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Educational Impact of Sensory Activity Schedules on Hand Flapping in Children with Autism: An Experimental Analysis

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Abstract

The aim of this study was to assess the effectiveness of a sensory activity schedule in reducing hand flapping behavior in children diagnosed with autism spectrum disorder (ASD). A total of four participants were selected through purposive sampling from private therapy sessions, with ages ranging from under 4 to 8 years. The Questions About Behavior Function (QABF) developed by Matons and Vollmer in 1995 was utilize which is use for assessing the function of the behavior, and a behavior frequency sheet designed to record the frequency of hand flapping behavior.

Prior to the intervention, baseline data were collected using the behavior frequency sheet. Subsequently, a sensory activity schedule targeting hand flapping behavior was implemented for the participants. After a duration of two months, post-intervention data were collected using the behavior frequency sheet for comparison. Data analysis was conducted using SPSS version 26.

Results indicated a statistically significant decrease in the frequency of hand flapping behavior following the implementation of the sensory activity schedule. This finding suggests that the sensory activity schedule intervention had a positive impact in reducing hand flapping behavior in children with ASD. These findings contribute to our understanding of effective interventions for managing

problematic behaviors associated with ASD and highlight the importance of sensory-based approaches in behavioral interventions for individuals with autism.

Keywords: *Sensory activity schedule, Hand flapping and Autism*

Introduction

Autism spectrum is a neurological disorder that is characterized by some of common symptoms like delay in speech, poor eye contact, non-social, functional impairment and stereotypic or repetitive behaviors. Autism spectrum disorder is a developmental disorder which replace the old term of autism, Asperger"s. Autism is known as a genetically transmitted disorder but there is no reliable biological test which can assess this problem. Not a single study suggests that its only caused by single factor but some of the study suggest that it may be due to the combinations of many factors like environmental factor, genetic factor, and developmental factor. Some of the researchers suggest that autism is strongly caused due to the genetic factor. A family with autistic child having the high risk of another child with autism disorder. Older parents can also the cause of autism. Early infancy and environmental factor can also the cause of autism.

As specified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the person with ASD must have symptoms that significantly impair occupational and social areas of functioning. The people with autism spectrum disorder may face some challenges which impact their social area of functioning. The stereotypic behaviors are highly prevalence in the children diagnosed with autism spectrum disorder that impaired their social area of functioning. The guardian of people with autism spectrum disorder faces some challenges like stereotypic behavior in social gathering. Stereotypic behavior is common in autism spectrum client when they found themselves in a stressful situation. It's a self-stimulatory behavior in which the person showed repetitive physical movement, words, sounds, showed rhythmic pattern with objects. These behaviors often follow the pattern of repetition and the behavior increase when the person confront to the stressful situation. It is often a comforting behavior in response to stress or anxiety. It's a non-functional, purposeless behaviors in response to a stressful situation. Other definition includes those stereotypic behaviors is "non goal directed'' (Edwards et al., 2012, p.182), "inappropriateness'' (Turner 1999, p.839).

The word spectrum suggests that people with autism disorder faces some challenges which might be mild, moderate or severe depending on the level of suffering. Some people with autism have poor functional speech but some have a

good speech. It might be possible that some are socially active and some are socially withdrawal. Some have sensory issue some might not suffering from sensory issues. Some parents and teacher of children with autism exhibit challenging behaviors which depends on the level of severity of disorder. It is classified as a sensory disorder and it is sometime called stimming in autism. Stereotypy is a repetitive movement which an differentiate from tics on the basis of beginning in early age before 3 year which are more rhythmic and remain constant for many years. The guardian of autism spectrum disorder with sensory behavior has a more concern about such sensory behavior. As showing such behavior in social gathering the people may label the child with different name and problems which is more stressful situation for the parents and guardian. As it is a socially inappropriate behavior so it is important to manage such behaviors for social approval and learning process. It reduces the attention span of the kids during working situation. It also results in aggression in social setting with peers, and parents. The management of such behaviors improve the attention and focus of the child in learning procedure. So, it is important to manage those behaviors so the child can work appropriately and get social approval. Hand stimming is a kind of stereotypic behaviors that is common in children with autism. Its look like a repetitive movement like waving hands with the wrist flicking back and forth. These behaviors help them to calm themselves in stressful situation which is difficult to divert such behaviors.

The sensory activity schedule is the intervention which is based on the concept of sensory diet according to the need of the child. The term sensory diet was coined by Wibargers in 1984. He explained the term 'sensory diet' to give idea about sensory that that how it is important to enhance once occupational performance (Wibargar 2017). Sensory activity schedule is the activity plan which are carefully constructed after the detailed assessment of child sensory needs. It reduces the sensory behaviors of the child diagnose with autism spectrum disorder. The sensory activity Schedule is used for children who demonstrate evidence of challenging behaviors that is consistently linked to specific sensory everyday events. It involves a specific set of activities that are used to enhanced the occupational and school performance. It targets the particular sensory behaviors and particular set of sensory issues and designed to fulfill those sensory problems. It helps the student to improve their focus and self-regulation in classroom activities.

The sensory diet helping the child to overcome their anxiety and help them to focused on task and performance. It improves the task performance and attention of the child. The sensory diet for hand flapping includes massages, sensory ball, sensory bottles, pouring rice from one container to other, etc.

The Education for People with Special Educational Needs Act (SENA, 2004) signifies that all children who were with special education needs have an

opportunity to learn in an inclusive school environment. This enables them to act correctly in social setting. Classrooms environment are typically facing the sensory behaviors challenges. The nature of being seated in small groups leads the person to get unpredictable tactile input. Furthermore, interactive whiteboards and various wall displays in modern classroom can provide very entertaining visual feedback. Numerous challenges have been raised about the presentation of academic material through verbal instruction and the effect of excessive noise on learning and attention (Ashburner et al., 2008).

Occupational therapists traditionally address sensory processing difficulties through therapy sessions along with guidance and support in home and school settings. Access to occupational therapy services in the Republic of Ireland involves extensive waiting lists. According to the reports, 3611 Irish children and young adults under the age of 18 are waiting for their first occupational therapy assessment (Murphy & Mahoney, 2016). Because of the extremely limited guidance and assistance to teacher who are assigned to instructing children with autism and sensory processing problem for approximately five hours each day, five days per week which turn out more difficult to provide an inclusive learning environment.

The study examines the effects of adult-directed physical activities conducted during circle time on the on-task behaviors of students during a

journal-writing activity held immediately after circle. The participants of the study attended a full day inclusive kindergarten program all of them were diagnosed with autism spectrum disorder. All of them were male adult with autism spectrum disorder. During the last five minutes of morning circle the entire class, including the target participants, engaged in one of three activities that required different amounts of physical exertion (yoga, dance party, or book reading) that were selected randomly by the teacher. On-task behaviors data was collected for each participant during the first five minutes of the subsequent journal writing activity. Results found that, in general, movement (yoga and dance party) prior to journal led to higher levels of on-task behaviors during journal writing, with different activities yielding different outcomes for individual participants. Implications are that students with ASD would benefit from participating in multiple bouts of planned physical activity across the instructional day.

Hand-fluttering has been conjectured in different ways within different disciplinary systems. One of the schools of thought showed interest in stereotypy behavior that why people flap their hands, as well as how to smother, oversee or control this type of behavior. Some school of thoughts including psychoanalytic, behaviorist showed that this behavior is because of tangible and neurological points of view. All of the finding of these school of thought has directly formed

helpful suggestions and activities for this behavior. These different therapies continue to be sanctioned even as a few mentally unbalanced activists object to the courses in which hand-fluttering has been both conceptualized and treated.

Current clinical speech, hand-fluttering is sorted as an engine stereotypy. The term ‘stereotypes’ incorporates an extremely different scope of developments and ways of behaving that are dull and seem to come up short on clear reason or capability. They have generally been conceptualized as having an adverse consequence upon the people participated in the behavior and, somewhat, others in their nearby climate. For sure, the idea that stereotypes obstruct versatile capability is necessary to their conceptualization and resulting separation from normal idiosyncrasies (Barry et al., 2011). Goldman and partners give a table specifying the many kinds of movements that might be incorporated as stereotypy.

In other words, motor stereotypes can add to an ASD. In short one clinician said that, while sensory stereotypes are vague to chemical imbalance, persistent stereotypic conduct in the second year of life is a ‘warning’ for ASD determination (Bhat et al., 2011). Arm and hand/finger developments are now and again said to be particularly reminiscent of chemical imbalance (Goldman et al. 2009, p.35). The working assumption across these occasions has been that sensory

stereotypes are an indication of a broadly dysfunctional cerebrum (Goldman et al. 2009, p.30).

Word related treatment and tangible modulation both psychoanalytic and behaviorist worked on this behavior and understand, and acting upon, motor stereotypes recognize the significance of considering sensory experiences. Inside a psychoanalytic casing, sensory stereotypes have been interpreted as a mentally unbalanced procedure for raising an auto sensual obstruction against the world. However, 'stimming' is viewed as naturally supported self-stimulatory behavior. Nonetheless, the helpful system that is generally worried about the domain of the tactile is word related treatment or OT.

People with chemical imbalance range differently habitually participate in generalized and dreary change developments. The point of the review was to assess the viability of differential support in decreasing stereotypy conduct in mental imbalance that range differently depending on the level of severity of the disorder. The goal was to carry out differential support on youngsters with mental imbalance is often mixed up together having stereotypy behavior. To check the adequacy of differential support in decreasing stereotypy behavior in mental imbalance range differently. The youth chemical imbalance rating scale was utilized as a screening instrument to choose the kids with gentle chemical imbalance that mixed up together. The review was attempted with 14 youngsters

with chemical imbalance (11 male and 3 female). Guardians of 14 youngsters finished the RBQ-2 scale giving data on the dull ways of behaving found in the kids. Pretest and post test scores were gathered to assess the viability of differential support. The Outcome shows that there is a tremendous change in decreasing stereotypy behavior in mental imbalance that range differently utilizing differential support. The review inferred endless supply of the intercession the pace of the undesired ways of behaving decreased. Generally speaking, the review upheld the adequacy of differential support techniques in lessening the undesired ways of behaving in youngsters with mental imbalance in applied offices.

Monotonous ways of behaving in chemical imbalance are much of the time alluded and the people show stereotypic ways of behaving. Stereotypy is characterized as “successive practically mechanical reiteration of a similar stance, development or type of discourse” (Merriam, 2006, p.658). Stereotypic way of behaving can be verbal or nonverbal, it can include gross engine development or fine engine development, and it tends to be straightforward or complex. (Cunningham & Schreibman, 2007). Kids with ASD participate in monotonous way of behaving related with play while their companions without ASD participate in less redundant ways of behaving. Stereotypy among people exist due to the chemical imbalance and processing of the stimuli.

Literature review

Not only children with ASD face difficulty in developing and maintaining relationships but also face difficulty in participating social interaction and communication. They also demonstrate difficulty in other areas of functioning like academic and occupational area. Children with ASD face unique challenges in their life as a student when compared to their typical developing peers and siblings. These challenges stem from various characteristics of their diagnosis, including the presence of stereotyped behavior's, atypical sensory processing, and limited ability to self-regulate (Ashburner et al., 2008). One of the studies was conducted to determine whether a classroom based Sensory Activity Schedule (SAS) improves behavioral outcomes for one student with ASD who demonstrated atypical sensory processing and associated challenging behaviors. They used critical case study methods to describe changes in the frequency of challenging behaviors. They selected one eight-year-old student with autism as a subject. The result show reduction in the reported frequency of challenging behaviors which indicate that SAS helps to reduce the sensory issues. The result concluded that SAS was associated with a reduction of challenging behaviors incidents for one student with autism during classroom activities.

One of the other quasi-experimental studies was conducted to explored the effects of sensorimotor strategies on improving attention and in-seat behaviors of

preschoolers with autism spectrum disorder (ASD). Mills et al. (2023) conducted a study by using a single subject, A-B-A-B design with a sensorimotor phase (B) and non-sensorimotor phase (A), duration of attention and in-seat behaviors were recorded and analyzed from a convenience sample of three participants with ASD in an integrated preschool classroom. Results indicated that there were observable but inconsistent positive changes observed in attention and in-seat behaviors during phases with the application of sensorimotor strategies. These findings suggest that sensorimotor strategies may be useful in increasing the average attention and time span of preschooler with ASD in the classroom. This study gives them an opportunity for self-modulation and participation in the educational process.

Common amongst most of the literature is a correlation between difficulty with attention or engagement in the classroom and problems with sensory processing. The study was conducted to investigate the extent to how participation in a sensory processing training session would improve teachers' competence, confidence and practice towards supporting children with autism. The study design with mixed qualitative and quantitative methods was used to evaluate the impact of sensory processing training on six teachers who taught at least one child with autism in a mainstream school. Qualitative data provided by participants corroborated this and indicated a need for further and more detailed training in the

area. There was no change in the practice of teachers consulting with pupils about their sensory needs. This study found that the attendance of teachers at sensory processing training is justified and the promotion of sensory processing training is therefore warranted. Findings of this pilot study indicate that sensory processing training for teachers does improve competence, confidence and practice towards supporting children with autism. Review of the session to allow more detail, including consulting with the children themselves, is recommended.

For these reasons, it is critical to mediate and endeavor to take out, supplant, or decline stereotypic way of behaving. A significant method in conduct mediations which is found compelling is differential support. Differential support of substitute way of behaving (DRA) essentially implies that you put an undesired conduct on elimination, while at the same time giving support to a suitable way of behaving. DRA incorporate DRO, Differential Support of Other Way of behaving, and DRI, Differential Support of Contrary Way of behaving. Set forth plainly, DRO implies you give support as long as the kid isn't participating in the issue conduct. DRI implies you support suitable ways of behaving that are incongruent with the issue conduct. The reason for this task is to assess how differential support method is useful in handling stereotypy ways of behaving in ASD. It helps in distinguishing the particular wellspring of excitement and

forestalling further event with the goal that the objective way of behaving can be diminished and further develop youngster execution.

As per the present principles and rules for proof based rehearses. This review was led to duplicate and expand past examination by looking at the impact of oxygen consuming practice as fiery running for 10 back-to-back minutes on the level of time two primary school-matured kids with intellectual disorder participated in stereotypic ways of behaving during educational exercises toward the beginning of the day (promptly following the high-impact work out), with an optional examination assessing potential remaining impacts later in the school day. A six-stage intervention (ABABAB) plan was utilized to decide the presence of a utilitarian connection among running and stereotypy. Upon visual investigation of diagramed information, useful relations were clear for the two members. Allison invested 12% less energy taking part in stereotypic conduct promptly following the running meetings when contrasted with gauge, and Boyd's stereotypic conduct diminished by 10.7% by and large. There was no huge vestige impact to the educational meetings two hours after the intercession. Proportions of social legitimacy affirmed that the mediation was not difficult to carry out and seen as helpful. Suggestions for future exploration and practice are talked about.

Utilization of consequently supported stereotypy as support has been demonstrated to find true success for expanding socially advantageous ways of behaving in people with scholarly handicaps (Charlop et al., 1990). A part investigation of this treatment was led with 3 youths who had been determined to have intellectual disorder, and the reached out by (a) logically expanding the quantitative and subjective parts of the reaction necessity to procure admittance to stereotypy, (b) organizing objective proportions of client inclination for contingent admittance to stereotypy contrasted with other pertinent medicines for their consequently Supported stereotypy, and (c)surveying the social legitimacy of this treatment with other significant partners. Suggestions for tending to stereotypy and expanding the relaxation abilities of teenagers with intellectual disorder were examined.

Evaluated the effectiveness of two non-contingent reinforcement (NCR) as a treatment for automatically reinforced stereotypy. The study was conducted in 2002 by Lisa, James and Kimberlee in which they examined the efficacy of Non contingent reinforcement as an automatically reinforced stereotypy. Three individuals were participated in this study who had diagnosed with developmental problems (developmental delays, mental retardation, and/or autism) who made repetitive hand motions, face rubbing motions, or head rocking motions. They were 8, 26, and 28 years old. Functional evaluations in the initial portion of the

investigation showed that the participant's showed stereotypy was upheld regardless of social repercussions. To determine the precise sensory products that seemed to perpetuate the behaviors, a sensory class assessment was then carried out. Finally, under two scenarios, the effects of NCR were assessed utilizing the stimuli found in the earlier analyses. The recreational object was made freely available in the initial scenario by being placed on the table in front of ahead of the S. In the alternate scenario, an investigator pushed the S to engage with the recreational object at the start of the session. The findings show that NCR was only able to successfully contend against stereotypy when Ss were encouraged to interact with the leisure object. The development of NCR therapies for automatically reinforced aberrant behavior is considered in light of these findings.

In three trials, encouraging low response rates resulted in a decrease in improper behavior. When the teacher gave one TMR student 5 minutes of free time with a talk-out rate of less than 0.06 per minute in the first research, the student's talking-out behavior decreased. In a second study, when reinforcement was given for a response rate of less than 0.10 per minute, the talking-out behavior of an entire TMR class was decreased. In a third study, a high school business class as a whole had its off-task verbalizations reduced by progressively lower DRL limitations. Each time, the DRL approach worked well to curb misbehavior and was manageable for the teacher.

The sensory integration therapy (SIT) and behavioral intervention (BI) effects on the difficult behavior of 10 individuals with autism spectrum disorder were directly compared in the current study using an AB crossover design. A study conducted by (Helena et al., 2017) in which all of the individuals got both treatments throughout the intervention phase. Four participants who underwent the more successful intervention had follow-up probes done a month after the intervention. The findings demonstrated that BI was successful in bringing difficult behavior down to low or almost zero levels. SIT, on the other hand, led to higher and more inconsistent rates of challenging behavior. One notable exception was participant 4, who had less problematic behavior during SIT. The implications of the findings for practice and upcoming research are highlighted.

Caroline and Christine (2016) conducted a critical case study with the aim to determine the impact of classroom based sensory activity schedule on the improvement of behavior of student with ASD who was diagnosed with ASD with some sensory issues. These sensory behaviors are the challenging behavior which was aimed to improve by classroom based sensory activity schedule. This critical case study designed method were used to designed to change the frequency of the challenging behavior which was recorded prior from the eight-year-old child who was diagnosed with autism spectrum disorder. The result

showed that the sensory activity schedule help to reduce the frequency of challenging behavior which were associated with sensory problems.

Sensory Activity schedule was commonly used for the improvement in cognition of student with autism. A single case research designed was used to assess the relationship of correct response of student with autism and the delivered of sensory intervention. It was a single case research designed which result showed that it would not be effective for all children with autism because all children have different sensory behavior and the severity of the problematic behavior.

The average of student with autism spectrum disorder demonstrates sensory related behavior which was steamed as a self-relaxation behavior. The Autistic child showed sensory behavior to avoid the stressful situation. To examine the sensory modulation items on sensory profile in response to a community controls. For this purpose, one of the studies was conducted which examined the autistic child in community. the data for this study was collected as a part of cross-sectional study in which they examine 103 individuals using their sensory profile. They divide the participant two group an older group and younger group and matched their community controls. The result showed that there is an obvious difference in their community control in individual with autism.

Rationale of the study

People with autism is the most neglected people in our society so there are less previous researches on people with autism. The people with autism had many sensory issues like hand flapping, vocal stimming, jumping etc. Such behavior like hand flapping is such a most common sensory issue in autism. Many researches showed that children who diagnosed with autism spectrum disorder demonstrate various sensory and repetitive behaviors in everyday activities (Baranek et al.,2006). The guardian of such children who had sensory behavior like hand flapping showed much concerned to control or overcome those sensory behavior of hand flapping. There is no previous study on the management of hand flapping in one-to-one setting through sensory activity schedule. There are no previous researches conducted in Pakistan on hand flapping management. The result of the study will help the professional who works with special kids.

Research design

A pretest and posttest without controlled group design were used to check the effect of sensory activities schedule on hand flapping. In pretest posttest design the subject was test before and after the treatment. The result of pretest and posttest was compared to check the results. The autistic children with sensory behavior were taken as subjects. In this type of research design we check the targeted behavior before implementing the intervention and when get to know the intensity or frequency of the targeted behavior we will design an intervention and

implement it so that the intensity or frequency of the behavior might decrease or increase in order to check the effect or reliability of the intervention we have been using since 1 or 2 month or so and after implementing it for quite a time (which is by the researcher can be preplanned) we do the posttest.

The word posttest itself tells that it is something which should be done after implementing the intervention whereas the word pretest itself tells that the analysis should be done before implementing the intervention.

Sampling strategy

Non-probability purposive sampling strategy was used for selecting the sample. Non probability sampling is a sampling method in which the subjects from the population was not selected randomly but they were chosen on a subjective method. Non probability sampling is an easiest and non-expensive way of selecting a sample from the population. The subject of the study should be representative of the population so the result can draw conclusion about the population. In this type of study design, the sample is selected by keeping in view the purpose of the study so that an effective study sample is selected which makes the results of the study more credible.

The sample in this study was selected through purposive sampling which comes under the group of non-probability sampling. In purposive sampling the subjects were chosen because of the specific characteristic of the subjects.

Purposive sampling is use when a researcher wants to focus on an in-depth information about the small sample. The individual in purposive sample shares the same characteristic which is the requirement of the study.

The subject in this research shares the same characteristic of behavior and same function of the behavior. The subject of this study showed similar behavior of hand flapping. Every behavior has different functions, like some behavior is because of the escape and some is because of the attention. In this research the subject with similar function of sensory behavior was chosen as a sample. All those who showed behavior of hand flapping because of some other functions was not chosen as a subject. Critical case sampling technique is a technique of purposive sampling in which a small group of similar characteristics was chosen as a sample to explain the similar cases. Potton (1990) has proposed some types of the purposive sampling. Extreme and deviant case, intensity cases, maximum cases variation, homogeneous cases, typical cases, stratified purposeful, critical case, snow ball, criterion and random purposeful sampling are some types which was proposed.

Sample

4-8-year-old children diagnosed with ASD was selected as a sample. Total number of four participants was selected as a sample. The participants were selected through purposive sampling technique. Purposive sampling is a technique

in which the member of the sample shares the certain characteristics. The subject selected for the study fits for your study. age of the subjects was between four to eight. All the subjects were diagnosed with autism spectrum disorder with mild to moderate severity. The subject in this research shares the same characteristic of behavior and same function of the behavior. The subjects of this study showed similar behavior of hand flapping. the total number of subjects were four in which 2 of them were male and 2 of them were female. Permission was taken from parents of the participants to allow their child to be a part of this study. All the four participants who demonstrated atypical stereotypic behavior like hand flapping were chosen as a sample and the function of the behavior was assess by Question About Behavior Function.

Questions About Behavior Function (QABF).

Question About Behavior Function (Matson's & Vollmer, 1995) is an assessment tool that is use to assess the functions of maladaptive behaviors in individuals diagnose with mental disabilities. Parents, teachers and caregiver are asked about the behaviors of the child. The measure consists of 25 items which requires the rater to respond on Likert-type rating scale. These 25 items assess the score on the 5 categories: attention, escape, tangible, physical and nonsocial. The highest score on the any domain describes the function of behavior. The

composite reliability (CR) of the scale is above 0.855 and higher. The AVE value is above 0.5 which showed convergent validity of the tool.

Frequency data sheet

Other instrument use in the study is frequency data sheet which is design to collect information about the frequency of behavior related to attention and compliance in an interval recorded form. The method involves the counting the number of times a behavior occurs in a specific time period. It can also record in a frequency and duration of time. The method of recording the behavior is in number of occurrences of the behavior in one-hour duration. The occurrence of the behavior was recorded by counting the number of the behavior in one-hour session. In this each occurrence of the behavior is recorded.

Procedure

This research was conducted in a one-to-one setting. It was a private session for 1 hour in a day and 5 hours in a week. Total number of 4 participants was selected as a sample who were already diagnosed with autism spectrum disorder. The subject was selected through purposive sampling. The age range of the participants were 4-8 year who shares the same stereotypic behavior of hand flapping or hand stimming. The consent of participants parents was taken before conducting the study.

Phase I: Pre-Assessment: In this phase the pre-assessment of the participants behavior was taken by frequency data sheet. The participants who were diagnosed with ASD was chosen as a sample. The function of behavior of hand flapping was assessed through Question About Behavior Function (QABF). Question About Behavior Function (QABF) is the assessment tool which is used to assess the function of the behavior. Every child has different function of behaviors. Some showed behavior just to get attention from their care giver while other showed behavior to escape from the working situation. All those participants whose function of the behavior was sensory was selected as a sample. The rest of the participant were not the representative of the study so they were not selected as the part of the study. The next step was to record the intensity of hand flapping on frequency data sheet collection form for pre testing record before implementation of treatment. The child was taken to the session room for session and data was recorded for pre testing record. The data was saved for the comparison of post assessment.

Phase II: **Intervention:** At this phase the participant was taken comfortably to the session room for further procedure of the study. At this phase the implementation of the treatment was started and the participant was given sensory activity schedule after every 15 minutes. It was a one-hour session in which the total number of giving the treatment was three-time after every 15-minute

interval. The time duration for this treatment was five minutes. Sensory activity schedule (SAS) intervention was given at fixed and specific times, like after every fifteen minutes for five minutes. Every time sensory activity schedule was given with the presentation of green time and the treatment time was five minutes. In this five-minute duration the pressure on the hands and sensory balls and bottle was given to the child. After five minute the treatment was stopped and the red card presented in front of the participant. With the presentation of red card, the sensory activity schedule for hand flapping was taken away from the subject and the subjects were stop by blocking his/her hands. If the subject showed hand flapping in this 15-minute interval then he/she was blocked by putting hands on their hands and showing the red card. The client was engaged in other working activities for fifteen minute and the procedure was repeated again after fifteen minutes. Here the red card means to stop the sensory behaviors and the green card mean that you are allow to demonstrate the sensory behavior and to overcome it by taking advantages from the sensory activity schedule. In sensory activity schedule the child was given deep pressure on hands, sensory ball roll on hand, pouring rice from one container to another and sensory bottle to shake in order to overcome the hand flapping. The time duration for sensory activity schedule was 5 minutes after every 15-minute interval and total three-time treatment was delivered in 1-hour session. Total number of 45 sessions were conducted with one participant.

Phase III: Post-Assessment: The total time duration for this study was 2 months. Total number of 45 session were conducted with a single participant. After 2 months the post assessment was taken through frequency data sheet. The data was recorded through frequency data sheet to compare the pre-assessment and post-assessment. The number of behavior occurrence before implementation of treatment and after implementation of the study was compare and checked for further analysis and result.

Result

The main purpose of this study was to check the effect of sensory activity schedule on hand flapping in children with autism who showed some kind of stereotypic behavior. It was a pretest and posttest designed in which the subjects were tested twice during research duration. First the data was recorded before implementation of treatment. After that the data was recorded after implementation of treatment to check the impact of intervention. The pre assessment and post assessment data was compare to check the result. The data analysis concerned performing first, analysis of demographic variable like age, gender, level of severity, qualification and type of stereotypy.

Wilcoxson signed rank test analysis was run to compare the same dependent variable at different time point. The data was analyzed by using Social Science Statistical System, version 26 (SPSS-26). To find the missing and abrupt values,

the data was first checked out. The result shows that the data is statistically significant or not. The descriptive statistical table record the standard deviation, quantity and percentage. The finding is illustrated statistic that show that the results are based on study target and hypothesis. The data was evaluated and analyzed by Wilcoxon signed rank test. The sensory activity schedule plays an important role in decreasing the hand flapping in children with autism spectrum disorder.

Demographic Information Sheet

Demographic measures include age, gender and birth order. Total number of 4 participants were chosen from a private session.

Table 4.1

Descriptive Statistic of Demographic Characteristics of Participants (N=4)

Demographic variables	**Frequency**	**Percentage**
Gender		
Male	2	50
Female	2	50
Age		

5	1	25
6	2	50
7	1	25
Birth order		
First born	1	25
Middle born	2	50
Last born	1	25
Severity of disorder		
Mild	4	100
Moderate	0	0
Severe	0	0
Verbal	0	0
Non verbal	4	100

Total number of 4 participant were chosen as a sample who was diagnosed with autism spectrum disorder. 50 % of participants were male and 50 % were female. The age of 25 % participants comes under the age of 5 year, 50 %

participants come under the age of 6 year and 25 % of participants comes under the age of 7 years. 25 % of the participants were first born, 50 percent of the participants were second born and 25 percent of the participant were last born. 25 % of first born were female, 50 % of second born participant were male and 25 % of last-born participants were female. 100 % of the participants comes under the mild level of severity of autism spectrum disorder. And all of them are non-verbal.

Table 4.2

Scores of the client in five different domains of Question Bout Behavior Function.

Participant initial	Tangible	Non-social	Escape	Physical	Attention
A	1	14	1	2	0
B	0	12	0	0	0
C	0	11	1	0	0
D	0	12	1	1	0

A = first participant, B second participants, C third participants, D forth participants

The participant's A was a male who was 6-year-old and got score 14 in nonsocial domain which means that the hand flapping of the participants was due to the sensory issue. The participant B was male score 12 in nonsocial domain which indicates that the client showed hand flapping due to sensory issue. The participant C was a female and score 11 in non-social domain. The participants D score 12 in non-social domain which indicates that the behavior is because of sensory issue.

Table 4.3

Pre and post assessment of hand flapping via frequency data sheet.

Participants initial	Date (pre assessment)	Frequency	Behavior	Date (post assessment)	Frequency
A(M)	1 December	20 time/ hr.	Hand flapping	30 January	18 time/hr.
B (M)	1 December	21 time/ hr.	Hand flapping	30 January	19 time/hr.
C (F)	1 December	19 time/hr.	Hand flapping	30 January	17 time/hr.
D(F)	1 December	19 time/	Hand	30 January	17 time/hr.

hr. flapping

A = first participant(male), B second participant(male), C third participant(female), D forth participant(f) Note hr.= hour

The frequency data sheet indicates that the participants A(M) showed 20-time hand flapping per hour before intervention and after intervention the participant showed 18-time hand flapping per hour. The participant B(M) showed 21-time hand flapping before the treatment and after treatment the participant showed 19-time hand flapping in 1-hour duration. The participant C(F) showed 9-time hand flapping before implication of treatment and after treatment the frequency decreased to 17-time per hour. The participant D(F) showed 19-time hand flapping before intervention and after intervention the frequency decreases to 17-time per hour.

As the data showed that there is low amount of changes in decreasing the frequency of hand flapping before and after intervention. The reason is that the duration of the research is too short. The amount of decreasing the hand flapping is correlated with the time duration that how much and how long the sensory activity schedule was delivered to the participant.

Table No 4.5

Descriptive statistics of before and after implementation of treatment

	M	SD	Minimum	Maximum
Before	19.7	.95	19	21
After	17.75	.95	17	19

Note: M = Mean, SD = Standard Deviation

Table no 1 shows that the before treatment the value of mean and standard deviation is M(SD)= 19.7(.95) and after treatment is M(SD)=17.7(.95). The result showed that there is a significant difference in Mean of before and after intervention M (19.7>17.75) which indicates that there is significant difference before and after intervention of the treatment. This indicates that the treatment has a positive effect on hand flapping and help to reduce the hand flapping.

Wilcoxson signed rank test analysis comparison

Table No 4.5

Critical value of Wilcoxon signed ranked test analysis

Subjects	Before treatment	After treatment	Sig
A(m)	20	18	
B(m)	21	19	0.046
C(f)	19	17	

D(f)	19	17

Note A(m)= first subject, B(m)= second subject, C(f)= third subject, D(f)=fourth subject.

Table no 4.5 A Wilcoxson signed rank test showed that there was a significant difference in before and after treatment with p-value 0.046which is smaller than the level of significance 0.05. The score of before treatment is greater than the after treatment Before > After which also indicates that the treatment have a positive impact on the hand flapping of participants. The overall result showed that the sensory activity schedule help to decrease the frequency of hand flapping when it is delivered for the hand flapping behavior.

Discussion

This study helps us to understand that how much it is important to decrease the sensory behavior of the child which is the hand flapping in this study. Children with ASD do have so many sensory issues and behaviors and hand flapping is one of them. It is very important to keep in consideration that whether this hand flapping is because of excitement or because of some sensory disturbance which can be either auditory or tactile.

The use of QABF in my study is the key component which tells us the function of the behavior of hand flapping in an appropriate way. Keeping in view

the behavior of functions the child can do hand flapping may be because he wants something tangible, or child wants something which can be edible as well (tangible), maybe it because a child wants your attention or it can be his/her sensory need which can be visual, olfactory, tactile etc.

The use of QABF in taking care of such behaviors help us to develop a very specific certain management plan which ultimately gives us very impactful result in child's overall behavior. By keeping in mind, the result of the study, we can clearly see that a reliable intervention strategy can lower the behavior of hand flapping and it isn't something which cannot be managed.

The aim of the research is to check the impact of sensory activity schedule on hand flapping in children with autism. The study was conducted in one-to-one setting in which the sensory activity schedule was delivered to the autistic child who have hand flapping. first the QABF was conducted with the subject to confirm the behavior of the subjects. All those subjects who had sensory behavior was included in this research. The data was recorded through behavior frequency sheet before the delivering the treatment. The regular sessions were started from the next day in which the addition of new treatment was given. The treatment was delivered after every 15 minutes. In the 15-minute interval the child was engage in the regular activities. the duration of sensory activity schedule is for 5 minutes. In this 5-minute interval the child was given a sensory ball roll, sensory bottle and

pressure on hand. The subject also showed good response o regular task while introducing the sensory activity schedule. According to Caroline and Christine (2016) who conducted a critical case study and the result show that the frequency of challenging behavior decreases after the introducing of sensory activity schedule. The result of this study also shows that by introducing the sensory activity schedule in regular session decrease the frequency of the problematic behavior. the frequency of behavior before treatment is greater than the after treatment (before> after) which indicates that the SAS have a positive impact on hand flapping.

The use of toys is very much important when we are dealing with children with ASD. As we know that autism is a disorder which covers so many areas as it's spectrum so one thing or the other is linked with one another and keeping everything in loop it's so important to develop an intervention that keeps everything side by side. For example, while conducting an ABA session it's highly recommendable to give child sensory toys or sensory music so that it will help them maintaining good attention throughout the session. Talking about the behavior that can become obstacle in child's learning is called inappropriate behavior and thus make it difficult for child to learn properly. Such behaviors are needed to be recorded and for this we use frequency sheet which tells us how many time the behavior has been occurred and this frequency sheet can be used to

either note down the times of the behavior occurrence or it can be the intensity on which the behavior has been occurred. The sheet really helps us to keep in consideration the record that how the problematic behavior has been managed or improved. Relating my study to the previously done research which is how the training of sensory training clearly give us the results that such studies can improve the confidence and competence of the teachers. Talking about the profession of teaching for these people having a good sense to analysis critically everything is so important and such trainings help them to understand the ways by which they can boast their sensory intelligence and processing which ultimately boast their confidence in delivering their lecture to students and helping them fulfil their sensory needs too.

In my opinion, such behavior which are said to be stereotypic moments of ASD child can be managed by developing strategies that vary from child to child because the reason of each child of doing same behavior would be different so for that we have to take a look on child's trigger to such behavior more closely.

Author Contributions

SJ: Conceptualization, Data curation, Software, Validation, Visualization, writing—original draft, writing—review & editing, TM: Data curation, Investigation, Project administration, Software, writing—review & editing, HA: Writing—review & editing, Visualization, KM: Writing—review & editing, SA:

Data curation, Validation, Visualization, Writing—review & editing .

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement:

The data that support the findings of this study are not publicly available due to privacy concerns. However, data are available from the corresponding author upon reasonable request.Ethical Approval Statement:

The study's methodology was reviewed by an Ethics Committee member, who determined that formal approval was not required due to its survey-based design. No significant risks were identified beyond those inherent in daily activities. Measures were taken to ensure the protection of participants' privacy, dignity, and psychological well-being. All participants were fully informed of the study procedures, their right to anonymity, and their ability to withdraw at any time, with informed consent obtained prior to participatio

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.

Tomchek, S. D., Huebner, R. A., & Dunn, W. (2014). Patterns of sensory processing in children with an autism spectrum disorder. *Research in Autism Spectrum Disorders, 8*(10), 1214-1224.

Arkansas Behavior Support Specialists. (2021, May). Questions about behavior functions (QABF). Retrieved from https://arbss.org2021/05PDF

Ashburner, J. K., Rodger, S. A., Ziviani, J. M., & Hinder, E. A. (2014). Optimizing the participation of children with autism spectrum disorder experiencing sensory challenges: A clinical reasoning framework. *Canadian Journal of Occupational Therapy, 81*(1), 29-30.

Bhat, A., & Rebecva, L. (2011). Current perspective on motor functioning in infants, children, and adults with autism spectrum disorders. *Physical Therapy, 91*(7), 1116-1129.

Government of Ireland. (2004). *Education for persons with special educational needs act*. The Stationery Office.

Kennedy Krieger Institute. (n.d.). Introduction to autism. Retrieved from https://www.kennedykrieger.org/stories/interactive-autism-network/introduction-autism

Larley, S. (2008). Practical sensory programmes for students with autism spectrum disorder and other special needs. *An International Journal for Personal, Social and Emotional Development, 25*(1), 2008.

Leekam, S. R., Prior, M. R., & Uljarevic, M. (2011). Restricted and repetitive behaviors in autism spectrum disorders: A review of research in the last decade. *Psychological Bulletin, 137*(4), 562-593.

Liss, M., Saulnier, C., Fein, D., & Kinsbourne, M. (2006). Sensory and attention abnormalities in autistic spectrum disorders. *Autism, 10*(2), 155-172.

Lydon, H., Healy, O., & Grey, I. (2017). Comparison of behavioral intervention and sensory integration therapy on challenging behavior of children with autism. *Journal of Behavioral Interventions, 10*(2), 1-10. https://doi.org/10.1002/bin.1419

Mills, C., Tracey, D., Nash, S., & Gorkin III, R. (2023). Perception of a virtual reality sensory room for adults with neurodevelopmental disabilities. *Disabilities and Rehabilitation, 1*-10.

Mills, C., & Chapparo, C. (2016). Use of an in-class sensory activity schedule for students with autism: A critical case study. *Creative Education, 7*, 979-989. https://doi.org/10.4236/ce.2016.77102

Sans-Cervera, P., Pastor-Cerezuela, G., Gonzalez-Sala, F., Tarraga-Minguez, R., & Fernandez-Sala, M.-I. (2017). Sensory processing in children with autism spectrum disorder and/or attention deficit hyperactivity disorder in the home and classroom contexts. *Frontiers in Psychology, 8*, Article 1. https://doi.org/10.3389/fpsyg.2017.00012

Sparapani, N., Morgan, L., Reinhardt, V. P., Schatschneider, C., & Wetherby, A. M. (2016). Evaluation of classroom active engagement in elementary students with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 46*(3), 782-796.

Samuel, M., & Alan, C. (2022). Differentially reinforcing low rate of misbehavior with normal elementary school children. *Journal of Applied Behavior Analysis, 55*(3), 622-637. https://doi.org/10.1901/jaba.2022.55-622

Teder-Salejarvi, W. A., Pierce, K. L., Courchesne, E., & Hillyard, S. A. (2005). Auditory spatial localization and attention deficits in autistic adults. *Cognitive Brain Research, 23*(2-3), 221-234.

Wittemeyer, K., English, A., Jones, G., Lyn-Cook, L., & Milton, D. (2015). *Schools autism competency framework.* Autism Education Trust, London.

Wilcoxon signed ranks test - An overview. Retrieved from https://www.sciencedirect.com/topics/medicine-and-dentistry/wilcoxon-signed-ranks-test