Exploring Gender Disparities in Autism Spectrum Disorders: Prevalence and Symptoms in Malaysia

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Keywords	Abstract
_____ Autism spectrum disorders, Gender disparities, Malaysia, Pravelence, Symptomatology _____	_____ In light of the considerable number of cases documented on an annual basis, autism spectrum disorder (ASD) has emerged as a condition with a rising prevalence in recent times. There is a greater prevalence of ASD in males than in females, both in terms of overall incidence and the presentation of symptoms. Additionally, males with ASD tend to exhibit more functional impairments and repetitive behaviors. To gain a deeper understanding of these variations, further research is required. The principal objective of this study is to ascertain whether there are gender disparities in the frequency and symptoms of autism spectrum disorders in Malaysia. The Malay translation of the Autism Spectrum Quotient – Children's Version and the Children's Autism Spectrum Test have been completed by parents or caregivers of fifty-two children between the ages of seven and twelve who have been diagnosed with autism spectrum disorder (ASD). The current research indicates that, in terms of prevalence, there is a ratio of 1:5 in favor of males over females. However, no clear differences were observed between the sexes in terms of ASD symptoms in this study group. Significant advances in the prevention or treatment of autism spectrum disorders in men and women can be achieved through systematic efforts to understand gender differences in the prevalence and symptoms of these diseases in Malaysia.

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INTRODUCTION

Autism Spectrum Disorder (ASD) is a prevalent neurodevelopmental disorder that can manifest in the general population. It is characterised by difficulties in social interactions and repetitive behaviours (Baird et al., 2006; DSM-5, 2013). The Centers for Disease Control and Prevention (2012) report that autism spectrum disorder (ASD) is becoming increasingly widespread around the world. As a result, it needs to be regarded as a public health emergency. The Ministry of Education Malaysia (Dzulkifli, 2023) states that based on the information currently available in Malaysia, ASD is classified with other developmental and intellectual impairments under the heading of learning disorders. As a result, neurodevelopmental disorders such as ASD typically manifest symptoms prior to the age of three. In addition to chronic communication and social interaction deficits, ASD is also characterized by limited and repetitive patterns of behavior, interests, and hobbies (DSM-5, 2013). These ASD symptoms are believed to manifest in early childhood and have the potential to hinder and limit day-to-day functioning. They might not always become completely apparent till later in life. Furthermore, many children with ASD are characterized by cognitive and language impairments even though these impairments are not core symptoms of ASD.

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder, typically characterized by difficulties with communication, social interaction, and repetitive behaviors, as described by Beggiato et al. (2017). ASD is less common in women than men, according to research that has repeatedly been conducted (Beggiato et al., 2017). However, studies have indicated that females with ASD may be underdiagnosed, even when presenting with similar symptoms to males (Menezes et al., 2022). In Malaysia, the prevalence of ASD is estimated to be around 1 in 625 children (Fikry & Hassan, 2016). Despite this prevalence, there is a lack of local epidemiological studies on the exact prevalence of ASD in Malaysia (Zainal et al., 2021). Differences in the prevalence and symptoms of ASD by gender have been an interesting research topic, with studies emphasizing the importance of understanding how ASD presents differently in men and women (Beggiato et al., 2017). While ASD is more commonly associated with males, it is important to consider the possibility of underdiagnosis in females, which could impact the overall understanding of ASD in different populations (Menezes et al., 2022).

In Malaysia, the National Autism Society reports that 1 in every 150 children has been identified with ASD. These statistics underscore the importance of further research to explore gender differences in ASD within the Malaysian context. Studies have also emphasized challenges faced by parents or caregivers of children with ASD, highlighting the need for support systems and coping mechanisms (Zainal et al., 2021). The lack of available local epidemiological studies in Malaysia challenges understanding the full scope of ASD prevalence and its impact on families (Zainal et al., 2021). Additionally, the limited intervention facilities in Malaysia further

compound the difficulties faced by families of children with ASD (Aun et al., 2022). Addressing these challenges requires a comprehensive understanding of the prevalence and symptomatology of ASD, particularly concerning gender differences. The prevalence of ASD globally varies, with estimates suggesting rates around 1% (Hallmayer et al., 2011). However, the exact prevalence in different regions, including Malaysia, remains unclear due to the lack of comprehensive local studies (Zainal et al., 2021). Factors such as biological sex, sociodemographic status, and ethnicity/race have been identified as potential modifiers of ASD prevalence estimates (Zeidan et al., 2022). Developing focused therapies and support networks for people with ASD requires an understanding of these aspects, particularly in places like Malaysia, where local data is scarce. Parent-mediated techniques are beneficial in enhancing social-emotional skills and overall results in research on therapies for children with ASD (Hamid et al., 2023).

Parental participation in occupational therapy shows promising results in supporting the achievement of positive outcomes for children with ASD in Malaysia (Hamid et al., 2023). These results suggest that in the process of intervention and customization of appropriate approaches, families have an important involvement to meet the needs of children with ASD in diverse cultural contexts, such as in Malaysia. In conclusion, globally this study has added valuable new findings regarding the prevalence and symptoms of ASD, there is a need for more localized studies to understand the specific nuances of ASD in Malaysia. Prevalence and symptoms of ASD based on gender differences, coupled with the challenges faced by caregivers and the limited intervention facilities, highlight the importance of further research in this area. By addressing these gaps in knowledge, Malaysia could be a better place to support individuals with ASD symptoms and be supported by policymakers and healthcare providers.

This condition encompasses a broad spectrum of symptoms ranging from minor to severe impairments, with significant clinical variability. Several previous researchers have found cross-gender variations in ASD. For a considerable amount of time, these community-based investigations have demonstrated a 4 to 1 sex ratio that is significantly biased towards men. The 4:1 ratio that is commonly mentioned is based on an average from several research conducted both domestically and abroad; for average intellectual patients, this ratio rises to 8 to 1 (Fombonne, 2003; Werling & Geschwind, 2013).

Aside from that, several studies indicate that the symptoms exhibited by individuals with ASD vary depending on their gender (Mandy et al., 2012). For example, girls with ASD appear to be less affected by early social development than boysand exhibit unlimited repetitive behaviors (Lai et al., 2015; Supekar & Menon, 2015). These findings suggest that gender-specific items or norms are needed in the treatment of boys and girls with ASD (Baron-Cohen et al., 2009). Nevertheless, Zwaigenbaum et al. (2012) found that the effect size of these variations was tiny and

not clinically significant, which led the DSM-5 (2013) ASD symptoms experienced by girls and boys are the same. As per the DSM-5 (2013) girls who do not have associated intellectual disabilities or language delays may not receive a diagnosis because females with autism spectrum disorders are more likely to exhibit them. These divergent findings from other researchers highlight the need for additional research on gender variations in the prevalence and symptomology of autism spectrum disorders, particularly in Malaysia, in order to aid in early detection and precise diagnosis and the provision of services catered to specific requirements of each gender. Children with ASD as well as other developmental disorders, such as learning difficulties (LD) and attention deficit hyperactivity disorder (ADHD), are therefore placed in special education classrooms to receive special education services. This may occasionally compromise the needs of each child in these settings. In addition, children with ASD are identified considerably later in life, which may be because parents in Malaysia are not as knowledgeable or aware of the disorder (Dolah et al., 2012). As a result, it is necessary to put in place suitable systems that allow psychometrically adequate ASD screening methods to be utilized for screening in the native Malay language. This will also make it easier to monitor, diagnose, classify, and help with ASD in Malaysia. The observation might reinforce this hypothesis that appropriate early intervention options for children with ASD will result from early and accurate identification and diagnosis, which will be more economical in terms of money, time, and resources.

Thus, the purpose of our study was to ascertain whether there are gender-related differences in the scores obtained on two standardized screening tools for ASD in children who have been diagnosed using the AQ-Child Auyeung et al. (2008) and the Childhood Autism Spectrum Test Scott et al. (2002). Our specific goal was to determine whether there are gender disparities in the frequency and symptomology of autism spectrum disorders in Malaysia.

METHOD
Design

A survey research strategy and a research questionnaire were used in the current study. Informed authorization papers and a translated version of CAST and AQ-Child in Malay were delivered to parents of students enrolled at a specific educational school. When they filled out and submitted the questionnaire, an implicit agreement was acquired to participate in the study.

Participants

A total of 52 parents and guardians of children aged 7 to 12 years who had been diagnosed with ASD participated in this study. They completed a consent form and a research questionnaire regarding their children. The sample frame for this research was obtained from Kota Kinabalu elementary schools. A purposive design

was employed, whereby public elementary schools with special education programmes and qualified special education instructors of students with ASD were included in the sample. Following the obtaining of consent from instructors, parents were contacted through seven general elementary school classes and five special education classes in the metropolitan area of Kota Kinabalu, Malaysia.

Instruments

The instrument is a questionnaire divided into three sections. Section A collected background information on the child, including age, gender, race, birth order, and twin or singleton birth status.

Section B includes a 37-item parent-completed questionnaire called the Childhood Autism Spectrum Test (CAST). Only 31 elements are evaluated, nevertheless, in order to provide a valid diagnosis of autism spectrum disorder. Regarding the scoring, an ASD positive reaction on the scored items carries one point, and an ASD negative response carries zero. The CAST elements can be arranged into two subscales, per Vulchanova et al. (2016). These subscales are named (a) communication, social behavior, and interaction, which had 16 items (items 1, 2, 5, 8, 10, 11, 13, 15, 16, 17, 18, 21, 24, 27, 31, and 35), and (b) restricted repetitive behavior patterns, which are composed of 15 items (items 6, 7, 9, 14, 20, 23, 25, 28, 29, 30, 32, 34, 36, and 37). Two key symptoms of autism spectrum disorder that are recommended in the DSM-5 also match with these two subscales. The score range is from 0-31, with higher scores (15 and above) to be considered as an indicator of ASD.

The Children's Version of Autism Spectrum Quotient (AQ-Child) is found in Section C. The AQ-Child is a 50-item parent-report questionnaire designed to measure autistic features in children between the ages of 4 and 11. It takes the form of a Likert scale (definitely disagree-definitely agree). These elements may be categorized into five areas of difficulty: imagination, social skills, communication, attention to detail, and attention-switching linked to ASD. Additionally, there are reversal items on the scale (1, 3, 8, 10, 11, 14), which were scored precisely. The entire score range is 0-150, with scores of 76 and above being classified as having ASD. AQ-Child was translated into Malay using the back-to-back translation technique, preserving the uniqueness of the original construction. The translation questionnaire produced was called the Malay AQ-Child. First, a small sample of participants (n = 35) were given the Malay AQ-Child. For pilot research, parents of children aged 6 to 12 were recruited from one primary school in Kota Kinabalu area. The purpose was to assess the applicability of AQ-Child to Malaysian culture and ascertain parents' grasp and understanding levels of the program. After the data from the pilot research and the responses from participants were analyzed, more changes were made to the Malay version. The data for the actual study was then gathered using Malay AQ-Child and the biodata form, which asks for details like a

child's age, gender, race, birth order, and whether they were born as twins or as single.

Procedure

Following the acquisition of ethical permission from relevant authorities, the administration of the chosen schools and the research team discussed an explanation of the research's goal and methodology. After presenting an official application letter to the school administration and obtaining official consent from every school, the research team and classroom instructors continued their conversation on the direction of the research. During the data-gathering phase, respectful class instructors were asked for assistance and help. Study team members presented the study questionnaire and informed permission forms to parents of children who had received a formal diagnosis of ASD from a medical professional on the first day of the week, with the assistance of their class instructors.

The Malaysian Social Welfare Department has provided each of these kids with a disability card. After three days, the questionnaire was gathered. Following Kriejcie and Morgan (10), 63 questionnaires were given to parents of students enrolled in special education classes; 54 (85%) of the returned questionnaires were retrieved, and 47 (74.6%) of them were examined. Parents of children with typical development patterns were surveyed using the same protocol. Only 52 (82.5%) of the questionnaires remained after incomplete ones were eliminated for analysis. Given that ASD prevalence has been estimated to be around 1% of the population by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM – 5), the inclusion of both typically developing and ASD-affected children in this study appears appropriate.

Instrument Translation and Cross-Cultural Adaptation

To fulfill the first study goal, the original constructions of the Autism Spectrum Tests were preserved during the Malay translation process by employing the Back-to-Back translation technique (Brislin R W., 1970). The first stage was employing two multilingual translators of local Sabahan ancestry to translate the original English questionnaire into Malay. Combining these surveys was the second stage in the translation process. The surveys were reevaluated to merge the two completed Malay versions. An academician who is fluent in Malay conducted the review and the combining stage. This procedure was conducted to make sure the merged version was correct. During this phase, significant notes on suitable wordings and words were made. The questionnaire was translated back into the third stage. The Malay questionnaire was back-translated into English by two skilled multilingual translators.

The two translators worked independently and were not provided with the original form of the questionnaire. To check the accuracy of the translation process, the English versions were examined once again. Significant notes were also made on suitable vocabulary and terminology during this phase. The original and back-translated versions were compared to determine whether the two versions were equivalent. Following the back-translation process, a few minor modifications were made to the Malay questionnaire. The completed Malay versions of the surveys underwent further editing to reduce typographical and grammatical mistakes. Next, to assess the instrument's compatibility with Malaysian culture, a small sample of participants (n=40) were given the Malay Childhood Autism Spectrum Test (CAST) and the Autism Spectrum Quotient (AQ-Child). The Malay CAST and Malay AQ-CHILD are the final instruments that were created after more changes were made in response to feedback from the respondents. The remaining goals of the study were accomplished by using these two translated instruments.

Data Analysis

SPSS 24 was used to examine the data. Data on demographics was analyzed using descriptive statistics. Mann-Whitney U test was used to determine gender differences in symptomatology. Cronbach's Alpha determined the reliability of the scales, and the R-value determined the Convergent validity of the scales and subscales.

Establishing the reliability of the scale

Another crucial factor in determining the precision of measuring devices is reliability. Estimating the degree of error-free measurement is known as reliability. As to Sekaran (2014), the degree of biaslessness (error-freeness) in a measure is indicated by its reliability. As a result, it guarantees accurate measurement across time and with different equipment types. In simpler terms, it signifies the degree of reliability and consistency with which the tool evaluates the idea and aids in determining the "goodness" of a measurement. Test-retest and parallel form reliability are two factors that might lead to measure stability. When scores are acquired from the same respondents at multiple periods or from different sets of forms with variations in the question's phrasing and sequencing, the same measure is deemed stable in this context. Conversely, split-half reliability and inter-item consistency reliability may be used to establish measure consistency.

Thus, the purpose of the reliability test in this study is to guarantee a suitable level of internal consistency among the items that reflect a particular factor. One of the most often utilized dependability coefficients is Cronbach's Alpha.

The Reliability of Malay Childhood Autism Spectrum Test and Malay Autism Spectrum Quotient

An acceptable level of internal consistency between the items that represent a given factor is checked through the reliability test. The Malay Childhood Autism Spectrum Test and the Malay Autism Spectrum Quotient, as well as their individual items grouped into subscales based on the difficulty areas linked to ASD, demonstrated good reliability values, as indicated by the results in Table 1. It demonstrates that the Cronbach's Alpha score exceeded the lower dependability limit of 0.70. This suggests that the instruments have a high degree of internal consistency.

Table 1
Reliability of Malay CAST and Malay AQ- Child

Scale	Items	Cronbach's Alpha
Malay Childhood Autism Spectrum Test (CAST)	31	.74
• Communication, Social Behavior, and interaction	16	.74
• Restricted Repetitive behavior patterns	15	.71
Malay Autism Spectrum Quotient (AQ- Child)	50	.71
• Attention-switching	10	.74
• Attention to details	10	.71
• Social skills	10	.72
• Communication	10	.70
• Imagination	10	.77

Convergent validity of Malay Childhood Autism Spectrum Test and Malay Autism Spectrum Quotient

Based on the R-values for each of the two instrument subscales, the results shown in Table 2 demonstrate that the Malay Childhood Autism Spectrum Test and Malay Autism Spectrum Quotient have high convergent validity values.

Table 2
Convergent validity of Malay CAST and Malay AQ- Child

Scales	r value					
	1	2	3	4	5	6
Malay Childhood Autism Spectrum Test (CAST)						
1. Communication, Social Behavior, and interaction	1					
2. Restricted Repetitive behavior patterns	.11** .00	1				
Malay Autism Spectrum Quotient (AQ- Child)						

3.	Attention-switching	.39**	.35**	1			
		.00	.00				
4.	Social and communication skills	.34**	.08*	.40**	1		
		.00	.02	.00			
5.	Attention to details	-.08*	.32**	-.16**	-.12**	1	
		.02	.00	.00	.00		
6.	Imagination	.34**	.02	.42**	.47**	-.34**	1
		.00	.55	.00	.00	.00	
7.	Communication	.22**	.03	.44**	.48**	.31**	1
		.00	.01	.00	.00	.00	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

RESULT

SPSS 26 was used for the data analysis. The analysis of the demographic data was done using descriptive statistics. The gender differences in symptomatology were determined using the Mann-Whitney U test.

Demographic information of children reported by parents.

Demographic profile of children based on reports from their parents, is displayed in Table 3. Males outnumbered females in special education courses by a ratio of 1 5.5, indicating glaring gender disparities among children with ASD. The youngsters ranged in age from 7 to 12 years old, and the research participants' ethnic backgrounds revealed a significant proportion of Bumiputera Sabah.

Table 3
Demographic information of the research participants (N = 52)

Variables	Frequency	Percentage
Gender		
Male	44	84.6
Female	8	15.4
Age (years old)		
7	10	19.2
8	10	19.2
9	12	23.1
10	10	19.2
11	3	5.8
12	7	13.7
Ethnicity		
Malay	4	7.7
Chinese	2	3.8
India	0	0
Bumiputera Sabah	40	76.9
Bumiputera Sarawak	2	3.8
Others	4	7.7

The research participants' demographic profile offers crucial information on the composition and attributes of the sample. Males significantly out number

females among children with autism spectrum disorder (ASD) in special education courses, according to the statistics, which indicates a gender discrepancy. There were 84.6% more male participants (44 children) than female participants (15 children), meaning the male-to-female ratio was almost 5.5 to 1. This notable imbalance aligns with broader research trends indicating a higher prevalence of ASD among males.

Regarding age, the children ranged from 7 to 12 years old, with a relatively even distribution across most age groups. The largest age group was 9-year-olds, comprising 23.1% of the participants (12 children). The ages of 7, 8, and 10 each accounted for 19.2% of the sample (10 children each). The 11-year-olds represented the smallest group, with only 5.8% of the participants (3 children), while the 12-year-olds comprised 13.7% of the sample (7 children). This diverse age range allows for examining ASD characteristics and interventions across different stages of childhood development.

The ethnic composition of the participants reveals a predominance of Bumiputra Sabah, who accounted for 76.9% of the sample (40 children). Other ethnic groups were less represented, with Malay children making up 7.7% (4 children), Chinese children at 3.8% (2 children), Bumiputera Sarawak also 3.8% (2 children), and the 'Others' category constituting 7.7% (4 children). Notably, there were no participants of Indian ethnicity in this study. The high percentage of Bumiputera Sabah indicates the need for culturally appropriate ASD therapies and is consistent with the research location's demographic emphasis.

Thus, the demographic profile highlights critical characteristics of the study sample, including significant gender disparities, a wide age range, and a predominantly Bumiputra Sabah ethnic background. These factors are essential for contextualizing the research findings and understanding the participants' specific needs and challenges.

Gender differences in symptoms of Autism Spectrum Disorders (ASD)

The Mann-Whitney U test was used to identify whether there are gender differences in symptoms based on the results on the scales and subscales of the two instruments applied in this study. Table 2 below illustrates that there were significant gender differences in the AQ score obtained in the current study when compared to the overall scores of the two scales.

Using a variety of measures, Table 4 offers a thorough analysis of how gender variations exist in ASD symptoms. The Childhood Autism Spectrum Test (CAST) and its subscales measuring social behavior, communication, and interaction, as well as patterns of restricting repetitive behavior, are the main subjects of the analysis. On the subscales measuring interaction, social behavior, and communication, no discernible gender differences were discovered, according to this study's findings.

In contrast, significant gender differences were observed in the restrictive, repetitive behavior pattern subscale (Z = -2.31, p = .02). Females had a mean rank of 37.81, significantly higher than the male mean rank of 24.44. This finding indicates that females reported more severe difficulties with restricted and repetitive behaviors than males. The significant difference highlights that restrictive, repetitive behaviors may be more pronounced or more frequently reported among females.

The significant difference in the restrictive repetitive behavior pattern subscale indicates that females may experience or report these behaviors more intensely than males. This could reflect gender-specific variations in how repetitive behaviors manifest or are perceived. The higher mean rank for females suggests that this aspect of ASD may warrant special attention when assessing and supporting female individuals.

Table 4 also provides an extensive examination of gender differences in Autism Spectrum Disorder (ASD) symptoms, incorporating additional subscales and the Autism Spectrum Quotient – Children's Version (AQ-Child). The analysis offers a comprehensive view of how symptoms of ASD vary between males and females across several domains. We thoroughly explore these findings, focusing on significant and non-significant differences observed across various scales and subscales.

Only attention switching (Z = -2.12, p = .03) showed a significant gender difference among the five subscales of the AQ-Child. No significant gender differences were detected in social skills, attention to detail, communication, or creativity. Males had a mean rank of 28.39, significantly higher than the female mean rank of 16.13. This finding highlights that males experienced more difficulty with attention switching, a critical component of executive functioning, suggesting a gender-specific variation in this aspect of ASD.

Table 4
Gender differences in symptoms of Autism Spectrum Disorders

Scales	Group	N	Mean Rank	Z	Sig
Childhood Autism Spectrum Test	Male	44	25.25	-1.40	.17
	Female	8	33.38		
Communication, social behavior, and interaction	Male	44	26.76	-.29	.77
	Female	8	25.06		
Restricted repetitive behavior pattern	Male	44	24.44	-2.31	.02
	Female	8	37.81		

Scales	Group	N	Mean Rank	Z	Sig
	Male	44	28.47		
Autism Spectrum Quotient – Children's Version				-2.19	.02
	Female	8	15.69		
	Male	44	27.42		
Social skills				-1.03	.31
	Female	8	21.44		
	Males	44	28.39		
Attention switching				-2.12	.03
	Female	8	16.13		
	Male	44	27.01		
Attention to details				-.57	.57
	Female	8	23.69		
	Male	44	27.02		
Communication				-.58	.57
	Female	8	23.63		
	Male	44	26.89		
Imagination				-.43	.68
	Female	8	24.38		

DISCUSSION

Finding out how scores on two standardized screening tests, the Childhood Autism Spectrum Test Scott et al. (2002) and the AQ-Child Auyeung et al. (2008), the purpose of this study was to determine the differences in frequency and symptoms of ASD in Malaysia. It was discovered that there were 5.5 times greater for boys in school with ASD than that of female students. As a result, this study indicates that in Malaysia, the prevalence of ASD in women is five times less than in men. This study is consistent with previous research, which shows that boys are more inclined than girls to have ASD disorders. According to recent large-scale epidemiological studies based on populations, male-to-female ratios in prevalence/incidence may range from 2.5 to 5 1 (Baio, 2014; Baron-Cohen et al., 2009; Jensen et al., 2014).

When it came to the symptomatology of ASD, it was discovered that there were significant differences in the Autism Spectrum Quotient – Children's Version overall score between males and females, but not significant differences in the Childhood Autism Spectrum test overall score between the sexes. While no gender differences were found on the communication, social behavior, or interaction subscales of the two CAST subscales, girls were found to face more difficulties than boys on the restricted repetitive behavior patterns subscale. Females with ASD exhibited fewer repetitive behaviors than males and this is in contrast to previous studies that found that females with ASD exhibited fewer repetitive behaviors than males (Maenner et

al., 2013; Mandy et al., 2012). Only the distraction subscale showed significant gender differences, with boys appearing to face greater difficulties in this aspect. No significant gender differences were found in the other five AQ-Child subscales, such as social skills, attention to detail, communication and creativity. The present study's findings are consistent with previous research Banach et al. (2008) and McLennan et al. (1993) that found no gender disparities in the primary symptoms of autism spectrum disorders.

It is essential to exercise caution when extending these findings. Due to the high reported male-to-female ratio of ASD, there are only a limited number of female participants accessible for research investigations, both in this current study and in many previous studies. Future studies should collect more extensive samples of female participants so that score patterns between genders with ASD may be more extensively compared. In addition, in order to accurately identify symptoms, doctors must have as much experience as possible in monitoring both boys and girls with ASD.

Significant research has focused on gender variations in the frequency and symptoms of autism spectrum disorders (ASD). According to studies, there are around four afflicted men for every affected female with ASD, indicating a skewed sex ratio towards males (Werling & Geschwind, 2013). The incidence of ASD is higher in men than in women, a finding that has been consistently seen across a range of demographic and age groups (Mussey et al., 2017).

Studies have also demonstrated that in Malaysia, male gender, non-Malay ethnicity, and higher parental education level are important risk factors for ASD (Menezes et al., 2022). Furthermore, research suggests that even when a female's symptom presentation is identical to a male's, females with ASD are underdiagnosed (Daub & Huber, 2020). There seems to be a gender difference in the way that ASD symptoms show. Research ahas revealed that high-functioning females with ASD had fewer communication difficulties and more motor impairments, suggesting that symptomatology may differ depending on gender (Chien et al., 2020).

Furthermore, studies have demonstrated that gender, related neurodevelopmental disorders, and autistic subtypes all have an impact on the occurrence of significant psychiatric comorbidities, which are more common in ASD (Singh & Bunyak, 2018). This shows that gender influences the appearance of comorbid illnesses linked to ASD as well as the prevalence of the disorder itself. In addition, research has also examined how gender variation relates to age at diagnosis, cognitive profile, social communication symptoms, as well as the overall severity of ASD symptoms.

Males and females differed in these elements in research on a community-based sample of people with ASD, suggesting that gender may have an impact on how ASD presents itself (Lai et al., 2015). This highlights the importance of taking gender into account when diagnosing and treating ASD to provide individually

appropriate therapy for each patient. Ethnic and racial discrepancies exist in the identification and provision of care for ASD, in addition to gender differences. There is a need for more inclusive and equitable procedures in diagnosing and supporting people with ASD since studies have revealed differences in ASD identification and access to services depending on race and ethnicity (Low et al., 2021; Mandell et al., 2009).

Furthermore, research has pointed out that expertise and infrastructure constraints are significant hindering factors for the delayed identification and intervention of ASD in Malaysia, emphasizing the need for improved resources and awareness in the region. Overall, research on gender differences in ASD prevalence and symptoms emphasizes the importance of considering gender-specific factors in understanding and treating ASD. By recognizing the disparities in prevalence, symptom presentation, and comorbid conditions based on gender, healthcare professionals and policymakers can develop more targeted and effective strategies for the early identification, diagnosis, and intervention of ASD in both males and females.

CONCLUSION

This research aims to encourage further study into differences in ASD symptom domains, extent, and severity, taking into account age as well as developmental or cognitive level. The impact of assessment and intervention on women with ASD is important to understand. This study provides an overview of important issues that need to be addressed in the future, such as the validity of diagnostic criteria and assessment tools, variations in symptom manifestations, changes in symptoms over time, the clinical course of the condition, biases related to comorbidities, informant bias in reporting and expectations, and the influence of social factors.

In addition, for helping in order to provide appropriate treatment and resources that might address each gender's unique requirements, an early and accurate screening of autism spectrum disorders in males and females is essential to identify the characteristics and symptoms that are unique to each gender. Therefore, to provide lifelong care to females whose disabilities may go undiagnosed, it is also essential to identify symptoms like autism and make an appropriate diagnosis. Understanding the incidence and symptomatology of ASD in Malaysia with the use of the current research's findings may facilitate the provision of intervention and support to individuals of both genders and aid in closing the service gap for females with autism spectrum disorders.

These results have important implications for clinical practice and research development. Clinicians should be aware of potential gender-specific manifestations of ASD, particularly in restrictive and repetitive behaviors, to tailor interventions more effectively. Awareness and training on these gender differences can enhance

diagnostic accuracy and treatment outcomes. Furthermore, future research should continue to explore these differences, employing diverse and longitudinal samples to validate and extend these findings.

In conclusion, understanding and addressing gender differences in ASD symptoms is essential for developing effective, individualized support strategies. By recognizing how symptoms may differ across genders, we can improve diagnostic processes, enhance intervention strategies, and ultimately provide more targeted and practical support for individuals with autism spectrum disorder.

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