A Study on Tactile Defensiveness in Children with Autism Spectrum Disorder

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Autism is a wide range of neuro developmental disorder which is characterized by social and communication challenges, stereotype behaviour, sensory processing disorder etc., hence it is also known as Autism spectrum disorder (ASD). Autism is a long lasting and life-long condition. Not many studies have been conducted in epidemiological studies of autism in India, but the estimated figure are rising continuously. Children with ASD are typically unable to viably handle the tangible information’s from their environment. Many children with autism also experience sensory related issues such as difficulty in processing information from the surroundings and tactile defensiveness is one of them. The most Common Signs of tactile defensiveness are extraordinary responses or overwhelming response to senses of touch, sounds, sights, movement, taste and smell. Children with tactile defensiveness get fomented by light touch and dislikes getting cuddled. They are extremely delicate to sounds, and light, they squints, flickers, or rubs eyes every now and then. They additionally encounter difficulties in motor skills and body awareness, including fine motor delays for e.g., trouble in composing, drawing, joining pop dots and snap-together building toy. Some of them have gross motor delays for e.g., strolling, running, dressing, clothing, climbing stairs, finding a ball, moves awkwardly or appears clumsy. Oral motor and feeding issues, including oral touchiness, frequent dribbling or choking, picky eating, Speech and language delays, all these delays in day to day activities and behavioural issues, results in frequent meltdowns and anxiety in children with autism.

The application of deep touch pressure has been suggested to provide positive effects, have a substantial calming in mood, and better control of behaviour in the children with autism.

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However, empirical and theoretical evidence linked to the clinical effects of deep touch pressure are relatively rare. A few Studies have demonstrated that wearing therapy garment such as weighted garment, air pressure garment, compression clothing have a positive outcome in children with autism, however there are a few examinations that have mixed results and in some beneficial outcomes of wearing of weighted vests is not very clear. Over all there is not much information on therapy clothing for children with Autism Spectrum Disorder are available in India. This study plans to explore what all sensory challenges the children with ASD are facing and what all clothing products are currently utilized for the therapy purpose for children with ASD in Delhi NCR and encourage a knowledge for need of clothing design that may ease the tactile issues and reduce the anxiety.

[Keywords: Autism, Sensory processing, Tactile Defensiveness, Anxiety, therapy garment/clothing, Deep touch pressure]

1. Introduction

Autism is a neuro developmental disorder characterized by qualitative impairments in social interaction and communication skill, along with a restricted repetitive and stereotyped pattern of behaviour (American Psychiatric Association, 2000).

There is a varying degree of impairments, with a wide range of symptoms including difficulty in communication and social skills along with repetitive behaviours, and deficits in sensory perception hence it is identified as Autism Spectrum Disorder (ASD).

The term ‘autism’ originates from the Greek word “ autos,” which signifies “self.” was first used by Eugen Bleuler, a Swiss psychiatrist, he started using it around 1911 to refer to schizophrenia. It portrays conditions in which a person is isolated from social communication and interaction (Feinstein Adam 2010).

Many children with autism are diagnosed with sensory defensiveness. They have varied and odd reactions to certain sensory stimuli, common symptoms may include over sensitivity to unexpected touch or light touch, sudden movement, excess of noise or visual stimuli and certain types of smell.

In autism, the individual is unable to process the sensory information from their surrounding environment, thus making it hard for them to use the sensory information for functional purposes, known as sensory dysfunction. This results in interference with the learning process which in later stage may cause behavioural and attention problems in the child.

These behavioural problems can be partially be a result of these sensory challenges. Hence occupational therapists from all over the world include some sensory integration therapy which can help some of the related behavioural problems. The tactile system plays a foremost impact in determining physical, mental, and emotional human behavior. This tactile system gives us the information that is essential for an individual to perform daily activities. Complication in processing of tactile sensations is referred to as tactile dysfunction.
Tactile defensiveness means negative or adverse response to certain types of tactile stimuli (Royeen et al. 1989). The individual with tactile defensiveness may experience extreme sensory input and can have great difficulties in their daily lives and routines. There are many challenges that these autistic children may be experiencing. For example, they are unable to maintain balance, they have oversensitivity to touch and may experience pain. They may be constantly aware of the clothes they are wearing and sensitive to the feel of certain fabric textures, certain types of clothing, such as socks with seams, tags and garment seams. They feel uncomfortable and distracted wearing these garments as they create discomfort and lot of chafing with the body.

Individuals who have tactile dysfunction are regularly unfit to complete everyday life exercises. Regular attributes shown by children are: poor balance, difficulty in holding a prone position, clumsiness, gravitational uncertainty, so they dislikes swinging, climbing, hopping. They breaks toys effortlessly, experience issues in figuring out how to tie shoes, riding bike, zip or catch garments, additionally deferred dialect improvement, poor eye-hand coordination, poor motor planning, aversion to touch (especially light touch), certain smells, lights, or commotions, dislikes getting hands dirty, dislikes going barefoot, and drops things frequently. Individuals may fluctuate in their tactile reactions relying upon their mind-set, the season, the time of day, and other ecological components (Haar, S. J., 1998).

Children with ASD who have certain eating issues such as fussy or picky eating should be screen for tactile defensiveness (Annatjie M. Smith, et al., 2003).

Children with tactile defensiveness (hypersensitivity to touch/tactile input) will avoid touching, become fearful of, or bothered by the following tactile experiences such as textured materials/items, “messy” things, vibrating toys, hug, kiss, certain clothing textures, rough or bumpy bed sheets, seams on socks, tags on shirts, light touch, hands or face being dirty, shoes and/or sandals, wind blowing on bare skin, bare feet touching grass or sand (Chirstopher, S., 2018).

Children with higher levels of tactile defensiveness were also more likely to evidence behavioural issues, repetitive and stereotype behaviour, and abnormal focused affections that are often associated with autism. (Baranek G T et.al, 1996)

As a result of these characteristics, many parents and professionals are still unaware of handling children with tactile defensiveness.

The child may be so much distracted by the constant sensory input from the surrounding environment that he/she can develop great distress. An autistic child might want to dress from head to toe in soft sweat clothes, even in hot weather, as this prevents his skin from being exposed to tactile stimulation and decrease the sensory invasion of his nervous system. The slightest accidental bump from another person may feel like a threat and he may lash out in defense. The child may dislike group games, or holding hands with a partner can be agonizing. The child
may be afraid of the possibility of being touched by another child. The child may not be unable to concentrate on school work because his brain’s filtering system is not able to screen the information such as the feel of bench, the sharp edges of the paper, the air flowing through the room, etc.

It might create the impression that the child is impulsive, rash, hits others and himself also, however nobody comprehends that he is constantly battling against the perceived raid of his space as interpreted by his brain but no one understands (Chirstopher, S., 2018).

Around 5%-15% of children of playschool-age in the overall community exhibit difficulties with sensory processing (Srivastava A., 2016 & Ahn RR, et al. 2004). Additionally, a vast number about 95% of children with Autism Spectrum Disorders (ASD) demonstrates sensory dysfunction related behaviour (Tomchek SD, 2007). Research Involvements related to sensory or tactile activities is one of the most commonly asked area by the parents and guardians of the children with ASD (Srivastava, A., 2016).

Many children with ASD have unusual reactions to certain sensory stimuli, some overreacts to week sensory input, but others do not respond negatively to strong stimuli (Guclu, et al., 2007).

Majority of evidences describing sensory processing disorders was identified by observing autistic children with sensory processing disorder with retrospective videotape analysis, interviewing parents (Tomchek, S. D., Dunn W., 2007) and Occupational therapist professionals, by experiencing sensory processing disorder methods and reviewing literature.

Sensory dysfunction is a developmental disorder defined by deficits in the central processing of vestibular, proprioceptive, and tactile sensory inputs that are not attributable to either peripheral or cortical central nervous system dysfunction (Ahn R. R., Miller L. J. et al., 2004). During late 1950s and early 1960s the Sensory Integration theory was developed by A. Jean Ayres (Mailloux, Z. et al., 2011). According to Ayres, it makes difficult to process and use sensory information for useful purposes which can meddle with the person’s learning process and might cause behavioral issues.

Studies shows that, covering a child with in a gym mat along with pillow caused a substantial calming in mood, and better control of behaviour (Ayres A. J. & Jeff Robbins, 1979).

Temple Grandin a worldwide well-known researcher and also an autistic person herself, has designed deep touch pressure “squeeze machine” which applies horizontal and internally guided weight to the individual’s whole body, by compressing the client between two froth cushioned machine. Clinical perceptions and a few examinations propose that that deep touch pressure helped the user to learn to endure touching, to diminish uneasiness and anxiety, it beneficial for autistic children (Edelson S.M., et al., 1998). The squeeze machine reduced her
anxiety, decreased her tension, expanded her resilience of touch and had a noteworthy effect in her personal satisfaction.

The application of deep touch pressure has been suggested to provide positive effects, have a substantial calming effect in mood in those with high levels of arousal and anxiety (Edelson S. M. et al., 1998) and helpful in organizing the central nervous system (Vanden Berg, 2001) which results in and better control of behaviour in the children with autism. However, empirical and theoretical evidence linked to the clinical effects of deep touch pressure are relatively rare (Hsin-Yung Chen, 2011).

A few Studies have demonstrated that wearing therapy garment such as weighted garment, air pressure garment, compression clothing have a positive outcome in children with autism, however there are a few examinations that have mixed results and in some beneficial outcomes of wearing of weighted vests is not very clear (Stephenson J. & Carter M., 2008).

Clothing mainly in the form of weighted vest, are being utilized to calm children with autism (Brian Reichow et al., 2009). Other weighted items to wear or drape on the body are now available, mainly through occupational therapy catalogues and via internet are collars, quilts, arm, ankle bands, shoulder wraps, belts and snug sleeping bags etc. which provide both pressure and comfort to the user.

Studies says that psychological well-being can be firmly affected by the feeling of touch. The Wilbarger Protocol and therapeutic holding are effective successful tactile reconciliation treatments. The Wilbarger Protocol depicts three sorts of touch honed as a major aspect of tactile coordination treatment: 1) brushing, 2) joint pressure and 3) weight. Advisors utilize their hands to apply profound weight to different parts of the body, trailed by the utilization of a delicate brush to the skin and finished up using a substantial weight, for example, a weighted blanket. This treatment is drilled each couple of hours for a few minutes for whatever length of time that one year. Studies reveal that these sorts of touch treatment can help regard issue, for example, dementia, depressive issue, nervousness issue and anxiety disorders (Cati Vaucelle et.al., 2009).

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2. Method

A descriptive and qualitative study on “A study on Tactile defensiveness in children with Autism spectrum Disorder” was carried out to study the presence of
tactile defensiveness in children with autism in various tactile components. The researcher has used Purposive sampling/non-probability sample method for selection of sample. The sample comprised of 32 children with autism in the age group of 3 to 15 years with Autism spectrum disorder was chosen. A self-prepared sensory processing questionnaire was used and data was collected from three special schools and four occupational therapy centres from across Delhi by using direct observation, parental/guardian Interview and interaction with occupational therapist and special educators and care givers. Data was descriptively analyzed and a database was generated that connects the design elements to the attributes of ASD. The following factors were analyzed: tactile sensitivity, clothing, deep pressure, weighted / compression garment.

To protect the identity, names of the respondents were changed. Some further significant information like the interview of sibling, grandparents, physical therapists, instructors at rehabilitation center, speech therapists, of the child will be included in the data collection period.

3. Findings/Result and Discussion

For most of us, wearing clothes gives us protection, warmth and comfort, but for some children with autism it can be terrifying. Few children can’t tolerate certain items such as elasticated pants, undergarment, belts, caps, hats, shoes can give a feeling of overwhelming to some children. Some children can’t withstand anything that touches neck such as high neck t-shirt, clothing with collar.

Findings in this area is limited for such apparent behaviors of Sensory, tactile sensitive children, particularly towards apparel and clothing ranging from innerwear to outerwear. In India, studies on therapy garment for autistic children are not been explored. Therapeutic garment such as weighted vest, compression garment and air pressure garments are not found easily in India, limitation of commercially available therapy clothing products have been identified.

The researcher have found, on 50% of children, weighted cuffs for anklets and wrist are given by the occupational therapist. There is no specific size and weight used for different age group in the therapy centres, and the weighted cuffs used are unisex and can fit any size wrist or ankle that can be tighten or loosen by an adjustable velcro attachment as per the required size. The exterior fabric material are made up of synthetic material generally neoprene and colours are grey, beige, blue and black.

Only 72% of parents are not aware of the compression clothing used as therapy clothing for ASD. The use of weighted vest, air pressure jackets and compression vest are rarely used by the therapist in medical centres. Parents of children are unable to find the right product for children in India such as weighted Jackets/vest and compression clothing, weighted vest are usually custom-made by parents and therapists. Some of the parents try to order from abroad which becomes very costly.
It was found that the sensory issues exhibited by children is different for each child, relying upon their mood, the season, the time of day, and other ecological components. All the seven senses such as touch, taste, smell, sound, sight, vestibular and proprioceptive, plays an important role in sensory processing and every one of these inputs contribute in regulating responses to sensory stimuli. All these senses gives information to an individual and contribute in proper functioning in day to day activities, any hindrance in perceiving these information by brain can cause sensory dysfunction. About all the children with ASD demonstrate that they have one or other sensory problems. The issue of Sensory defensiveness can keep a child away from play and from basics of learning and social associations. The researchers have found that about 72% of children with ASD have frequent tantrum and meltdown and 87% of children exhibit repetitive and stereotype behaviour.

The researcher have found, 81% of children between the age group 3 to 15 years are given deep touch pressure, 85% are given sensory brushing and 63% are given vibrations by the therapist in occupational therapy centres to reduce the sensory challenges and helps the child nervous system to become more organized which assists the child with improved attention span and better performance in their day to day lives.

Tactile defensiveness is discussed under the following factors - touch, distance, clothing, grooming & food habits :

**Touch :** Often, children with tactile defensiveness who are hypersensitivity to touch will abstain from touching, become fearful of, or bothered by textured materials/items, certain apparel surfaces, creases and seams on socks, labels on articles of clothing. About 59% of children dislikes when touched by other people, 53% of children find it intolerable when cuddled or hugged but 25% of children lacks the normal awareness of being touched. Sameer, a 5 year old boy, would anticipate that a person would touch him and try to move away. If anyone touches him, he responds with panic and then gets annoyed and try to move him/her by his hands.

Pritam a 7 year old boy dislikes being kissed and rubs his face continuously at the place if kissed, since the feeling of touch is so overwhelming for him to withstand. He also feel immensely ticklish by touch, even slightest of air blowing to his skin makes him ticklish.

Sometimes an autistic child touch, smells or taste an object more than usual than other children before using it. It was found that about 41% of children with ASD touch, smell or taste toys, clothes, or foods more than usual.

**Distance :** Dilip 10 year old boy, screams when others come too close to him, he becomes fearful and withdraws from the activity completely, he also sometimes holds the person coming near him too tightly and pinch so that the person gets back. About 37% of children dislikes standing in close proximity to other people or
peers. It might create the impression that the child is impulsive, hits others, however nobody realizes that he is constantly battling against the apparent raid of his space as interpreted by his brain.

**Grooming:** it is observed that 72% of children resist brushing teeth and 66% of children resist getting groomed and avoids hair brushing, hair cutting and nail cutting. 41% of children dislikes messy play that involves playing with mud, clay or playing with poster colours. Anything that feels sticky or dirty they will not touch, becomes defensive and resist such activities and try to wash that place repeatedly. Anyway, their play is limited, this further limits their play and learning experience.

**Clothing:** About 19% of children are bothered by seams and tags in clothing and 47% of children dislikes wearing garment with collars or wearing socks and undergarment. 31% of children find it difficult to adjust to clothing due to change of weather. 53% of children declines to wear stiff clothes and clothes with rough textures.

Rohit a 7 year old boy, is constantly aware that he is wearing jeans which have a hard texture that touches his skin, he gets irritated while wearing jeans and trousers with elasticated waist, unable to put his thoughts he does all sorts of tantrums such as screaming, scratching and pulling it to avoid wearing the garment.

Children who are hypersensitive to touch refuses to wear socks and undergarments. Amar a 6-year-old boy wears undergarments just while going outside, but quickly removes it when he reaches home. He likewise gets pestered by seams and tags in garments and tries to pull and lift the shirt or t-shirt as often as possible. He also feels annoyed when he wears lowers with rib attachment at the bottom as the seam crease contacts his ankle.

Sameer dislikes wearing socks, as the seams inside the socks hurts his feet and he is constantly pulling it till he removes the socks. He likewise dislikes wearing strappy shoes that touches his feet and tries remove it often.

Ujjval is very particular about the clothing he wears, he refuses to wear garment with collars and irrespective to the weather hot, humid or cold, he prefers wearing full sleeve t shirt and full length knitted pants all the time. He also cant withstand the breeze blowing on his skin, can’t sit in a room where the fan is blowing too fast.

**Food habit:** It was observed that 44% of children are picky eaters, and they are also sensitive to rough food textures. Keeping in mind the child’s fussy eating habits, mothers to provide them a balanced diet make a smooth paste the food and then feed them.

But for an autistic person with limited verbal capability, who might be easily distracted by sensory information, the task of keeping them calm can be very tough for parents. It is found that about 72% - 78% of children are engaged in repetitive
and self-stimulating behaviour, so that they can pacify themselves from these sensory overload. However, this problem can be improved by introducing a range of seamless garments with compression knits which can induce deep touch pressure using knitted tension, which will help in regulating the sensory input as it gives a hug like feel for the tactile sensitive people which can be used for daily wear as well as can be used for therapy purpose. Wearing compression clothes can calm and soothe them, make them more relaxed improve their condition and also give them added benefit of therapy which help them control anxiety. Then they can concentrate more on other day to day activities and it will also help to gain their self-esteem.

An investigation of this kind will encourage the parents to understand and adapt to the specific needs of these children and plan strategies according to their needs.

Further studies should be done for developing prototype sensory clothing that can help reduce sensory issues and reduce anxiety and improve the concentration in children with Autism Spectrum Disorder.

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