-value < 0.05*

**Table (5): Correlation between Childrens Age, Socioeconomic Status in the Experimental and the Control Groups and Autistic Behavioural  Rating Scale Dimensions Pre-Cognitive Behavioural Training Program (n = 62).**

| Autistic behavioural rating scale dimensions | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| | | Age | Socio economic status | Age | Socio economic status |
| Social dimension | R | 0.203 | 0.843 | 0.236 | 0.045 |
| | P – value | 0.272 | 0.081 | 0.202 | 0.808 |
| Communicative dimension | R | **0.592** | 0.104 | **0.383** | 0.148 |
| | P – value | **0.001**** | 0.578 | **0.033**** | 0.427 |
| Behavioral dimension | R | 0.255 | 0.448 | 0.070 | 0.40 |
| | P – value | 0.166 | 0.061 | 0.708 | 0.193 |
| Motor-sensory dimension | R | 0.254 | 0.417 | 0.262 | 0.251 |
| | P – value | 0.168 | 0.521 | 0.149 | 0.173 |
| Autistic cognitive rating scale | R | 0.210 | 0.670 | 0.243 | 0.315 |
| | P – value | 0.257 | 0.325 | 0.188 | 0.085 |

*****correlation P – value at 0.01*

**Table (1):** Showed the distribution of personal data among the studied sample in which the majority of the studied sample, both the experimental and the control groups, were boys (80.6, & 83.9%respectively), with an age range 6-11years old and more than one-third of the studied sample either experimental or control groups at the low socioeconomic level (35.4%& 41.9% respectively). No statistical significant differences were found between children in the experimental and the control groups related all items in the table

**Table (2):** Showed an equivalent in the mean scores of the studied sample (experimental& control groups) on the four dimensions (social, communicative, behavioral, and motor-sensory) of the Autistic Behavior Rating Scale in the pre-cognitive behavioural training program. However, there is an increase in the social, communicative, behavioral, and motor-sensory domains in the post-cognitive behavioural training programs among the experimental group with a statistically significant difference(P. Value 0.001).

**Table (3):** Indicated that 45.2% &80.6% of children in the experimental group had moderate ability to interact and play appropriately and communicate with others properly, *P*-value= (0.001 & 0.03 respectively). 58.1% and 77.4% of autistic children in the experimental group used different senses appropriately in different situations, used appropriate behaviour, and used different interactions methods respectively with *P*-value = (0.001 & 0.001 respectively) post cognitive behavioural training program.

**Figure (1):** Illustrated that most children in the experimental and the control groups had very little applicable behaviour. In the post-cognitive behavioural training program, nearly half of the experimental group could interact, communicate, use different senses, and use different methods of interactions with others, while none of those in the control group.

**Table (4):** Presented that female autistic children could interact, communicate, use different senses, and use different methods of interactions with others than male autistic children pre and post-cognitive behavioural training program *P*-value < 0.001 & 0.05 respectively.

**Table (5):** Revealed a positive association between children age and communications of autistic children with others in the experimental and the control groups precognitive behavioural training program (r = 0.592, P-value < 0.001; r = 0.383, P-value 0.033 respectively).

**Discussion:**

Autism spectrum disorder (ASD) is a developmental disability that can cause significant social, communication, and behavioural challenges. It is characterized by sensory and motor problems. Sound, vision, touch, taste, and smell perception, as well as kinesthetic and proprioceptive experiences, have all been described as anomalous. There have been reports of both hypo and hyperresponsiveness to sensory input, suggesting that there may be two types of sensory responders on the autism spectrum **(Attwood, 2019)**.

The cognitive behavioural training program for autistic children demonstrated a considerable increase in all cognitive processes, particularly higher perceptual functions including visual and auditory attention, shared attention, self-regulation, and two-way communication. This finding is evidenced by **Ingersoll et al. (2020)**, who mentioned that treatment for autistic children includes training parents' intervention strategies to help their children acquire skills and/or regulate their behavior.

This finding, in the same line with **Koea et al. (2020)**, postulated that the training program could be more helpful than other therapies in helping children absorb information and become socially competent,also when compared to the total mean score of the control group, the total mean score of the Autistic Behavior Rating Scale in the post-test (295.50)and in the pre-test (175.25) showed a statistically significant difference (P value= 0.008**).

In addition to **Ingersoll et al. (2020)** investigated the role of professional training experiences and manualized programs in ABA providers' use of parent training with autistic children and recommended that the training and supporting providers at the pre-service and in-service levels are means of increasing access to parent training for children with ASD in community settings.

Also, **Yokoyama et al. (2017)** found that constructing training program effects on frequency and intelligibility of vocalizations ,were maintained 6–8 months after training in three people with ASD, in the classroom, and at home. In addition, the current findings are similar to **Johnson et al. (2017)** which suggest that CTP has a good influence on social-communicative abilities. It's worth noting that cooperative play in the CPT group improved during the three-time points.

Concerning the relation between total mean scores of total behavioural scale for the experimental and the control groups of the studied sample at pre and post cognitive training program, female autistic children could interact, communicate, use different senses, and use different methods of interactions with others than male autistic children in pre and post cognitive

training program with a statistically significant difference. This result, consistent with **McQuaid et al. (2021)**, investigated the gap between I.Q. and adaptive functioning in autism spectrum disorder: Disentangling diagnostic and sex differences indicated that females showed significantly higher adaptive functioning than males in communication daily living skills, but not Socialization. Also, **Tse et al. (2021)** examined the learning, social and emotion adaptation questionnaire short form: a measure of adaptive behavior for primary school students with autism spectrum disorder found that girls with ASD lagging behind their same-gender peers in related skills more than boys with ASD did, across both grade levels and especially in senior grades.

Regarding children age and communications skills among the studied autistic children, positive association was found pre-cognitive behavioural training program**.** This result, incongerent with **Sultana et al. (2019)** examined the life skill development of autistic children following education therapy in specialized schools,showed that there is no significant association between age of autistic children and development of communication skills following therapy.

## Conclusion:
The study concludes that there was an equivalent in the mean scores of the studied sample (experimental& control groups) in the four dimensions (social, communicative, behavioral, and motor-sensory) of the autistic behaviour rating scale before the cognitive behavioural training program, while there was increasing in the four dimensions among the experimental group with a statistically significant difference post the cognitive behavioural training program. In addition, this study presented that female autistic children could interact, communicate, use different senses, and use different methods of interactions with others than male autistic children pre and post-cognitive behavioural training program .

## Recommendations:
Based on the findings of this study ,continues educational family programs regularly are suggested to increase the capacity of autistic children to engage, communicate, utilize multiple senses and employ different techniques of interactions with others, as well as increase parental perception and care of the autistic children .

## Limitation of the study:
1- Shortage of the number of autistic children refeered to the outpatient clinic of the psychiatric mental health hospital that results in the long period of applying the program.
2- Unavailability of the equipements in the outpatient clinic suitable for the application of the cognitive behavioural training program that results in high cost for buying those equipemet from the researcher.
3- Refusal of many autistic childrens parents to envolve their children in the training program

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