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IMPACT OF A TRAINING PROGRAM ON SENSORY PERCEPTION OF CHILDREN WITH AUTISM IN SAUDI ARABIA

The current study aims to develop sensory perception for three dimensions (auditory, visual, and motor) in children with Autism in the Kingdom of Saudi Arabia. In this experimental study, a single experimental group has been considered for pre and post-study measurements to achieve the goals of the study. Five children were chosen (3 males and 2 females) for the study whose ages ranged from six years to ten years to respond effectively to the study tool i.e. a training program for developing sensory perception in autistic children. The results of the study concluded that there were statistically significant differences (0.05) in both the pre and post measurements of the average grades of autistic children in the Kingdom of Saudi Arabia. The value of the bilateral correlation coefficient for auditory and visual (rprb) (0.95: 0.98) indicates a significant effect of the training program on the autistic children, except for the sensory-motor dimension where the effect was average.

Keywords: Training program; sensory perception; Autism; Saudi Arabia; special education.

INTRODUCTION

Recent years have witnessed growing trends in the comprehensive developmental disorders that appear in the early years of a child's life and eventually affect their growth and development. Autism is the most prevalent disorder as it affects attention, awareness, cognitive development, social development, and emotional aspects too. As per the *Cambridge Dictionary of Psychology* [1], it is one of the comprehensive developmental disorders in the early stage, which is characterized by weak social learning and communication, limited activities, interests, learning, insufficient imaginative and stereotypical thinking or non-functional thinking of movements and verbalities [2], [3], [4], [5], [6]. These symptoms appear at the age of three and the symptoms may differ for each individual. On this basis, experts considered that Autism resembles what is likely to be a variety of behavioural disorders that are usually diagnosed by individual criteria, which require doctors to identify general and specific specifications for diagnosing Autism to distinguish them from other similar cases [7], [8], [9]. Autism is considered one of the most severe disabilities that starts with the birth of the child and continues with him until his death, except for improvement of the small percentage of 20% to 30%; this is limited to mild cases that suffer from Autism only and do not have mental retardation or other intellectual disabilities.

Other than that, we find that more than 70% of cases of Autism reach adulthood or old age and they still suffer from a severe disability and still need full care in the family or in one of the comprehensive care centres where they reside for the rest of their lives [10], [6]. Key [11] explains that a lack of sensory perception leads to a leading autistic child's sensitivity to sensory stimuli or weak sensitivity and the child is not aware of the surrounding environment. In both cases, the child is unable to integrate with the environment, which affects how he communicates and participates in

his/her daily life. In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V, 2013), sensory insufficiency in autistic children is part of the diagnosis of Autism through failure to respond to sensory stimuli, which affects the response to environmental tasks.

Lane et al. [12] confirms that activities in the Montessori program are sensory and dynamic in nature that help the autistic child to organize the information that reaches the autistic child through the senses and helps reduce behavioural disorders by training the child's senses and developing his motor skills and helping him to explore the environment he lives in. This method was created by Maria Montessori. We find that Einstein, Beethoven, and Van Gogh, Bill Gates, despite having some symptoms of Autism spectrum disorder such as isolation or poor social communication, but they have contributed a lot to the society [13]. Shukair [15] indicates that an autistic child is less able to adapt, communicate and deal with others, and this disability leads to behavioural patterns that are not appropriate for the environment and the societal norms or expectations, which affect the autistic child's compatibility with the environment. Recent years have witnessed growing interest in assisting the use of programs and methods of treatment to children with Autism and provide them with care to adapt in their personal and social lives. The movement activities program is one of the most appropriate programs that help autistic child to interact with those around him [16].

Statement of the problem

Sensory behavioural problems associated with inadequate treatment or sensory regulations are common among children with severe Autism. These problems affect their ability to adapt to society and get benefitted from their educational experiences, as there is a correlation between sensory responses with the adaptive behaviour [17], academic performance [18], life skills, and self-care skills [19].

Perceptive disabilities lead to academic, social, and emotional difficulties for children, and exploring appropriate strategies to help overcome these problems may be of great benefit for treating such disabilities [20], [6], [21]. The researcher noted that many autistic children suffer from a lack of sensory perception; especially the skills of synergy and sensory-motor integration and disturbed sensory responses which result in behavioural disorders. The research problem can be formulated as below: a. Is there an effect of the sensory development program on reducing behavioural disorders of the experimental group? b. Does the effect of the program last in autistic children after applying it for a period of time?

Research questions

- a. What is the effectiveness of the training program in developing sensory perception (auditory perception - visual perception - sensory-motor perception)
- b. Are there statistically significant differences between the mean scores of the experimental group scores in the pre and post study measurements of children with Autism on the multi-sensory perception scale (auditory perception - visual perception - sensory-motor)?

Theoretical Framework for the study

Autism and its diagnosis:

Autism is one of the most mysterious developmental disabilities due to a lack of access to the causes that led to this disorder, and its strange non-adaptive behavioural patterns. It is a disorder characterized by the child's preoccupation with himself, his withdrawal from social life, his deficiency in social skills, and the deficiency of his verbal and non-verbal communication [22]. Collins [23] that autism is characterized by a lack of ability to communicate socially as it is characterized by specific stereotypical activities and behavioural patterns with disturbances in language and speech forms appear before the first three years of life. Howlin [24] indicates that the prevalence of autism is more among boys compared to girls (4: 1); 90% of autistic children have an intelligence within the limits of simple and moderate mental retardation.

Okasha [25] knows autism disorder is a condition of diffuse progressive disorder that is characterized by the presence of an abnormal upgrading that is evident before the age of three years and is characterized by the child's abnormal performance in the three psychological areas: social interaction, communication, repeated limited behaviour in addition to the presence of other problems such as phobia, sleep and eating disorders, flare-ups and self-aggression Suleiman & Ghazal [26] proposed that it is a kind of sophisticated developmental disorder that remains in sync with the child and keeps him/her away from natural growth and eventually affects all aspects of development throughout his/her life. This type of disturbance affects communication, whether verbal or non-verbal, as well as social relationships and mental capabilities. In the first three years of the child's life and this disorder is curable by early interventions.

Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition (DSM-V- / 2013) is followed and the diagnostic criteria include three points:

1. Continuous lack of communication and social interaction across multiple contexts, which is manifested through the following:
 - a. A deficiency in the ability to exchange emotional and social feelings with others. For example, failure to continue in a modern exchange with others and a reduced ability to share the joys, sorrows, and concerns of others or with failure to initiate the communication.
 - b. Insufficient non-verbal communicative behaviours used in social interaction such as poor non-verbal communication, insufficient visual communication, body language, or a lack of understanding of gestures.

2. Typical and repetitive behaviour and limited interests and activities, which is reflected in at least two of the following fields:
 - a. Repetitive physical movements such as arranging toys, flipping things, repeating words, or phrases.

The rigid and non-functional preoccupation with patterns of routine behaviour that have no meaning (for example, extreme narrowing of any small changes, problems, and difficulties when changing the routine, rigid thinking patterns, and an urgent desire to eat the same food daily).

- b. Very limited and useful interests which with varying intensity of severity (for example, an extreme preoccupation with unusual things and excessively restricted or overly limited interests). There is excessive or no response to sensory inputs (e.g. *clear indifference to pain/temperature/excessive, or obsessive touching or sniffing certain things, visual fascination with lights or movements*).

3. Other

Symptoms must be present or apparent in an early growth period.

Symptoms cause an important deficiency in the social, functional or other important areas of job performance.

The behaviour is not caused by other disorders such as intellectual disability.

Autism treatment

1. Sensory Integration Therapy: This treatment aims to create a sensory balance in the individual through exposure to sensory stimuli by doing a set of exercises that makes the individual be able to deal with sensory stimuli of a high or low level [27].
2. Play Therapy: Autistic children acquire skills through the surrounding environment, and if it does not acquire it, its social development deteriorates greatly [28]. Some studies have demonstrated positive effects of play on the development of sensory perceptions [29], and the development of social communication [30].

Perception:

Helmy [31] sees perception is the mental process by which individuals are get attracted towards the outside stimuli which in turn arouse their senses too, and this mental process begins to affect their organs of sensation. Scot et al. [32] see the process in which sensual stimuli are recognized, organized, and understood [33].

Many stimuli surround us, and we cannot receive them all at once. The senses have limited energy. The senses, after we feel the external stimuli, transmit them through a nerve to the brain to relax it. Despite many stimuli in the environment, we do not pay attention to all stimuli at once, but we pay attention to some stimuli [34]. In perception, we organize and interpret the stimuli that we feel. When we pay attention to certain stimuli, we try to organize and classify the information we receive to interpret them and realize them in a certain sense [35].

Perception begins with a sense of the source, and this varies from one sense to another. After this these alarms turn into nerve impulses and get transferred through the neurons of each sense to their nerve centres in the cerebral cortex where they are cognitively processed and process meaning to them as well as sensory perception occurs for a certain amount of stimulating energy that scientists call *absolute and distinct thresholds*. The absolute threshold is the lowest amount of energy needed to alert a particular sensory organ in an individual. For example, we find that the eye cannot see short light waves such as X-rays and ultraviolet, as well as the ear, cannot hear high-frequency or low-frequency sound waves. The threshold difference means the minimum amount of alert energy needed to distinguish between two stimuli [2].

Sensory perceptions are affected by several factors: the maturity and integrity of the various senses, the level of growth of the central nervous system, which receives mental images, and gives them meaning, the environment surrounding the child and his interaction with it, the cultural, social and economic environments, and the range of patterns needed for child's proper upbringing [3], [36], [37], [6], [21].

LITERATURE REVIEW

Studies concerned with sensory / motor perception

Baranek [38] studied the effectiveness of sensory and motor interventions for the children of Autism and suggests that these sensory interventions be applied by trained technicians. Luce [39] suggested that the effect of sensory kinetics on repetitive movements in children with Autism Spectrum Disorders. A program based on the use of sensory activities was applied to the rate of recurring stereotypical behaviours in pre-school children. The study sample consisted of 25 children of three to six age-ranges and they were divided into two groups; the experimental group received a sensory activities program and the other was a control group. The results proved that the children who received the sensory-motor activities program had a significant impact on their stereotypical behaviours.

Bin Siddiq [40] studied the effectiveness of a proposed program for developing non-verbal communication skills among a sample of children with Autism and its impact on their social behaviour. The program aimed to develop non-verbal communication skills, effective attention, and visual communication among a sample of children with Autism in Riyadh and the impact of this on their social behaviour too. The results of the study showed that there were statistically significant differences in non-verbal communication skills in the pre and post-study measurements. The differences were in favour of the experimental group.

Wegens et al. [41] aimed to study the symptoms of abnormal sensory in young children as indicators for distinguishing Autism spectrum disorders. Sensory difficulties were explored among young children with Autism, and their sensory profile was examined. Interestingly the study sample consisted of 35 children with an average age of 33 months. A nature associated with a D shape with their typical behaviours and interests and characteristic of autistic disorder which must be taken into account during the diagnosis.

Kamel [42] explored the effectiveness of an early intervention program using Montessori activities in developing cognitive and communicative skills of autistic children of children. The results indicated that there were deficiencies in cognitive skills that included attention, perception, and remember, and they also had deficiencies in verbal and non-verbal communication. Riyad et al. [43] investigated the effectiveness of a training program for developing sensory abilities based on the theory of sensory integration in reducing isolationist behaviour among autistic children. The

sample consisted of 4 four children (5Y-7Y) with Autism spectrum disorder. The study resulted in the successful implementation of the program. Al-Sayed [37] conducted a similar study on the children aged 3.5Y to 6.5Y and observed very encouraging results. Ibrahim [44] aimed to reveal the effectiveness of a training program to reduce the sensory integration disorder for autistic children. The study sample consisted of 50 children with Autism who suffer from sensory disorders in different age groups. A psychological examination was applied for each child using the childhood Autism assessment scale. The results indicated that there were statistically significant differences in the study group before and after their exposure to the sensory integration program.

Studies concerned with visual perception

Reginald & Bryon [45] studied visual attention in children with Autism and those with Down syndrome. The results showed that children with Autism suffer from a clear deficiency in the transmission of persistent attention, and their attention was less as compared to children with Down syndrome. Hamidah [46] employed a program to develop visual perception among autistic children and found the program effective in reducing stereotypical behaviour. Shaker's study [47] concluded the effectiveness of some techniques of the tasks of mind theory in improving the specific issues of sensory inputs in children with Autism spectrum disorder. The study sample consisted of four children (two males and two females with Autism). The results of the study were very encouraging to improve issues with sensory inputs.

Studies concerned with auditory perception

Khalifa [48] assessed the effectiveness of a training program for developing communication skills using computers. He assessed the role of working memory in auditory and visual attention of children with Autism. The results of the study favoured the experimental group. Beers et al. [49] studied auditory disorder of children with Autism, and the results showed the prevalence of hearing sensitivity among individuals with Autism. The delay in early diagnosis and lack of auditory evaluation of children due to poverty in some areas lead to the severity of the cases and result in neglect in follow-up and behavioural interventions.

Most studies indicated that there are deficiencies in the sensory aspect of autistic children such as the study of [41], [6], [21] and the study of Reginald & Bryon [45] and the study of Beers et al. [49] which emphasized their collection on insufficiency of sensory ability and deficiency in motor skills and audio-visual for Autism. The use of some techniques that were used in previous studies on perceptions such as modelling, verbal guidance, material formation, and moral reinforcement and other techniques that the researcher benefited from in designing the training program. The researcher relied on the experimental design of the one group and the pre and post-measurement, which is appropriate for the nature of the sample, as it was difficult to find two homogeneous groups of autistic children. In light of the above, the following research hypotheses were formulated.

METHOD

Sample

The study sample consisted of five children (three males and two females) of the age range from six to ten years from *Prince Dr. Mashban Abdullah Center for Day Care* in Rafha Governorate in the Northern Borders Region of Saudi Arabia. The experimental method is used with a single experimental group for their pre and post measurements due to the difficulty in obtaining two homogeneous samples from autistic children.

Tools

- a. A scale for measuring perception in autistic children (prepared by the researcher)
- b. A training program for developing sensory perception in children with Autism

The scale for measuring sensory perception consisted of forty-five words divided into three dimensions: visual perception, auditory perception, and perception. The responses were marked on the scale five options (never, rarely, sometimes, often, and mostly). The responses were recorded one of the parents; due to some cultural constraints, the availability of both the parents was impossible.

Such issues might happen if the study is conducted in the major cities as educated parents are available more in numbers. Considering Rafha a small town, the researcher observed a limited access to the informants. As a result, the numbers of informants were very limited for the study. The tool for diagnosis with autistic symptoms was prepared in light of the fifth edition of the *Statistical Diagnostic Manual for Psychological and Mental Disorders (DSM-V)*. As per the scale, if at least half of the phrases were found in children, they would be classified as autistic. The researcher identified the children of age ranged from six to ten years and were diagnosed with Autism by doctors and special-education specialists. The researcher considered a set of conditions for the current study: the child should be simple or moderate autistic, and excluded the children with other disabilities, such as mental, hearing, and visual or mobility impairments. The researcher applied a sensory perception scale to determine the degree of perception in the sample and then applied the training program to develop their perceptual awareness.

Psychometric properties of the scale:

The scale was presented to ten consultants in psychology who were asked to express their opinion on what they deem found appropriate on the statements of the scale. Complete agreement was maintained on each of the statements of the scale (percentage of agreement 100%). The results of the Alpha Cronbach coefficient and the half-way method (using the Spearman-Brown and Gettman equations) analysis confirmed the stability of the perceptual scale as a whole.

Table 1. Stability of the perceptual scale

Components	Methods of persistence		
	Alpha	Spearman	Gettman
Audio	** .916	** .956	** .943
Visual	** .716	** .835	** .810
Kinesthetic	** .846	** .916	** .898

It is clear from the table that the scale has a high degree of stability, which is all indicative at the level of 0.01. The researcher confirmed the stability and validity of the scale and its suitability for use in the current study.

A program was developed to develop sensory perception for children with Autism based on behavior modification in autistic children for visual, auditory, and sensory-motor perception. The program was applied after the pre-evaluation of the samples. The stability of the program was verified using some stability indicators such as the internal consistency of the list of behavioral manifestations. This was verified by calculating the correlation coefficients between the vocabulary (Vocab. hereafter) and the overall degree of the dimension to which it belongs.

Table 2. Correlation coefficients between the vocabulary and the overall degree of the dimension

Vocab.	Correlation of vocabulary with degree of the audio dimension	Indication	Vocab.	Correlation of vocab. with degree of the visual dimension	Indication	Vocab.	Correlation of vocab. with degree of kinesthetic sense	Indication
A1	.488	Function	A16	.361	Function	A31	.390	Function
A2	.697	Function	A17	.674	Function	A32	.456	Function
A3	.600	Function	A18	.866	Function	A33	.243	Function
A4	.621	Function	A19	.448	Function	A34	.607	Function
A5	.357	Function	A20	.514	Function	A35	.449	Function

A6	.595	Function	A21	.728	Function	A36	.132	Function
A7	.393	Function	A22	.600	Function	A37	.639	Function
A8	.620	Function	A23	.611	Function	A38	.535	Function
A9	.299	Function	A24	.652	Function	A39	.693	Function
A10	.660	Function	A25	.336	Function	A40	.390	Function
A11	.573	Function	A26	.726	Function	A41	.480	Function
A12	.423	Function	A27	.483	Function	A42	.529	Function
A13	.421	Function	A28	.623	Function	A43	.390	Function
A14	.379	Function	A29	.473	Function	A44	.542	Function
A15	.611	Function	A30	.702	Function	A45	.248	Function

The arbitrators for the program were from the area of mental health and psychology, and they were university professors. They judged the program in terms of the number of training sessions as well as the nature of the content in each session. The program was implemented over two months (1/11 - 30/12) in the year 2019 with one session per day. Five sessions per week amounted to 40 sessions in total for the program.

Variables

The study variables were: Independent variables (the training program), Dependent variables (Development of perception in Autism).

Hypotheses

H1: There is a statistical difference between the average score of the pre and post study measurements of the program.

H2: There are no statistically significant differences between the mean scores of the pre and post measurements for children with Autism on the dimensions of sensory integration scale.

H3: There is a statistically significant difference between the average score of the pre and post measurement scores on the dimensions (auditory communication skill, visual communication skill, communication skill).

FINDINGS

For the data elicitation, the researcher used the non-parametric statistics *WILcoxon signed Ranks Test*.

The two samples were related. This test was suitable for achieving the accuracy of the results due to the small sample size and the nature of the Autism in the children.

H1: The first hypothesis states that there are statistically significant differences between the average grades of the pre and post-test on the dimensions of the program. To validate this hypothesis, the researcher used the laboratory method (WILcoxon test). The following table shows the results for this hypothesis.

Table 3. WILcoxon Signed Ranks Test results

Dimensions	Measurement	Value range	No.	Avg.	Total	Value (z)	Sig. level	Deg. of confidence	Influence level
Auditory	Pre/Post	-	5	3	15	2.023	0.05	0.95	Very strong
		+	0	0	0				
		=	0						
		Total	5						
Visual	Pre/Post	-	5	3	15	2.023	0.05	0.97	Very strong
		+	0	0	0				
		=	0						
		Total	5						

Sensory	Pre/Post	- + = Total	5 0 1 5	3 0	15 0	2.041	0.05	0.72	Average
Motor	Pre/Post	- + = Total	5 0 0 5	3 0	15 0	2.023	0.05	0.98	Very strong
Total marks	Pre/Post	- + = Total	5 0 0 5	3 0	15 0	2.023	0.05	0.97	Very strong

The above table shows the following evidence:

- There are statistically significant differences (at the level of 0.05) between the average grade of school children in both the pre and post measurements.
- The value of the bilateral correlation coefficient for the ranks of the related spouses (rprb) equal to (0.95: 0.98) indicates a significant effect of the training program on the autistic children.
- Since on the sensory dimension the effect was average, the result indicates the validity of the first hypothesis.

H2: There are no statistically significant differences between the mean levels of the degrees of post-test and follow-up measurements of autistic children on the perceptual scale. To verify this hypothesis, the researcher used the WILcoxon Signed Ranks Test. For this the researcher had two samples to calculate the significance of differences between the average grades of children with Autism.

Table 4. Wilcoxon test results on perception scale

Dimensions	Measurement	Value range	No.	Avg.	Total	Value (z)	Sig. level
Auditory	Pre/Post	- + = Total	3 1 1 5	5.2 2.5	7.5 2.5	-1.000	.317 Not sig.
Optical	Pre/Post	- + = Total	2 0 3 5	1.50 0	3 0	-1.414	.157 Not sig.
Sensory	Pre/Post	- + = Total	3 0 2 5	3 0	6 0	-1.730	.083 Not sig.
Motor	Pre/Post	- + = Total	2 1 2 5	2 2	4 2	-0.577	.564 Not sig.
Total marks	Pre/Post	- + = Total	4 0 1 5	2.5 0	10 0	-1.82	.068 Not sig.

The following are the generalizations:

- There were statistically no significant differences between the mean scores for the telemetric and tracking scales for children with Autism
- There is no effect of the program and the value of the bilateral correlation coefficient for the ranks of married couples (r_{prb}) indicates that there is no significant effect of the training program on improving the level of autistic children.

H3: There is a statistically significant difference between the average levels of the levels of pre and post-measurement on the dimensions of the program scale for developing sensory skills (the skill of visual communication, the skill of visual communication, the skill of motor communication) before and after the application of the program. To validate this hypothesis, the researcher used the WILcoxon signed Ranks Test.

Table 5. WILcoxon signed Ranks Test results for sensory skills

Dimensions	Measurement	Value range	No.	Avg.	Total	Value (z)	Sig. level	Deg. of confidence	Influence level
Auditory	Pre/Post	-	0	3	0	2.023	0.05	0.94	Very Strong
		+	5	0	15				
		=	0						
		Total	0						
Visual	Pre/Post	-	0	3	0	2.023	0.05	0.92	Very Strong
		+	5	0	15				
		=	0						
		Total	0						
Motor	Pre/Post	-	0	3	0	2.032	0.05	0.93	Average
		+	5	0	15				
		=	0						
		Total	0						
Total	Pre/Post	-	0	3	0	2.023	0.05	0.93	Very Strong
		+	5	0	15				
		=	0						
		Total	0						

It is clear from the above table that the presence of statistically significant differences (0.05) between the average degrees of children with Autism. Study groups in each of the two measurements (to improve visual perception and auditory perception and motor perception and the development of sensory perception skill), a pre test results showed the average levels of children with Autism was higher statistical significance than that of post-measurement. The current study tried to statistically verify the effectiveness of the program, which is based on the development of the kinetic coordination of the body and the development of synergy between the eye and the hand and the development of balance skill. The effect of using the program on the study sample was shown to improve the sensory-motor impairment of autistic children.

CONCLUSION, DISCUSSION AND SUGGESTIONS

The perception of sensory perception is one of the most important characteristics of autistic children, and these characteristics have been considered one of the fundamental symptoms of Autism (Glod et al., 2019; Posar & Visconti, 2018; Balasco et al., 2020). Moates & Schumacher (1980) found that the child fails to acquire life skills and face difficulties in their day-to-day lives. Al-Sayed (2018) in his study addressed the effectiveness of the sensory integration program in alleviating some sensory behavioral problems in children with Autism Spectrum Disorder. His study showed the importance of the program in dealing with the behavioral symptoms of autistic children. In a similar line, some previous studies have also supported the effectiveness of programs (Shaker, 2017; Beers et al., 2014); both the studies explained the importance of training programs aimed at acquiring life skills.

The current study has shown that the training program used was effective in developing and improving life skills as the results of the first hypothesis indicated that there were significant differences between pre and post-measurement. The program of forty sessions included activities and procedures that helped in developing auditory, visual, and sensory-motor skills. Moreover, the training sessions contributed to the activities in understanding the expressions, movements, gestures, and other sensory skills.

The results of the second hypothesis indicated that there were statistically no significant differences between the mean of post-test measurements of children with Autism on all the dimensions of perception scale. Khalifa (2008) validated the effectiveness of a training program to develop communication skills using computers in dealing with the audio-visual attention and also the role of working memory in the due process for autistic children. The study found that the program was effective in not only improving children's participation but in enhancing their other skills too. The results of the third hypothesis indicated the presence of a statistically significant difference between the average levels in pre and post measurements on the dimensions of the program scale for developing sensory skills (the skill of visual communication, the skill of visual communication, the communication skill) before and after the application of the program. Kamel (2014) found similar results too.

The results of the study suggest the need to develop programs to train autistic children on different sensory skills. The study determines that there are several measures to determine the types of programs needed by the autistics; specialized training required by the facilitators to impart desired skills. It also recommends that the involvement of parents in the programs offered to children with Autism should be encouraged which will enhance the effectiveness of such programs. Despite the small sample size, the objectives of the study were successfully achieved; primarily to attest the effectiveness of the program and to observe significant changes in the post application of the program. However, a large sample size would definitely reflect more promising results. Other related crucial factors such as hypo-responsiveness, hyper-responsiveness, anxiety, intolerance of uncertainty to understand the inter-relatedness among the factors should be taken as variables which have been established as important ones (Glod et al., 2019; Balasco et al., 2020). The study was limited to the Arab samples only; samples from variety of contexts would yield quite convincing results and would pave the way forward for future research.

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ВПЛИВ ПРОГРАМИ НАВЧАННЯ НА СЕНСОРНЕ СПРИЙНЯТТЯ ДІТЕЙ З АУТИЗМОМ У САУДІВСЬКІЙ АРАВІЇ

Це дослідження спрямоване на розвиток у дітей з аутизмом у Королівстві Саудівська Аравія сенсорного сприйняття за трьома параметрами (слухове, зорове та моторне). У цьому експериментальному дослідженні було розглянуто одну експериментальну групу для вимірювань до і після дослідження для досягнення його цілей. Для дослідження було обрано п'ять дітей (три хлопчика і дві дівчинки) віком від шести до десяти років, щоб ефективно реагувати на інструмент дослідження, тобто програму навчання для розвитку сенсорного сприйняття в аутичних дітей. За результатами дослідження зроблено висновок про статистично значущі відмінності (0,05) як до, так і після вимірювання середніх оцінок аутичних дітей у Королівстві Саудівська Аравія. Значення двостороннього коефіцієнта кореляції слухового і зорового (r_{grb}) (0,95: 0,98) вказує на істотний вплив програми навчання на аутичних дітей, за винятком сенсорно-моторного вимірювання, де ефект був середнім.

Ключові слова: програма навчання; чуттєве сприйняття; аутизм; Саудівська Аравія; спеціальна освіта.

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ВЛИЯНИЕ ПРОГРАММЫ ОБУЧЕНИЯ НА СЕНСОРНОЕ ВОСПРИЯТИЕ ДЕТЕЙ С АУТИЗМОМ В САУДОВСКОЙ АРАВИИ

Настоящее исследование направлено на развитие у детей с аутизмом в Королевстве Саудовская Аравия сенсорного восприятия по трем параметрам (слуховое, зрительное и моторное). В этом экспериментальном исследовании была рассмотрена одна экспериментальная группа для измерений до и после исследования для достижения целей исследования. Для исследования были выбраны пять детей (3 мальчика и 2 девочки) в возрасте от шести до десяти лет, чтобы эффективно реагировать на инструмент исследования, то есть программу обучения для развития сенсорного восприятия у аутичных детей. По результатам исследования был сделан вывод о статистически значимых различиях (0,05) как до, так и после измерения средних оценок аутичных детей в Королевстве Саудовская Аравия. Значение двустороннего коэффициента корреляции слухового и зрительного (r_{grb}) (0,95: 0,98) указывает на значительное влияние программы обучения на аутичных детей, за исключением сенсорно-моторного измерения, где эффект был средним.

Ключевые слова: программа обучения; чувственное восприятие; аутизм; Саудовская Аравия; специальное образование.