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The Effect of Social Story Telling on Motor Skills and Verbal Communication among the Children and Adolescents (5-17 Years Old) with Severe Autism Spectrum Disorder

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Abstract
Introduction: Autism is one of the structural disorders of brain which is accompanied by deficiency in motor skills and verbal communications. The present study was conducted aiming at investigating the effect of social story telling on the development of motor skills and verbal communications among the children and adolescents suffering the autism.
Methods: This study was semi-experimental of pretest- posttest type with control group. Statistical population of this study included all children with autism from 5 to 17 years old in Sirjan City in March 2017- March 2018 from among whom, 16 persons were selected by accessible random sampling method based on the conditions for entering the study, then they were divided randomly into two experimental and control groups. Experimental group was involved with the social stories intervention for children and adolescents through researcher direct training for 12 weeks and 2 sessions a week and control group received no intervention. Research tools were GARS autism rating scale, Vineland social maturity scale and social stories. Results obtained from pretest and posttest stages were analyzed by statistical test of covariance and the significance level was considered at $p< 0.05$.
Results: Finding showed that the social skills training increases significantly the motor skills and verbal communications among the children and adolescents with severe autism spectrum disorder at level of $p < 0.001$ compared to the control group.
Conclusion: Social skills training to autistic children is likely to improve the motor skills and verbal communications among them through strengthening the sensorimotor integration, creativity and motivation for progress and reducing the anxiety.
Keywords: Social Skills, Motor Skills, Verbal Communication, Autism

Introduction

Autism spectrum disease is one of the developmental disorders of central nervous system which is specified by disorder in social meetings and communication capabilities and existence of stereotyped activities and behaviours (1). Autism comes with structural anomalies of brain, seizure and motor disorders and autonomic irregularities (2, 3). From early childhood, most children with autism disorder are facing various behavioural and cognitive problems including problems with eating, wearing clothes, verbal communication and motor activities and concerning the high tension of parents of children with autism and their low self-help, training the applied behaviour analysis program and empowering the communication skills seem to be required for such patients (4). In former study study, it was shown that training the self-help skills improves the social interactions and communications among the children suffering the autism spectrum disorder (5). Studies support the application

capability and logo therapy efficiency for increasing the social skills and correcting the social sufficiency among the children suffering autism disorder with high performance (6). Results of visual graphs for variables of stereotyped behaviours, communication, social interaction and general symptoms of autism indicate the effect of treatment of sensorimotor integration on children's autism symptoms (7). Recent findings of scientists and neuroscience specialists show that prescribing the oxytocin in early ages for autism children makes such patients have natural smart performances and improve their verbal capabilities in the community. It also enhances the eye contacts among them and increase the time spent by patient for looking at other people's eyes (8). Autism spectrum disorder is given by various problems in the fields of social performance, communications and existence of repetitive stereotyped behaviors (9). Results of a study showed that probability of video modeling increases the self-help skills among the children with autism spectrum disorder (10). Findings of another study indicate that floor time method affects the improvement of emotional functions such as communicative, emotional and playing skills among the children with autism spectrum disorders (11). Another research shows the capability of story-telling and its structure in improving the social interactions of the children with autism spectrum disorders (12). Based on the findings of a study, emotion regulation method can be used for improving the social cognition and various metacognitive skills among the children with autism spectrum disorders (13). Weakness in sensory processing, especially sensory sensitivity, can be a factor to limit the involvement of children with autism in activities (14). Parents based early intervention can be used as effective training methods for improvement of joint attention among the pre-school children with autism spectrum disorder. Since any damage in joint attention is known as one of the main characteristics of children with autism spectrum disorder and joint attention leads to improvement in other developmental fields, it can be proposed that improved joint attention should be determined as a main goal in rehabilitation and training interventions among the children with autism spectrum disorder (15). Results of a study showed that supportive and training group psychotherapy programs can reduce the amount of anxiety, depression and stress among the children with autism spectrum disorder and promote their quality of life (16). Another study's results indicate that neurofeedback improves the executive performance of children with autism spectrum disorder and neurofeedback effects become more clear by adding occupational therapy (17). Results of a meta-analysis support the impact of applied behavior analysis method intervention on improved verbal skills of children with autism spectrum disorder (18). Weakness in sensory processing, especially sensory sensitivity, can be a factor to limit the involvement of children with autism in activities (19). Among the children with autism spectrum disorder, interfered communication skills include the lack of speech or delayed speech, repetitive speech and echolalia and not using the facial expressions and gesture during the communication with others (20). Although among the normal children, understanding process and development of non-verbal communication skills are formed in early childhood, among the autism children, development and formation of communication skills face many limitations and defects and hence therapeutic and training interventions are required (21, 22). Meanwhile, initiation and responding to the joint attention are one the main deficiencies of non-verbal communication skills among the autistic children (23) and is known as one of the criteria for diagnosing such children and it is especially an objective and priority of their therapeutic interventions (24). Since those children suffering from the autism prevent to establish social communication with others

and face many problems with verbal communications and motor activities from their childhood, they are prone to various types of behavioral – emotional problems. Furthermore, in view of socialization, the ability to interact with others is of high importance in life and autistic children suffer serious deficiency in this field, hence they need support and training in the field of social skills so that they can obtain the required social skills. Therefore, with regards to limited studies conducted on the role of social skills training to children and adolescents with autism spectrum disorder in connection to verbal communications and motor activities among them, the present study aimed at investigating the effect of training the social story telling on development of motor skills and verbal communication among the children and adolescents with severe autism spectrum disorder.

Methods

This study is a semi-experimental study of pretest- posttest type with control group. Statistical population of this study included all 374 children with autism aged 5- 17 years old in Sirjan City in March 2017- 2018 from among whom, based on the conditions for entering the study, 16 persons were selected by accessible random sampling method from Sirjan City Autism Center; then they were divided randomly into two experimental and control groups. The research sample incuded 8 children with autism in preschool and primary school and 8 adolescents with autism studying in high school. GARS autism rating scale measures three areas of stereotyped behaviors, communication and social interaction. The studies conducted indicated the Cronbach's alpha coefficient of 90 %, 89% and 93% for stereotypes behaviors, communication and social interaction, respectively. Its validity was also approved through comparing it with similar evaluation and screening systems. To measure the children's social development, Vineland social maturity scale was used. Vineland social maturity scale was developed by Edgar A. D in 1953, then revised in 1965. This scale measures the amount of personal responsibility and attention to personal needs. 117 questions were developed in view of the social development or the person's strength to deal with and take care of himself/ herself and meeting his/her personal needs. This test includes birth to 25 years or even more and is applicable in all age levels. But studies have shown that it is more valuable in lower ages and includes 8 subscales of general self-help, self-help in eating, self-help in wearing clothes, self-leadership, self-entertainment, mobility– relocation, being social and social gain of which the reliability coefficient is 0.92. In training intervention, the content of stories was included as follow: First social story: I go to the doctor. He examines me and asks me some questions. I try to answer his/her questions. I look at the doctor with my eyes. I listen to the doctor with my ears. I speak with my lips. If I try to do what the doctor says, I'm getting better. Second social story: when my teacher gives us homework, I sit still on my chair. I open my notebook and start to write the homework. When I write badly, I erase with eraser. When all of my homework are finished, I do not interrupt my friend and do not make any noise. When I write my homework well, my teacher tells me: bravo. Then, she allows me to play with toys. Third social story: I am getting on the car with my father and go to the store. Store is very busy. I take my father's hand tightly to not get lost. I see a blue ball. I want this ball. The salesperson brings the ball and gives it to me. I give the money to the salesperson. I return back happily to home with my father. Fourth social story: today is the time for sport and playing. Teacher wants to hold a competition for us. I and Sahar on one side, and Matin and Arash on the other side. There are two baskets full of balls and also two empty baskets. We have to take the ball and throw in into the empty basket. I run and take a ball and put into the empty one. We are happy with this game

and the teacher gives us gifts. Fifth social story: today we have guest. We have to clean the house. I go to my room. In put the ball into the basket. I put the machine into the closet. Someone knocks at the door. My mother opens the door. My aunt has come. I say hello. Dear aunt says hello. I prepare a plate and a knife for my aunt to eat the fruits. I'm very happy. Sixth social story: today a bottle fell out of my hand on the kitchen floor and broke. Without collecting the broken glasses, I went to my room. Suddenly I heard my little sister, Sara, screaming. When I went out, I say a piece of glass inured her foot and she was crying. Mother got angry. Today, Sara cannot play with me. I am so upset. I go to the kitchen and collect the glasses. My mother become happy with my action and tells to me, well done, my son. Seventh social story: children are playing in the school yard. But Mohammad is crying in the class. I clean his tears by a handkerchief. But he still continue crying. Then, I give him a glass of water. Teacher put her hand on his forehead. Oh, Mohammad has a fever (he is sick). I bring Mohammad to the health teacher to visit him. Health teacher thanks me for helping Mohammad.

Finally, using analysis of covariance (ANCOVA), data were analyzed using SPSS (version 20). The significance level was considered at $p< 0.05$.

Results

Results obtained from data analysis showed that there is significant difference between the experimental and control groups in terms of verbal communication, and the adjusted score of verbal communication in experimental group is higher than the control group after training the social skills. Therefore, based on the results of this study, it can be said that training the social skills increases significantly the verbal communication of children and adolescents (5 to 17 years old) with severe autism spectrum disorder at $p < 0.05$ level than the control group. Additionally, on the basis of results obtained from the data analysis, it was revealed that there is a significant difference between experimental and control groups in terms of movement and the adjusted score of movement in terms group is higher than the control group after training the social skills. Therefore, based on the results of this study, it can be said that training the social skills increases significantly the movement of children and adolescents (5 to 17 years old) with severe autism spectrum disorder at $p < 0.05$ level compared to the control group (Tables 1- 9).

Table 1. Description of components of movement and verbal communication variables among the subjects

Variable	Stage	Experimental			Control		
		Mean	SD	Quantity	Mean	SD	Quantity
Movement	Before intervention	2.38	0.52	8	2.13	0.35	8
	After intervention	5.63	0.52	8	2.50	0.54	8
Verbal communication	Before intervention	1.88	1.46	8	1.38	0.92	8
	After intervention	9.25	2.25	8	2.50	1.69	8

Table 2. Normality test of distribution of verbal communication variable

Variable	Shapiro – Wilk	p- value
Verbal communication	0.984	0.421

Table 3. Default test of variance homogeneity of covariance analysis data

Test of variance homogeneity	Levin test statistic	Degree of freedom	Degree of freedom	P
Verbal communication before intervention	0.09	1	14	0.76
Verbal communication after intervention	0.31	1	14	0.58

Table 4. Investigating the regression slope homogeneity

Source of test	Sum of squares	Degree of freedom	Mean of squares	F	P
Verbal communication group	89.10	2	44.55	4.06	0.05
Error	142.64	13	10.97	-	-
Total	231.75	15	-	-	-

Table 5. Covariance analysis of impact of social skills training and before intervention on verbal communication

Source of changes	Sum of squares	Degree of freedom	Mean of squares	F	P	Squares
y-intercept	155.078	1	155.078	42.082	0.001	0.76
Before intervention (Covariance)	1.593	1	1.593	0.432	0.522	0.03
Grouping	166.806	1	166.806	45.265	0.001	0.77
Error	47.907	13	3.685	-	-	-
Total	231.750	15	-	-	-	-

Table 6. Normality test of distribution of movement variable

Variable	Shapiro- Wilk	P
Movement	0.951	0.168

Table 7. Default test of variance homogeneity of covariance analysis data

Test of variance homogeneity	Levin test statistic	Degree of freedom	Degree of freedom	P
Movement before intervention	3.74	1	14	0.05
Movement after intervention	0.46	1	14	0.50

Table 8. Investigating the regression slope homogeneity

Source of test	Sum of squares	Degree of freedom	Mean of squares	F	P
Movement group	10.657	2	5.328	2.14	0.25
Error	32.280	13	2.483	-	-
Total	42.938	15	-	-	-

Table 9. Covariance analysis of impact of social skills training and before intervention on movement

Source of changes	Sum of squares	Degree of freedom	Mean of squares	F	P	Squares
y-intercept	6.62	1	6.62	23.07	0.001	0.64
Before intervention (Covariance)	0.14	1	0.14	0.79	0.49	0.03
Grouping	34.51	1	34.51	120.20	0.001	0.90
Error	3.73	13	0.28	-	-	-
Total	42.93	15	-	-	-	-

Discussion

Results of this study showed that social skills training among the 5-17 years old children and adolescents with autism disorder improves their verbal communication and movement. It was shown that social stories are a desirable way to decrease the behavioral problems and increase the interactions of autistic children (25). With regards to the results, motor skills, as a predictor for the social communication ability and the challenging behaviors reduction, seem to be an effective interventional and therapeutic factor for improving and enhancing the social skills and reducing the challenging behaviors (26). Based on the researchers' opinions, children with autism disorder receive ranks of weak and too weak in both subscales of movement and object control than the healthy people in motor development test (27). It is argued that motor skills of autistic children with high performance is weaker than the health persons (28). By making use of gross motor development test, it was shown that the motor development of children with autism disorder is too low than the healthy peers; i.e. 50% (29). In investigating the social-communication skills, the children with autism spectrum disorder with fine and gross developments skills in comparison to the children with communication deficiencies, showed weaker motor skills (30). Among the children with autism, disorder in social interaction is a main deficiency of such disease so that most patients are not able to play their social roles and perform their experimental skills and cannot use the verbal and written tools to establish communication (31). From among the characteristics of autism, continuous deficiency in communications and social interactions in various fields and repetitive and limited models in their behavior, interests and action can be mentioned (32). Autism spectrum children face disorders in processing the sensory information and give unnatural responses to sensory stimuli like avoidance responses and excessive interaction (33). These children have deficiencies and disorders in the field of emotions (34). Furthermore, they are likely to be normal in in learning language and speech (35). They also have problems with motor skills, especially fine movements of hands and daily activities and playing (36). In sum, it can be said that autistic children are battling a wide range of

medical and psychological disorders (37). In a study, it was shown that among the children with autism disorder, using the social stories can increase the time of social participation and special social skills (38). It was also suggested that using the social stories with facilitating the social behaviors training decreases widely the behavioral problems of autistic children (39). Among the autism spectrum children, anxiety and isolation, low communicative tendencies and social interactions, inability to establish verbal and non-verbal communications, low level of trust, sympathy, affiliation need and sociability are very evident and any factor like oxytocin which has desired effects, especially in the field of stress and isolation reduction, and can improve and enhance the communicative tendencies and social interactions among such patients and increase the verbal and non-verbal communications as well as trust, sympathy, affiliation need and sociability, can be used as a therapeutic solution (40). Therefore, using the social stories through increasing the oxytocin secretion shortage of which can be seen among these patients, in the present study enhances the verbal communications and movement among them. In a research, it was shown that using the doll play therapy among the children with autism improves the eye contact in the field of initiating behavioral request, low level initiating requests, response to a social interaction, general initiating behavioral requests and in sub-skill of performing the requests. Based on the qualitative findings taken from the parents' reports, effectiveness of intervention is approved (41). Consistent with the results of this study, data analysis of another study showed that after finishing the story-telling sessions based on the social skills training and upon the teacher evaluation, a significant increase was observed in the subscales of collaboration, assertiveness, self-control and total score of social skills and a significant reduction was also seen in the scores of behavioral problems of 8-10 years old male students suffering from oppositional defiant disorder (42).

Conclusion

Results of the present study showed that by making use of social stories, the children with autism disorder learn to become fluent speakers through interactions with other peers and adults so that they improve their weak status of movement skill by increasing the social cognition and social interaction.

Ethical issues

Not applicable.

Authors' contributions

All authors equally contributed to the writing and revision of this paper.

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