



RESEARCH PAPER

Differences between the Sensory and Behavioral Problems of Children with Autism Spectrum Disorder before and after Pandemic Condition of Covid-19: Fathers' Perspective

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ABSTRACT

Autism is a severe disability, and it is one of the pervasive developmental disorders that have many mysterious signs, yet it remains the least understandable but has lifelong effects on the individual. The major objectives of the study were to know the occurrence of sensory and behavioral problems before and after COVID-19 perceived by fathers, 2) know the differences based on the locality of the respondents. The type of research was quantitative. 50 fathers residents of rural and urban areas were selected as a sample of the study by using purposive sampling technique from Lahore and Faisalabad. Researchers have developed a Likert-type questionnaire consisting of two domains, sensory and behavioral domains. Each domain consisted of 22 questions to elicit the responses from the sample. Researchers used the same instrument for knowing before and after covid-19 sensory and behavioral problems of children with autism spectrum disorder, after the pandemic condition of covid-19. The collected data revealed that Sensory problems after COVID-19 ($\bar{x} = 92.060$) are higher than the mean of Sensory problems before COVID-19 ($\bar{x} = 64.74$). The behavior problems after COVID-19 ($\bar{x} = 83.1800$) is higher than the behavior problems before COVID-19 ($\bar{x} = 57.880$). There is a rise in the severity of the problem after COVID-19.

KEYWORDS Autism Spectrum Disorder, Behavioral Problems, COVID-19, Sensory Problems

Introduction

In 1943, since Kanner's very first characterization of Autism, sensory responsivity is reported as abnormal in the context of autism spectrum disorder. There has always been a significant difference in the ways that children with autism spectrum disorder respond to stimuli as compared to typically developing children. Based upon the relevancy of sensory processing patterns in the diagnosis and support services of Children with Autism; Atypical response to sensory stimuli, unusual interest in sensory aspects of an environment, and hyper-reactivity or hypo-reactivity to sensory stimuli is added to the core diagnostic features of autism spectrum disorder (DSM-5).

High rates of Abnormalities have been reported in the sensory functioning of individuals with ASD. As our daily life is spent functioning in complex sensory environments, the difference in the processing of children with ASD is reported to cause, create and promote the challenging behaviors and distress. Moreover, these differences have been predictive of abnormalities in social, cognitive and motor abilities (Tomchek, Miller and Ben-Sasson, 2007). Atypical responses and a high range of disturbances are reported in all sensory modalities of children with ASD (Marco, Hinkley, Hill, and Nagarajan, 2011). The available literature on sensory symptoms of children with ASD, while using standardized rating scales has clearly shown a high frequency of sensory symptoms with at least 1 standard deviation from standardized norms.

Disorders of sensory modulation are most common to be observed and reported in studies. Sensory modulation can be defined as an abnormal response to sensory stimuli which will lead to functional impairment (Miller, Anzalone, Lane, Cermak, & Osten, 2007).

Sensory modulation Disorder can be divided into three categories. The first category is sensory over-responsivity (SOR); a child may be over-responsive and displays an overreactive or exaggerated response to sensory stimuli, further leading toward avoidance or hypervigilance to the related stimulus (Miller *et al.*, 2007). For example, a child with ASD may be more sensitive to tactile sensations and this sensitivity can be associated with particular items of clothing, texture or particular features, such as embossing or tags, on clothing. Wearing such items can make a child upset or anxious leading to an outburst or refusal and avoidance of the item.

The second category of sensory modulation is sensory under responsivity (SUR); a child may be unaware, or take more time to respond, slow respond as compared to typical response, a delayed response to sensory stimuli (Miller *et al.*, 2007). For example, some children are under-responsive to pain leading them to an injury as they will continue to engage in self-injurious behavior, such as touching a hot iron, that generally elicits a strong and unbearable pain response leading towards avoidance.

Sensory-seeking is the third category of sensory modulation disorder. Sensory seeking can be defined as an unusual sensory craving or preoccupation with certain sensory experiences (Miller *et al.*, 2007). These children, for example, may keep smelling some specific objects, or putting inedible items in their mouth. Most of the research available on sensory issues has focused on sensory over-responsivity. The reason might be that it can be understood and reported easily by caregivers.

In available studies, SOR is reported highly prevalent in children with ASD with a high range from 56% to 70% (Baranek,2006). However, in 2009, a meta-analysis of 14 studies of sensory modulation disorder suggested that sensory under-responsivity might be the most prevalent symptom in individuals with ASD (Ben-Sasson, Cermak and Orsmond, 2009). Most of individuals with ASD suffer from both, a combination of SOR and SUR symptoms (Baranek *et al.*, 2006). Although any sensory modality might be affected, there are some evidence that the domains of smell and taste, (Leekam,2007) and tactile sensitivity (Rogers, 2003) are having a higher frequency as compared to the other domains of dysfunction.

In 2020, the coronavirus pandemic COVID-19 created an alarming situation and led many governments to take restrictive measures to control its wider spread. Staying at home and social distancing were the planned measures for prevention. Institutes were closed and people were limited to their homes including families of children with autism spectrum disorder (ASD). In Pakistan, Children with ASD, who were receiving some more or fewer therapies before the pandemic but during the pandemic maintaining social distance made it impossible for children with ASD and their families to have these therapeutic sessions and participate in external sessions (Narzisi, 2020). In times of pandemics or natural disasters, individuals with previous mental health issues are considered vulnerable populations and are expected to be more effected (Esterwood & Saeed, 2020).

The objective of this study was to understand the impact of covid pandemic on the lives of children with ASD as perceived by their fathers and know the differences on the basis of the locality. Studying the Effect of this time on the sensory issues of children with ASD as they improved or worsened or stay the same and whether lockdown has or not has any impact on their sensory processing and behavioral patterns.

Methods and Materials

The present study was completed by applying a quantitative approach along with the survey method.

Population of the study

Fathers living in Faisalabad and Lahore cities of Pakistan were the population of the study. Lahore is the capital city of the province of Punjab, the second-largest metropolitan area in Pakistan. Faisalabad is the third largest city of Pakistan after Karachi and Lahore.

Sample of the study

50 fathers from rural and urban areas was selected as a sample of the study by using purposive sampling technique. Majority of the sample fathers were between 35 to 45 years. Majority of them have metric qualification. 78 % children with autism spectrum disorder were male student. Majority of the sample had monthly income in rupees from 30,000 to 40,000. Researchers had selected 50% sample from urban areas and 50% from rural areas.

Instrument of the study

For data collection researchers have developed self-made Likert type questionnaire which was consisted of 22 items. Researchers have developed questionnaire in two parts, in first part, researchers have asked about demographic information of the respondents. In part 2, researchers have made 22 statements. The questionnaire was developed bilingually (English and Urdu) and content validity was checked by experts. Researchers used the Cronbach Alpha Test to find the reliability of the research instrument. The reliability of the scale was .87 which is considered the good reliability of the instrument.

Data Collection

Researchers personally meet all participants of the study and explained the purpose of the study to the respondents. Personal assistance for filling up the questionnaire was provided by the researchers on respondent's request.

Data analysis

After the completion of coding, data was analyzed with the help of SPSS by using descriptive and non-parametric statistical procedures.

Results and Discussion

Table 1
Mean and standard deviation

Sr. NO.	Statements	Responses of sensory domain before covid-19		Responses of sensory domain after Covid-19	
		Mean	SD	Mean	SD
1	Feel texture of clothes against their skin	2.9	1.1	4.4	.85
2	Feel about their accessories (watch, jewelry, chain, pony, hair catcher or belt etc.)	3.0	1	4.3	.89
3	Feel whether they are sitting up or lying down.	2.4	1.1	4.5	.57
4	Feel smells like; socks, sweating, washable clothes	2.5	1.4	4.7	.46
5	Feel micro smells like; kitchen, sand, each human body smell, surf, soap, shampoo etc.	2.6	1.2	4.6	.47
6	Feel scent	2.8	1.4	4.4	.64
7	Feel specific sound (knocking, opening door, vehicle horn, ice-cream bell etc.)	3.1	1	3.7	1

8	Feel the faint tick of a clock sound	3.1	1.2	4	.84
9	Feel light (night bulb, streetlight, vehicle light)	2.8	1.3	4.1	.62
10	Feel mirror	2.5	1.4	4.1	.85
11	Feel spinning fans	3.2	1.2	4.2	.72
12	Sense the seams of his/her socks.	2.9	1.2	4.5	.50
13	Sense the seams of his/her tights.	2.6	1	4.4	.90
14	Feel the texture of specific garments.	2.8	1.2	4	1
15	Feel the sound of washing machine	2.9	1.2	3.7	.91
16	Feels the flickers of a light	3.1	1.3	4	.92
17	Feel a shirt label	3.1	1.4	3.7	1
18	Feel the sound of a fridge	3.4	1.1	3.3	1.3
19	Feel the sound of spinning fans.	3.2	1.2	3.4	1.3
20	Scream if his/her face get wet.	3.1	1.4	4.6	.69
21	When you try to get them dressed show temper tantrums	3.1	1.5	4.4	.92
22	Feel unusual high/low pain	3.0	1.2	4	1.1

Table 2
Mean and standard deviation

Sr. NO.	Statements	Responses of behavioral domain before covid-19		Responses of behavioral domain after Covid-19	
		Mean	SD	Mean	SD
1	They ignored, remain unresponsive when others try to interact with them.	2.7	1.3	4	1.3
2	They remain isolated or aloof	2.8	1.3	3.9	1.2
3	Not show or point out on others something that they have made or like	2.8	1.3	3.9	1.3
4	Thinking about the feelings and thoughts of others	2.8	1.3	3.8	1.4
5	Understand when others are joking or being sarcastic to him	2.6	1.2	3.8	1.2
6	Have empathy for others	2.1	1.1	3.1	1.4
7	Do back and forth conversation	2.6	1.1	2.9	1.1
8	Gave eye contact	2.1	.99	2.8	1.3
9	Smiling or other facial expression when expected	2.6	1.4	2.9	1.2
10	Have such behavior and gestures that engage the attention of another person for social interaction	2.1	.96	3.3	1.5
11	They make interaction with speaking and combine it with expected eye contact & smiling	2.2	1.1	3.6	1.4
12	They make interaction with gestures and combine it with expected eye contact & smiling	2.1	1.1	3.8	1.4
13	Develop relationship with other people	2.4	1.4	3.6	1.4
14	Have pretending play and imitation	2.3	1.1	3.6	1.3
15	Stereotyped behavior (Rocking, hand Flapping, Unusual body movement)	2.8	1.4	4.2	.59
16	Manipulation of objects (repeatedly jiggling, spinning, tapping, rubbing, or lining up certain objects)	3	1.2	4.2	1.1
17	Verbal or vocal behavior in an unusual manner (echolalia, repeat the words or phrases of others)	3	1.4	4.4	.69
18	Reaction to small changes (altered school bus route, food, clothes, new picture on the wall, patterns of dealing)	2.9	1.4	4.6	.69
19	Crashing into the walls or people	3.2	.98	4.1	.88
20	Putting inedible things into their mouth (like, rock & paint)	3.2	1.1	4.4	.86
21	Welcoming to relatives/ outsider/ visitors.	2.3	1.2	4	1.4
22	Share feelings (love, affection, or fear)	2.5	1.3	3.6	1.4

Table 3
Association between qualification of fathers and sensory and behavior problems

Association between qualification of Fathers and sensory problems before COVID-19			
Chi-Square Tests	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	73.958 ^a	24	.000
Association between qualification of Fathers and sensory problems of children with ASD after COVID-19			
Pearson Chi-Square	73.313 ^a	22	.000
association between qualification of Fathers and Behavior problems before COVID-19			
Pearson Chi-Square	76.394 ^a	24	.000
association between qualification of Fathers and of Behavior problems after COVID-19			
Pearson Chi-Square	70.956 ^a	20	.000

The above table clearly express that there are significant associations between fathers' qualification and their perceptions about sensory and behavior problem of children with ASD before and after COVID -19. In all above 4 situations the p value is significant at 0.000.

Table 4
Gender based differences problems before and after COVID -19

Variables	Gender	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	P
Sensory problems score before COVID-19	Male	39	24.46	954.00	174.000	954.000	-.954	.340
	Female	11	29.18	321.00				
Sensory problems after COVID-19	Male	39	26.18	1021.00	188.000	254.000	-.624	.533
	Female	11	23.09	254.00				
Behavior problems before COVID -19	Male	39	24.13	941.00	161.000	941.000	-1.260	.208
	Female	11	30.36	334.00				
Behavior problems after COVID -19	Male	39	28.28	1103.00	106.000	172.000	-2.567	.010
	Female	11	15.64	172.00				
	Total	50						

This table shows that there are no significant differences in the perception of father about the gender of their children with ASD and their sensory problem before and after COVID-19. As the p value is greater than 0.005 excluding the behavior problem after COVID-19. There are no differences among sensory problems before and after COVID based on the gender of children except for behavior problems after COVID 19- are different in boys and girls with ASD.

Table 5
Mean differences among sensory and behavior problems

Variables	N	Mean	Std. Deviation	Minimum	Maximum
Sensory problems score before COVID-19	50	64.7400	12.95331	47.00	95.00
Sensory problems after COVID-19	50	92.0600	8.28180	73.00	104.00
Behavior problems before COVID -19	50	57.8800	10.72597	41.00	88.00

Behavior problems after COVID -19	50	83.1800	17.52862	43.00	102.00
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The above table explains that the mean of Sensory problems after COVID-19 ($\bar{x} = 92.060$) is higher than the mean of Sensory problems before COVID-19 ($\bar{x} = 64.74$). The mean of behavior problems after COVID-19 ($\bar{x} = 83.1800$) is higher than the mean of behavior problems before COVID-19 ($\bar{x} = 57.880$). There is rise in severity of problem after COVID -19

Table 6
Differences between behavior problems before and after COVID-19

Wilcoxon Signed Ranks Test	Behavior problems score before COVID-19-	Behavior problems score After COVID-19-
Z	-6.159 ^a	
Asymp. Sig. (2-tailed)	.000	

Above depicts that there are significant differences ($Z = -6.159$ and $P = .000$) in the behavior problems score before and after COVID -19

Table 7
Differences between sensory problems before and after COVID-19

Wilcoxon Signed Ranks Test	Sensory problems score before COVID-19-	Sensory problems score After COVID-19-
Z		-6.016 ^a
Asymp. Sig. (2-tailed)		.000

Table reveals that there are significant differences ($Z = -6.016$ and $P = .000$) in the Sensory problems score before and after COVID 19-

Table 8
Differences based on their location rural and urban

Variables	Locality	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig.(2-tailed)
Sensory problems score before COVID-19	Urban	25	25	625.00	300.000	625.000	-.244	.807
	Rural	25	26	650.00				
Sensory problems after COVID-19	Urban	25	25.64	641.00	300.000	625.000	-.244	.807
	Rural	25	25.36	634.00				
Behavior problems before COVID -19	Urban	25	26	650.00	309.000	634.000	-0.68	.946
	Rural	25	25	625.00				
Behavior problems after COVID -19	Urban	25	25.06	626.50	301.000	626.500	-2.216	.829
	Rural	25	25.94	648.50				
	Total	50						

Since the P values are higher (0.000-0.05) which express that there are no significant differences in the perceptions of fathers about the sensory and behavior problems of children with ASD before and after COVID19- based on their location rural and urban.

The purpose of study was to find the difference in the occurrence of sensory and behavioral problems before and after COVID-19, and know the differences based on gender locality of the respondents. The covid 19 pandemic creates an alarming situation for all

mankind, the persons with disabilities were at higher risk. Esterwood & Saeed (2020) stated that the times of pandemics or natural disasters effects more individuals with mental health issues and such people are vulnerable population as being already at risk. Sensory issues exist in children with ASD, and it effects their daily living causing changed behaviors. There are abnormalities in the sensory responsivity. Although the type of responsivity, sensory over-responsivity or sensory under-responsivity remains a matter of secondary importance. The results of the study showed that there is a difference in the sensory responsivity of children with ASD and an increase in behavioral problems in before and after pandemic. Quarantine condition increase problems and children with ASD are reported with increased sensory over-responsivity and disturbed behavior patterns. The results are supported by the study conducted in Italy which results showed that after one month of the strict measures announced and applied by Italian government, there was an increase in restricted, fixation, repetitive and stereotypes behaviors in about 33% of the children in the sample (Di Renzo, *et al.*, 2020). The finding is also supported by Sprang and Silman (2013), who found that during the 2009 H1-N1 pandemic in the United States there were signs of post-traumatic stress disorder in the 30% of quarantined or isolated children.

The results of this showed that parents reported an increase in hyper-sensitivity, nervousness and fear of new situations and facing people. The result is being supported from the results of Di Renzo, *et al.*, (2020) said that there was a significant increase in the areas of Hyperactivity and Fear of new situations, expressed in terms of sensory-motor agitation and restlessness.

Conclusion

This study was conducted to see differences between the sensory and behavioral problems of children with autism spectrum disorder before and after pandemic condition of covid-19: fathers' perspective. It is concluded that the occurrences and severity of sensory and behavior problems were high in Post COVID -19 as compared to before pandemic. No differences found among sensory problems before and after COVID based on the gender of children except for behavior problems after COVID 19- are different in boys and girls with ASD. The perceptions of fathers living in rural and urban areas of Lahore and Faisalabad were same.

Recommendations

Managing sensory and behavioral issues is a time consuming and tiring process which usually make the parents feel that it's useless and they quit. As the purpose of the study was knowing the difference in sensory and behavioral problems of children with ASD, after a gap due to pandemic ultimately leading to social distance, it was recommended that continuity and consistency is the core of all.

Findings of the study also showed that pandemics are more alarming for children with special needs as they are at higher level of risk. In such situations, online sessions with the help of parents can be continued as the gap can increase the sensory and behavioral problems of children with special needs.

Recent study was conducted to know the parental perspective, so further studies can be conducted to know the perspective of other caregivers like siblings, teachers, Therapists etc.

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