Section: Paediatrics

Original Research Article

TO ESTIMATE THE PROPORTION OF TD SIBLINGS OF CHILDREN WITH AUTISM SCORING IN ABNORMAL RANGE OF SDQ & CORRELATION BETWEEN SDQ, FIQ & ISAA WITH REGARD TO SEVERITY OF AUTISM

K.C. Ramalingam[1], P. Ilamparithi[2], P. Selvakumar[3]

[1]Junior Resident, Government RMH and Thanjavur Medical College, India.
[2]Senior Assistant Professor, Government RMH and Thanjavur Medical College, India.
[3]Professor of Paediatrics, Government RMH and Thanjavur Medical College, India.

Received : 03/12/2025
Received in revised form : 20/01/2026
Accepted : 06/02/2026

Keywords:
Autism Spectrum Disorder, siblings, behavioural, SDQ, FIQ, ISSA.

Corresponding Author:
Dr. P, Ilamparithi,
Email: dr.muthuilam@gmail.com

DOI: 10.47009/jamp.2026.8.1.209

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (1); 1095-1106

ABSTRACT

Background: Siblings of children with Autism Spectrum Disorder (ASD) often face unique emotional and behavioural challenges due to increased caregiving demands and altered family dynamics. This study aimed to assess these challenges in typically developing (TD) siblings and examine their correlation with the severity of the child's ASD. **Methods:** This cross-sectional study was conducted among 42 mother-TD sibling dyads recruited from the District Early Intervention Centre (DEIC) attached to a medical college, Thanjavur, Tamil Nadu. Consecutive sampling was used. Emotional and behavioural difficulties of TD siblings were assessed using the Strengths and Difficulties Questionnaire (SDQ), and the perceived impact of ASD on family dynamics was evaluated using the Sibling Negative Impact Subscale of the Family Impact Questionnaire (FIQ). The severity of ASD was determined using the Indian Scale for Assessment of Autism (ISAA). Data were analyzed using SPSS, employing descriptive statistics and correlation analysis. **Results:** Of the 42 TD siblings, 54.8% scored in the abnormal range of the SDQ, indicating significant emotional and behavioural difficulties. Higher ISAA scores were positively correlated with SDQ ($r = 0.62$, $p < 0.01$) and FIQ scores ($r = 0.68$, $p < 0.01$). SDQ and FIQ scores also showed a significant positive correlation ($r = 0.56$, $p < 0.01$), highlighting the interrelationship between sibling challenges and perceived family impact. **Conclusion:** The findings demonstrate a significant association between ASD severity and the emotional and behavioural difficulties of TD siblings, emphasizing the need for targeted family-centered interventions to support sibling well-being. There is a positive correlation between the emotional and behavioural changes with the severity of autism and family dynamics.

INTRODUCTION

Autism spectrum disorder (ASD) includes a range of neurodevelopmental conditions characterized by impairments in social interactions, accompanied by inflexible as well as repetitive behavioural patterns and activities. The ICD-11 defines ASD as a condition marked by ongoing challenges in initiating or sustaining social interactions and relationships. Additionally, it involves a tendency towards limited, repetitive behaviours or narrowly focused interests that are either atypical or adhered to with excessive rigidity, considering cultural norms.[1] This interfering condition normally develops early in life and often causes significant impairment in day-to-day functioning. Often, it causes exaggerated discomfort at the prospect of environmental changes given its low adaptability. Other than social and behavioural difficulties, individuals with ASD often have comorbid conditions, including language deficits, intellectual disabilities, and seizures. These impairments, in addition to its pervasive nature across personal, social, and educational domains, have serious impacts not only for the individual but also for their family.[2-4] Conceptualization of ASD has undergone change; now, it encompasses conditions like autistic disorder, Asperger's disorder and pervasive developmental disorder-not otherwise specified (PDD-NOS) classified under a unified diagnostic grouping in both the DSM-5 and ICD-11.[5-10] ASD is more common in males than females with a male-to-female with a ratio of almost 4:1. The occurrence of ASD has increased dramatically in the last few decades. The global estimates have ranged

ISSN (O): 2687-5365; ISSN (P): 2753-6556

between 0.07% to 1.8%.[5-7,11-15] In India, it is estimated to be approximately 1 in 68 children, and boys outnumber girls at a ratio of 3:1.[16] Highly prevalent ASD affects more and more families and their siblings suffering from the additional difficulties of ASD. There are studies proved that the siblings of a child having a special need, especially with ASD, who are far more susceptible to emotional and behavioural difficulties such as anger and depression, and most importantly exclusion from social life.[17-20] The siblings are confronted with many more wellbeing-related challenges than other children whose siblings do not have special needs, mainly because with the birth of a child with special needs, the family has to make significant changes in their lifestyle. Of course, some brothers and sisters are amazingly resilient: their self-confidence is very high, and they master challenging problem-solving strategies. In any case, the outcomes vary with cultural, economic, and family factors and the nature of the disability.[22-26] The sharp increase in ASD prevalence has exposed an increasing number of families to these challenges, especially siblings who are essential parts of the family life. The sibling relationship is the most significant after the parent-relationship and occupies all important functions such as companion, social model, teacher, and source of emotional support. However, the challenges faced by siblings of children with ASD remains a significant lacuna in the literature, specifically within the Indian context, where cultural and other societal factors may further increase the magnitude of outcomes. It is essential to recognize the problems and coping mechanisms among siblings for several reasons. Primarily, siblings tend to become the lifetime companion and caregiver for one another. Hence, their wellbeing becomes critical for the family system. Additionally, sibling-focused research may be easily applied to support the entire family, including ASD-diagnosed children and their siblings. Lastly, the knowledge of experience in a study makes the notion of know-how of behavioural adaptation and coping very pertinent in defining and further understanding family dynamics in ASD. Since sibling experiences have received insufficient research attention, particularly in developing countries, this study anticipates substantiating that gap by assessing emotional and behavioural challenges related to sibling experience due to children with ASD in settings of socio-cultural perspectives from these study centers. The research findings will have significant implications for creating focused assistance programs and interventions. These efforts aim to enhance outcomes for siblings and promote a comprehensive family-oriented care approach.

Aim and Objectives: Aim: To assess the difficulties in emotional and behavioural functioning of children with a sibling who has an Autism Spectrum Disorder. **Primary Objectives:** 1. To evaluate emotional and behavioural problems of the unaffected siblings of ASD children using Strengths and Difficulties Questionnaire. 2. To assess the perceived impact of having a sibling with ASD on family dynamics using the Sibling Negative Impact subscale of the Family Impact Questionnaire (FIQ). 3. To correlate the SDQ scores of typically developing (TD) siblings with the severity of autism in the affected sibling, as assessed by the Indian Scale for Assessment of Autism (ISAA). 4. To examine the relationship between FIQ scores of typically developing (TD) siblings and the severity of autism in the affected sibling, as assessed by the Indian Scale for Assessment of Autism (ISAA). **Secondary Objective:** 1. To assess the correlation between the SDQ and FIQ scores to explore the interrelationship between sibling emotional and behavioural challenges and the perceived family impact.

MATERIALS AND METHODS

Study Design: This cross-sectional study assessed the emotional and behavioural challenges experienced by siblings of children with Autism Spectrum Disorder (ASD) in Thanjavur district. **Study Setting:** The study was carried out at the District Early Intervention Centre (DEIC) attached to a medical college hospital and special children support centers in and around the district of Thanjavur. **Sample Size Calculation:** Sample size estimation was done using a finite population correction factor (fpc). The population size (N) was assumed to be 1,000,000, with a confidence level (z) of 95%. The study's sample size was determined to be 42, calculated using an anticipated frequency outcome factor (P) of 2.77%, a precision (d) of 5%, and a design effect of 1. The sample size was determined using the following formula:

$$n = \frac{Z^2 \times P \times (1-P)}{d^2} \times \frac{N}{N-1}$$

Where: Z= 1.96 (for 95% confidence), P = 2.77% (expected frequency of outcome factor), d = 5% (precision), N = 1,000,000 (population size)

Sampling Method: A consecutive sampling method was employed, where all eligible participants meeting the inclusion criteria were approached during the study period. **Inclusion Criteria:** 1. Siblings of children diagnosed with Autism Spectrum Disorder (ASD) attending the DEIC or special children support centers in and around the district of Thanjavur. 1. Typically developing (TD) siblings aged 4-18 years along with mothers. 2. Ability to understand and provide informed consent. **Exclusion Criteria:** 1. Siblings of children with additional developmental or chronic health conditions. 2. Siblings with a diagnosed psychiatric or behavioural disorder. 3. Siblings of children who have been diagnosed with ASD but are not attending the DEIC or special children support centers. 4. Siblings who are non-verbal or unable to complete the

ISSN (O): 2687-5365; ISSN (P): 2753-6556

questionnaires. **Data Collection Tools:** 1. Indian Scale for Assessment of Autism (ISAA): The ISAA is a standardized tool used to measure the severity of autism in children and adolescents. It categorizes severity as Mild, Moderate, or Severe based on total scores, allowing for correlation with sibling outcomes. The ISAA was administered to quantify the ASD severity in the affected sibling as part of the study. **2. Family Impact Questionnaire (FIQ), Sibling Negative Impact Subscale:** This subscale was used to evaluate the perceived negative impact of having a sibling with ASD on the emotional and behavioural well-being of the typically developing (TD) sibling. It measures areas such as changes in social interactions, emotional challenges, and adjustments in family dynamics. Scores were interpreted with higher scores indicating greater perceived negative impact. Sibling Negative Impact Subscale Score Range. The subscale typically includes 5–8 items, each scored on a Likert scale. Minimum Score: 0 (no negative impact). Maximum Score: Dependent on the number of items (e.g., for 8 items, 0– 32). Interpretation: Higher scores indicate a greater negative emotional, behavioural and social impact on the sibling due to having a child with ASD in the family. Suggested score ranges for interpretation (may vary based on validation studies): 0–8: Minimal impact, 9–16: Moderate impact, 17 and above: High impact, **3. SDQ: Strengths and Difficulties Questionnaire:** The Strengths and Difficulties Questionnaire (SDQ) is a validated tool for evaluating emotional and behavioural challenges in young people. It comprises 25 items across five categories: emotional symptoms, conduct problems, hyperactivity, peer problems, and prosocial behaviour. The Total Difficulties Score is calculated by adding up the scores from all domains except for Prosocial Behaviour with scores categorized as Normal (0–13), Borderline (14–16), or Abnormal (17–40). The scale provides both a domain-specific assessment and an overall measure of difficulties [108]. Domains: The SDQ has 25 items grouped into 5 domains: Emotional Symptoms (5 items), Conduct Problems (5 items), Hyperactivity/Inattention (5 items), Peer Relationship Problems (5 items), Prosocial Behaviour (5 items), Scoring System: Each item is scored on a scale of 0–2: 0 = Not True, 1 = Somewhat True, 2 = Certainly True Interpretation, Domain Scores: Lesser scores in Emotional Symptoms, Conduct Problems, Hyperactivity, and Peer Problems are required. Greater scores in Prosocial Behaviour are required. Total Difficulties Score: 0–13: Normal, 14–16: Borderline, 17–40: Abnormal. **Data Collection Procedure: Consent Process:** Written informed consent was obtained from the mothers of participating TD siblings prior to their inclusion in the study. Mothers were provided with detailed information about the study's purpose, procedures, confidentiality measures, and their right to withdraw at any stage. **Interview Setting:** Data were collected in private, quiet settings such as the District Early Intervention Center (DEIC) or special children support centers to ensure confidentiality and comfort. The interview process was customised to minimize distractions and maximize participant focus. **Administration of Scales:** Mother-Assisted Administration: For typically developing siblings 4 years of age and older, mothers provided assistance during face-to-face interviews to complete the SDQ and FIQ surveys. **Interview method:** The investigator carried out the evaluation by verbally presenting each inquiry to both the mother and sibling. Responses were recorded based on the mother's observations and the sibling's expressed experiences, without further probing to avoid bias. **Translation and Validity:** Both the SDQ and FIQ were translated into the vernacular language to ensure cultural and linguistic relevance. Back translation was conducted by an independent expert to validate the accuracy of the translation. The translated versions were pretested on a small group to ensure clarity and comprehension. **Severity Assessment of ASD:** The ISAA was used to evaluate the severity of autism in the affected sibling. This assessment was carried out by trained professionals in the DEIC or the support center. **Scoring and Interpretation:** For the SDQ, scores were categorized based on established cutoffs for Total Difficulties and individual domains. The FIQ Sibling Negative Impact Subscale was scored by summing the responses, with higher scores indicating greater perceived impact. The ISAA scores were categorized into mild, moderate, and severe autism based on standardized cutoffs. Confidentiality and **Ethical Considerations:** To ensure privacy, all data were de-identified, and records were securely stored. The study subjects were assured that their answers would be utilized exclusively for research. Before commencing data collection, the study received ethical clearance from the institution's ethics board. **Statistical Analysis:** The statistical analysis was performed using IBM SPSS Statistics (version 26) (IBM Corp., Armonk, NY). The analysis was chosen to address the study objectives, including descriptive statistics, group comparisons, and correlation analyses. The details of the statistical procedures are as follows: Descriptive Statistics: All categorical variables like gender, ISAA interpretation (mild, moderate, severe), SDQ categorization (normal, borderline, abnormal), and sibling birth order (elder, younger) were tabulated in terms of their frequencies and percentages. Descriptive statistics provide a summary of the demographic and study-specific characteristics of a population. Continuous variables, such as the age of autistic children and their siblings, ISAA scores, FIQ Sibling Negative Impact Subscale scores, and SDQ domain and total scores are summarized in means and standard deviations. Comparison of Emotional and Behavioural Impact Based on Autism Severity. Comparison of Emotional and Behavioural scales among Siblings of Children with Mild and Moderate-to-Severe Autism. Independent Samples T-test for normally distributed variables was used to find out if there were

ISSN (O): 2687-5365; ISSN (P): 2753-6556

differences in mean scores between the FIQ. Sibling Negative Impact Subscale and the domains of SDQ: For those variables that were non normally distributed, the Mann-Whitney U test was adopted to determine the difference. The significance level was kept at $p < 0.05$. Comparison of Emotional and Behavioural Impact Based on Sibling Birth Order (Elder vs. Younger): A comparison was conducted to determine the differences in sibling birth order effects between older and younger siblings in emotional and behavioural outcomes. This depends on the distribution of the variables. A t-test for independent samples or the Mann-Whitney U test was used. Differences in the scores of the FIQ Sibling Negative Impact Subscale and SDQ domains were observed, with p-values < 0.05. A Chi-square test was utilized to assess the relationship between the severity of autism (mild vs. moderate-severe) and SDQ categorization (normal, borderline, and abnormal). Correlation of ISAA, FIQ and SDQ Domains: Pearson's correlation test was applied to explore the relationship between the severity of autism as represented by ISAA scores, emotional and behavioural outcomes as measured by the FIQ Sibling Negative Impact Subscale and the domains of the SDQ. Strength of and direction of associations interpreted according to conventional cut-offs: weak at 0.1–0.3, moderate at 0.3–0.5, and strong at >0.5. Calculation of p values for statistical significance required <0.05. Correlation between FIQ Sibling Negative Impact Subscale and SDQ Domains. Pearson correlation was conducted to establish any correlation between the domains of the SDQ and the FIQ Sibling Negative Impact Subscale. The correlation was divided into three categories - weak, moderate, and strong. Each category was translated to the appropriate interpretation. A p value less than 0.05 was taken to be significant.

RESULTS

Table 1: Descriptive statistics of categorical variables of study population

Variables		Counts (N)	%
Gender	Female	10	23.80%
	Male	32	76.20%
ISAA Interpretation	Mild	19	45.20%
	Moderate	17	40.50%
	Severe	6	14.30%
Categorization Of SDQ	Abnormal	23	54.80%
	Borderline	11	26.20%
	Normal	8	19.00%
Sibling birth Order	Elder	17	40.5%
	Younger	25	59.5%

This table 1. represents among the siblings of children with autism shows, 76.2% were males while 23.8% were females. Regarding the severity of autism, based on ISAA, 45.2% fell in the "Mild" level, 40.5% in "Moderate, and 14.3% in "Severe". The most siblings scored abnormal emotional and behavioural difficulties, 17–40, using the SDQ total score. 26.2% fell into the borderline range of 14–16 and 19.0% fell within the normal range of 0–13. A disproportionate number of younger siblings (59.5%) were comprised in the study, compared to older siblings (40.5%).

Table 2: Descriptive statistics of continuous variables of study population

Variables	Mean	Standard deviation
Age of Autistic child	6.02	1.97
Age of sibling	6.05	2.05
FIQ(Sibling Negative Impact Subscale)	16.4	4.07
SDQ (Domains)		
Emotional Problems Scale	3.88	3.96
Conduct Problems Scale	3.4	3.19
Hyperactivity Scale	4.26	3.46
Peer Problems Scale	4.98	2.41
Prosocial Scale	6.6	3.12
SDQ total score	22	8.88
ISAA	112	25.1

This Table 2. displayed mean and standard deviation for continuous variables. The age of the children with autism averaged 6.02 years of age, while the sibling's age averaged 6.05 years of age. The average score on the FIQ Sibling Negative Impact Subscale was 16.4 moderate impact. On the SDQ domains, Emotional Problems 3.88, Conduct Problems (3.4) Hyperactivity (4.26) and Peer Problems (4.98) showed mild levels of problems, but leaning towards abnormal levels. The mean score on the Prosocial Scale was 6.6, which reflects appropriate prosocial behaviour. The siblings exhibited significant emotional and behavioural issues, as evidenced by their SDQ total score of 22, ranging from 17 to 40. The average ISAA score of 112 indicated that the

ISSN (O): 2687-5365; ISSN (P): 2753-6556

autism severity in the study population was moderate.
[Table 2]

Table 3: Comparison of Emotional and Behavioural Influence on Siblings of Children with Autism Spectrum Disorder based on Severity of Autism (Mild vs. Moderate-Severe)

Group based on autistic spectrum	mild		moderate-severe		
	mean	SD	mean	SD	p value
[a]FIQ(Sibling Negative Impact Subscale)	14.8	3.47	17.6	4.16	0.026*
SDQ (Domains)					
Emotional Problems Scale	2.11	2.75	5.35	4.26	0.017*
Conduct Problems Scale	2.53	2.78	4.13	3.39	0.138
Hyperactivity Scale	2.95	2.74	5.35	3.68	0.034*
[a]Peer Problems Scale	3.95	1.9	5.83	2.5	0.010*
Prosocial Scale	6.68	3.3	6.52	3.04	0.884
SDQ total score	17.7	6.18	25.5	9.31	0.012*

[a]-Student t test; Mann whitney U test; ($p<0.05$)

This table.3. Compares the emotional and behavioural influences on siblings based on the severity of autism in children (mild vs. moderate to severe). The FIQ Sibling Negative Impact Subscale showed significantly higher scores in the moderate-severe group (17.6 ± 4.16) than in the mild group (14.8 ± 3.47, p = 0.026). Among the SDQ domains: Emotional Problems Scale (5.35 vs. 2.11, p = 0.017), Hyperactivity Scale (5.35 vs. 2.95, p = 0.034), and Peer Problems Scale (5.83 vs. 3.95, p = 0.010) showed significantly higher difficulty in the moderate-severe group. The SDQ total Score was also significantly higher in the moderate-severe group (25.5 ± 9.31 vs. 17.7 ± 6.18, p = 0.012), indicating more emotional and behavioural issues. The Prosocial Scale scores were similar across both groups, suggesting no significant differences in prosocial behaviour based on autism severity.

Table 4: Comparison of Emotional and Behavioural Impact on Siblings of Children with Autism Spectrum Disorder Based on sibling birth order

Sibling order	Elder (N=17)		younger (N=25)		
	Mean	SD	Mean	SD	p value
[a]FIQ(Sibling Negative Impact Subscale)	15.4	4.58	17	3.63	0.218
SDQ (Domains)					
Emotional Problems Scale	4.18	4.29	3.68	3.8	0.72
Conduct Problems Scale	3.18	3	3.56	3.37	0.814
Hyperactivity Scale	3.82	2.94	4.56	3.81	0.726
[a]Peer Problems Scale	5.12	2.64	4.88	2.3	0.758
Prosocial Scale	6.82	3.38	6.44	3	0.75
SDQ total score	22.5	9.51	21.6	8.61	0.757

[a]-Student t test; Mann whitney U test; ($p<0.05$)

This table. 4. Presents a comparison of FIQ Sibling Negative Impact Subscale scores revealed a non-significant difference between younger and older siblings (p = 0.218). Younger siblings exhibited a slightly higher mean score (M = 17, SD = 3.63) compared to older siblings (M = 15.4, SD = 4.58). No significant differences were observed between older and younger siblings on any SDQ domain. The score on the Emotional Problems scale was marginally higher for elder siblings, mean = 4.18, SD = 4.29 compared with the younger ones, mean = 3.68, SD = 3.8, p = 0.72. The total score for SDQ is also marginally higher in elder siblings. The observed values were marginally higher in the older siblings (mean = 22.5, SD = 9.51) compared to the younger siblings (mean = 21.6, SD = 8.61, p = 0.757). The results suggest that sibling birth order does not have a statistically significant impact on the emotional and behavioural outcomes within this research population. The FIQ Sibling Negative Impact Subscale indicates intermediate effects, the most significant being for siblings whose children suffer from intermediate-severe autism. SDQ scores revealed that there were higher emotional and behavioural difficulties within the moderate-severe autism group; abnormal scores recorded were mainly in the domains of emotional problems, hyperactivity, and peer problems. Since there is no significant differentiation of siblings based on birth order, emotional and behavioural challenges seem equally balanced within the family irrespective of the position of the sibling.

Table 5: Cross Table for SDQ category based on autistic spectrum

	Mild (N=19)	moderate-severe (N=23)	Test Statistic
Band Categorisation-SDQ			
			X^2=4.50,P=0.112
Abnormal	0.4 7/19	0.7 16/23	
Borderline	0.4 7/19	0.2 4/23	
Normal	0.3 5/19	0.1 3/23	

ISSN (O): 2687-5365; ISSN (P): 2753-6556

chi square test; (not significant)

Table 5 presents the distribution of SDQ categories (Normal, Borderline, Abnormal) among siblings of children with mild and moderate-severe autism. A higher proportion of siblings of children with moderate-severe autism were classified as Abnormal on the SDQ (70%, 16/23) compared to siblings of children with mild autism (40%, 7/19). Conversely, a higher percentage of siblings of children with mild autism were classified as Normal (26%, 5/19) compared to siblings of children with moderate-severe autism (13%, 3/23). While these findings suggest a trend towards increased emotional and behavioural difficulties in siblings of children with more severe autism, the difference between the two groups were not statistical significant (p = 0.112).

Table 6: Correlation between ISAA and FIQ scale and SDQ Domains

Variable	Pearson's r	p-value
FIQ Sibling Negative Impact Subscale	0.555***	0.001
Emotional Problems Scale	0.610***	0.001
Conduct Problems Scale	0.477**	0.001
Hyperactivity Scale	0.497***	0.001
Peer Problems Scale	0.574***	0.001
Prosocial Scale	-0.179	0.256
SDQ Total Score	0.652***	0.001

Note. Pearson correlation test; p < .05, p < .01, *p < .001.

This table.6 illustrates the relationship of severity of autism, as assessed by Indian Scale for Assessment of Autism ISAA, and various emotional and effects measures. FIQ Sibling Negative Impact Subscale showed a highly significant positive correlation with ISAA (r = 0.555, p < 0.001); that is to say, higher severity of autism is associated with reported negative impact of the sibling. All domains but the Prosocial Scale showed significant positive correlations with the ISAA. The most significant correlation was with the Emotional Problems Scale (r = 0.610, p < 0.001). This suggests that the higher the severity of autism, the higher are the emotional difficulties, of which anxiety and sadness are manifestations among siblings. Other domains like Conduct Problems were characterized by significant positive correlations where higher levels of autism severity are associated with severe behavioural and social problems: r = 0.477, p < 0.001; Hyperactivity: r = 0.497, p < 0.001; Peer Problems: r = 0.574, p < 0.001. The Prosocial Scale was weakly negatively correlated with ISAA, r = -0.179, p = 0.256, suggesting a nonsignificant trend whereby increased autism severity may decrease prosociality in siblings. The SDQ Total Score had the strongest correlation overall with ISAA, r = 0.652, p < 0.001; this only confirmed that the siblings of children with more severe autism do indeed have overall emotional and behavioural difficulties that are significantly higher.

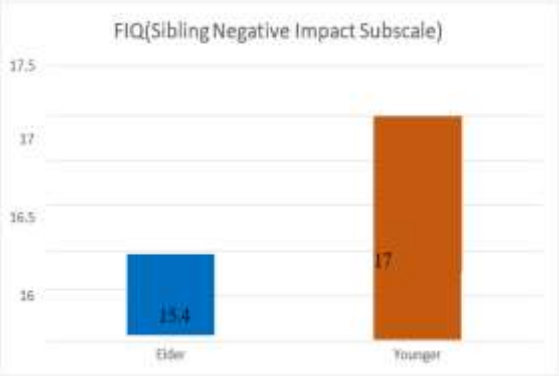
Table 7: Correlation between FIQ Sibling Negative Impact Subscale and SDQ Domains

Variable	r value	p-value
Emotional Problems Scale	0.402**	0.008
Conduct Problems Scale	0.355*	0.021
Hyperactivity Scale	0.281	0.072
Peer Problems Scale	0.249	0.111
Prosocial Scale	-0.175	0.269
SDQ Total Score	0.383*	0.012

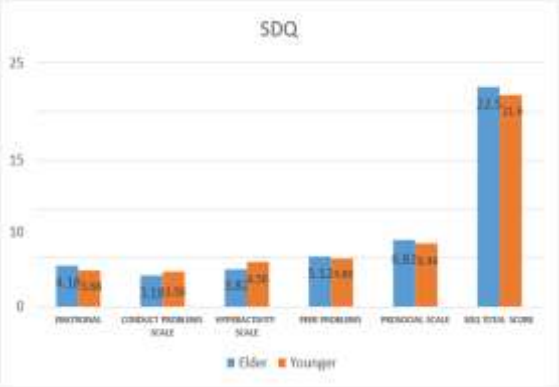
Note. Pearson correlation test; p < .05, p < .01, *p < .001.

This table.7. assesses the relationship between sibling-rated side effects (FIQ Sibling Negative Impact Subscale) and emotional/behavioural difficulties (SDQ domains). The Emotional Problems Scale exhibited a positive correlation with FIQ, with statistically significant results (r = 0.402, p = 0.008). This indicates that siblings who report greater adverse effects also tend to experience more severe emotional issues, such as anxiety or depression. Similarly, the Conduct Problems Scale demonstrated a strong positive correlation (r = 0.355, p = 0.021). This suggests that negative impacts are associated with an increase in behavioural issues, including aggression or acts of defiance. Although the Hyperactivity Scale reached positive trends of r = 0.281, p = 0.072 and of r = 0.249, p = 0.111 for the Peer Problems Scale, the correlations proved statistically not significant. The Prosocial Scale had a weak negative correlation with the FIQ subscale, r = -0.175, p = 0.269. This implies that higher perceived negative impacts do not bring about a strong association with tendencies in siblings to behave prosocially. The SDQ Total Score was significantly positively associated (r = 0.383, p = 0.012), indicating that the more negative impacts that siblings report the more their total emotional and behavioural difficulties.

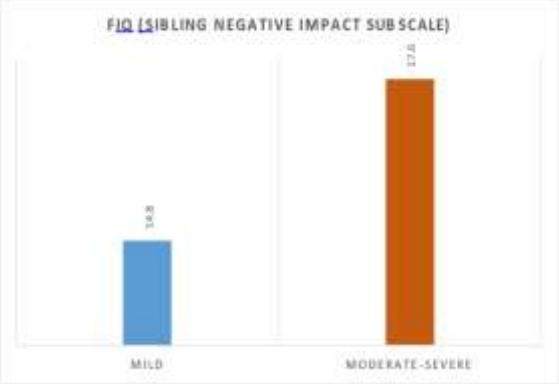
ISSN (O): 2687-5365; ISSN (P): 2753-6556



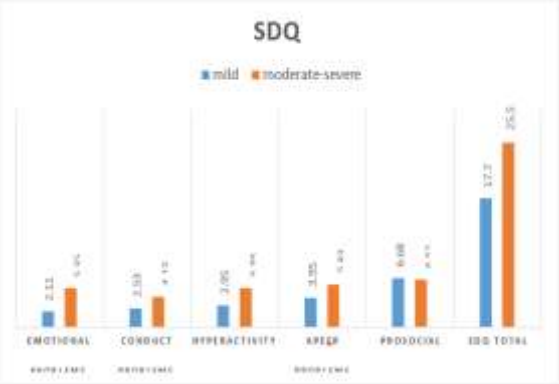
Graph 1: Comparison of FIQ based on sibling order



Graph 2: Comparison of SDQ based on sibling order

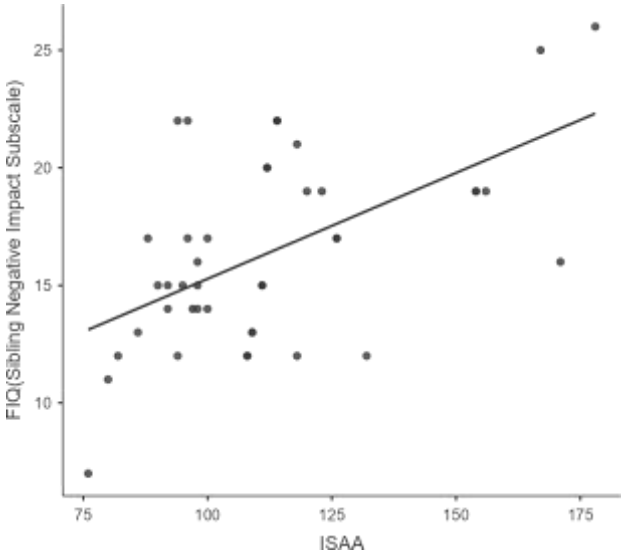


Graph 3: Comparison of FIQ among sibling based on severity of autism

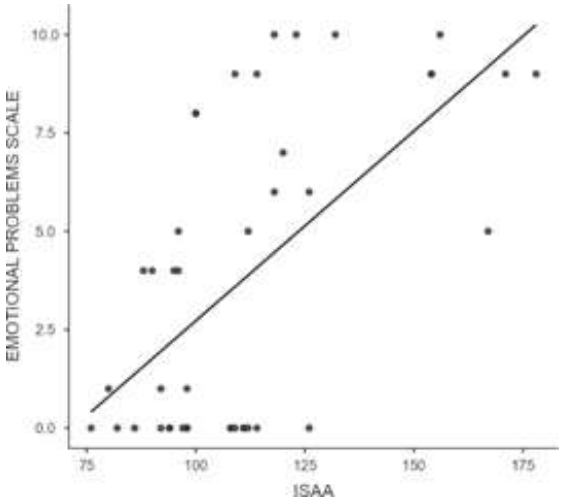


Graph 4: Comparison of SDQ among sibling based on severity of autism

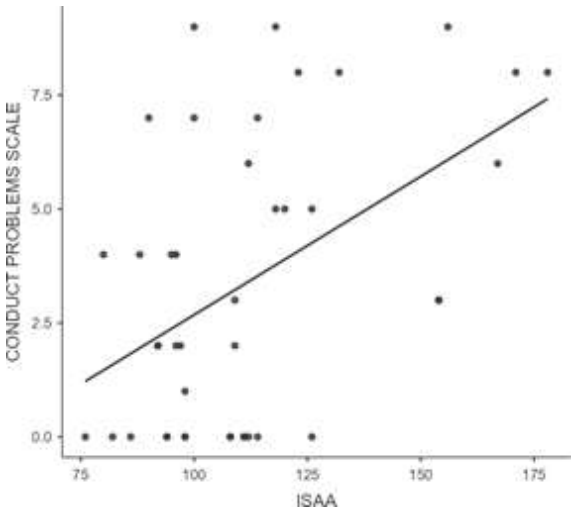
Scatter Plots



Graph 5: Correlation between ISAA and FIQ Sibling Negative Impact Subscale

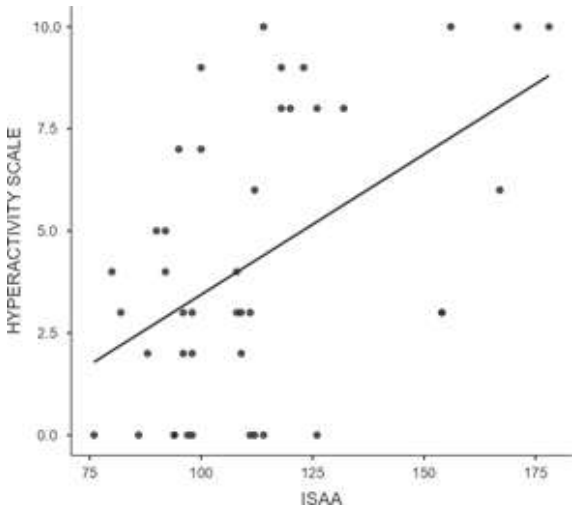


Graph 6: Correlation between ISAA and Emotional Problems Scale

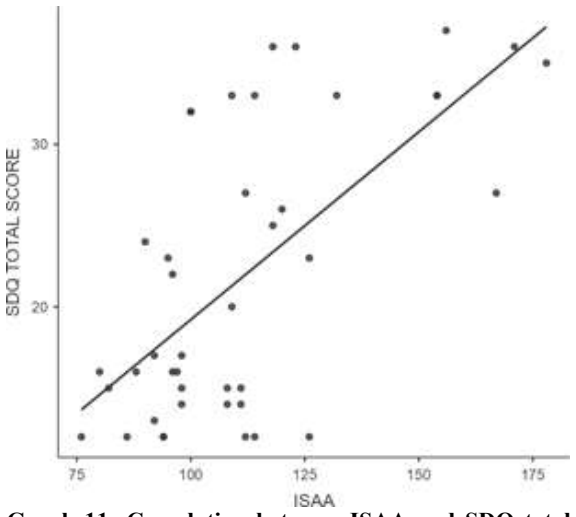


Graph 7: Correlation between ISAA and Conduct Problems Scale

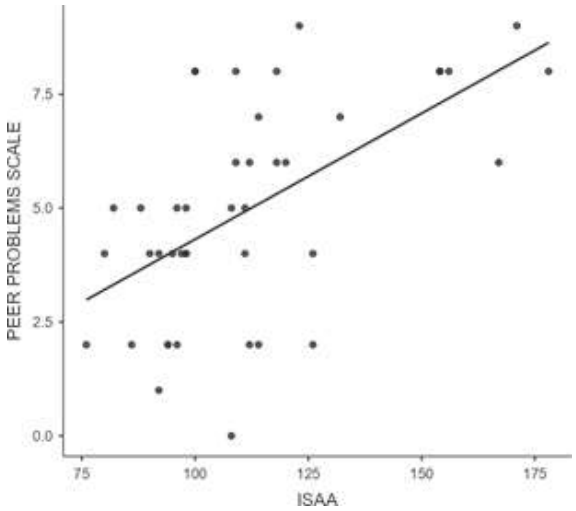
ISSN (O): 2687-5365; ISSN (P): 2753-6556



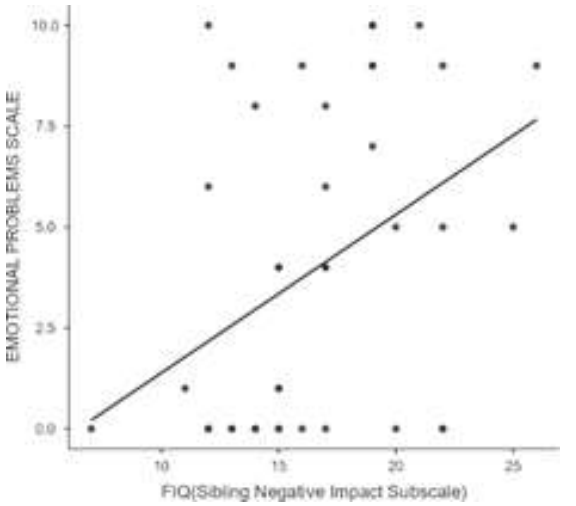
Graph 8: Correlation between ISAA and Hyperactivity Scale



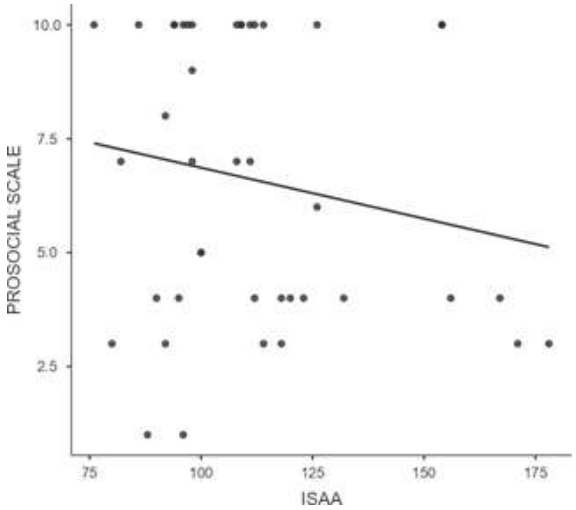
Graph 11: Correlation between ISAA and SDQ total score



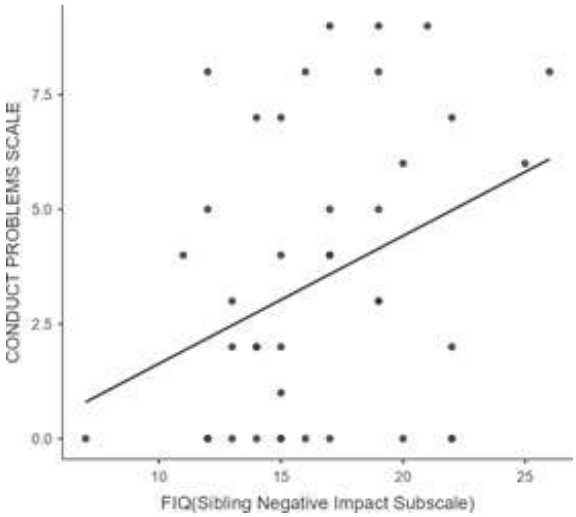
Graph 9: Correlation between ISAA and Peer Problems Scale



Graph 12: Correlation between FIQ and emotional problem scale



Graph 10: Correlation between ISAA and Prosocial Scale



Graph 13: Correlation between FIQ and conduct problem scale

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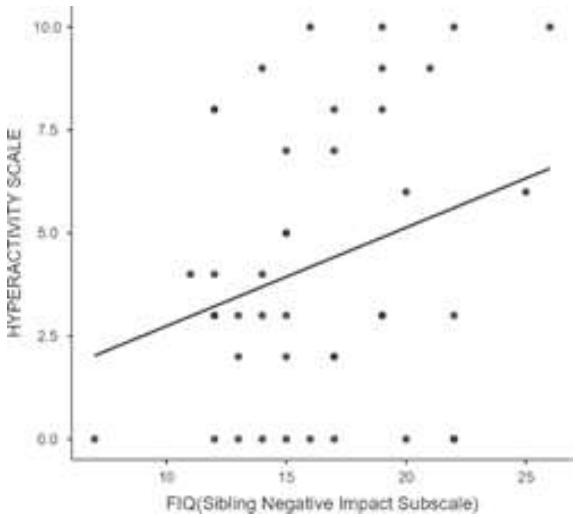
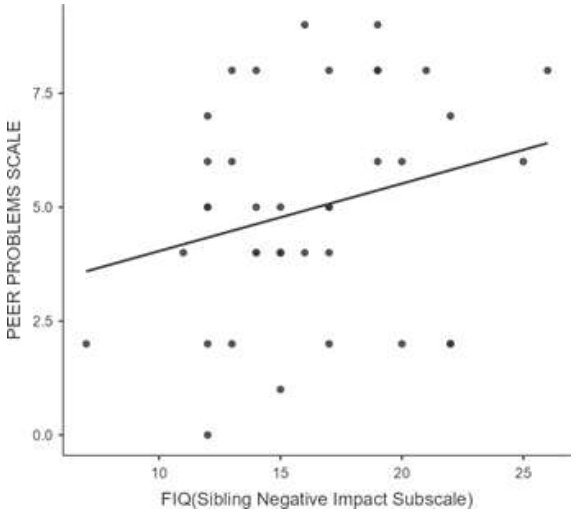
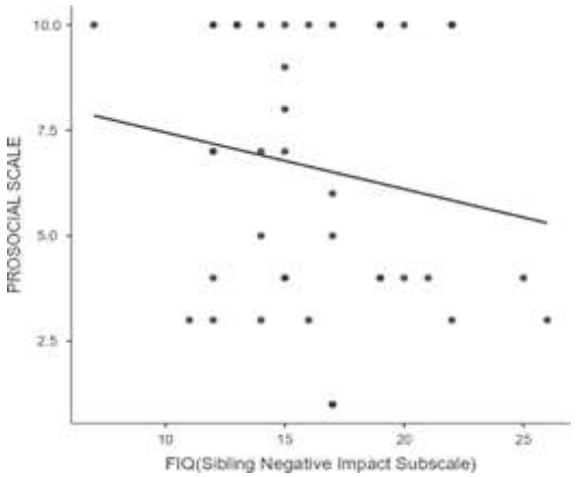


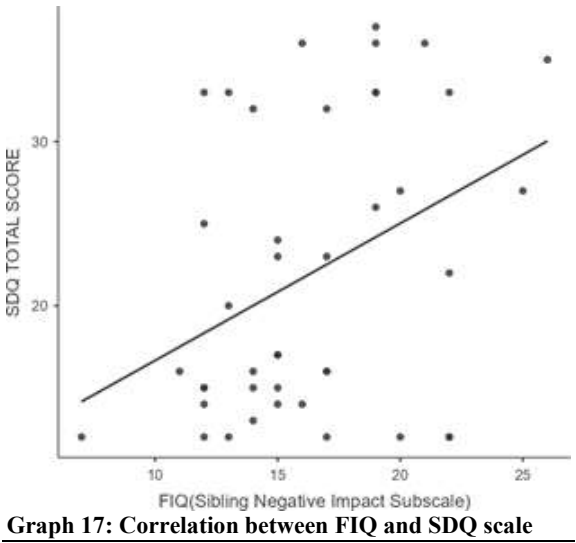
Graph 14: Correlation between FIQ and Hyperactivity scale



Graph 15: Correlation between FIQ and Hyperactivity scale



Graph 16: Correlation between FIQ and Prosocial scale



Graph 17: Correlation between FIQ and SDQ scale

DISCUSSION

This study provides valuable insights into the emotional and behavioural challenges faced by siblings of children with Autism Spectrum Disorder (ASD). The findings indicate that the majority of siblings experience significant emotional and behavioural difficulties, particularly when the severity of autism is greater. These results not only align with existing literature but also extend our understanding of how family dynamics and caregiving responsibilities impact typically developing (TD) siblings. The study employed the Indian Scale for Assessment of Autism (ISAA) and the Strengths and Difficulties Questionnaire (SDQ) to systematically examine the severity of autism in the index child and its association with emotional problems, conduct issues, peer relationships, and prosocial behaviours in their siblings. Descriptive analysis of the SDQ data revealed that 54.8% of the siblings scored within the abnormal range on the total difficulties score, indicating significant emotional and behavioural challenges. Only 19% of the siblings fell within normal ranges. This implies that growing up with a sibling with ASD especially in moderate-severe cases, poses unique challenges to TD siblings. Additionally, 76.2% of the study population were male, and while birth order did not significantly influence outcomes, younger siblings showed marginally higher FIQ and SDQ scores. Importantly, the study identified autism severity as a key factor influencing sibling adjustment, with greater autism severity correlating with more pronounced emotional and behavioural difficulties. The findings of this study highlight a clear relationship between the severity of autism and sibling adjustment. Siblings of children with moderate-severe autism demonstrated significantly higher emotional and behavioural difficulties compared to those with mild autism. For instance, the FIQ Sibling Negative Impact Subscale was notably higher in the moderate-severe group, reflecting greater perceived caregiving burdens and family stress. Similarly, significant differences were

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observed in SDQ domains such as emotional problems, peer problems, and hyperactivity. These findings align with Hastings and Petalas (2015),[21] who reported that greater ASD severity predicts increased sibling adjustment difficulties, particularly in areas of emotional stress and interpersonal challenges. This pattern was also observed in Meyer KA (2011),[22] where maternal stress and ASD severity were strongly associated with sibling adjustment issues. Nevertheless, this study inflates on previous findings by quantitatively demonstrating the domain-specific impacts, highlighting the most important contests in emotional regulation, social interactions, and peer relationships handled by siblings of children with moderate-severe autism. The results are consistent with Bronfenbrenner's ecological theory, which suggests that family dynamics within the microsystem significantly influence an individual's development.[25] As caregiving demands and family stress intensify in moderate-severe autism, siblings are likely to experience heightened emotional and behavioural challenges, underlining the need for targeted support. While younger siblings exhibited slightly higher FIQ and SDQ total scores, the differences were not statistically significant. This finding contrasts with some literature suggesting that sibling birth order may moderate the effects of having a sibling with ASD (Walton, 2015).[24] For example, elder siblings are often expected to take on caregiving roles, potentially leading to increased stress and reduced social opportunities. However, the current study suggests that factors beyond birth order, such as family income, support systems, and sibling coping mechanisms, may play a more critical role in shaping outcomes. The lack of significant differences could also be attributed to the relatively small sample size or cultural factors influencing family dynamics in this study population. This observation highlights the complexity of sibling relationships in families with children with ASD and suggests that birth order alone is not a determinant of sibling adjustment outcomes. The ISAA scores were significantly positively correlated with the FIQ Sibling Negative Impact Subscale and most SDQ domains, including emotional problems, conduct issues, peer problems, and hyperactivity. This finding underscores the central role of autism severity in shaping sibling adjustment. Greater autism severity likely intensifies caregiving demands and emotional stress within the family, contributing to the observed difficulties. These results are consistent with Meyer KA et al (2011), [22] who highlighted ASD severity as a critical risk factor for sibling adjustment. Similarly, Walton (2015),[24] identified greater ASD severity as a predictor of sibling difficulties, particularly in families with limited resources or support systems. Remarkably, the Prosocial Scale was not significantly correlated with ISAA scores, indicating that autism severity does not strongly influence prosocial behaviours. This aligns with Hughes C (2018), who found that while some siblings exhibited emotional or behavioural difficulties, their ability to display empathy and prosocial behaviour remained relatively stable. This suggests that prosocial traits may be influenced more by individual temperament or external factors such as parental modeling and peer interactions. The FIQ Sibling Negative Impact Subscale showed significant positive correlations with the domains of SDQ emotional problems, conduct problems, and the SDQtotal score. This indicates that siblings who perceive greater negative impacts due to their sibling's autism are more likely to experience emotional distress and behavioural difficulties. These findings align with Hastings and Petalas (2014),[21] who reported that increased caregiving responsibilities and family stress contribute to sibling adjustment challenges. However, correlations with the hyperactivity and peer problems domains were not statistically significant, suggesting that these areas may be influenced by other factors, such as external support systems or sibling temperament. The findings of this study are consistent with prior research highlighting the complex and varied impacts of ASD on TD siblings. While some studies, such as Meyer KA (2011),[22] emphasize the resilience and positive adjustment of many siblings, others, like Hastings and Petalas (2014),[21] report elevated emotional and behavioural difficulties. The current study contributes to this body of knowledge by demonstrating that autism severity is a critical determinant of sibling outcomes and that domain-specific challenges, such as emotional regulation and peer relationships, warrant particular attention. However, the lack of significant differences in birth order effects contrasts with Walton (2015),[24] suggesting that cultural or contextual factors may influence sibling adjustment. The findings align with Bronfenbrenner's ecological theory, which emphasizes the interplay between family dynamics and external environments in shaping individual development. In families with children with ASD, caregiving responsibilities and associated stress create a microsystem that disproportionately impacts siblings. This study highlights the need for interventions that address these systemic challenges, particularly for families with children with moderate-severe autism. By identifying autism severity as a critical factor in sibling adjustment, this research underscores the importance of family-centered care and targeted support for TD siblings. Practical Implications: The results have several practical implications. Clinicians and educators should recognize the heightened risk of emotional and behavioural problems in siblings of children with moderate-severe autism. Family-based interventions should focus on this determines reducing caregiving burdens, enhancing parental support, and providing siblings. Structured peer activities and opportunities for social engagement can help mitigate emotional and behavioural challenges, as suggested by Caner et al. (2023).[25] Further studies are needed to explore the longstanding impacts of ASD severity on sibling

ISSN (O): 2687-5365; ISSN (P): 2753-6556

outcomes and identify protective factors that promote resilience. Limitations: This study has a few limitations that should be viewed in the context of interpreting this study's findings. For example, the sample size may be small for generalizability of results into larger or diverse populations. The cross-sectional research design does not allow causal relationships to be indicated between the severity of autism and sibling outcomes. Longitudinal studies will help in understanding the dynamic process of adjustment among siblings over time. Although the study assessed various core domains of emotional and behavioural difficulties, the absence of qualitative data limits our understanding of the subjective experiences and coping strategies of siblings of children with autism. Furthermore, some confounding variables like family income, parental stress, and support services were not completely controlled in this study that may confound the outcomes found. Finally, the study was carried out in a particular cultural and geographic context that may limit its generalizability to other populations or cultural settings. Future Directions: Qualitative studies exploring the lived experiences of siblings can provide a richer contextual understanding and help identify specific areas for intervention. Investigating protective factors, such as positive peer relationships, parental support, and coping mechanisms, can shed light on strategies to promote resilience in siblings. Comparative studies across different cultural and socioeconomic contexts would also be valuable to explore how family dynamics and external factors shape sibling adjustment. The integration of neuropsychological assessments could provide valuable insights into the cognitive and emotional processes that may contribute to the challenges experienced by siblings of children with autism, particularly in domains such as executive function and social cognition.

CONCLUSION

This research systematically highlights the emotional and behavioural challenges confronted by typically developing (TD) siblings of children with Autism Spectrum Disorder (ASD). Using the Strengths and Difficulties Questionnaire (SDQ), the study determines that a significant proportion of siblings experience higher emotional distress, conduct issues, and peer problems, particularly in families where the severity of autism is higher. These findings emphasize the critical importance of recognizing and addressing the psychological needs of typically developing siblings within the family system to optimize their psychosocial development. The study utilized the Sibling Negative Impact (SNI) subscale of the Family Impact Questionnaire (FIQ) to assess the perceived impact of a sibling's autism on family dynamics. Results indicated that siblings of children with moderate-severe autism reported higher levels of negative impact compared to those with mild autism, emphasizing the significant role of autism severity in shaping family experiences. Moreover, SDQ scores of TD siblings were significantly correlated with the severity of autism in the affected sibling, as measured by the Indian Scale for Assessment of Autism (ISAA). Correspondingly, a positive correlation was observed between FIQ-SNI scores and ISAA scores, reinforcing the direct influence of autism severity on both sibling adjustment and perceived family burdens. The secondary objective revealed a significant relationship between SDQ and FIQ-SNI scores, demonstrating the interrelationship between sibling emotional and behavioural challenges and the broader family impact. These findings align with Bronfenbrenner's ecological theory, which highlights the interconnectedness of family dynamics and individual development. In practical terms, this research suggests the need for strategies to alleviate caregiver stress, improve family support systems, and promote social interactions for siblings. Although many brothers and sisters show adaptability, some may require specific assistance to manage emotional and behavioural issues. By recognizing these requirements, the study contributes to an expanding knowledge base and sets the stage for future research and interventions designed to enhance outcomes for siblings of individuals with Autism Spectrum Disorder (ASD). While most siblings demonstrate resilience, a portion may benefit from tailored support to address their unique challenges.

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