



The Effect of Family-Centered Nature Therapy on the Sensory Processing of Children with Autism Spectrum

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Abstract

Background: Treatment methods for autistic spectrum have been of utmost interest for researchers. In this regard, nature therapy is one of the most cost-efficient methods of treatment. Considering this issue, the aim of this study was to investigate the effect of family-centered nature therapy on the sensory processing of children with autism spectrum.

Methods: This study was an applied and semi-experimental (pre-test and post-test) with control group. The statistical population included all children with autism spectrum disorder (3 - 7 years old) referring to Tehran's rehabilitation and therapy centers. The sample size of 14 children (12 males and 2 females) with autism spectrum disorder was selected by convenience sampling method and were randomly divided into experimental and control groups. Ten sessions of nature therapy were held at Sagan Nature School along with parents' mandatory attendance. To collect the data, the sensory evaluation checklist and the Nature Therapy Schedule were used based on theoretical framework and research findings. The obtained data were analyzed using Leven, Kolmogorov-Smirnov and covariance analysis tests.

Results: Based on the obtained results, nature therapy had a significant effect on sensory processing in experimental group ($F = 22.42$; $P = 0.001$). Furthermore, eta coefficient of 0.67 indicated that approximately 67% of the variance of the dependent variable (sensory processing) is affected by the study intervention.

Conclusions: The findings showed that family-centered nature therapy reduced some sensory problems in children with autism spectrum disorders. These children, especially in motion and touch, showed significant progress. Therefore, this method can be used for reducing the syndrome of children with autism spectrum disorder due to its positive, simple, and beneficial effects as a complementary therapy along with other therapies.

Keywords: Autism, Nature Therapy, Sensory Processing, Family-Centered

1. Background

One of the most important issues in mental health research is the study of children with autism and their treatment. The symptoms of this disorder are ranged from mild to severe. One of the symptoms that greatly affect their social interaction is the sensory processing (1-3). Sensory processing problems in children with autism spectrum disorders consist of learning difficulties, child labor, anxiety disorders, hemiplegia, dementia, schizophrenia and post-traumatic stress disorder (4). The rate of such problems are reported about 42% to 96% in children with autism (5) which adversely affect muscle tone, motor skills, self-

awareness, relationships with others and their daily performance (6). The term "nature" covers a wide range of open spaces from gardens to desert areas, which include the life of plants, natural elements such as water, rock, soil, etc., and nature therapy is one of the treatment methods that are used in natural environments with natural elements (7). Richardlove's first statement in 2005 states that the inactivity of children in the open space and their engagement in electronic media and gadgets causes a problem called "neglect of nature", meaning not having a child relationship with nature that affects the quality of life (8, 9). It focuses on the association with the natural elements and animals and stimulates the senses through colors,

sounds and fresh air and carry out physical or manual activities freely which would improve the sensory, psychological and social conditions in all people in different conditions and age groups (10-12). There are some evidences suggesting that outdoor physical activities have positive effects on psychological aspects of humans which leads to promotion of an active outdoor lifestyle (13, 14). Hence, this approach is about treatment for children with attention deficit hyperactivity, anxious, depressed and aggressive children, and also children with autism spectrum disorders (15). Since this technique has been successful, we are looking at whether family-based nature therapy can reduce the sensory processing problems of children in the autistic spectrum.

2. Methods

This study was an applied and semi-experimental (pre-test and post-test) with control group. The statistical population included all children with autism spectrum disorder (3 - 7 years old) referring to Tehran's rehabilitation and therapy centers. The sample size of 14 children (12 males and 2 females) of children with autism spectrum disorder was selected by convenience sampling method that were randomly divided into experimental ($n = 7$) and control groups ($n = 7$). The inclusion criteria included ages 3 to 7 years, autism spectrum disorder according to the psychiatrist's diagnostic opinion (lack of mental retardation, attention deficit and hyperactivity disorder based on DSM5 criterion), the consent form signed by parents prior to study (at least one of the parents). Ten sessions of nature therapy were held at Sagan Nature School along with parents' mandatory attendance. To collect the data, the sensory evaluation checklist and the Nature Therapy Schedule were used based on theoretical framework and research findings. The obtained data were analyzed using descriptive and inferential statistical methods (Leven test, Kolmogorov-Smirnov test and covariance analysis). It should be noted that both groups continue to receive psychological and occupational therapy interventions that had already in their work schedule. To create a sense of security for families and children at educational sessions, several nature therapy specialists from the nature school were asked to cooperate for explaining the assignments for training sessions.

2.1. Research Instruments

Sensory Checklist: This checklist was written by Larkey et al. to measure the sensory status of children with Autism. The questionnaire consisted of eight dimensions:

Motion section (22 items), visual field (15 items), eye contact section with subjects and objects (10 items), eating area (14 items), touching part (32 items), audio system (11 items), olfactory (8 items) and sleep (5 items), which were answers by Likert scale in 5 options of 1 (rarely), 2 (sometimes), 3 (most often) and 4 (always) (16).

2.2. Nature Therapy Program

This program has been developed in two main stages: (1) Engage the child in nature, and (2) being in nature along with doing different assignments. The first stage includes activities that were conducted freely without direct guidance from the researcher. The second phase consisted of three parts: performing horticultural activity, communicating with the animal in the natural environment, and doing physical activity in the natural environment, with each specific assignment replaced. The section "performing physical activity in the natural environment" includes six types of activities, each of which relates to one of the various senses (vision, taste, touch, hearing, olfactory), along with the vestibular sense. The content of the program was approved by five experts. Ten days after the end of training sessions, the sensory evaluation checklist was completed and used as a follow-up test by two experimental and control groups and after 3 months as a follow-up step.

3. Results

Table 1 shows the sensory evaluation checklist with the follow-up scores of the experimental group.

As shown in Table 2, there was a significant effect of nature therapy on sensory processing in experimental group ($F = 22.42$; $P = 0.001$). Furthermore, eta coefficient of 0.67 indicates that approximately 67% of the variance of the dependent variable (sensory processing) is affected by the study intervention.

4. Discussion

The purpose of this study was to investigate the effect of family-centered nature therapy on sensory processing in children with autism. The findings showed that the nature therapy reduced some sensory problems of these children. The results are consistent with the findings of Adams et al. that indicated the positive effect of nature therapy on the increase in strength and physical activity (15). In agreement with our study, Karim et al. showed that sensory integration methods improve the fine and gross movements in children with autism. Among the researches, Kajbaf et al. concluded that those families with pet had better sleep patterns compared to non-pet households (17). In explaining

Table 1. The Sensory Evaluation Checklist with the Follow-Up Scores of the Experimental Group

Scale	Experimental (n = 7)			Control (n = 7)		
	Mean ± SD	Min	Max	Mean ± SD	Min	Max
Movement						
Pre-test	63 ± 10.65	50	78	64.71 ± 9.32	52	78
Post-test	72 ± 3.92	68	79	65.14 ± 9.03	53	78
Follow-up	72.57 ± 3.95			-		
Vision						
Pre-test	34.14 ± 4.91	38	51	45 ± 4.65	40	55
Post-test	49.86 ± 5.05	42	56	39.71 ± 9.11	26	50
Follow-up	18 ± 4.69			-		
Eye contact						
Pre-test	24.71 ± 6.42	15	31	28.29 ± 4.54	26	38
Post-test	32.43 ± 2.15	30	35	26.29 ± 2.06	23	30
Follow-up	31.29 ± 1.7			-		
Touch						
Pre-test	98.14 ± 6.57	88	106	93.43 ± 6.96	80	107
Post-test	1.6 ± 4.83	100	113	92.86 ± 10.75	80	114
Follow-up	106.71 ± 4.39			-		
Eating						
Pre-test	43.12 ± 5.11	39	51	44.12 ± 9.65	31	56
Post-test	43.57 ± 4.61	39	51	44.25 ± 8.94	32	55
Follow-up	42.44 ± 4.86			-		
Hearing						
Pre-test	32.57 ± 2.76	30	36	28.71 ± 2.63	25	42
Post-test	37.71 ± 4.27	32	42	28.29 ± 2.93	25	33
Follow-up	36.29 ± 4.86			-		
Olfactory						
Pre-test	26 ± 2.36	23	30	25.86 ± 4.67	20	32
Post-test	26.12 ± 2.27	24	30	26.90 ± 4.35	22	32
Follow-up	25.22 ± 2.79			-		
Sleep						
Pre-test	10.02 ± 1.95	8	13	10.88 ± 2.06	8	14
Post-test	10.14 ± 1.41	9	13	10.92 ± 1.81	8	13
Follow-up	8.9 ± 0.90			-		
Sensory processing						
Pre-test	343 ± 19.06	314	376	340.57 ± 15.94	317	361
Post-test	380.43 ± 17.56	375	406	332.71 ± 24.1	301	375
Follow-up	374 ± 19.22			-		

Table 2. The Results of Covariance Analysis in Assessing the Effectiveness of Nature Therapy Program on Sensory Processing

Source	SS	df	F	P Value	Eta Coefficient
Trial	7385.17	1	22.42	0.001	0.67
Error	3623.07	11			
Total	13303.43	13			

the findings of this research, one of the reasons why children have sensory processing problems is the existence of

inefficient neural pathways. Since various senses are transmitted to the brain by electronic impulses and synapse be-

tween the neurons and through the pathway of the nervous system, the use of more of these paths is helpful. Children are actually shaping and creating their own neural pathways when they play, and they look for something, and they have a lot of different things and looking for new emotions. Whatever the children are trying to experience more by different senses (hear, touch, vision...), their neural pathways become powerful, and thus the child is more able to adapt to the sensory elements of their surroundings (18).

The vital aspect of sensory integrity is located in the lower centers of the central nervous system, especially in the brainstem and thalamus stem. As higher levels of the central nervous system depend on lower levels, increasing the efficiency of the brainstem and thalamic stem leads to higher levels of performance. Nature not only allows the child to walk, run, climb a tree, walk on various materials (rock, etc.), but also the child manipulate different objects which increase awareness of child toward the body. These abilities lead to improvement of fundamental abilities such as balance touch and motor control, which results in optimal efficacy of higher levels of the central nervous system (1). Since children live on their senses, the sensory experiences connect the children with the hidden and emotional world of the future, so the direct experience of nature is an issue that awakens the child's senses and experiences the two senses (vision - hearing). In fact, nature is considered to be the main source of reinforces for the child's senses, so that much of human learning is done via environments.

4.1. Conclusion

Based on the findings of this study, it can be concluded that the family-centered nature therapy program reduces some of the problems in children with autism spectrum.

One of the limitations of this study is the nature of school space. Because the nature school space is generally embedded in ordinary children, it is necessary for these children to be more involved in natural environments for getting more experiences. The other limitations referred to the child's parents' work conditions; the low number of nature therapy sessions. Therefore, nature therapy is highly recommended for children with autism disorder along with other therapies.

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Footnote

Ethical Considerations: All ethical considerations were considered.

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