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The Emotion Awareness and Skills Enhancement Program about Alexithymia among Children with Autism

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Abstract
Background: Autism spectrum disorder frequently exhibit alexithymia, which is thought to be the cause of issues with anxiety, despair, and anger that are frequently observed. To reduce emotion regulation impairment and improve behavioral disturbance, the emotional awareness and skills enhancement program was created. With regard to alexithymia in children with autism, the **aim** of this study was to evaluate the effect of emotion awareness and skills enhancement program on alexithymia among autistic children. Using one group pre/post, **a quasi-experimental design** was used. **Subjects**: Children's outpatient clinics at the Psychiatric and Mental Health Hospital in Benha City, Qalyubia Governorate, provided a purposeful sample of fifty children with autism diagnoses. **Data were gathered** using the structured interview questionnaire and the Toronto Alexithymia Scale. **The primary research results** showed that, prior to program intervention, slightly over three-quarters of the children in the study exhibited alexithymia. However, less than 25% of them had alexithymia following program intervention, but over half of them had probable alexithymia. **The study concluded** that, the implementation of an emotion awareness and skills enhancement program showed highly significant differences ($P < 0.001$) regarding all subscales of emotion control abilities. Therefore, to enhance the capacity of autistic children and those with alexithymia perceive emotions better, it is recommended that, nurses attend seminars in different approaches, including mindfulness and use them to help autistic children articulate their emotions more clearly.

Keywords: Alexithymia, Autism, Children, Emotion Awareness & Skills Enhancement Program

Introduction:
According to **the American Psychiatric Association (2021),** a neurological issue that hinders a person's ability for social interaction and communication is autism spectrum disorder (ASD). Two primary signs stand out: restricted, recurring behavioral patterns and abnormal sensory reactions. Nonetheless, ASD has also been linked to issues with handling emotion, specifically in identifying emotions in other people **(Kinnaird et al., 2019).**
For many autistic children, emotional regulation is a well-known difficulty. Most youngsters on the spectrum (67–79%) and many (42–54 %) also experience comorbid symptoms of anxiety and despair **(Zawisz, 2023).** Numerous factors have an impact on how emotional regulation is experienced by autistic children **(Shuid et al., 2020).** For many autistic children, alexithymia particularly "poorer regulation of negative affect" is a further factor linked to emotional- processing difficulties **(Morie et al., 2019).**
The psychoanalysts **Nemiah & Sifneos (1970)** developed the term alexithymia, which translates to "without words for emotions" in Greek, to designate a collection of emotion processing abnormalities frequently observed in mental patients. Since then, empirical research has firmly established alexithymia's status as a multidimensional personality trait with at least three core components, including difficulties identifying one's feelings (DIF), difficulties describing feelings (DDF), and externally oriented thinking (EOT), which tends to cause one to not pay attention to one's emotions **(Preece et al., 2020).**
According to **Preece et al. (2017)** proposed attention-appraisal model of alexithymia, the main symptoms of the condition are difficulties paying attention to and evaluating emotions. The absence of integration of physiological arousal brought on by an emotional state inside conscious consciousness is suggested by several hypotheses of alexithymia.
Across the lifespan, emotion dysregulation (ED), or the inability to control the strength and length of emotional reactions, is extremely common among people with autism **(Conner et al., 2021)**. According to research, there is a trans-diagnostic process underlying co-occurring psychiatric illnesses (such as depression and anxiety), externalizing difficulties (such as violence and explosive behavior), and suicidality that predisposes autistic individuals to ED **(Conner et al., 2020).**

Children with autism may find it difficult to identify and describe emotions through cognitive processes. Since both low-functioning and high-functioning children with autism spectrum disorder experience alexithymia, challenges with emotional detection are not solely due to neurocognitive capacity. The concept of empathy, where some research has revealed that empathy levels tend to be low, is another area where alexithymia and ASD share some general similarities **(Deolinda, 2022)**

There has recently been a lot of attention on the relationship between alexithymia and ASD symptoms because of the similarities between alexithymia features and the communication and social skills deficiencies in people with ASD **(Kinnaird et al., 2019).** The relationship is inadequately comprehended, although individuals with ASD generally exhibit elevated levels of alexithymia, with estimates indicating that between 40 and 65 percent of those affected demonstrate significant alexithymic traits. This has resulted in the hypothesis that certain deficiencies in ASD may be attributable to the co-occurrence of alexithymia. **(Bird & Cook, 2013).**

The Emotion Awareness and Skills Enhancement (EA SE) Program is a individualized treatment designed to assist individuals with autism spectrum disorder (ASD) who possess no intellectual limitations in enha ncing their emotional regulation and overall well-being **(Mazefsky et al., 2018).**

Being emotionally aware, or having the capacity to recognize and categorize internal emotional states, improves our comprehension of our own emotions and our capacity to control how they influence us and others. This, in turn, enhances our well-being **(Garcia-Garcia et al., 2022).** Increasing our emotional intelligence, which has been shown to benefit people in a variety of areas of their lives, including their academic and professional careers, comes from increasing our emotional awareness **(Mohzan et al., 2013).**

Moreover, Mindfulness-based interventions (MBIs) present a potentially effective way to address ED while adapting to the diverse requirements of children with autism **(Shaffer et al., 2019).** Through recurrent, regularly scheduled meditations that can be easily adjusted to meet a children's verbal and cognitive demands as well as experiential activities that allow children to practice new skills in real-world situations, MBIs help children develop an awareness of emotions **(Beck et al., 2020).** MBI called the emotion awareness and skills enhancement (EASE) program specifically targets the prevalent ED profile in ASD, which is defined by a propensity to react intensely without knowledge or planning **(Beck et al., 2021).**

A few studies since **Cameron et al. (2014)** suggest that mindfulness-based training may also be useful in lowering alexithymia **(Byrne et al., 2016).** This could be due to improved neural processing linked to the recognition of body sensations, known as interoception **(Fissler et al., 2016).**

Furthermore, in order to inform clinical practice, **Norman et al. (2018)** carried out a systematic synthesis to evaluate the current state of knowledge regarding the impact of mindfulness-based interventions on alexithymia. They found that the study group experienced a statistically significant improvement in alexithymia (measured by the Toronto Alexithymia Scale) when compared to the control group (mean difference= −5.28, 95% CI −9.28 to −1.28, p=0.010). Additionally, their findings suggest that mindfulness-based intervention could be a useful way to lessen alexithymia.

Significant of the study:

Meguid et al. (2023) reported that, 22.5% of Egyptian kids with exceptional needs had autism spectrum disorder (ASD), and kids with comorbid conditions had significantly higher autistic rating scores ($p < 0.0001$). In addition, preschoolers in Sharkia, Egypt, frequently have autism spectrum disorder, and 2.8% of them were at risk factors contributing to this frequency **(Yousef et al., 2021).** The therapeutic potential of alexithymia in children with autism spectrum disorder (ASD) is significant, since its incidence varies between 50 and 85%. Regardless of autistic status, the severity of alexithymia symptoms indicates fewer social contacts.

Operational definition: Emotional blindness, or alexithymia, is a neuropsychological condition marked by severe difficulties identifying, expressing, locating, and characterizing one's feelings. It's linked to issues with interpersonal relationships and attachment **(Hoerricks, 2023)**.

Aim of the study:

This study aimed to evaluate the effect of emotion awareness and skills enhancement program on alexithymia among autistic children. This was accomplished through the development and implementation of a program focused on enhancing emotion awareness and skills, followed by an evaluation of the program's effect on addressing the manifestations of alexithymia in children with autism.

Research hypothesis:

The following research hypothesis was developed to achieve the study's purpose:

H1. Children with autism who receive the program will exhibit reduced alexithymia manifestations and improvement in emotion regulation skills at post-program than pre-program.

Subjects and Methods

Research design:

A quasi-experimental approach was used, with one group receiving pre/post program. One benefit of this research design is that it is directionally focused, which means that an independent variable is used to assess a dependent variable both before and after program application.

Setting:

The study was carried out at the outpatient clinics for children at the Psychiatric and Mental Health Hospital in Benha City, Qalyubia Governorate. The hospital is affiliated to the General Secretariat of Mental Health. There are two sections in the hospital. Section one comprises of six outpatient clinics: 2 psychiatric clinics, addiction clinic, children's clinic, epilepsy clinic and geriatric clinic. Section two comprises six inpatient departments, which include an addiction treatment unit with a capacity of 20 beds and 18 nursing staff members, as well as five psychiatric departments with a total capacity of 200 beds.

Participants:

The target population consisted of 50 children diagnosed with autism who exhibit signs of alexithymia, selected through a purposive sampling technique. These children were followed up at the Outpatient Clinics of a Psychiatric and Mental Health Hospital with **inclusion criteria**: Children with autism aged 5 to 18 years old, whose parents consented, evidence of intellectual disability in health records, a nonverbal IQ above 50 on the Leiter International Performance Test-3, and a minimum of four weeks of stable medication use without scheduled changes. Children experiencing psychological distress or trauma, including vascular or other forms of brain damage that result in secondary and organic alexithymia, were **excluded** from the study. Out of sixty-five children, three did not meet the inclusion criteria, five had parents who opted out of the study, four withdrew during the study, and three were unreachable (no response) (Figure 1).

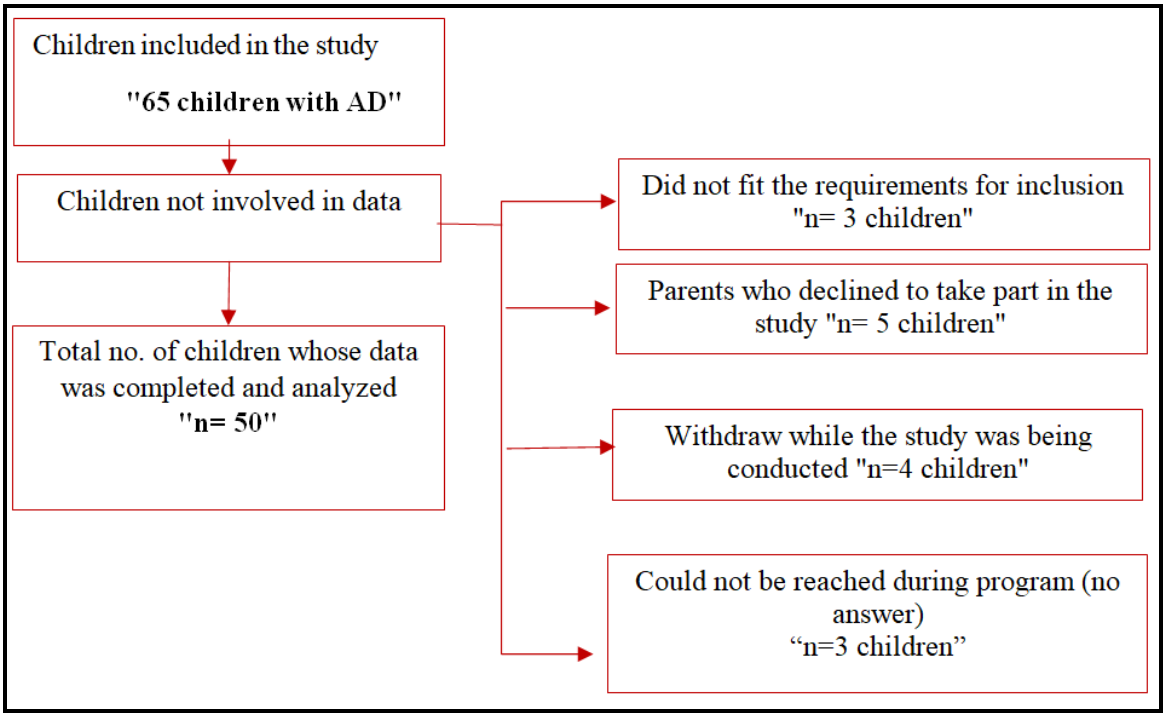

Figure (1): Flowchart of participants' recruitment process

Data collection instruments:

To achieve the goal of this study, the researcher utilized one instrument to gather pertinent and critical data, which comprised:

Tool I: Structured Interviewing Questionnaire: Which developed by the researchers and it consisted of three parts:

Part one: Personal characteristics of studied sample as age, sex and academic year.

Part two: Clinical data such as onset of autism, family history from autism, number of children in the family and the child's ranking in the family.

Part three: Toronto Alexithymia Scale adopted from **(Bagby et al., 2020)** and translated in Arabic language. It assessed alexithymia's difficulties detecting and characterizing emotions. It consisted of 20 items measured three subscales (factors): Factors 1: Difficulty identifying feelings (1, 3, 6, 7, 9, 13, 14

items), factor 2: Difficulty describing feelings (2, 4, 11, 12, 17 items), and factor 3: Externally-oriented thinking (5, 8, 10, 15, 16, 18, 19, 20 items). Reverse-scored items are 4, 5, 10, 18, and 19.

Scoring system: The quiz employs a five-point Likert scale (1 = "strongly disagree"; 5 = "strongly agree"). The ratings are 20–100 (higher scores indicate greater impairment/challenges), 0 - 51 no alexithymia, 52 - 60 possible, and 61–100 alexithymia.

Validity and reliability: The tool was translated into Arabic. Then it was translated into English again. The booklet and color cards about emotions' faces were shown to nursing specialists and therapists at a psychiatric and mental health hospital in Benha City for the assessment of content's validity. Internal consistency assesses the reliability of a tool by evaluating the extent to which items within the instrument measure the same underlying concept or construct. The Toronto Alexithymia Scale demonstrates superior internal consistency. Cronbach's alpha coefficient is calculated as follows:

Tool	Alpha Cronbach	Internal consistency
Difficulty identifying feelings	0.899	Good
Difficulty describing feelings	0.808	Good
Externally-oriented thinking	0.882	Good
Toronto Alexithymia Scale	**0.956**	**Excellent**

Pilot study:

A pilot study was conducted on 10% (5 children) of the sample prior to data collection to estimate sheet completion time and identify data gathering barriers. Pilot study participants enrolled in the main study that may help to increase the overall sample size, enhancing statistical power and the generalizability of findings. In addition, their feedback can guide implementation and help identify practical challenges or strengths that new participants may not initially perceive.

Program description:

A printed Arabic booklet offered theoretical insights into autism and alexithymia, covering definitions, signs, symptoms, causes, types, complications, treatment options, and the benefits and side effects of medications. Additionally, it includes color cards depicting various emotions and researchers' phones displaying facial expressions of emotions. To add more details, a study of relevant literature was conducted, including journals, internet sources, and nursing textbooks. The theoretical and practical sessions aimed to enhance emotional regulation and decrease alexithymia in autistic children. Program design adjusted from **Conner et al. (2018)**, the researchers employed the ABCD model, which emphasizes different emotional regulation skills. Consequently, the researchers can achieve their study purpose, allowing the children to express their emotions. The subsequent modules are interdependent and build upon one another. Awareness, acceptance, change, and diversion.

The procedures:

An official permission was obtained from the dean of the faculty of nursing and the authoritative personnel at the hospital. After finalizing the study tools, the actual data collection took six months in the period from the beginning of October, 2023 to the end of March, 2024. Evaluation was done two time; one preprogram and the other two months after the program's execution. The stages of the instructional program were as follows:

Planning phase:

The phase sought to identify the needs of the study subjects as a foundational aspect of the intervention program. The researchers were present at the study place two days per week from 10:00 AM to 1:00 PM. A suitable, private location was selected for the interview with the participants. Participants in the study were organized into small groups, with each group consisting of 3 to 5 children. The researcher collected the subjects' eligibility and baseline data (pre and post-test) through interviews with the children and their parents for clarification purposes. The interview duration was allocated as 1 hour for previous children and 2 hours for new children. The researcher invited parents to attend sessions, and the researcher is fixed with the same children from the start of the program until it is finished.

Implementation phase:

The Emotion Awareness and Skills Enhancement (EASE) program indicates that mindfulness is scientifically supported in reducing various emotional and mental challenges beyond ASD, including those addressed by the EASE model. Cognitive Behavioral Therapy (CBT) is employed in the treatment of anxiety associated with Autism Spectrum Disorder (ASD). This phase comprised 16 sessions, each lasting 45 to 60 minutes and conducted weekly. The first two sessions of the phase including the pre-test assessment, welcome to children and parents, explained the EASE program, and discussed change motivation. **A: Awareness** encompassed the third, fourth, and fifth sessions, focusing on mindful awareness of emotions and goals, concluding with the practice of mindfulness awareness at home setting. **B: Be accepting** (breathing) encompassed sixth and seventh sessions, focusing on mindfulness breathing, which can be sustained through home practice. **C: Change** involved in eight to twelfth sessions focusing

on emotions and thoughts, distracting from thoughts (diffusions), reframing (reappraisal), consolidations such distancing and reframing, culminating in practice at home. **D: Divert** comprised sessions thirteen and fourteen, which focused on distraction techniques and practicing outside the hospital environment (at home). Sessions fifteen and sixteen addressed strategies for maintaining calm during critical moments, as well as planning ahead and the process of saying goodbye.

During the program executive, the researcher works with a therapist at an outpatient clinic to create the ABCD model. The researcher employed role-play, laptop videos, demonstration, and re-demonstration as methods for teaching practical skills. Additionally, lectures, videos, and group discussions were utilized. Role-play exercises focused on emotional facial expressions were conducted among the children and between the children and the researcher. The researcher encouraged parents to actively support and monitor their children's practice at home and utilized diverse teaching methods, including lectures and handouts, presented clearly and effectively through engaging PowerPoint presentations. The researcher prepared media, including pictures and videos, utilizing simplified Arabic language, in conjunction with group discussions, to promote active participation and motivate children through rewards or positive reinforcement.

Participants were encouraged to utilize applied techniques including breathing exercises, body scans, and games aimed at enhancing emotional expression and regulation. The activities were designed to enhance relaxation, self-awareness, and situational awareness, encompassing an understanding of time and place. Each session follows the same format; (1) Set an agenda and perform a mindful check-in; (2) Review previous material and verify homework completion; (3) Teach and practice advanced ER techniques or meditations; (4) Conduct a mindfulness exercise at the end of the session; and (5) Assign homework and prepare for post-session activities. Children were encouraged to facilitate the mindfulness exercises for the therapist during EASE, promoting self-confidence and the autonomous use of mindfulness meditation techniques. Children were encouraged to lead the mindfulness exercises for the therapist during EASE, promoting self-assurance and the independent application of mindfulness meditation techniques.

Evaluation phase:

Upon implementation of the program, the researcher collaborates with parents and children to identify the most suitable time that aligns with the schedule for the subsequent follow-up visit at the outpatient clinic. The collection of data for the posttest constitutes a component of this process. A single post-intervention assessment was conducted two months after the program's execution to evaluate the effects of the Emotion Awareness and Skills Enhancement Program.

Ethical considerations:

The Institutional Review Board (IRB) of Benha University provided ethical approval for the current study before it began. Before beginning the study, the researcher defined the objectives and goals to each child and parent/caregiver involved, emphasizing that all data collected were totally confidential and would only be used for scientific purposes. Prior to participation in the trial, the parents/caregivers provided informed consent. Subjects were informed that they could choose whether or not to participate in the study, and that they had the right to withdraw at any time. Furthermore, the study had no negative consequences for them.

Statistical analysis:

The acquired data were processed, tabulated, and statistically analyzed using Statistical Package for Social Science (SPSS) version 25 for Windows, which ran on an IBM-compatible computer. Descriptive statistics were used (e.g., frequency, percentages, mean, and SD). The quantitative variables were compared using the paired t test, with independent samples. The T test (t) is used to compare means of two categories, while the One Way ANOVA Test is used for more than two categories. The correlation coefficient test (r) was employed to determine the relationship between the variables under study. Emotion management skills were predicted using multiple linear regression. Cronbach's Alpha was used to determine the reliability of the study tools. A significant level value was defined as $p < 0.05$, and a highly significant level value as $p < 0.001$. There was no statistically significant change when $p \geq 0.05$.

Results:

Table (1): Frequency distribution of the studied children according to personal characteristics (n=50)

Personal characteristics	No.	%
Age (Years)		
<6	2	4.0
6-<10	33	66.0
≥ 10	15	30.0
Range	**5-12**	
Mean ± SD	**8.36±2.06**	
Sex		
Male	29	58.0
Female	21	42.0
Academic year		
Nursery	2	4.0
First year	10	20.0
Second year	10	20.0
Third year	12	24.0
Fourth year	7	14.0
Fifth year	4	8.0
Sixth year	5	10.0

SD: Standard Deviation.

Table (2): Frequency distribution of the studied children according to clinical data (n=50)

Clinical data	No.	%
Onset of autism		
A year ago	11	22.0
Two years ago	11	22.0
3 years ago or more	28	56.0
Family history from autism		
Yes	6	12.0
No	44	88.0
***what is the Kinship (n=6)**		
Brother	0	0.0
Sister	1	16.7
Cousin or aunt	3	50.0
Son of a maternal uncle or aunt	2	33.3
Number of children in the family		
One	13	26.0
Two	29	58.0
Three and more	8	16.0
The child's ranking in the family		
First	27	54.0
Second	14	28.0
Third	5	10.0
Other	4	8.0

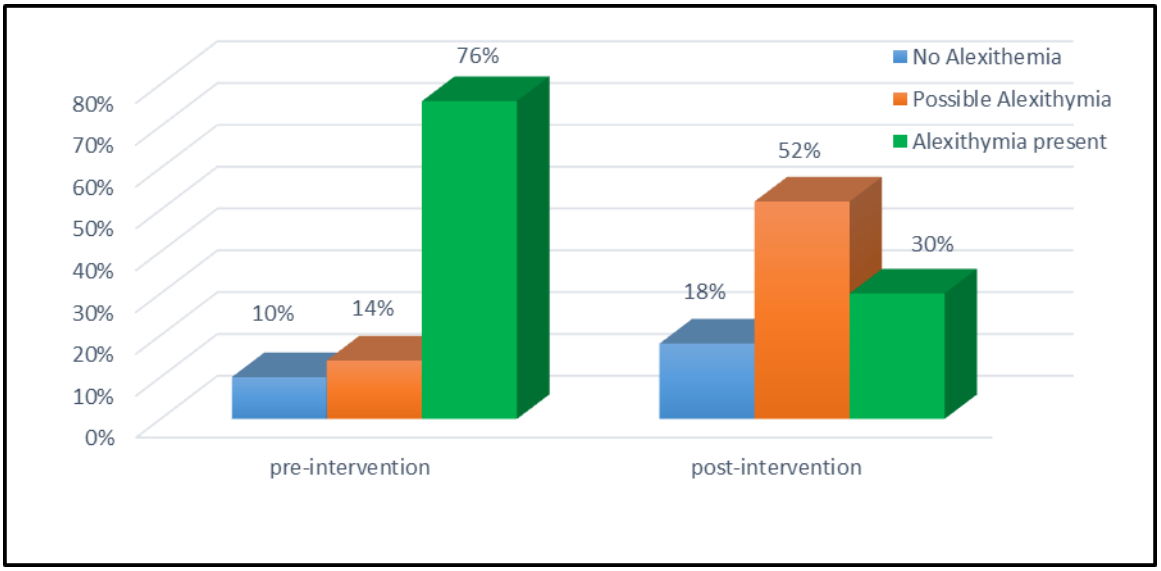

Figure (2): Percentage distribution of the studied children based on overall alexithymia levels pre- and post-implementation of emotion awareness and skills enhancement program (n=50).

Table (3): Distribution of mean scores reported by children regarding alexithymia subscales (factors) at pre and post implementation of emotion awareness and skills enhancement program (n=50)

Variables	No. of items	Pre-intervention Mean ± SD	Post-intervention Mean ± SD	t	P-value
Difficulty identifying feelings	7	25.98 ± 6.52	20.0 ± 5.46	**8.119**	**0.001****
Difficulty describing feelings	5	17.98 ± 4.30	14.48 ± 3.46	**7.536**	**0.001****
Externally-oriented thinking	8	30.54 ± 6.83	23.78 ± 4.97	**8.642**	**0.001****
Overall alexithymia	**20**	**74.60 ± 17.1**	**58.32 ± 10.37**	**9.129**	**0.001****

SD**: Standard deviation;* ***t**: t value paired t-test;* ** highly statistically significant at p <0 .001.*

Table (4): Relation between children' personal characteristics and their overall alexithymia at pre and post implementation of emotion awareness and skills enhancement program (n=50)

Personal data		Overall alexithymia at pre – intervention	Test of Sig.	P-value	Overall alexithymia at post – intervention	Test of Sig.	P-value
Age (years)	<6	89.0±5.65	**F=5.776**	**0.006****	74.5±3.5	**F=5.921**	**0.005****
	6-<10	78.7±15.0			60.8±9.7		
	≥ 10	63.5±17.4			50.6±15.4		
Gender	Male	72.9±17.1	**t=0.809**	**0.423**	59.3±14.4	**t=0.641**	**0.525**
	Female	76.9±17.1			56.9±10.1		
Academic year	Nursery	89.0±5.6	**F=2.559**	**0.033***	74.5±3.5	**F=3.784**	**0.004****
	First year	77.9±20.5			55.7±9.4		
	Second year	80.8±9.5			61.8±9.4		
	Third year	79.6±13.5			64.7±8.8		
	Fourth year	60.1±14.8			48.4±15.4		
	Fifth year	58.7±23.6			43.7±12.2		
	Sixth year	70.6±14.8			60.2±14.0		

***t:** Independent t-test.* ***F:** One Way ANOVA Test.* *No significant at p > 0.05.*
***** Statistically significant at p < 0.05.* ***** Highly significant at p <0 .001.*

Table (5): Relation between children' clinical data and their overall alexithymia at pre and post implementation of emotion awareness and skills enhancement program (n=50)

Clinical data		Overall alexithymia at pre - intervention	Test of Sig.	P-value	Overall alexithymia at post – intervention	Test of Sig.	P-value
Onset of autism	A year ago,	66.7±16.8	**F=4.142**	**0.022***	54.4±13.1	**F=3.579**	**0.036***
	Two years ago,	73.8±19.3			53.9±10.1		
	3 years ago, or more	81.4±13.7			63.5±12.1		
Family history from autism	Yes	92.6±1.75	**t=2.974**	**0.005****	74.8±1.6	**t=3.815**	**0.001****
	No	72.1±16.7			56.1±11.9		
Number of children in the family	One	87.1±13.0	**F=15.75**	**0.001****	64.9±10.0	**F=10.85**	**0.001****
	Two	74.8±14.5			59.6±10.9		
	Three and more	53.1±9.3			42.8±11.4		
The child's ranking in the family	First	80.5±16.2	**F=5.195**	**0.004****	59.9±10.7	**F=6.283**	**0.001****
	Second	74.1±11.9			64.1±11.1		
	Third	59.8±19.6			43.2±10.9		
	Other	54.7±11.8			45.7±13.8		

t: *Independent t-test.* ***F:*** *One Way ANOVA Test.*
***** *Statistically significant at p < 0.05.* ****** *Highly significant at p <0 .001.*

Table (6): Correlation between alexithymia factors among the studied children at pre and post implementation of emotion awareness and skills enhancement program (n=50)

Variables		Difficulty identifying feelings		Difficulty describing feelings	
		Pre-intervention	Post intervention	Pre-intervention	Post intervention
Difficulty identifying feelings	**r**	1	1	1	1
	p				
Difficulty describing feelings	**r**	0.404	0.530	1	1
	p	0.001**	0.001**		
Externally-oriented thinking	**r**	0.309	0.449	0.370	0.639
	p	0.001**	0.001**	0.001**	0.001**

r*= Pearson correlation coefficient test.* ***p****= p-value.* ****** *Highly statistically significant at p <0 .001.*

Table (7): Multiple linear regression model for children' emotion regulation skills (alexithymia) after implementation of emotion awareness and skills enhancement program (n=50)

R=0.697 R Square = 0.486 Sum of Squares= 3879.89 F=10.61

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	89.63	7.335		12.22	0.001**
Age	9.184	2.691	0.379	3.413	0.001**
Family history	12.60	4.598	0.324	2.740	0.009*
Number of children in the family	7.827	3.394	0.396	2.306	0.026*
The child's ranking in the family	1.629	2.227	0.121	0.731	0.468

Dependent Variable: *Emotion regulation skills at post -intervention.*
F*= One Way ANOVA Test.* ***t:*** *Independent t-test. No significant at p > 0.05.* * *p < 0.05.* ** *p < 0.001.*
R*= Pearson correlation coefficient test,* R^2 *= Coefficient of multiple determination*

Table (1): Reveals that 66.0% of the studied children are aged 6 to <10 years, with a mean age of 8.36±2.06 years. More than half (58.0%) of the participants are males. In the context of the academic year, 24.0% are in the third year

Table (2): Displays that over half of the participants (56.0%) have the disease for three years or longer. In addition, slightly less than one fifth of the investigated children (12.0%) have family history from autism; 50.0% of them are cousins or aunts. Moreover, more than half (58.0%) of them have two children. Regarding the child's ranking in the family, more than half (54.0%) of them are the first child.

Figure (2): Illustrates that slightly more than three quadrants of the studied children (76.0%) have alexithymia before program intervention. While, after

program intervention, more than half (52.0%) of them have possible alexithymia and less than two fifths of them (30.0%) have alexithymia.

Table (3): Indicates a statistically significant improvement in all subscales of alexithymia factors following the implementation of an emotion awareness and skills enhancement program ($P < 0.001$). The mean and standard deviation of overall alexithymia factors show a decrease following the implementation of the EASE program compared to pre-implementation, with a statistically significant difference (58.32 ± 10.37, 74.60 ± 17.1 & $p < 0.001$, respectively).

As demonstrated in **Table (4):** A substantial relationship between pre-intervention alexithymia in children and their age ($P < 0.001$). Furthermore, a statistically significant relationship was observed with their academic year and alexithymia ($P < 0.05$). However, no statistically significant relationship was observed between gender at the pre- and post-intervention stages ($P > 0.05$).

Table (5): Shows a substantial correlation ($P < 0.001$) between total children's alexithymia at pre- and post-intervention phases and their family history of autism, number of children, and ranking in the family. Additionally, there is a strong correlation with the onset of autism and children's alexithymia ($P < 0.05$).

Table (6): Reveals that, there are a highly significant statistical positive correlations between overall alexithymia factors (difficulty identifying feelings, difficulty describing feelings and externally-oriented thinking) among the studied children at pre and post implementation of emotion awareness and skills enhancement program ($p < 0.001$) with positive association.

Table (7): Illustrated that a higher predictor factors for positive effect of emotion awareness and skills enhancement program on children' emotion regulation skills (alexithymia) is participants' age (3.413, < 0.001), followed by family history and number of children in the family (2.740, < 0.009 & 2.306, < 0.026 respectively). While, the child's ranking in the family is not consider as a predictor (0.731, < 0.468).

Discussion:

Social interaction issues stem from diminished emotional awareness, which hinders an individual's capacity to manage their own emotions and affects their ability to comprehend the emotions of others. Individuals with alexithymia, in particular, cannot comprehend or recognize emotional input (e.g., facial expression or tone of voice), both spoken and nonverbal, due to their difficulty distinguishing and classifying sentiments. As a result, individuals struggle to build close-knit social relationships, comprehend the motives and attitudes of others, and make ethically sound decisions that consider the opinions of others. Some of the most significant overlaps between alexithymia and ASD include these alexithymia characteristics, communication, and social skills deficiencies **(Pastore et al., 2018)**. The primary purpose of this study was to evaluate the effectiveness of an emotion awareness and skills enhancement program on alexithymia among autistic children.

The current study, involving fifty autistic children with alexithymia, revealed that around two-thirds of them were aged between six and ten years, with a mean age of 8.36±2.06 years. Additionally, more than half of the participants were males, and nearly a quarter of them were in the third academic year. Autism is believed to stem from early developmental disruptions in brain and central nervous system growth. This indicates that the condition is congenital and cannot be acquired later in life. There is no recognized diagnosis for acquired or late-onset autism. In addition, autism spectrum disorder affects one out of every fifty-nine children. ASD is identified three to four times more often in boys than in girls. **(Baio et al., 2018; Palinkas et al., 2019).**

These findings align with **Mostafa (2019),** who reported an age range of 2 to 10 years, with a mean of 5.20±2.04 years. Additionally, over one-third of the children in the study were between 6 and 8 years old. In the similar vein, **Conner et al. (2018) & Josyfon et al. (2023)** discovered that the majority of subjects were males. Moreover, these findings were in harmony with the study conducted by **Speyer et al. (2022),** which focused on children aged 8 to 12 (Mean = 9.46, SD = 1.28).

In the current study; it was observed that over fifty percent of the studied children had a disease duration of three years or more. This outcome may be due to the delayed diagnosis of many children until they reach school age, even though parents observe symptoms of the illness within the first two years of life. Additionally, parental concerns at twelve months were found to have a strong correlation with independent evaluations of developmental status and autism symptoms. This has facilitated the prediction of which infants may later receive an ASD diagnosis; however, concerns identified at 6 months have been determined to be unrelated. Retrospective research indicates that while mothers identify early abnormalities, diagnoses for children are often delayed due to various factors, leading to missed opportunities for early and intensive intervention **(Daniels & Mandell, 2014; Herlihy et al. 2015).**

This finding aligns with **Açıkel et al. (2022),** who reported that the average age of ASD diagnosis was 35.73±12.03 months, whereas the average age at which mothers observed communication, language, or

other anomalies in their children was 27.07±9.43 months. Furthermore, previous study supported this finding of **Compas et al. (2012)** who reported that chronic illnesses that manifest in childhood are often associated with improved emotional and mental stressors, as well as increased levels of worry, tension, or emotional regulation issues.

The data in current study show that prior to intervention in the program, just over three quarters of the studied children showed signs of alexithymia. These high rates highlight the importance of addressing emotional insight deficits in children, as alexithymia can significantly affect their emotional development, socialization, and overall psychological well-being **(Taylor & Bagby, 2021).** Moreover, alexithymia is characterized by difficulties in recognizing and interpreting emotions, which can lead to difficulties in emotional regulation and interpersonal relationships **(Preece et al., 2020).**

While, significant improvement was observed after program intervention, as more than half of the children fell into the "possible alexithymia" category, despite the low prevalence of full alexithymia in children two-fifths. The decrease in severe alexithymia following the intervention indicates that the mindfulness component of the program positively influenced the children's ability to identify and express their emotions. There is particularly true during the session where the kids learned how to apply techniques like body scans, breathing exercises, and playing games to express and regulate their emotions. Respondents were also advised to remain calm, self-conscious, and aware of their surroundings, including time and location.

According to a random-effects meta-analysis of trial endpoint data, the study by **Norman et al. (2018)** found that the Toronto Alexithymia Scale's alexithymia was statistically significantly affected by mindfulness-based treatment when compared to the control group (mean difference = −5.28, 95%CI −9.28 to −1.28, p = 0.010). These results suggest that mindfulness-based treatments could be helpful in lowering alexithymia. Furthermore, **Silveira et al. (2023)** results point to the effectiveness of online coaching sessions combined with app-based socio-emotional and mindfulness-based techniques in addressing impairments in emotion processing. Also, the research results reported by **Agha et al., (2023)** displayed statistically significant differences in the degree of alexithymia according to the post of implementation of the program.

The study discovered a significant improvement in alexithymia across all subscales after implementing an EASE program (P<0.001). This could be attributed to the program, which was created to reduce emotion regulation impairment and thereby improve behavioral disturbance through mindful awareness of emotion and goals.

This finding lines up with **Conner et al. (2018),** who discovered that outcome data support program feasibility and acceptance among participants, as well as considerable improvement in emotion control deficiencies and related concerns. The results provide preliminary support for the feasibility and clinical effectiveness of the emotional awareness and skills training program. In addition, this finding is congruent to **Pedregal & Heaton (2021)** who found that participants showed post-intervention improvements in emotion recognition and alexithymia.

Likewise, the present study revealed that the mean and standard deviation of alexithymia's subscales (factors: troubling identifying feelings, difficulty describing feelings, and externally-oriented thinking) decreased after implementation of emotion awareness and skills enhancement program compared with pre implementation. This might be because there is a greater understanding of alexithymia and how it affects the welfare of children with autism. This emphasizes the significance of interventions that help people recognize their emotions and physical sensations. This result is congruent with **Oakley et al. (2022**) who reported different clinical outcomes for autistic individuals are linked to challenges in recognizing and expressing emotions. It also implies that psychological interventions aimed at enhancing emotional awareness could potentially alleviate social-communication and anxiety symptoms in autistic individuals, leading to long-term advantages.

Regarding to overall alexithymia's subscales at pre intervention phase, the present study revealed that mean and standard deviation was increase while they decreased during post intervention phase (74.60 ± 17.1& 58.32 ± 10.37 respectively). This may be due to many autistic children experience significant social-communication difficulties and elevated anxiety/depression and alexithymia. While, emotion awareness and skills enhancement program was used to help children with alexithymia explore and understand their emotions through using techniques such as emotion-focused therapy to help children identify and express their feelings more effectively.

This finding is consistent with **Hassen et al. (2023)** who found that autism spectrum disorder (ASD) group showed higher scores in alexithymia and emotional regulation problems. Furthermore, **Sari et al. (2024)** who found that the emotion awareness and skills enhancement program (EASE) are effective in improving emotional regulation in children with ASD. EASE was developed to reduce emotional regulation disorders and improve behavioral disorders, through mindfulness.

The current study demonstrated that there was a high significant statistical link with a favorable relationship between total alexithymia factors among the studied children at pre- and post-implementation of an emotion awareness and skills enhancement program ($p < 0.001$). This means that if any improvement in any factor can affect other factors and improve it. **Huggin et al. (2020)** discovered significant differences in difficulty identifying, describing, and externally-oriented thinking (DIF) subscale scores between autistic and non-autistic individuals ($p < 0.001$).

Finally, the current study presents important discoveries about the factors that indicate favorable results from a program that improves abilities and emotion awareness. Remarkably, the most reliable indicators of improved emotional regulation following the session were the participants' age (T 3.413, P<0.001) may be attributed to cognitive and emotional maturation processes. As individuals age, they develop more sophisticated emotional regulation strategies, which can be further enhanced through structured interventions. Followed by family history, and the number of children in the home (T 2.740, $P < 0.009$ & T 2.306, $P < 0.026$ respectively). On the other hand, the child's ranking within the family (T 0.731, $P < 0.468$) did not show any significant correlation with the outcome and didn't consider as a predictor. Though birth order theories sometimes imply that younger or older infants may grow up in distinct emotional contexts **(Sissons, 2024).**

This observation contradicts **Strang et al. (2024),** who reported no significant difference between groups regarding age ($t(100) = 0.40$, $p = .693$). While, other study supports the current study indirectly by **Sharma (2024)** argues that the proportion of siblings and age are connected to the degree of alexithymia. According to the study, adolescents with siblings showed lower alexithymia than only children, while college students showed lower alexithymia than younger students.

This is congruence with the findings of **Pedregal & Heaton (2021),** which indicated that at the pre-test, the ability to recognize verbal and facial emotions, as well as the intention to not conceal emotions, were significantly correlated with chronological age (CA) and receptive vocabulary. The post-test revealed that older children had improved more in emotional bodily awareness and voice recognition. Furthermore, the study's findings are corroborated by **Costa et al. (2019)** research, which discovered that parent-child interactions are less frequent in autistic children with alexithymia. The authors of that study hypothesized that co-regulation is negatively impacted by the inability of autistic children to communicate their inner states to their parents. Last but not least, this study can serve as a foundation for further studies examining the effects of the emotion awareness and skills enhancement program for alexithymia in autistic children.

Conclusion:

According to the outcomes of the current investigation, it turns out that after program intervention less than two fifth of them had alexithymia, the mean and standard deviation of overall alexithymia's subscales (factors) were decreased. The study found a significant beneficial correlation between alexithymia factors among children before and after implementation ($p < 0.001$).

Recommendations:

The study's findings suggest the following recommendations:

- Raise public knowledge of autism and its impact on children and parents, as well as strategies for managing it.
- Motivate nurses to participate in workshops, such as mindfulness and practice to help autistic children communicate their emotions more clearly.
- Music-based therapies can improve emotion detection in children with autism and alexithymia.

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