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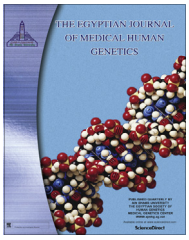

ORIGINAL ARTICLE

Effectiveness of sensory integration program in motor skills in children with autism

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KEYWORDS

Sensory integration program;
Autism spectrum disorder;
Peabody Developmental Motor Scale;
Gross motor;
Fine motor

Abstract *Background:* Autism spectrum disorders (ASDs) represent an extensive category of conditions that had a variety of deficits. Dysfunctions of perceptual and sensory processing as well as interaction and neurological functioning result in various functional behavior limitations.

Aim: The present study aimed to determine the effectiveness of sensory integration program in children with autism.

Methods: Thirty-four children from both sexes suffering from autism spectrum disorders (ASDs) participated in this study. Their age ranged from 40 to 65 months with mean age 53.21 ± 6.87 months. The children were tested pre and post treatment using the Peabody Developmental Motor Scale (PDMS-2) to assess gross and fine motor skills and to identify the effectiveness of sensory integration on the developmental skill levels. Each child received sensory integration program. The sensory integration program was conducted three sessions per week for 6 months.

Results: Comparing the pre and post treatment mean values of the variables measured using PDMS-2, revealed significant improvement in gross and fine motor skills.

Conclusion: The sensory integration therapy was effective in the treatment of autistic children as it helps those children to become more independent and participate in everyday activities.

1. Introduction

Autism spectrum disorders (ASDs) represent an extensive category of conditions that had a variety of deficits. These deficits change considerably and vary from mild to severe. These children had problems with social communication, somatosensory, typical developmental patterns, mood and concentration [1]. Perception, communication, sensory processing and neurological dysfunctions result in various functional behavior limitations [2].

Sensory processing dysfunction is relatively familiar among children with ASD; ranging from 42% to 88% [3]. Those children often have complexity in modifiable responses to sensations and specific stimuli. They may use self-stimulation to recompense for limited sensory input or to keep away from overstimulation [4–6].

These atypical sensory reactions suggest unfortunate sensory integration in the central nervous system. This could explain

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impairments in attention and arousal self-stimulatory behaviors, represented as repetitive movements that had no detectable function in the environment. Each behavior interferes with a child's capability to join in or become skilled at therapeutic activities [1].

Sensory-based therapies are progressively more used by therapists in the management of children with developmental and behavioral disorders. These therapies engage activities that are thought to manage the sensory system by providing vestibular, proprioceptive, auditory, and tactile inputs. Brushes, swings, balls, and other particularly intended therapeutic or recreational equipment are used to supply these inputs [7].

Problems with sensory organization have been established through deficits in 'sway-referenced' (balance) trials in people with autism. Difficulty with postural stability has been shown to be specifically observable when somatosensory processing was relied upon, and suggests a trouble of multisense integration [8]. Related studies have shown that the action and sensory integration troubles of autistic students are summarized in the difficulty in visual space; kinesthetic sense; and events that need multisensory integration [9].

The aim of this study was to determine the effectiveness of sensory integration program in children with autism.

2. Subjects, instrumentations and procedures

2.1. Subjects

Thirty-four children from both sexes (21 males, 13 females) suffering from autism spectrum disorders (ASDs) participated in this study. Their age ranged from 40 to 65 months with mean age 53.21 ± 6.87 months.

This study was conducted in the period from September 2012 to February 2014. They were recruited from the schools of special needs and some private clinics, according to the following criteria:

1. They were suffering from mild to moderate autistic features according to the Childhood Autism Rating Scale (CARS); [10]. All children were assessed by a psychologist to determine the degree of autism; they had a score ranging from 25 to 35 according to this scale.
2. Children were able to follow simple verbal commands and instructions included in the test. Their IQ ranged from 69 to 83 (borderline) according to Stanford Binet Test.
3. They had neither visual nor auditory defects.
4. They had no history of cerebral palsy or epilepsy.

The study was approved by an Ethics Committee of the Cairo University. Child's parents were provided with a Volunteer Information Sheet and written consent informing them about the purpose of the study, its benefits and inherent risks and their committee with regard to time and money.

2.2. Instrumentations

2.2.1. For evaluation

2.2.1.1. Peabody Developmental Motor Scale (PDMS-2). Before evaluation, the purposes and procedures were fully explained to the children's parents. The Peabody Developmental Motor Scale (PDMS-2) was used to assess gross and fine motor skills [11]. The children were tested pre and post treatment to determine the developmental skills levels and to identify the efficiency of sensory integration on the developmental skill levels. Each child was evaluated and tested individually following the standard protocol.

2.2.2. For treatment

A sensory integration program was conducted to all children who participated in this study. This program was conducted three sessions per week for 6 months. Each child's particular play was individualized and guided by the therapist; the therapy was done in a large gym with mats, swings, a ball pit, carpeted "scooter boards," and other equipment. It was designed to encourage the kids to be active and get more comfortable with the sensory information they are receiving. The activities were set up to allow each of the senses to be used frequently during the session.

2.3. Procedures

2.3.1. Testing procedures

Each child was examined individually, using the Peabody Developmental Motor Scale (PDMS-2), the examiner recorded the relevant data about the child being tested which included name, gender, and age. The child's age was determined by subtracting the birth date from the date on which he/she was tested, finally, the child's age was converted to months by multiplying the number of years by 12 and adding the number of months. Age in months was used to determine scoring information.

- The testing procedure consisted of:
  - (A) Assessment of gross motor skills including the following subsets:
    - (a) *Stationary:* The 30-item stationary subtests measure child's ability to maintain his or her body within its center of gravity and keep up equilibrium.
    - (b) *Locomotion:* The 89-item locomotion subtests evaluate child's ability to move from one place to another. The actions measured included crawling, walking, running, hopping, and jumping forward.
    - (c) *Object manipulation:* The 24-item object manipulation subtests assess child's ability to manipulate balls. Examples of the actions measured included catching, throwing and kicking.
  - (B) Assessment of fine motor skills including the following subsets:
    - (a) *Grasping*: The 26-item grasping subtests measure child's ability to use his or her hands. It began with the ability to grasp an object with one hand and progressed to actions concerning the controlled use of the fingers of both hands.
    - (b) *Visual-Motor Integration:* The 72-item Visual-Motor Integration subtests measure child's ability to use his or her visual perceptual skills to carry out complex eye-hand coordination tasks, such as reaching and grasping for an object, building with blocks and copying designs.