Autism Spectrum Disorder And Significant Behavioral Changes

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ABSTRACT

Objective: In order to determine common triggers or correlated causes of behavioral changes (e.g., puberty, environment, co-morbidities, therapeutic interventions), the study's primary goal is to investigate the type and degree of significant behavioral changes among people with autism spectrum disorder. Additionally, the study will evaluate how well the present methods of behavior management used by professionals and caregivers are working.

Methods: This study will use a cross-sectional descriptive approach to evaluate the noteworthy behavioral alterations seen in people with autism spectrum disorder (ASD) and the factors that contribute to those alterations. In the Kingdom of Saudi Arabia, the cross-sectional approach allows the researcher to gather information from a large number of participants at one time, giving a glimpse of the patterns and degree of behavioral differences among people with ASD across different age groups, severity levels, and sociocultural contexts.

Results: The study included 450 participants. The most frequent Child's Age among them was 3-5 years old (n=167, 37.1%), followed by 6-10 years old (n=156, 34.7%), then 0-2 years old (n=99, 22%), at least 11-16 years old (n=28, 6.2%). The most frequent Child gender among study participants was male (n=237, 52.7 %) and female (n=213, 47.3%). The most frequent child with autism spectrum disorder among study participants was No (n=401, 89.1%), followed by Yes (n=49, 10.9%). Educational level of parents of children with autism spectrum disorder (ASD) among study participants, the majority were Postgraduate (n=31, 63.3%),

followed by Secondary (n=13, 26.5%), then Primary (n=5, 10.2%). Employment Status of parents of children with autism spectrum disorder (ASD) among study participants, most of them were Employed Full-Time (n=34, 69.4%), followed by Housewife (n=8, 16.3%), then Part-Time (n=4, 8.2%), and at least Unemployed (n=8, 16.3%). The participants were asked how the child was diagnosed with ASD, most of them answered Pediatrician (n=21, 42.9%), followed by Psychologist (n=14, 28.6%), then Neurologist (n=3, 6.1%). Participants were asked Did cultural or social stigma delay seeking medical help, most of them answered no (n=34, 69.4%), followed by not sure (n=10, 20.4%), then yes (n=5, 10.2%). Participants were asked Do you feel stress in managing your child's behavior. The most frequent were occasionally (n=24, 49%), followed by rarely (n=13, 26.5%), then frequently (n=9, 18.4%), and never (n=3, 6.1%). Participants were asked, about Does your child attend a special education center/school. The most frequent were yes (n=26, 53.1%), then no (n=18, 36.7%), and planning to enroll (n=5, 10.2%). Participants were asked Has your child shown behavioral improvement with therapy; Most reported Significant improvement (n=19, 38.8%), followed by Moderate improvement (n=16, 32.7%), then no noticeable change (n=14, 28.6%).
Conclusion: The results showed significant associations between children's behavioral outcomes and several factors, including age, age at diagnosis, parental education, employment status, and method of diagnosis. These findings indicate that demographic and diagnostic characteristics influence behavioral patterns in children with ASD. In contrast, no significant relationship was found with gender.

INTRODUCTION

Among the neurodevelopmental problems that affect children is autism spectrum disorder (ASD). ASD encompasses a range of conditions that fall into two primary areas of impairment. Social interaction and communication are the first area, and confined repetitive activity is the second. [1] Finally, when compared to the general population, ASD is frequently associated with other co-occurring physical, developmental, and neuropsychiatric symptoms, with major depressive disorder (MDD) being the most common association, followed by anxiety and bipolar disorder. Additionally, symptoms and severity vary from person to person, and some people may develop intellectual and/or language disability or even above-average intellectual performance. Interestingly, these differences and their intersection with mood problems seen in ASD lead to further difficulties in diagnosing the disorder. **[2], [3]**

In the past, autism was mostly linked to dysfunctional parenting and a lack of love for children by their insensitive mothers. Later, this idea was discredited. **[4]** By the end of the twentieth century, research revealed that monozygotic twins have a 90% chance of developing autism, which caused focus to move to genetic issues. Undoubtedly, ASD is a polygenic condition linked to a variety of etiologies and environmental exposures during pregnancy. It is widely known that stigma affects a lot of minority groups. which is characterized as encountering discrimination, bias, and ignorance. **[5]** Autism is conveniently regarded as an identity-based minority that encounters this kind of ableism on a regular basis in a variety of social contexts. **[3], [7]**

Yet, despite well-established negative consequences, such as poor mental and physical health, fewer social connections, and an increase in camouflaging behaviors, the specific experience of stigma in the context of autism has received relatively little research, in addition to an emphasis on the experiences of family members rather than autistic people themselves. **[6], [8]** When comparing the Diagnostic and Statistical Manual for Mental Disorders' fifth edition

(DSM-5)—which was released in 2013—to its previous edition (DSM-4), there have been notable changes in how ASD is classified. Naturally, these modifications have an impact on the diagnostic standards for autism. **[9]** The field's increasing understanding of ASD, the fact that communication is a part of social processes, and the fact that sensory abnormalities are quite common are all taken into consideration in the new DSM-5 diagnostic criteria. **[10]**

Additionally, the ASD community has greatly profited from notable advancements in worldwide policy brought about by a breakthrough in autism research. **[11]** Furthermore, epidemiological research examining the social and economic effects of autism on the community was made easier by this heightened interest. **[12]** According to a 2017 study, raising a child with autism can cost an additional $3,000,000 USD. Therefore, research is urgently needed to help solve the mystery of autism for both medical and humanitarian reasons. In addition, compared to non-disabled populations, postsecondary school graduation rates for those with autism diagnoses are low. **[13]**

Several researchers have looked into the unique difficulties faced by college students with autism and have repeatedly found that, despite their academic aptitude, these students are severely hampered by the social complexities of college campuses and the stigma attached to autism. **[14], [15]** This piqued our curiosity about student stigmatization. However, society as a whole has a shared obligation to assist the ASD community. According to a study, persons with autism who experience loneliness have more severe depression. Such loneliness is certainly a result of peer rejection and bullying. According to pertinent research, teenagers with autism tend to report having poorer friendships. **[16]**

As neurodiversity theory demonstrates, there must be a change in the prevalent understanding of autism as a "deficit" to one that values alternative ways of thinking. Repetitive behaviors, social interaction, and communication are among the numerous neurodevelopmental disorders that define autism spectrum disorder (ASD). **[17], [18]** Autism is a spectrum disorder, meaning that each person will experience symptoms and severity to varying degrees. Research to understand the origin, presentation, and long-term behavioral effects of ASD has increased dramatically in recent decades due to the considerable increase in its incidence worldwide. Adults and children with ASD diagnoses frequently display a broad range of behavioral patterns, many of which might undergo substantial changes over time. **[19], [20]**

These alterations may be caused by co-occurring mental health disorders, environmental influences, developmental shifts, or intervention techniques. Early indicators of ASD typically appear before the age of three, but behavioral traits frequently change with time, posing new difficulties for doctors, educators, and caregivers.

When appropriate interventions are used, significant behavioral changes in people with ASD can include increased aggression, anxiety, withdrawal, obsessive-compulsive behaviors, or even gains in social responsiveness and communication. To ensure prompt and individualized treatments, it is essential to recognize and comprehend these changes. Similar to many other nations, Saudi Arabia has seen an increase in ASD awareness and diagnosis rates. **[9], [17]**

Yet, little localized research has been done on how ASD behavioral symptoms change over time in the Saudi community, particularly when considering family dynamics, cultural factors, and accessibility to support networks. The majority of the body of research on the subject concentrates on early childhood therapies and initial diagnosis, paying little attention to long-term behavioral trends. **[21]**

This study looks on the kinds, causes, and effects of notable behavioral changes in people with ASD in the Kingdom of Saudi Arabia in an effort to close this gap. The study will evaluate the

frequency, type, and potential causes of these changes while taking into account the efficacy of the therapeutic programs, parental participation, and support systems in place. By doing this, it hopes to create more adaptive care models and regulations in the area and advance a better understanding of how behavior changes in ASD.

METHODS

Study design

This study will use a cross-sectional descriptive approach to evaluate the noteworthy behavioral alterations seen in people with autism spectrum disorder (ASD) and the factors that contribute to those alterations. In the Kingdom of Saudi Arabia, the cross-sectional approach allows the researcher to gather information from a large number of participants at one time, giving a glimpse of the patterns and degree of behavioral differences among people with ASD across different age groups, severity levels, and sociocultural contexts.

Study approach

Selected hospitals, autism centers, and special education facilities located throughout Saudi Arabia's major cities will be the sites of the study, including:

- Riyadh, the capital and center of medicine
- Jeddah (in the west)
- Dammam/Al-Khobar (in the east)
- Other central and southern regions are represented by Medina and Abha.

Based on their expertise in treating patients with autism, their availability of registered patients with ASD, and their willingness to take part in the study, these facilities will be selected.

Study population

Primary Participants: Parents and primary caregivers of children and adolescents with an official diagnosis of ASD, ages 4 to 25.

Secondary Participants: ASD specialists, such as developmental pediatricians, psychologists, behavioral therapists, and special educators, are optional secondary participants (if necessary for qualitative triangulation).

Study sample

Purposive sampling, which guarantees that participants are chosen based on predetermined standards pertinent to the study's goals, will be used in this investigation. Purposive sampling is better suitable for focusing on a population (i.e., caregivers of people with ASD) who have particular experience and expertise regarding the behavioral development of people with ASD, whereas random sample is best for generalizability.

Study tool

For the current study, a questionnaire was used for data collection and was also considered a study tool.

Data collection

- The appropriate ethical review bodies will give their approval.
- The questionnaire will be sent to participants either in person or through secure online platforms (like RedCap or Google Forms) once consent has been obtained.
- With prior consent, information will be gathered from hospitals and ASD care facilities over the course of two months.

Data analysis

Analysis of the data will be done with SPSS (version 25 or higher).

a. Descriptive analysis uses means, standard deviations, percentages, and frequencies to analyze behavioral and demographic data.
b. Chi-square tests are used in inferential analysis to determine if behavioral changes and categorical variables—such as severity or therapy status—are related.
c. To compare group means, use ANOVA or t-tests.
d. If necessary, use multivariate regression to identify the factors that significantly alter behavior.
e. A statistically significant result will be defined as $p < 0.05$.

Ethical considerations

It will be carried out on 10% of the total respondents (may be 30-40), and the results will be checked thereof. Further, any type of discrepancy will be removed, and the questionnaire or data sheet will be revised. A pilot study may also be conducted to state the precision level of the statistical tools and even the selection criteria of the respondents. The above-stated process will be followed throughout the pilot study, and the outcomes will be analyzed. The duration, manner, and viability will also be evaluated.

RESULTS

The study included 450 participants. The most frequent Child's Age among them was 3-5 years old (n=167, 37.1%), followed by 6-10 years old (n=156, 34.7%), then 0-2 years old (n=99, 22%), at least 11-16 years old (n=28, 6.2%). Figure 1 shows the distribution of children's age among study participants. The most frequent Child gender among study participants was male (n=237, 52.7 %) and female (n=213, 47.3%). Figure 2 shows the gender distribution of children among study participants. The most frequent child with autism spectrum disorder among study participants was No (n=401, 89.1%), followed by Yes (n=49, 10.9%). Figure 3 shows the distribution of children with autism spectrum disorder among study participants.

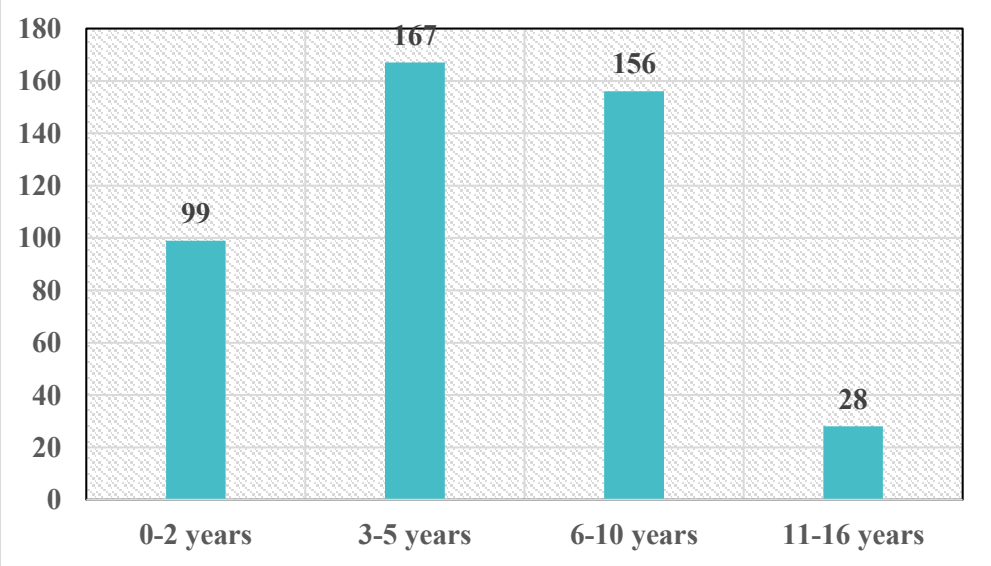

Figure 1: Children's Age distribution among study participants

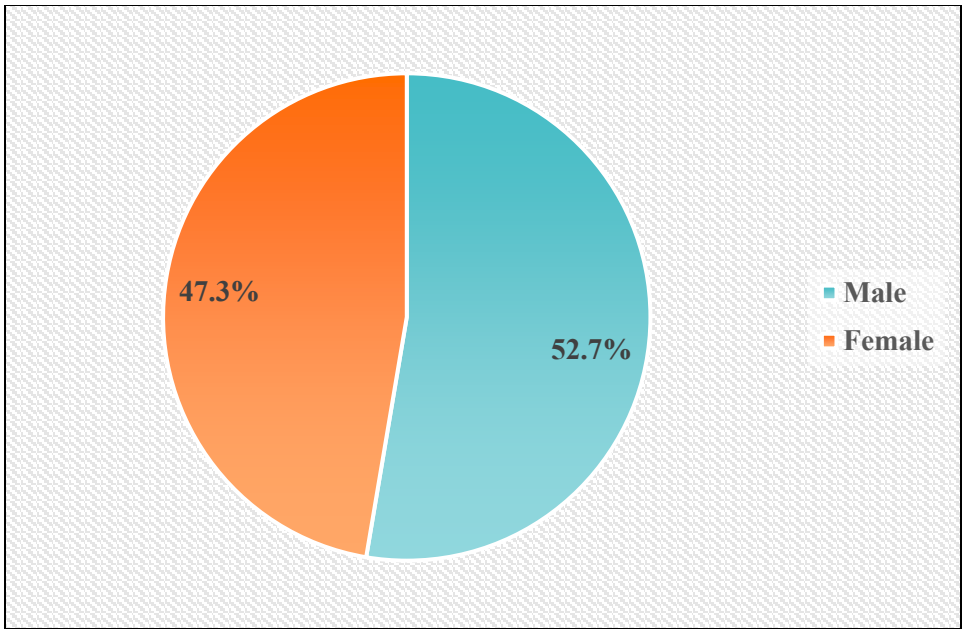

Figure 2: Gender distribution of children among study participants

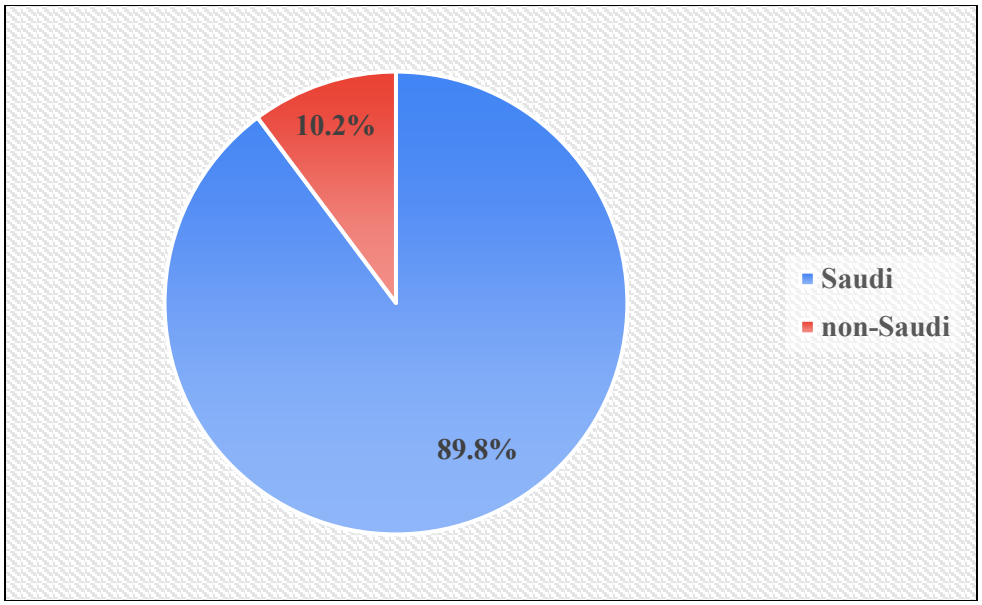

Figure 3: Children with autism spectrum disorder among study participants.

Educational level of parents of children with autism spectrum disorder (ASD) among study participants, the majority were Postgraduate (n=31, 63.3%), followed by Secondary (n=13, 26.5%), then Primary (n=5, 10.2%).

Employment Status of parents of children with autism spectrum disorder (ASD) among study participants, most of them were Employed Full-Time (n=34, 69.4%), followed by Housewife (n=8, 16.3%), then Part-Time (n=4, 8.2%), and at least Unemployed (n=8, 16.3%).

The participants were asked how the child was diagnosed with ASD, most of them answered Pediatrician (n=21, 42.9%), followed by Psychologist (n=14, 28.6%), then Neurologist (n=3, 6.1%). The Distribution of professionals diagnosing ASD among study participants is shown in Figure 4.

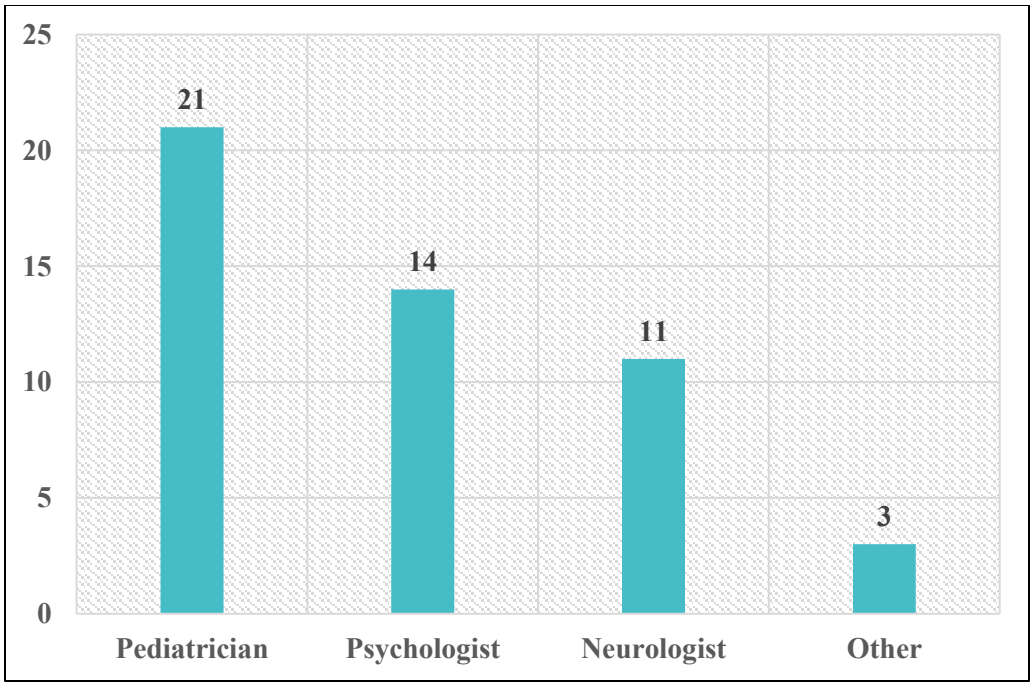

Figure 4: Distribution of professionals diagnosing ASD among study participants

Participants were asked Did cultural or social stigma delay seeking medical help, Most of them answered no (n=34, 69.4%), followed by not sure (n=10, 20.4%), then yes (n=5, 10.2%). Figure 5 shows the distribution of cultural/social stigma in delaying seeking medical help among study participants.

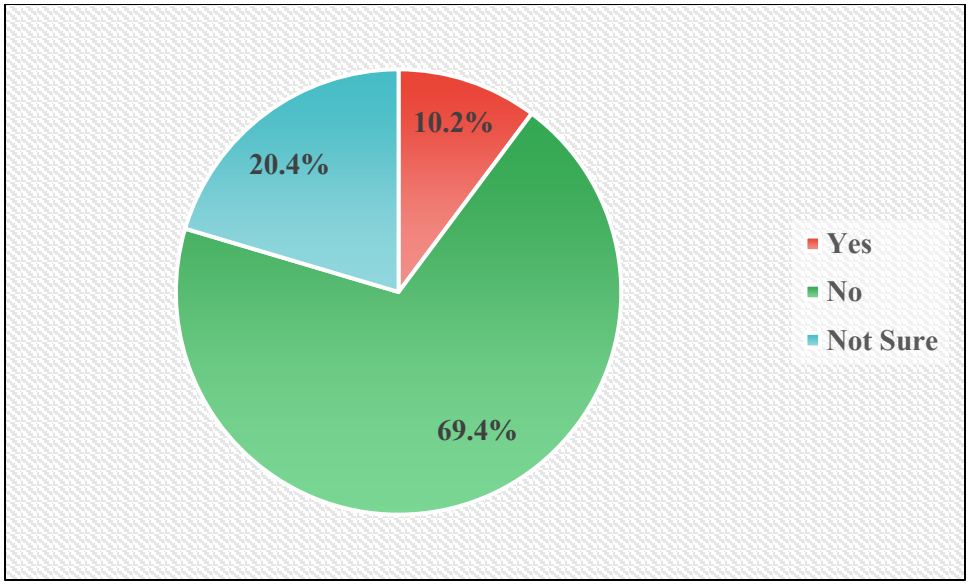

Figure 5: cultural/social stigma delay seeking medical help distribution among study participants

Participants were asked Do you feel stress in managing your child's behavior. The most frequent were occasionally (n=24, 49%), followed by rarely (n=13, 26.5%), then frequently (n=9, 18.4%), and never (n=3, 6.1%).

Participants were asked, about Does your child attend a special education center/school. The most frequent were yes (n=26, 53.1%), then no (n=18, 36.7%), and planning to enroll (n=5, 10.2%).

Participants were asked to rate the extent to which the following behaviors are present in their child. Their responses and results are presented in Table 1.

Table 1: Parent-Reported Frequency of Behavioral

Behavior	Never	2	3	4	Always
Repetitive movements (e.g., hand flapping, rocking)	24 (49%)	11 (22.4%)	9 (18.4%)	1 (2%)	4 (8.25%)
Difficulty maintaining eye contact	10 (20.4%)	10 (20.4%)	5 (10.2%)	15 (30.6%)	9 (18.4%)
Tantrums or meltdowns	12 (24.5%)	11 (22.4%)	13 (26.5%)	5 (10.2%)	8 (16.3%)
Aggressive behavior (e.g., hitting, biting)	15 (30.6%)	14 (28.6%)	11 (22.4%)	5 (10.2%)	4 (8.2%)
Self-harming behaviors (e.g., head-banging)	26 (53.1%)	3 (6.1%)	12 (24.5%)	1 (2%)	7 (14.3%)
High anxiety or fearfulness	20 (40.8%)	21 (42.9%)	6 (12.2%)	1 (2%)	1 (2%)
Resistance to change or rigid routines	16 (32.7%)	16 (32.7%)	13 (26.5%)	1 (2%)	3 (6.1%)
Difficulty sleeping or irregular sleep patterns	20 (40.8%)	4 (8.2%)	14 (28.6%)	10 (20.4%)	1 (2%)
Poor response to social cues or name-calling	14 (28.6%)	11 (22.4%)	15 (30.6%)	9 (18.4%)	0
Limited or absent verbal communication	14 (28.6%)	8 (16.3%)	14 (28.6%)	5 (10.2%)	8 (16.3%)

Participants were asked Has your child shown behavioral improvement with therapy; Most reported Significant improvement (n=19, 38.8%), followed by Moderate improvement (n=16, 32.7%), then no noticeable change (n=14, 28.6%). Figure 6 shows the Distribution of Behavioral Improvement Levels Among Children Receiving Therapy.

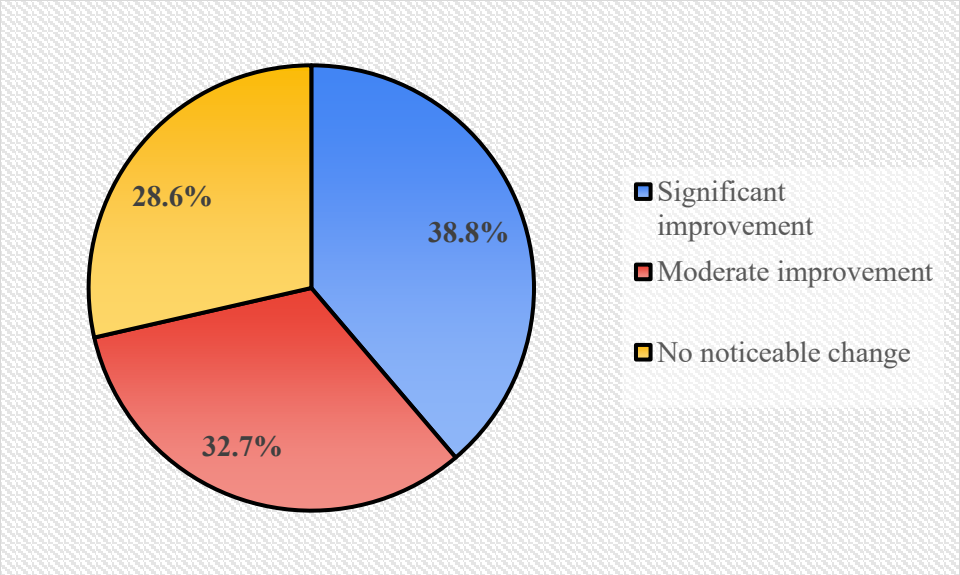

Figure 6: Distribution of Behavioral Improvement Levels Among Children Receiving Therapy

CONCLUSION

The results showed significant associations between children's behavioral outcomes and several factors, including age, age at diagnosis, parental education, employment status, and method of diagnosis. These findings indicate that demographic and diagnostic characteristics influence behavioral patterns in children with ASD. In contrast, no significant relationship was found with gender.

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ANNEX 1: DATA COLLECTION TOOL

1. Child's Age: ___ years

2. Child's Gender:

a. Male
b. Female

3. Do you have a child with autism spectrum disorder

a. Yes
b. No

Questions about your child with autism spectrum disorder

4. Age at Diagnosis of ASD: ___ years

5. Nationality:

a. Saudi
b. non-Saudi (specify): _____

6. Parental Education Level:

a. Primary
b. Secondary
c. Bachelor's
d. Postgraduate

7. Employment Status of Responding Parent:

a. Employed Full-Time
b. Part-Time
c. Unemployed
d. Housewife

8. How was the child diagnosed with ASD?

a. Pediatrician
b. Psychologist
c. Neurologist
d. Other (specify): _____

9. Was early intervention therapy initiated after diagnosis?

a. Yes
b. No

10. Which therapies has your child received? *(Check all that apply)*

a. Speech Therapy
b. Occupational Therapy
c. Behavioral Therapy (ABA)
d. Special Education
e. Others (specify): _____

11. Do you feel you were aware of ASD symptoms before diagnosis?

a. Yes
b. No

12. Did cultural or social stigma delay seeking medical help?
a. Yes
b. No
c. Not Sure

13. Behavioral Changes
Please rate the extent to which the following behaviors are present in your child. ***(1 = Never, 5 = Always)***

Behavior	**1**	**2**	**3**	**4**	**5**
Repetitive movements (e.g., hand flapping, rocking)	☐	☐	☐	☐	☐
Difficulty maintaining eye contact	☐	☐	☐	☐	☐
Tantrums or meltdowns	☐	☐	☐	☐	☐
Aggressive behavior (e.g., hitting, biting)	☐	☐	☐	☐	☐
Self-harming behaviors (e.g., head-banging)	☐	☐	☐	☐	☐
High anxiety or fearfulness	☐	☐	☐	☐	☐
Resistance to change or rigid routines	☐	☐	☐	☐	☐
Difficulty sleeping or irregular sleep patterns	☐	☐	☐	☐	☐
Poor response to social cues or name-calling	☐	☐	☐	☐	☐
Limited or absent verbal communication	☐	☐	☐	☐	☐

14. Does your child's behavior worsen in noisy or crowded environments?
a. Yes
b. No
c. Sometimes
15. Are there other children in the family with developmental or behavioral issues?
a. Yes
b. No
16. How involved is the family in the child's daily care and learning?
a. Very involved
b. Somewhat involved
c. Not involved
17. Do you feel stress in managing your child's behavior?
a. Frequently
b. Occasionally
c. Rarely
d. Never
18. Does your child attend a special education center/school?
a. Yes
b. No
c. Planning to enroll
19. Has your child shown behavioral improvement with therapy?
a. Significant improvement
b. Moderate improvement

c. No noticeable change
d. Behavior worsened

APPENDIX 2: Participants' responses to scale items

Age level	Frequency	Percent
0-2 years	99	22.0
3-5 years	167	37.1
6-10 years	156	34.7
11-16 years	28	6.2
Total	450	100.0

Child Gender	Frequency	Percent
Male	237	52.7
Female	213	47.3
Total	450	100.0

Child Autism	Frequency	Percent
Yes	49	10.9
No	401	89.1
Total	450	100.0

Age Diagnosis level	Frequency	Percent
0-2 years	25	51.0
3-5 years	20	40.8
6-10 years	3	6.1
11-16 years	1	2.0
Total	49	100.0

Nationality	Frequency	Percent
Saudi	44	89.8
non-Saudi	5	10.2
Total	49	100.0

Parental Education Level	Frequency	Percent
Primary	5	10.2
Secondary	13	26.5
Postgraduate	31	63.3
Total	49	100.0

Employment Status	Frequency	Percent
Employed Full-Time	34	69.4
Part-Time	4	8.2
Unemployed	3	6.1
Housewife	8	16.3
Total	49	100.0

How child diagnosed	Frequency	Percent
Pediatrician	21	42.9
Psychologist	14	28.6
Neurologist	11	22.4
Other	3	6.1
Total	49	100.0

Intervention therapy initiated	Frequency	Percent
Yes	31	63.3
No	18	36.7
Total	49	100.0

Aware ASD before diagnosis	Frequency	Percent
Yes	19	38.8
No	30	61.2
Total	49	100.0

Social stigma delays seeking medical help	Frequency	Percent
Yes	5	10.2
No	34	69.4
Not Sure	10	20.4
Total	49	100.0

Which therapies has your child received? *(Check all that apply)*	Frequency	Percent
Speech Therapy	13	19.1%
Occupational Therapy	16	23.5%
Behavioral Therapy (ABA)	24	35.3%
Special Education	14	20.6%
Others (specify): _____	1	1.5%

Behavior	Never	2	3	4	Always
Repetitive movements (e.g., hand flapping, rocking)	24 (49%)	11 (22.4%)	9 (18.4%)	1 (2%)	4 (8.25%)
Difficulty maintaining eye contact	10 (20.4%)	10 (20.4%)	5 (10.2%)	15 (30.6%)	9 (18.4%)
Tantrums or meltdowns	12 (24.5%)	11 (22.4%)	13 (26.5%)	5 (10.2%)	8 (16.3%)
Aggressive behavior (e.g., hitting, biting)	15 (30.6%)	14 (28.6%)	11 (22.4%)	5 (10.2%)	4 (8.2%)
Self-harming behaviors (e.g., head-banging)	26 (53.1%)	3 (6.1%)	12 (24.5%)	1 (2%)	7 (14.3%)
High anxiety or fearfulness	20 (40.8%)	21 (42.9%)	6 (12.2%)	1 (2%)	1 (2%)
Resistance to change or rigid routines	16 (32.7%)	16 (32.7%)	13 (26.5%)	1 (2%)	3 (6.1%)
Difficulty sleeping or irregular sleep patterns	20 (40.8%)	4 (8.2%)	14 (28.6%)	10 (20.4%)	1 (2%)
Poor response to social cues or name-calling	14 (28.6%)	11 (22.4%)	15 (30.6%)	9 (18.4%)	0
Limited or absent verbal communication	14 (28.6%)	8 (16.3%)	14 (28.6%)	5 (10.2%)	8 (16.3%)

Child behavior is worse noisy	Frequency	Percent
Yes	25	51.0
No	7	14.3

Sometimes	17	34.7
Total	49	100.0

Other children's developmental	Frequency	Percent
Yes	7	14.3
No	42	85.7
Total	49	100.0

How involved family child's daily care	Frequency	Percent
Very involved	31	63.3
Somewhat involved	18	36.7
Total	49	100.0

Feel stress managing child	Frequency	Percent
Frequently	9	18.4
Occasionally	24	49.0
Rarely	13	26.5
Never	3	6.1
Total	49	100.0

Child attend a special education center	Frequency	Percent
Yes	26	53.1
No	18	36.7
Planning to enroll	5	10.2
Total	49	100.0

Behavioral improvement therapy	Frequency	Percent
Significant improvement	19	38.8
Moderate improvement	16	32.7
No noticeable change	14	28.6
Total	49	100.0

Chi-square Test:

Test Statistics

	Age level	Child Gender	Child Autism	Age Diagnosis	Parental Education Level	Employment Status	How child diagnosed
Chi-Square	108.311[a]	1.280[b]	275.342[b]	35.490[c]	21.714[d]	52.633[c]	13.612[c]
df	3	1	1	3	2	3	3
Asymp. Sig.	.000	.258	.000	.000	.000	.000	.003
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 112.5.							
b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 225.0.							
c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 12.3.							
d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 16.3.							