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EFFICACY OF SENSORY INTEGRATION THERAPY IN CHILDREN WITH AUTISM: A CASE STUDY

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ABSTRACT Sensory integration is an innate neurobiological process and refers to the integration and interpretation of sensory stimulation from the environment by the brain. Sensory-based therapies are progressively more used by therapists in the management of children with developmental and behavioral disorders. Aim of the present study is to investigate the efficacy of sensory integration therapy in children with autism based on a case study method. The sensory integration therapy provided with tactile, vestibular, proprioceptive, auditory, and visual experiences to the child along with home based management. Results indicated that child was improved in eye contact, attention and concentration, tactile sensitivity was reduced, movement hypersensitity was normalized, his auditory hyper sensitivity was reduces, helped the child to access a crowded places in a better way. Study concluded that sensory integration therapy improved the synchronized functions of various sensory inputs in children with autism to help them in socialization and Activity Daily Living.

KEYWORDS : Sensory Integration Therapy, Autism, Case Study, Occupational Therapy, Home based Management

1 INTRODUCTION

Autism is a neurodevelopmental disorder involving impairments in social interaction and communication, and the presence of a restricted range of interests and/or repetitive behaviors. An autistic child may prefer to spend time alone rather than participate in cooperative games and prefer to play alone rather than interact with others. The expressive language and receptive language skills, or comprehension are always impaired in children with autism and these deficits vary from mild to severe. Non-verbal communication is also abnormal in children with autism. This includes the use of gestures, body posture, eye gaze, and facial expression. Their play is usually restricted to repetition and perseveration. Stereotypes like hand flapping may also dominate their play, further restricting their range of activities. Predominant characteristics of autism that are often the focus of intervention include limited social interaction (Gevers, Clifford, Mager, & Boer, 2006), delayed or deficit language (Smith, Goddard, & Fluck, 2004), behavioral problems (Horner, Carr, Strain, Todd, & Reed, 2002), and sensory-processing difficulties (Baranek, 2002; Dawson & Watling, 2000). The social play of children with ASD is substantially limited, lacking joint attention, creativity, and pretend scenarios. Greenspan and Wieder (1997) described absent joyful interactions and engagement that reflects interest in and attachment to others. Greenspan and Wieder (1997) estimated that 39% of children with ASD are under reactive to sensation, 20% are hypersensitive, and 36% show a mixed pattern of hypersensitivity and hyposensitivity. These children often have aversions to olfactory and gustatory sensations and, as a result, may be highly restrictive in what they eat. Baranek (2002) also documented that many children with ASD demonstrate unusual sensory responses (e.g., hypo responses and hyper responses) to touch and auditory stimulations. As ASD is not curable and evidence based results for most therapeutic interventions are limited (Dover & Le Couteur, 2007) only proper treatment and therapy shall help these children to lead normal lives and grow to be independent adults.

Sensory integration is an innate neurobiological process and refers to the integration and interpretation of sensory stimulation from the environment by the brain. Sensory integration focuses primarily on three basic senses--tactile, vestibular, and proprioceptive. Their inter connections start forming before birth and continue to develop as the person matures and interacts with his/her environment. Occupational therapists have provided practices and interventions to children with Pervasive Developmental Disorder based on the sensory integration theory (SIT) since it was introduced by Ayres (1963). Many children with ASD exhibiting SPD have difficulties in modulating their responses to sensory input, and occupational therapists assume that the child's behaviour reflect the central processing of sensory input from environment (Miller, Anzalone, Lane, Cermak, & Osten, 2007). Sensory-based 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 (Michelle & Larry, 2012). 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 (Minshew, et. al.,2004).

The multidisciplinary approach has brought out significant improvement in children with autism and the improvements are in the areas of relating to people, listening and visual response, and there are reduction in body use, object use, and activity level (Sridevi & Rangaswamy 2013). Jane Case-Smith and Teresa Bryan (1999) examined the effects of an occupational therapy intervention emphasizing sensory integration with five preschool children with autism and concluded that the behavioral changes that children with autism can make when participating in intervention using a sensory integration approach. The TEACCH model has increased in structure and individualized programming in the areas of communication, independence, socialization, developmental planning, and positive behavior management compared to participants in autism with severe disabilities (Mary et, al., 2003). Lovaas-based approaches and early intensive behavioural intervention variants and the Early Start Denver Model resulted in some improvements in cognitive performance, language skills, and adaptive behaviour skills in some young children with ASDs (Warren et. al., 2011). A study concluded that an early intervention can improve adaptive and personal social behaviours of children with autism (Sridevi & Saroj Arya, 2014). The SIT theory proposes that if a child is engaged in individually tailored sensory-motor activities, their nervous system is better able to modulate, organize, and integrate sensory information and more likely to use sensory information in adaptive ways (Ayres, 1972). Components of the intervention include a sensory-rich, playful, child-centered approach, providing a just-right challenge and facilitating progressively more sophisticated adaptive behaviors by engaging the child in individually tailored, developmentally appropriate play interactions (Schaaf et al., 2009). Mahoney and Perales (2005) completed a one-group pre and post assessment study measuring the effects of relationship focused intervention on young children with pervasive developmental disorders that encouraged parents (primarily mothers) to increase their responsive to their children. As in the Greenspan and Wieder studies (Greenspan & Wieder, 1997; Wieder & Greenspan, 2005), a primary focus of the intervention was to guide parents to develop positive interactional skills, that is, responsiveness and sensitivity to their child.

A reivew concluded that PCIT is empirically validated intervention that is designed for families with young children and was draw from both attachment and social learning theory in which teaching parents to

interact with their child in new ways to change the child's behavior (Sridevi, et al., 2017).

2 PRESENT STUDY & METHODOLOGY

Aim of the present study was to investigate the effects of sensory integration therapy in autism. A case study method was used for the present research study. Master 'L' aged 36 months was diagnosed as "Moderate Autism" as per ICD-10 classification. He was given an all encompassing sensory integration therapy program. Pre- post research design was used to study the efficacy of sensory integration therapy. The child was assessed by psychologist using Indian Scale for Assessment of Autism (ISAA), Denver Developmental Screening (DST), Short Sensory Profile (SSP) and Vineland Social Maturity Scale (VSMS) and also by observation and testing. Short Sensory Profile (SSP) was administered for pre-post assessment of intervention. Child underwent sensory integration therapy program for one year from Composite Regional Centre, Rajnandgaon. Informed consent from the parents was taken. The sensory integration therapy comprised of tactile, vestibular, proprioceptive, auditory, and visual experiences to the child along with home based management.

Master "L" 36 months aged boy brought by his parents with the complaints of unable to speak age appropriately, Poor eye contact, Poor attention & concentration, Lack of emotional response and poor imitation skills, unable to sit at one place, unable to mingle with other children and like to play alone, strange attachment with car toys and tires, likes to bang objects for making sounds, lack of awareness of danger and difficulty for adaptation to change. The onset was gradual and course was continuous. According to parents the child's motor development reported to be normal. He started to walk at the age of 1year 1month. The child was unable to speak any word, only babbling was present even after 18m and eye contact was poor. Child has another problem like poor attention and concentration. He did not recognized his mother, did not ask for mother when she was away from him. They also noticed that his symptoms were progressive with the increase of his age. The child began showing, lack of social & emotional response, not interested to play with peer group, not able to imitate verbal and nonverbal communications, disturbed in new situations. Child was self engaged and most of the time he used to play with car toys and mainly with tires of the car toys. The child's parents were noticed that he was not developing age appropriately after the age of 1years. They started for consultation with different doctors and finally they got to know about CRC, Rajnandgaon. So they came for CRC, Rajnandgoan from there child was referred to Department of Occupational Therapy.

In birth and developmental history; he is the only issue of non-consanguineous parents, full term normal delivery with normal birth cry. Average birth weight (2.5kg) was present. Child had neonatal jaundice after 7 days of the birth, and went for phototherapy for two days and there after no complications reported by the parents. His motor developmental milestones were reported to be normal but delayed in speech development. He started babbling from the age of 18months and did not speak a single word.

The child was assessed by psychologist using Indian Scale for Assessment of Autism (ISAA), Developmental Screening Test (DST), Short Sensory Profile (SSP) and Vineland Social Maturity Scale (VSMS) and also by observation and testing. In test findings on DST his developmental age is 1 year 7months and corresponding developmental quotient is 50 indicating mild developmental delay. Comparative to motor development he got low score on language, fine motor, personal and social development. Vineland Social Maturity Scale shows that his overall social maturity level is around 1 year 7 months and corresponding social quotient is 50. The total ISAA score is 107 which show "Moderate Autism". The Short Sensory Profile score was 76 which indicated definite difference.

In behavior observation; the child had poor eye contact, was not respond to name call and was unable to follow simple commands. His attention and concentration was poor and distracted very easily. He used to indicate his needs through gestures and drags his mother for his needs but unable to indicate his toilet needs. He was unable to sit at one place for required period of time. After taking the case history, test findings, behavior observation, and parent's reports in consideration Moderate Autism was made.

2.1 THERAPEUTIC PROCESS

2.1.1 Parental Counseling

Parental counseling involved, engagement of parents in treatment as a part, presentation of detailed information about the disorder and its consequences, and need of multi disciplinary treatment approach with team of professionals such as psychologist, speech therapist, special educator, occupational therapist. Parents were also counseled as primary care givers, for dealing with issues relating to the pressure and stress of parenting a child with autism and developing appropriate coping strategies to help themselves to manage the child's to develop the social support group to meet and share experiences with other parents.

2.1.2 Sensory Integration Therapy:

Sensory integration is the neurological process of taking in sensory information, organizing this information in the central nervous system, and using the information to function smoothly in daily life. Sensory integration is a never-ending building process: as children gain competence, their sensory integration improves. Sensory-based therapies are progressively more used by therapists in the management of children with developmental and behavioral disorders. These therapies prescribe activities that are designed to manage the sensory system by providing vestibular, proprioceptive, auditory, and tactile inputs. The goal of Sensory Integration therapy is to remediate deficits in neurological processing and integration of sensory information to allow the child to interact with the environment in a more adaptive fashion. Sensory integration was used to enable children to interpret sensory stimulation in a more appropriate manner by reducing both hyper and hypo-sensitivity to the stimuli, which in turn supports progress in communication, interaction, imagination and thus enables learning. Therapist took the child to sensory park to feel the different types of sensations like smoothness, hardness, and play with sand, swining, ringing the bells, climbing ladders etc. In sensory integration therapy the child get the chance to mingle with other children, to play, to interact and to share the things which also helped the child to improve his social skills.

Tactile experiences:

Here are some typical sensory-motor experiences which could be selected for a "sensory diet" to help the child stay organized were alert for interaction and learning. It also helped the child to be calm and energize experiences the child needs to remain attentive and on task throughout the day. The activities were introduced for the child are drawing with wet or dry chalk, handling and pedaling tricycles, building with blocks, walking barefoot, Manipulating small objects such as jigsaw puzzles, Using classroom tools, such as crayons, scissors, and brushes, Examining natural objects, such as pine-cones, feathers, sticks, and rocks, Curling up in "secret hideaways", Finger-painting with paint, shaving cream, or chocolate pudding, Gluing art projects, Manipulating play area, Handling rhythm instruments during sensory integration therapy sessions for tactile sensory experiences. Parents were also instructed to continue these activities for tactile experiences as home based management are puttering in the garden, Playing in the sink or bathtub, Lying on pillows or beanbag cushions, Petting and feeding animals, Washing hands with soap and drying hands with towels, Eating snacks with different textures, such as cheese, snacks, and fruit, Dressing up and Hugging and rough housing gently with friends.

Vestibular experiences:

The child was provided with some vestibular experiences such as Swinging in circles on a tire swing, Riding on a playground, Swinging back and forth, Riding up and down, walking, and balancing on a seesaw, Jumping on a trampoline or mattress, Jumping from a step or from the playground equipment, Climbing a jungle gym. The parents were also suggested to take the child to park and asked to provide exposure with different activities like Rolling and sledding down the at park, Sliding down a slide, Ascending and descending stairs, Running and Walking on uneven surfaces, such as grass or sand, Walking on a balance beam, railroad tie, Crawling through tunnels or large cartons and Swimming.

Proprioceptive experiences

The proprioceptive experiences were provided to the child through Pushing and pulling wagons, Moving through an obstacle course, Playing on the tire swing, Hanging from monkey bars, Stretching up to the sky, Wheel barrow walking, Pouring sand, beans, water, or juice from one container to another, Ripping paper, Pressing pegs into pegboards. Parents were also instructed to continue home based management with the activities like Getting in and out of seat belts, jackets and boots, shoes and socks, Opening doors without help,

Tumbling on the ground, Having a pillow fight, Hosing the car, Walking in shoeboxes, Walking with bag of rice or bean bag balanced on head, Holding up the wall, Playing catch with a ball and Pushing palms together.

Visual Experiences
The child was allowed to play with flashlight tag, Playing balloon volleyball, Tracing letters/numbers on a person's back, Taking photos with a camera, Blowing bubbles, Blowing whistles, Bubbling soap water through straws, Drawing chalkboard circles, using both hands and Playing board games

Auditory Experiences
The child was made to Dance/move to music, listen to music, Beat rhythm instruments, Moving hands, feet, or whole body up and down to sound of a slide whistle, Singing "drop-in" songs, Humming, Jumping rope and chanting, Singing vowels while moving (for example: eeeeeeee, 00000000), Playing non-competitive musical chairs

2.1.3 To Improve Eye Contact:
As the child's eye contact was not adequate; the following activities were followed to improve his eye contact. Mother was also included along with therapist. In this process mother was used as a co-therapist to carry out home based methods. Mother was asked to take a glass bottle. She was asked to fill the bottle with water and colored balls. She was asked to move the bottle shake up and down in front of the child so that he can watch it carefully how the colored beads are moving in the water bottle with this technique child could pay attention on the bottle. Magic wand is a stick, which is covered with a colorful satin ribbon and a bunch of beads are tied to its one end, which attracts the child. This can be moved by the therapist or mother infront of the child so, that he can observe it for a long time which can improve his attention. Every time the child was reinforced by Lays packet after paying his attention. Mother was trained to use some other techniques such as:

a) Placing the child in a darkroom and moving candle in front of him with a distance from one side to another side.

b) further, whenever the child pulls parents they were asked to pull back his hand and when he looks at them, look back at the desired object saying “Oh you want … “. Therapist and parent followed this method, through which the child learned that he need to look at the other person before his need is met.

c) Mother was asked to hold the child's head and engage him by talking along with the expressions.

d) Parent asked to tell the rhymes and stories with actions and facial expressions.

Initially his eye contact was very poor and after using the above techniques during therapy sessions as well as at home environment with the help of mother for one year, the child was able to give eye contact to other persons while asking something and when he asked to do some work.

2.1.4 To Improve His Attention and Concentration
The child had poor attention and concentration so; the therapist used some of the techniques to improve his attention. The child was distracted when child pre occupied in his world. Bead's technique was used to improve his attention mother was asked to give some beads and wire or thread so, that the child can make a strand. This activity could help the child to improve his attention. He was immediately rewarded verbally saying “Good Boy” and by providing an Apple. Therapist provided wooden blocks to the child, and made to remove the blocks one by one, after that the child was asked to fill the blocks again. After some sessions the child was asked to remove blocks sequins, and keep it back. After completing the task the child reinforced with apple.

The child was provided coins board and he was commanded to remove the coins first and fill the coins one by one. After some sessions the child was filling the coins according to the colours were introduced and then it was filled with alternative colours. The child was reinforced by kissing and hugging after completing the task by his mother. After some sessions he stared to pay attention whatever was carried out. Then the therapist was changed the techniques to sustain the attention, according to the child level. Parents were asked to provide the child with colouring books, to fill it using crayons. Child was motivated to colour the pictures with in the outer lines. At beginning child was not showing any interest to colour the pictures. Then the child was reinforced with Apple and slowly the child was able to colour the pictures and able to colour within the outer lines. The child was rewarded depending upon the situations. Initially the child used to get distracted very easily, but after using the above techniques in 10 sessions he started to be attentive for a while. After one year of intervention the child was able to concentrate for 1-2min.

2.1.5 Home Based Programme
Parents were trained how to handle the child in the home atmosphere in the initial phase of the intervention. Mother was taken as a co-therapist during the therapy sessions. Therapist motivated the mother to observe during the intervention program and she was also instructed that she should carry the methods at home. Mother showed much interest to continue these techniques at the home also and she used to engage the child at home by using different techniques which was instructed by the therapist. She was trained to handle the child and to engage the child with different activities they are: to reduce his restlessness, to improve his attention and concentration, to mingle with other children, to express his needs through verbalization, and to make independent in self help skills. Mother was guided to handle the child in natural setting of daily life. She was explained to improve his attention and concentration with available techniques at home like threading the flowers, filling the water bottles, pasting the peace of papers in the pictures, join the dots, matching the pictures, and find the differences between the two pictures.

Mother was explained to how to involve the child in play time with other children by using parallel play technique and gradually make the child to share the toys with other children. Mother was explained to make him to wait by using natural setting like; the child should wait for lays packet, until he complete the given task. Mother was instructed to explain the child that, he should wait for his father till the evening and prepare the child to wish others when he would meet others. Mother was instructed to help the child for catch the ball, hit the ball, throw the ball in the basket, and uses the bat to hit the ball, cut papers, buttoning his shirts, etc by using repeated trials. Mother was counseled to improve his speech by making the child to express his needs that the child should verbalize at least one word to reach his needs; it would motivate the child to express his needs through verbalization. She was explained to improve his self help skills and cognitive skills by using the natural settings of daily activities. She was instructed to use these techniques mainly to make the child little independent in the future. Mother showed very much interest during the therapy process and was enthusiastic to know the new techniques which can improve her child’s development. She used to continue the intervention process at home and spent lot of time with her child. She used to engage her child with different activities and new behavioral techniques. She used to follow the therapist instruction and continued the therapy process at home which made better improvement in the child’s development.

Parents were also asked to incorporated the sensory inputs in daily activities like
Bath time- Scrub with washcloth or bath brush, try a variety of soaps and lotions for bathing, play on the wall with shaving cream or bathing foam, rub body with lotion after bath time (deep massage), sprinkle powder onto body and brush or rub into skin.

Meal time- Asked the child to mix ingredients, especially the thick ones that will really work those muscles, allow child to help you carry pots and pans, bowls of water or ingredients under the supervision. Encourage eating of chewy foods and drinking out of a straw.

Grocery shopping- The child allowed to push the heavy cart (as long as the weight is within his capability) and asked child help carry heavy groceries and help put them away.

Household chores- Asked the child to help with the vacuuming or moving the furniture, asked him to help carry the laundry basket or the detergent and also involved him with digging for gardening or landscaping.

Play time- Child allowed to play in obstacle courses in the house or yard using crawling, jumping, hopping, skipping, rolling, etc. Play the sandwich game (child lies in between two pillows and pretends to be

the sandwich, while parents provide pressure to the top pillow to the child's desired amount).

2.2 TERMINATION AND OVERALL EVALUATION

The one year of early intervention in a multidisciplinary approach, the child was able to respond to the name call; his eye contact was improved and could able to recognize his parents. He was able to speak 4-5 words. He could identify forms like, circle, square, and triangle. He could identify the fruits, vehicles, and house hold articles. He identified alphabets, and was able to write alphabets up to letter K. He counted up to numbers 20 and was able to write numbers up to 10. As intervention autism takes long process and long duration parents were asked to continue the above techniques at home.

3 RESULTS AND DISCUSSION

Table-1: Improvement Observed one year in Post Intervention

Pre-Intervention	Post Intervention
Had poor eye contact	Can maintain eye contact for a while.
He was not able to sit for a required period of time	Able sit for 30 min with therapist co-operatively
Attention and concentration was poor	Attention was aroused and sustained for a while
Unable to speak a single word	Able to speak 4-5 words
Did not have any form concept	Able to identify the circle, square, triangle, rectangle, star
Unable to write purposefully, only scribbling present	Could copy circle
Not able to colour the pictures	Able to colour the pictures with in the lines
Not allow to groom and touch	Comfortable while being groomed and touched by known persons
Picky eater especially regarding the food texture	Texture of food not playing a significant role in eating behavior
Has fear of falling	Fear of falling when feet are off the ground is reduced
Doesn't like upside down movements	Has no problem with completing tasks upside down.
Jumps from one activity to other	Comfortable completes the task till the end
Used to get irritated when face and hands are messy	Level of discomfort is reduced significantly when face and hands are messy.
Was not following any verbal commands	Responds and carryout tasks when verbal command is given
No response to name call	Responds to name call
Unable to pay attestation	Can pay attention for more than 30 minutes with minimum distraction
Weak grasp	Firm grasp
Squints eye to protect from eye	Visual gage is normalized

Table -1 gives improvement of post intervention after a year. Master "L" was improved in maintaining eye contact as his visual stimulations were improved. His attention was aroused and sustained for a while but not required period of time and his restlessness was reduced and he could able to sit for 30 min with therapist as his proprioseptive seeking and tactile hypersensitivity were reduced. His auditory hypersensitivity was reduced and auditory processing improved that made him to respond name call and follow other verbal commands. He could able to recognize parents, he could able to look at other children, trying to touch them, giving shake hand, and waving bye-bye when therapist instructed.

Figure-1: Pre and post intervention scores on Short Sensory Profile

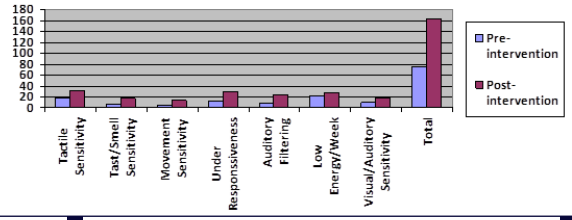

Figure gives the pre and post scores of each domain of Short Sensory Profile like tactile sensitivity, taste/smell sensitivity, movement sensitivity, under responsiveness, auditory filtering, low energy, and visual sensitivity. On total score the pre score was 76 and post score was 163 which shows typical performance. Over all the improvement was seen in Master "L" after a year of intervention and concluded that sensory integration therapy improved the synchronized functions of various sensory inputs in children with autism to help them in socialization and Activity Daily Living.

REFERENCES:

1. Ayres, A.J. (1963). The development of perceptual-motor abilities: a theoretical basis for treatment of dysfunction. American Journal of Occupational Therapy, 27, 221-225.
2. Ayres, A.J. (1972). Sensory integration and learning disorders. Los Angeles: Western Psychological Services.
3. Baranek, G.T. (2002). Efficacy of sensory and motor interventions for children with autism. Journal of Autism and Developmental Disorders, 32, 397–422.
4. Dawson, G., & Galpert, L. (1990). Mothers' use of initiative play for facilitating social responsiveness and toy play in young autistic children. Development and Psychopathology, 2, 151–162.
5. Dover, C.J., & Le Couteur, A. (2007). "How to diagnose autism," Archives of disease in childhood, 92, 540-545.
6. Gevers, C., Clifford, P., Mager, M., & Boer, F. (2006). Brief report: A theory-of-mind-based social-cognition training program for school-aged children with pervasive developmental disorders: An open study of its effectiveness. Journal of Autism and Developmental Disorders, 36, 567–571.
7. Greenspan, S.L., & Wieder, S. (1997). Developmental patterns and outcomes in infants and children with disorders in relating and communicating: A chart review of 200 cases of children with autistic spectrum diagnoses. Journal of Developmental and Learning Disorders, 1, 87–141.
8. Horner, R., Carr, E., Strain, P., Todd, A., & Reed, H. (2002). Problem behavior interventions for young children. Journal of Autism and Developmental Disorders, 32, 423–446.
9. Jane Case-Smith & Teresa Bryan. (1999). The effects of occupational therapy with sensory integration emphasis on preschool-age children with autism. American Journal of Occupational Therapy, 53(5), 489-497.
10. Mahoney, G., & Perales, F. (2005). Relationship-focused early intervention with children with pervasive developmental disorders and other disabilities: A comparative study. Developmental and Behavioral Pediatrics, 26, 77–85.
11. Mary, E., Bourgondien, V., Nancy, C.R., & Schopler, E. (2003). Effect of a model treatment approach on adult with autism. Journal of Autism and Developmental Disorder, 33(2), 131-140.
12. Michelle, M., Larry, D. (2012). Sensory integration therapies for children with developmental and behavioral disorders. Pediatrics, 59, 1186.
13. Miller, L.J., Anzalone, M.E., Lane, S.J., Cermak, S.A., & Osten, E.T. (2007). Concept evolution in sensory integration: a proposed nosology for diagnosis. American Journal of Occupational Therapy, 61(2), 135-142.
14. Minshew, N.J., Sung, K., Jones, B.L., Furman, J.M. (2004). Underdevelopment of the postural control system in autism. Neurology, 63, 2056-2061.
15. Smith, C., Goddard, S., & Fluck, M. (2004). A scheme to promote social attention and functional language in young children with communication difficulties and autistic spectrum disorder. Educational Psychology in Practice, 20, 319–333.
16. Sridevi, G., & Rangaswamy, K. (2013). Efficacy of Multidisciplinary Approach in the Treatment of Children with Autism. Indian Journal Developmental Disabilities, 1(1), 44-49.
17. Sridevi, G., & Saroj Arya. (2014). Effect of Early Intervention in Autism: A Case Study. International Journal of Scientific and Research Publications, 4(4), 1-11.
18. Sridevi, G., Debashis, R., & Rangaswami, K. (2017); Parent-Child Interaction Therapy for ADHD and related disorders: An overview; Int J Sci Res Publ 7(3).
19. Warren, Z., McPheeters, M.L., Sathe, N., Foss-Feig, J.H., Glasser, A., Veenstra-VanderWeele, J. (2011). A Systematic Review of Early Intensive Intervention for Autism Spectrum Disorders. American Academy of Pediatrics. Pediatrics, 127 (5), 1303-1311.
20. Wieder, S., & Greenspan, S. (2005).Can children with autism master the core deficits and become empathetic, creative, and reflective? Journal of Developmental and Learning Disorders, 9, 1–22.