Sex Differences in Presenting Concerns and ASD Diagnostic Outcome in a Clinical Sample

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Introduction

According to the Center for Disease Control and Prevention, approximately 1 in 68 children are identified with autism spectrum disorder (ASD). There is a higher rate of ASD diagnosis in males than females, specifically a 4:1 ratio[1,2]. Males and females have been found to manifest core ASD symptoms differently.

ASD Presentation in Females
Social Interaction
➢ Greater awareness of the need and desire for social interaction[3,4,5]
➢ Often perceived as "shy"[3,4,5]
➢ Tendency to mimic others in social interactions[3,4,5]
➢ Tendency to "camouflage" difficulties by developing compensatory strategies[3,4,5]
➢ One or few close friendships[3,4,5]
Communication
➢ Higher level linguistic abilities[3,4,5]
Restricted, repetitive patterns of behavior, interests, or activities
➢ The quality of repetitive behaviors may be different[3,4,5,6]
➢ Restricted interests tend to involve people/animals rather than objects/things (e.g., animals, soap operas, celebrities, pop music, fashion, horses, pets, and literature), which may be less recognized as related to autism[3,4,5]
➢ Greater difficulties with self-regulation and inhibition control[7]
➢ Circumscribed interests around dolls or babies that may be misinterpreted as pretend play.[6]
➢ Greater imagination (fantasizes and escapes into fictional and pretend play but prone to being nonreciprocal or scripted)[3,4,5]

One of the key priorities in autism research is the identification of early biological and behavioral indicators of ASD with particular of focus on sex differences.

Methods

Participants (N = 149)

- Age: Males: (Mean = 9.3 years +/- 3.5) Females: (Mean= 8.5 years +/ 3.3); $t(147) = 0.13$, $p = .37$).
- Sex: Males: 87.2% (n = 130), Females: 12.8% (n = 19).
- Ethnicity: White: 71.8% (n = 107), Black/African American 2.7% (n = 4), Asian: 2.7% (n = 4), Multiracial: 2.7% (n = 4).

Procedures

- Data was collected from an autism clinic over a five-year period.
- All participants were administered the Autism Diagnostic Observation Schedule (ADOS) Modules 3 or 4.
- T-tests compared sexes in terms of age at which parents were concerned, initially sought help, and ADOS scores.
- Chi-square statistics were used to evaluate the likelihood of children meeting ADOS criteria for ASD and final clinical diagnosis as a function of sex.
- Qualitative chart review examined differences in the nature of parents' concerns.

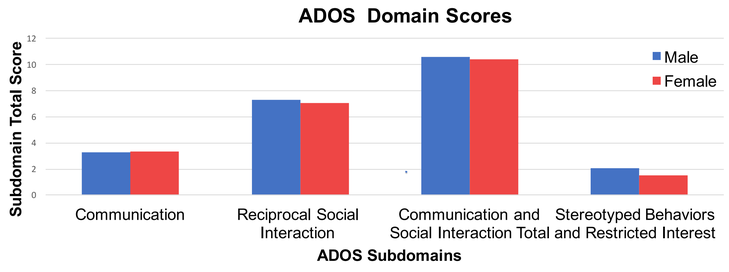
Results

Initial Parent Concerns

- A qualitative chart review indicated parents' first concerns were similar for boys and girls, where the main concerns were in regards to speech delays, social difficulties, and atypical behaviors.
- There was no significant difference in age between males and females when parents first had concerns about their children: Males: Mean = 23 months (SD = 17), Females: Mean = 25 months (SD = 15); [$t(147) = 0.25$, $p = .68$].
- There was no significant difference in age between males and females when parents brought their concerns to a specialist or sought treatment with a specialist: Males: Mean = 47 months (SD = 38), Females: Mean = 46 months (SD = 31); [$t(90) = 0.31$, $p = .96$].
- Males were significantly more likely to be seen by a psychiatrist than females ($\chi^2 = 5.17$, $p = .02$); otherwise, males and females did not differ in the type of specialist consulted (developmental pediatrician, neurologist, geneticist, psychologist, optometrist, occupational therapist, physical therapist, speech pathologist, or audiologist).

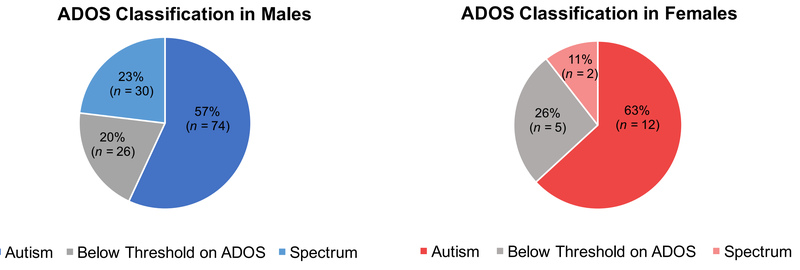
Developmental Evaluation Outcomes

- There were no significant sex differences in any of the domain scores on the ADOS:
  - Communication: Males: (Mean = 3.28 +/- 1.80), Females: (Mean = 3.37 +/- 1.89); [$t(147) = 0.10$, $p = .84$)].
  - Reciprocal Social Interaction: Males: (Mean = 7.29 +/- 3.08), Females: (Mean = 7.05 +/- 2.97); [$t(147) = 0.05$, $p = .75$].
  - Communication and Social Interaction: Males: (Mean = 10.57 +/- 4.50), Females: (Mean = 10.42 +/- 4.43); [$t(147) = 0.61$, $p = .89$].
  - Stereotyped Behaviors and Restricted Interest: Males: (Mean = 2.05 +/- 1.59), Females: (Mean = 1.53 +/- 1.54); [$t(147) = 0.39$, $p = .18$].



Note. For the Communication domain, a cut-off score for autism is 3 and autism spectrum is 2; for the Reciprocal Social Interaction domain, the autism cut off score is 6, and autism spectrum cut-off score is 4; for the Communication and Social Interaction Total, the autism cut-off score is 10 and the autism spectrum cut-off score is 7.

- There were no significant sex difference in ADOS classification ($\chi^2 = 1.65$, $p = .44$).



Results

- There were no significant sex differences in whether a child received an autism spectrum diagnosis compared to another clinical diagnosis or no diagnosis ($\chi^2 = .03$, $p = .87$).
- There were no significant sex differences in primary clinical diagnosis ($\chi^2 = 28.07$, $p = .06$).
- For those individuals receiving an ASD diagnosis, there was no significant sex difference in the presence of a comorbid disorder ($\chi^2 = .42$, $p = .52$).
- There were also no significant sex differences related to diagnostic comorbidity across all primary diagnoses ($\chi^2 = 2.61$, $p = .11$).

Clinical Diagnosis		
Primary Diagnosis	**Females** (n = 19)	**Males** (n = 130)
Autism Spectrum Disorder	73.7% (n = 14)	75.4% (n = 98)
No Diagnosis	-	6.9% (n = 9)
Intellectual Disability	-	1.5% (n = 2)
Mixed Developmental Disorder	-	2.3% (n = 3)
Learning Disability	5% (n = 1)	0.8% (n = 1)
Reactive Attachment Disorder	-	1.5% (n = 2)
ADD/ADHD	-	2.3% (n = 3)
Social Anxiety	10.5% (n = 2)	-
Non-verbal learning profile	5.3% (n = 1)	0.8% (n = 1)
Conduct Disorder	-	0.8% (n = 1)
Depression	-	0.8% (n = 1)
Obsessive Compulsive Disorder	-	0.8% (n = 1)
Anxiety Disorder NOS	5.3% (n = 1)	1.5% (n = 2)
Mood Disorder – NOS & Dysthymia	-	0.8% (n = 1)
Generalized Anxiety Disorder	-	0.8% (n = 1)

Conclusions

- The present study did not reveal significant sex differences in timing or content of parental concerns and when they sought consult or treatment with a specialist for their child.
- Boys and girls received similar domain scores on the ADOS and similar ADOS diagnostic classifications.
- There were no significant sex differences related to primary clinical diagnosis or comorbid diagnoses given at the conclusion of the clinic evaluation.
- Recent studies have suggested very small or no sex differences in age at diagnosis, IQ, cognitive profiles, or ASD symptom severity, indicating inconsistent findings related to sex differences in autism.[8]
- Given these findings at an autism clinic, future research is needed to examine potential sex differences in non-specialized community settings.

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