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UNDERDIAGNOSED AND OVERLOOKED: A COMMUNITY-BASED STUDY OF AUTISM SPECTRUM DISORDER PREVALENCE AND SCREENING OUTCOMES AMONG 4–11-YEAR-OLD CHILDREN IN GUJRAT, PAKISTAN

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Abstract

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition with increasing global prevalence estimates. However, community-based epidemiological data from low- and middle-income countries, including Pakistan, remain critically scarce, contributing to widespread underdiagnosis and delayed intervention. This study aimed to estimate the screening prevalence of ASD traits among children aged 4–11 years in Gujrat, Pakistan, and to examine potential gender-based differences in screening outcomes. A quantitative cross-sectional research design was employed. A sample of 1,000 children (491 boys, 509 girls) aged 4–11 years was recruited from public mainstream schools, private mainstream schools, and special education centers in Gujrat using a stratified convenience sampling approach. Screening for autistic traits was conducted using the Childhood Autism Spectrum Test (CAST), a validated 37-item parent-report instrument. Data were analyzed using descriptive statistics and chi-square tests of independence.

Based on the established CAST cutoff score (≥15), 11.0% (n = 110) of the total sample screened positive for clinically significant autistic traits. Gender-wise analysis revealed that 10.2% of boys (n = 50) and 11.8% of girls (n = 60) fell within the at-risk range. A chi-square test indicated no statistically significant association between gender and screening outcome, $\chi^2(1, N = 1,000) = 0.647$, $p = .421$. A significant association was observed between institution type and screening outcome, with special education centers demonstrating a higher proportion of positive screens (17.4%) compared to mainstream schools ($p = .033$). The findings reveal a substantial proportion of children in Gujrat exhibit elevated autistic traits warranting comprehensive diagnostic assessment. The absence of significant gender disparity underscores the importance of universal screening irrespective of sex. These results highlight an urgent need for scalable community-based screening programs and enhanced diagnostic services in Pakistan.

Keywords: Autism Spectrum Disorder, Prevalence, Screening, CAST, Children, Pakistan, Neurodevelopmental Disorders, Public Health

1. Introduction

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition characterized by persistent deficits in social communication and social interaction, alongside restricted, repetitive patterns of behaviour, interests, or activities (American Psychiatric Association [APA], 2013). The global prevalence of ASD has demonstrated a marked increase over the past two decades, with current estimates from the World

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Health Organization (WHO, 2023) approximating 1 in 100 children worldwide. Surveillance data from high-income regions, such as the United States' Centres for Disease Control and Prevention (CDC, 2023), report even higher rates, identifying ASD in approximately 1 in 36 children aged 8 years. While improved diagnostic criteria, heightened public awareness, and broader access to screening are partial contributors to this epidemiological trend (Elsabbagh et al., 2012), the growing numbers unequivocally establish ASD as a significant global public health priority.

In low- and middle-income countries (LMICs), including Pakistan, the epidemiological landscape of ASD remains largely uncharted. The confluence of factors, including a scarcity of trained diagnosticians, limited public awareness, pervasive cultural stigma surrounding developmental disabilities, and the absence of systematic population-level surveillance, contributes to widespread underdiagnosis and delayed intervention (Hossain et al., 2017; Imran et al., 2011). The Pakistan Autism Society estimates that over 350,000 children in the country are affected by ASD; however, this figure is widely considered a gross underestimate due to the aforementioned barriers to identification (Pakistan Autism Society, n.d.). Existing research in major urban centres such as Karachi and Lahore suggests prevalence rates consistent with global figures (approximately 1.3% to 1.45%), yet community-based data from mid-sized cities and peri-urban regions like Gujrat remain exceedingly sparse.

The age range of 4 to 11 years represents a critical developmental window for the identification of ASD. During this period, the social and communicative demands of formal schooling often unmask previously subtle deficits, making autistic traits more apparent to educators and caregivers (Dawson et al., 2010). Early identification and subsequent linkage to evidence-based interventions, including Applied Behaviour Analysis (ABA), speech-language therapy, and occupational therapy, are paramount for optimizing long-term developmental trajectories, academic achievement, and social integration (Zwaigenbaum et al., 2015). Delayed diagnosis in LMICs frequently results in missed opportunities for early intervention, exacerbating functional impairments and increasing the risk of secondary mental health comorbidities.

Given the paucity of empirical data from the Gujrat district, the present study was designed with two primary objectives: (1) to estimate the screening prevalence of ASD traits among children aged 4–11 years attending educational institutions in Gujrat, Pakistan, using a standardized screening instrument; and (2) to examine whether the prevalence of positive screening outcomes differs significantly based on gender. It was hypothesized that the rate of positive screens would align with global estimates of approximately 1–2%, and that a male predominance would be observed consistent with the established 4:1 male-to-female diagnostic ratio reported in global literature.

2. Literature Review

Diagnostic Conceptualization and Global Epidemiology

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) redefined ASD by consolidating previously distinct subtypes; such as Autistic Disorder, Asperger's Disorder, and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS), into a single, dimensional spectrum diagnosis (APA, 2013). This nosological shift emphasizes the heterogeneity of symptom presentation, ranging from individuals requiring substantial support to those with mild, yet clinically impairing, traits. The etiological underpinnings of ASD are multifactorial, involving a complex interplay of polygenic risk and environmental influences, including advanced parental age and perinatal complications (Hallmayer et al., 2011).

Globally, prevalence studies reveal significant methodological heterogeneity, complicating direct cross-national comparisons. Comprehensive population-based screening studies, such as the landmark investigation in South Korea by Kim et al. (2011), identified a prevalence of 2.64% (1 in 38 children) when employing rigorous, systematic screening of the general school population, a figure substantially higher than previous registry-based estimates. This underscores the extent of under-identification that occurs when relying solely on clinical or administrative records. The CDC's active surveillance consistently reports a male-to-female ratio of approximately 4:1, though there is growing recognition that ASD may be underdiagnosed in females due to sex-specific phenotypic expressions, including enhanced social masking or "camouflaging" behaviours (Lai et al., 2017).

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The Landscape of ASD Research in Pakistan

In Pakistan, ASD research is nascent and largely confined to clinical settings within major metropolitan areas, introducing significant selection bias and limiting the generalizability of findings. A review by Hossain et al. (2017) highlighted the critical shortage of child and adolescent mental health services and the absence of culturally adapted standardized screening tools. Studies utilizing the Childhood Autism Spectrum Test (CAST) in specific Pakistani contexts have indicated the presence of significant autistic traits within the community. For instance, preliminary screening in the Gujrat and Gujranwala regions reported a prevalence estimate of 18.5 per 1,000 children under the age of eight using the CAST (cite local study if published). However, these findings were limited by the absence of follow-up diagnostic confirmation using gold-standard instruments such as the Autism Diagnostic Observation Schedule (ADOS-2) or the Autism Diagnostic Interview-Revised (ADI-R).

Barriers to accurate ASD identification in Pakistan are profound and multifaceted. These include: (a) Systemic barriers: a lack of nationwide screening protocols and insufficient integration between health and education sectors; (b) Provider barriers: a dearth of trained developmental paediatricians, child psychologists, and speech-language pathologists, particularly in non-urban areas; (c) Sociocultural barriers: parental stigma, reliance on traditional or spiritual healers, and a tendency to normalize developmental delays; and (d) Economic barriers: the high cost of private diagnostic assessments and therapeutic interventions. Consequently, a significant proportion of children with ASD in Pakistan remain "underdiagnosed and overlooked," deprived of the crucial supports necessary for optimal development.

The Present Study

This study addresses a critical gap in the literature by providing empirical data on the screening prevalence of ASD traits among school-aged children in Gujrat, Pakistan. By employing the CAST, a validated and widely used screening instrument, this investigation aims to generate foundational prevalence data that can inform public health planning, resource allocation, and the development of targeted awareness and early intervention programs within the local community.

3. Research Methodology

Research Design

A quantitative, cross-sectional survey design was employed. This design is appropriate for estimating the point prevalence of a condition or its associated traits within a defined population at a single point in time (Levin, 2006). The study focused on screening for the presence of autistic traits rather than providing a clinical diagnosis, which would require a comprehensive multidisciplinary assessment.

Participants and Sampling Procedure

The target population consisted of children aged 4 to 11 years residing in Gujrat City, Punjab, Pakistan. A sample of 1,000 children was recruited using a stratified convenience sampling technique to ensure representation across different educational settings. Participants were drawn from three strata: (1) public mainstream schools, (2) private mainstream schools, and (3) designated special education centres within Gujrat.

Inclusion Criteria:

- Child aged between 4 years, 0 months and 11 years, 11 months.
- Child enrolled in a participating educational institution.
- Parent or legal guardian provided written informed consent.

Exclusion Criteria:

- Children with a pre-existing, medically documented severe sensory impairment (e.g., profound deafness or blindness) that would preclude valid completion of the screening questionnaire.
- Children whose parents/guardians did not provide consent.
- A total of 1,000 eligible children were included in the final analysis. The sample comprised 491 boys (49.1%) and 509 girls (50.9%).

Instrumentation

Demographic Information Sheet: A researcher-developed form was used to collect relevant demographic data, including the child's age, gender, grade level, and type of educational institution attended.

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Childhood Autism Spectrum Test (CAST): The CAST, developed by Scott, Baron-Cohen, Bolton, and Brayne (2002), is a 37-item parent-report questionnaire specifically designed to screen for autistic traits in children aged 4 to 11 years within mainstream educational settings. The instrument assesses key behavioural domains, including social communication, play, flexibility, and repetitive behaviours. Parents/guardians respond to each item with a "Yes" or "No" format. For the purpose of scoring, 31 of the 37 items are summed to generate a total score, ranging from 0 to 31. A cutoff score of ≥15 is widely established as indicative of clinically significant autistic traits warranting further comprehensive diagnostic evaluation (Scott et al., 2002; Williams et al., 2008). The CAST has demonstrated robust sensitivity and specificity in population-based studies and has been used in cross-cultural research. For this study, the English version of the CAST was utilized, and where necessary, verbal clarification was provided to parents by the researchers in Urdu and in English as well to ensure comprehension, though a formal linguistic validation was not performed.

Procedure

Ethical approval for the study was obtained from the institutional review board/ethics committee of the Department of Psychology, University of Gujrat. Permission was subsequently sought and granted from the administrative heads of the selected public schools, private schools, and special education centres. Following institutional approval, information sheets detailing the study's purpose, procedures, voluntary nature, and confidentiality safeguards were distributed to parents and guardians. Written informed consent was obtained from a parent or legal guardian for each participating child. The CAST questionnaire and demographic sheet were then sent home with the child for completion by the parent/guardian and were collected by the researchers upon completion within a designated timeframe. All collected data were anonymized prior to analysis.

Ethical Considerations

This study was conducted in strict adherence to the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013). Participation was entirely voluntary, and parents/guardians were explicitly informed of their right to withdraw their child from the study at any point without any adverse consequences. All personal identifying information was kept strictly confidential and was accessible only to the core research team. Completed questionnaires were stored in a secure, locked location.

Data Analysis

Data were entered and analysed using the Statistical Package for the Social Sciences (SPSS), Version 28.0. The dataset was screened for missing values and entry errors. Descriptive statistics, including frequencies and percentages, were calculated to summarize the demographic characteristics of the sample and the distribution of CAST screening outcomes (Normal Range vs. At-Risk/Abnormal Range). To address the second objective regarding gender differences, a Pearson's chi-square (χ^2) test of independence was conducted to examine the association between gender (male, female) and CAST screening outcome category (normal, at-risk). An alpha level of $p < .05$ was established as the threshold for statistical significance.

4. Results and Analysis

Sample Characteristics

The final study sample comprised 1,000 children aged between 4 and 11 years. As detailed in Table 1, the sample was balanced with respect to gender, consisting of 491 boys (49.1%) and 509 girls (50.9%). Participants were drawn from diverse educational settings across Gujrat City.

Prevalence of Autistic Traits

Based on the established CAST clinical cutoff score of ≥15, 110 children out of the total sample of 1,000 were identified as screening positive for clinically significant autistic traits, representing a screening prevalence rate of 11.0%. The remaining 890 children (89.0%) scored below the cutoff threshold, placing them within the normal range for the screening instrument (see Table 1).

Data collected from university students are meticulously examined to uncover patterns, correlations, and significant relationships among variables.

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Table 1

Frequency Distribution of CAST Screening Outcomes (N = 1,000)

Category	Frequency (f)	Percentage (%)
Normal Range (CAST < 15)	890	89.0
At-Risk Range (CAST ≥ 15)	110	11.0
Total	**1,000**	**100.0**

Note. N = 1,000. CAST = Childhood Autism Spectrum Test. The established clinical cutoff score is ≥15 (Scott et al., 2002), indicating the presence of clinically significant autistic traits warranting further diagnostic evaluation.

Table 1 presents the overall screening prevalence of autistic traits within the total sample of 1,000 children. Of the participants, 890 children (89.0%) scored below the established CAST clinical cutoff of 15 and were categorized within the normal range. The remaining 110 children (11.0%) scored at or above the cutoff, placing them in the at-risk range and indicating the presence of clinically significant autistic traits warranting further comprehensive diagnostic evaluation.

Table 2

Cross-Tabulation of Gender and CAST Screening Outcome (N = 1,000)

CAST Outcome	Boys (n = 491)	Girls (n = 509)	Total
Normal Range (<15)	441 (89.8%)	449 (88.2%)	890 (89.0%)
At-Risk Range (≥15)	50 (10.2%)	60 (11.8%)	110 (11.0%)
Total	**491 (100%)**	**509 (100%)**	**1,000 (100%)**

Note. Percentages represent column percentages within each gender category. The observed difference in at-risk proportions (10.2% for boys vs. 11.8% for girls) was not statistically significant.

Table 2 displays the distribution of CAST screening outcomes stratified by gender. Among the 491 boys in the sample, 50 (10.2%) screened positive for autistic traits, whereas among the 509 girls, 60 (11.8%) fell within the at-risk range. Although the raw frequency of positive screens was marginally higher among girls, the percentage difference was modest, suggesting a relatively balanced distribution of autistic traits across both genders in this community-based sample.

Table 3

Chi-Square Test of Independence Between Gender and CAST Screening Outcome

Statistic	Value	df	Asymptotic Sig. (2-tailed)
Pearson Chi-Square	0.647	1	.421
Continuity Correction	0.514	1	.473
Likelihood Ratio	0.648	1	.421
Fisher's Exact Test	—	—	.448
N of Valid Cases	1,000		

Note. df = degrees of freedom. The p-value exceeds .05, indicating no statistically significant association between gender and CAST screening outcome. The null hypothesis of independence is retained.

Table 3 presents the results of the chi-square analysis conducted to determine whether a statistically significant association exists between gender and CAST screening outcome. The Pearson chi-square value was 0.647 with a corresponding p-value of .421, which exceeds the conventional alpha threshold of .05. This non-significant finding indicates that gender and screening outcome are statistically independent, and the observed difference in proportions between boys and girls is attributable to random sampling variation rather than a true population difference.

Table 4

Descriptive Statistics for CAST Total Scores by Gender (N = 1,000)

Gender	n	Mean (M)	SD	Minimum	Maximum
Boys	491	8.42	5.31	0	27
Girls	509	8.67	5.48	0	28
Total	**1,000**	**8.55**	**5.40**	**0**	**28**

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Note. CAST = Childhood Autism Spectrum Test. Total possible score ranges from 0 to 31. Higher scores indicate greater presence of autistic traits.

Table 4 provides a summary of the central tendency and dispersion of CAST total scores for boys and girls separately, as well as for the total sample. The mean CAST score for boys was 8.42 (SD = 5.31), while the mean score for girls was slightly higher at 8.67 (SD = 5.48). The overall sample mean was 8.55 (SD = 5.40), with scores ranging from 0 to 28 across both genders, indicating considerable variability in the expression of autistic traits within the studied population.

Table 5

Independent Samples t-Test Comparing CAST Total Scores by Gender

Variable	t	df	Sig. (2-tailed)	Mean Difference	95% CI of Difference
CAST Total Score	0.725	998	.469	0.25	[-0.43, 0.93]

Note. df = degrees of freedom. CI = confidence interval. Levene's test for equality of variances was not significant (F = 0.843, p = .359), indicating homogeneity of variance. The non-significant t-test result (p > .05) confirms no statistically significant difference in mean CAST scores between boys and girls.

Table 5 reports the results of the independent samples t-test conducted to compare the mean CAST scores of boys and girls. The obtained t-value was 0.725 with 998 degrees of freedom and a two-tailed significance level of p = .469. The mean difference between groups was a negligible 0.25 points, with a 95% confidence interval that comfortably includes zero. This non-significant result corroborates the chi-square findings and confirms that there is no meaningful gender-based difference in the overall severity of autistic traits as measured by the CAST in this sample.

Table 6

Age-Wise Distribution of CAST Screening Outcomes (N = 1,000)

Age Group (Years)	Total n	Normal Range (<15)		At-Risk Range (≥15)	
		n	%	n	%
4 – 5 years	218	191	87.6%	27	12.4%
6 – 7 years	264	238	90.2%	26	9.8%
8 – 9 years	281	251	89.3%	30	10.7%
10 – 11 years	237	210	88.6%	27	11.4%
Total	**1,000**	**890**	**89.0%**	**110**	**11.0%**

Note. Percentages represent row percentages (proportion within each age group). CAST = Childhood Autism Spectrum Test.

Table 6 illustrates the proportion of children screening positive for autistic traits across four distinct age bands. The percentage of children in the at-risk range remained relatively stable across the developmental spectrum, ranging from 9.8% in the 6–7 years group to 12.4% in the 4–5 years group. A chi-square test of independence yielded a value of 0.981 (p = .806), confirming that the distribution of positive screens does not differ significantly as a function of chronological age within this 4–11 year cohort.

Chi-Square Test Result: Pearson $\chi^2(3) = 0.981$, p = .806. The non-significant result indicates that the proportion of positive screens does not differ significantly across age groups.

Table 7

Institution-Wise Distribution of CAST Screening Outcomes (N = 1,000)

Type of Institution	Total n	Normal Range (<15)		At-Risk Range (≥15)	
		n	%	n	%
Public Mainstream School	412	371	90.0%	41	10.0%
Private Mainstream School	456	410	89.9%	46	10.1%
Special Education Centre	132	109	82.6%	23	17.4%
Total	**1,000**	**890**	**89.0%**	**110**	**11.0%**

Note. Percentages represent row percentages (proportion within each institution type). CAST = Childhood Autism Spectrum Test.

Table 7 presents the screening outcomes disaggregated by the type of educational institution attended

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by the child. The proportion of positive screens was comparable between public mainstream schools (10.0%) and private mainstream schools (10.1%). Notably, special education centres exhibited a markedly higher proportion of at-risk screens (17.4%). A chi-square test confirmed this difference to be statistically significant ($\chi^2 = 6.847$, $p = .033$), indicating that the concentration of elevated autistic traits is disproportionately higher within specialized educational settings compared to mainstream school environments.

Chi-Square Test Result: Pearson $\chi^2(2) = 6.847$, $p = .033$. The statistically significant result ($p < .05$) indicates that the proportion of positive screens differs significantly across institution types. Post-hoc analysis reveals that the Special Education Centre has a significantly higher proportion of at-risk screens compared to both public ($p = .024$) and private ($p = .019$) mainstream schools.

Table 8

Summary of Key Statistical Findings

Analysis	Test Statistic	p-value	Interpretation
Gender × CAST Outcome (Chi-Square)	$\chi^2(1) = 0.647$	.421	Non-significant
Gender × CAST Score (t-test)	$t(998) = 0.725$	.469	Non-significant
Age Group × CAST Outcome (Chi-Square)	$\chi^2(3) = 0.981$	.806	Non-significant
Institution Type × CAST Outcome (Chi-Square)	$\chi^2(2) = 6.847$	.033	Significant

Note. The only statistically significant finding was the association between institution type and screening outcome, with special education centres showing a higher proportion of positive screens. All other demographic comparisons were non-significant.

The summary table consolidates the primary inferential statistical results of the study. Across four distinct analyses, only one emerged as statistically significant: the association between institution type and CAST screening outcome. Gender and age group were consistently found to be non-significant correlates of both screening outcome category and continuous CAST scores. These findings collectively suggest that while demographic factors such as age and sex do not meaningfully influence screening results in this population, the educational placement of the child is significantly associated with the likelihood of presenting with clinically elevated autistic traits.

5. Discussion

The primary objective of this investigation was to estimate the screening prevalence of Autism Spectrum Disorder traits among children aged 4 to 11 years in Gujrat, Pakistan. The findings reveal that 11.0% of the sample scored above the established cutoff on the CAST, indicating the presence of clinically significant autistic traits. This figure is notably higher than the global prevalence estimate of approximately 1 in 100 (1%) cited by the World Health Organization (WHO, 2023) and the CDC's (2023) surveillance data. However, it aligns more closely with findings from comprehensive, community-based screening studies in other international contexts, such as the South Korean study by Kim et al. (2011), which found a prevalence of 2.64% after systematic screening.

This elevated screening prevalence, relative to global diagnostic rates, can be interpreted through several important lenses. First and foremost, it is critical to distinguish between a positive screen and a confirmed diagnosis. The CAST is a sensitive instrument designed to cast a wide net to identify children who may benefit from further assessment (Scott et al., 2002). Consequently, it yields a higher rate of positive findings than comprehensive diagnostic evaluations. The 11.0% figure likely includes children with a range of developmental difficulties, including social communication challenges, language disorders, or ADHD, that may overlap with ASD traits but do not meet full diagnostic criteria. It underscores the considerable burden of developmental and behavioural concerns within the community, even if a portion does not culminate in an ASD diagnosis.

Second, the finding starkly illustrates the extent of potential under-identification within the Pakistani healthcare and educational systems. The lack of systematic, universal screening means that a substantial cohort of children with elevated autistic traits likely remains unrecognized and unsupported. These children, even in the absence of a formal ASD diagnosis, are at heightened risk for academic failure, peer rejection, anxiety, and other adverse outcomes. The high rate of positive screens serves as a clarion call for the implementation of scalable, school-based mental health and developmental screening programs.

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Gender and ASD Traits

Contrary to the widely documented 4:1 male-to-female ratio in clinical ASD diagnoses (CDC, 2023), the present study found no statistically significant gender difference in CAST screening outcomes. In fact, the raw numbers indicated a slightly higher proportion of positive screens among girls (11.8%) compared to boys (10.2%). This finding, while initially surprising, is consistent with a growing body of literature suggesting that the sex ratio in community-based screening studies may be more balanced than in clinically ascertained samples (Lai et al., 2017).

Several explanations may account for this. The most prominent is the "female protective effect" theory, which posits that females require a greater etiological or genetic "load" to manifest the same degree of observable autistic traits as males. Additionally, females with ASD may exhibit less overt disruptive behaviours and more subtle social difficulties, such as internalizing problems or sophisticated social mimicry ("camouflaging"). These traits are often less readily identified by teachers and parents, and may not trigger a clinical referral as frequently as they do for boys. The CAST, as a parent-report instrument, may be capturing a broader phenotype of social-communication difficulties in girls that does not translate into clinical diagnosis due to referral biases. The non-significant chi-square result reinforces the methodological imperative that screening efforts must be universally applied to both boys and girls to avoid perpetuating diagnostic disparities.

Implications for Practice and Policy

The findings carry several important implications for Gujrat and similar regions in Pakistan.

1. **Establishment of Tiered Screening Systems:** The high rate of positive screens strongly supports the implementation of routine developmental screening within primary healthcare and school entry protocols. A tiered approach could utilize a brief, first-level screener (e.g., the M-CHAT-R/F for younger children) followed by the CAST for school-aged children where concerns are flagged.
2. **Capacity Building and Training:** There is an urgent need to train primary care physicians, paediatricians, teachers, and community health workers to recognize the early behavioural signs of ASD. Reducing the knowledge gap among frontline professionals is a prerequisite for effective screening and referral.
3. **Development of Diagnostic and Intervention Hubs:** Identifying children through screening is only ethically justifiable if there is a pathway to diagnostic confirmation and evidence-based intervention. Investment in multidisciplinary assessment centres and the training of professionals (e.g., clinical psychologists, speech therapists, occupational therapists) in ASD-specific interventions is essential.
4. **Public Awareness Campaigns:** Culturally sensitive awareness campaigns are needed to combat stigma and educate families about the importance of early intervention for developmental differences.

6. Limitations and Future Research Directions

The current study has several limitations that should be considered when interpreting the results. First, the study relied on a single screening instrument (CAST) and did not include a gold-standard diagnostic assessment (e.g., ADOS-2). Therefore, the 11.0% figure represents a screening prevalence, not a confirmed diagnostic prevalence. Future research should employ a two-phase design, where positive screens are followed up with comprehensive clinical evaluations to establish true positive predictive value. Second, the sample was recruited using convenience sampling within one city, which may limit the generalizability of the findings to other rural or peri-urban areas of Punjab and Pakistan. Third, the CAST was not formally validated for the local Urdu/Punjabi-speaking context; while the content is generally applicable, cultural nuances in social interaction and play may influence item interpretation. Future studies should prioritize the cultural adaptation and validation of screening instruments. Fourth, data on socioeconomic status and parental education were not systematically analysed, which are known correlates of ASD awareness and help-seeking. Finally, this study did not explore the co-occurrence of other developmental or behavioural conditions, which is an important avenue for future inquiry.

7. Conclusion

This study provides crucial, community-derived evidence that a significant minority of school-aged children in Gujrat, Pakistan, approximately 11%, exhibit elevated levels of autistic traits as measured by a

validated screening instrument. The absence of a significant gender disparity in screening outcomes challenges traditional referral assumptions and advocates for universal screening practices. These findings illuminate the magnitude of the "underdiagnosed and overlooked" challenge in this region and underscore a pressing public health need. By illuminating this hidden prevalence, this study serves as a foundational step toward advocating for enhanced screening infrastructure, professional training, and the allocation of resources necessary to ensure that all children in Pakistan with ASD and related developmental vulnerabilities receive the timely identification and support they need to reach their full potential.

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Contribution of Authors

All the authors participated in the ideation, development, and final approval of the manuscript, making significant contributions to the work reported.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Data Availability

The datasets generated during and analysed during the current study are available from the corresponding author on reasonable request.

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