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Evaluation of the characteristics of children with autism spectrum disorder in Vietnam

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ABSTRACT

Autism spectrum disorder (ASD) is a developmental disability that causes lifelong impairments in physical, psychological, and social functioning. This disorder manifests when a baby is still in the womb and is detected around 24 months of age. Sixty children who attended part-boarding individual hours were transported to the Nhan Tam Children's Education and Counseling Center and Quang Ngai Provincial Psychiatric Hospital for intervention and evaluation; they were assessed for ASD using the Childhood Autism Spectrum Disorder scale (CARS) and were the subjects of our study. Before their involvement, the researcher explained the purpose of the research to the participants and received their informed consent. The results showed that 75% of the children had a severe form of ASD, whereas 25% had a mild or moderate type. Indicators of verbal and nonverbal communication were prominent among children with ASD. In terms of average test scores, we found a difference between children of stable-income parents and those from disadvantaged households. This offers a basis for educators, clinicians, and sociologists to implement education, intervention, and treatment for children with ASD, as well as to enhance awareness about this condition so that parents pay more attention to their children.

Contribution/Originality: This paper contributes to our knowledge of the evaluation of autism spectrum disorder characteristics in Vietnam. This study uncovered the need for educators, clinicians, and psychologists to implement education, intervention, and therapy for children with ASD and raise awareness about this illness so that parents pay greater attention to their children.

1. INTRODUCTION

Numerous studies have shown that children with autism spectrum disorder (ASD) display greater developmental gains with rigorous preschool intervention (Zwaigenbaum et al., 2015). ASD is a developmental disability that persists throughout life, and Kanner (1943) first used the term autism to describe patients with impairments in social interaction, difficulties in verbal and non-verbal communication, and narrow and repetitive behaviors and preferences (Sadock, Sadock, & Kaplan, 2009). ASD has severe psychological, social, and economic consequences, making it an obsession for many families and communities (Geier, Kern, & Geier, 2013). Children with ASD find it very difficult to integrate with children of the same age group because of qualitative defects in social interaction and communication (Geier et al., 2013). Many children with ASD experience severe dysfunction and live almost completely dependent on relatives or the hospital. In late adolescence, children with ASD often need

friends but are limited in their responses to the interests, feelings, and emotions of others, making it difficult to develop relationships (Damiano, Mazefsky, White, & Dichter, 2014).

Over the last two decades, the frequency of ASD diagnosis has increased rapidly (Lai, Tseng, & Guo, 2013). According to the United States (U.S.) Centers for Disease Control statistics, the percentage of children with ASD has increased gradually over time. In 2006, a study of 303,790 8-year-old children in the U.S. revealed that the rate of children with ASD was 9‰; compared with 2002, the ASD rate had increased by 57% (Rice, 2009). In 2008, this rate was 11.3‰, an increase of 78% compared to 2002 (Autism & Investigators, 2012). In 2010, the rate of children with ASD under eight years old was 14.7% higher than the previous year's rate (Autism & Investigators, 2014). In 2012, at least one in every 88 children in the U.S. was diagnosed with ASD (Autism & Investigators, 2012).

According to Fan (2018) analysis of 26 epidemiological studies conducted between 2000 and 2016, 0.30 percent of the Vietnamese population had ASD. This percentage is substantially lower than that of many other nations, notably the U.S., which has a reported rate closer to 1.5% (Christensen et al., 2016). According to a recent article in Spectrum News, the global rate may be closer to 2% and in certain regions, as high as 3% (Wright, 2018b). Cubells (2013) discussed studies in which ASD prevalence rates ranged from 1.8 in 10,000 to 426 in 10,000. However, the majority of studies have reported rates closer to those observed in Wang, Wang, Guo, van Wijngaarden, and Begeer (2018) meta-analysis. Based on their review of 44 studies going back to 1996, they estimated a prevalence of ASD of 11.8 per 10,000 individuals. Although the true prevalence of ASD in China is unclear, rates reported by Chinese researchers have been consistently lower than in other regions, such as Southeast Asia and the U.S. In Japan, the stated rate is 181 per 10,000 people; in South Korea, it is 264 per 10,000 people; and in the U.S., it is 168 per 10,000 people (Wang et al., 2018).

In Vietnam, before 1980, many experts said that there were no children with ASD. The concept of ASD was still very strange to pediatricians; however, since 2000, the number of children diagnosed with ASD has increased. Trang (2012) showed that the rate of ASD in children was 5.1‰ (Trang, 2012). In another study, conducted by Kien (2014) in Thai Nguyen, the rate of ASD in children from 18 to 60 months was 4.5‰ (Kien, 2014). In a cross-sectional descriptive study by Duc et al. (2021) involving 74,308 children aged 24-72 months in Quang Ngai province, the ASD rate was 3.8‰ (Duc et al., 2021).

1.1. Autism Spectrum Disorder (ASD)

Autism spectrum disorder is characterized by difficulties with social interaction and communication, as well as constrained, stereotypical patterns of behavior, interests, and activities (Geier et al., 2013). Recent research has demonstrated that several physiological, medical, and behavioral co-morbidities are regularly associated with ASD, including gastrointestinal troubles, incontinence, sleep problems, eating disorders, behavioral challenges, and sensory processing abnormalities (Geier, Kern, & Geier, 2012). Neuroimaging studies have uncovered diminished brain specialization for the processing of social information, such as the perception of faces, biological movements, and theory of mind activities (McPartland, Coffman, & Pelphrey, 2011; Pelphrey, Shultz, Hudac, & Vander Wyk, 2011), atypical activity of the prefrontal cortex during executive function tasks (Philip et al., 2012), as well as abnormal processing of auditory and linguistic stimuli (Kennedy & Courchesne, 2008; Minshew & Williams, 2007).

Bullies victimize children with ASD and other impairments, their non-disabled siblings, and individuals with intellectual disabilities more frequently than their peers (Nowell, Brewton, & Goin-Kochel, 2014; Sreckovic, Brunsting, & Able, 2014). In their global analysis of 17 studies on school bullying, Maiano, Normand, Salvas, Moullec, and Aimé (2016) revealed that children with ASD are bullied at three times the rate of typically developing children (Maiano et al., 2016). Hoover (2015) found that 31% of teenagers with ASD experienced physical, verbal, and relational school bullying (e.g., seeking to hurt a peer and/or that peer's standing within a certain peer group). Bullying occurs within and outside of special education settings but is more widespread in conventional classrooms and unstructured areas, such as on school buses.

Several researchers have examined data from the 2011–2012 National Survey of Children's Health in the U.S. (N = 95,678) to determine the frequency and impact of adverse childhood experiences (ACEs) on children with ASD (Berg, Shiu, Acharya, Stolbach, & Msall, 2016). The findings show that income inadequacy (ASD, 40%; healthy control, 23%), parental divorce (ASD, 28%; healthy control, 20%), neighborhood violence (ASD, 11%), and household mental health (ASD, 18%; healthy control, 7%) and/or substance use (ASD, 14%; healthy control, 10%) were more prevalent among children with ASD than among healthy control peers. In addition, children with ASD were twice as likely as healthy children to have experienced four or more unpleasant childhood experiences (10.2 vs. 5.1%).

1.2. The Childhood Autism Rating Scale (CARS)

The CARS (Schopler, Reichler, & Renner, 1988; Schopler, Reichler, DeVellis, & Daly, 1980) is one of the most commonly used and durable instruments. Using this scale, a trained observer rates a child's behavior on 15 dimensions or symptoms. It generates a total score that can be used as a continuous measure of autism severity and a trichotomous categorical diagnosis of non-autistic, mild/moderate autism, or severe autism. Given that it was first released in 1980, during the era of DSM-III, one criticism of the CARS is that it does not reflect current diagnostic criteria (such as DSM-IV). The CARS items were developed using five sets of criteria (Kanner, Creak, Rutter, Ritvo, and DSM-III-R) and clinical experience (Schopler et al., 1988). In reality, the CARS contains questions that are crucial to the three domains of the DSM-IV criteria (social and emotional reactions, verbal and nonverbal communication, multiple repeated behaviors), but it does not directly address peer relationships, shared attention, or symbolic play. In addition, the CARS includes several symptoms that, while not universal or exclusive to autism, are typically present and clinically significant, such as sensory abnormalities, anxiety and activity level, and imitation problems.

The CARS has been shown to be useful with preschool children (DiLalla & Rogers, 1994; Perry, Condillac, & Freeman, 2002; Schopler et al., 1988), school-aged children (Schopler et al., 1988), adolescents (Mesibov, Schopler, Schaffer, & Michal, 1989), and samples with wide age ranges (Sevin, Matson, Coe, Fee, & Sevin, 1991; Sturmey, Matson, & Sevin, 1992; Tachimori, Osada, & Kurita, 2003; Van Bourgondien, Marcus, & Schopler, 1992). The CARS is commonly used in clinical intervention programs, such as the model early intervention programs defined by Handleman and Harris (2001), to capture participants' behavioral profiles and severity. Some researchers also use it as an outcome measure (e.g., Perry et al. (2002)), whereby a drop in CARS scores indicates a favorable response to therapy. Recent professional consensus characterizes the CARS as having excellent psychometric qualities and therapeutic value. Training practitioners to utilize it consistently is straightforward and may be accomplished rapidly (Filipek et al., 1999). The New York Guidelines mention several benefits and disadvantages of the CARS (as well as other measures). Their recommendations indicate that there is strong evidence that the CARS is useful in a variety of settings, that it offers an acceptable combination of practicality and research support, and that the severity rating score may be useful for monitoring progress and as part of a standard assessment package; however, they caution that clinicians should have adequate knowledge of autism diagnosis and proper training in the use of the CARS (Filipek et al., 1999).

1.3. Family Income and ASD

In addition to the health burden, large economic expenses accompany the rise in the number of children with ASD (Amendah, Grosse, Peacock, & Mandell, 2011; Knapp, Romeo, & Beecham, 2009). Comparing the expenses of ASD in the United Kingdom and the U.S., Buescher, Cidav, Knapp, and Mandell (2014) determined that the lifetime cost of caring for a child with ASD topped $1 million in both countries. A significant portion of the expense is attributable to special education services and parental productivity losses (Buescher et al., 2014). Other research has shown that parents (particularly mothers) of children with ASD have reduced labor force involvement rates (Cidav,

Marcus, & Mandell, 2012; McEvilly, Wicks, & Dalman, 2015). Parents' participation in the labor force is essential since it provides the family with the financial benefits of employment income. It has been established that the cost of medical services for children with ASD is relatively high (Croen, Najjar, Ray, Lotspeich, & Bernal, 2006; Liptak, Stuart, & Auinger, 2006), and specialist care costs have been cited as a reason for the underutilization of health services in children with ASD (Chiri & Warfield, 2012) and those with chronic conditions in general (Callander, Corscadden, & Levesque, 2017; Chiri & Warfield, 2012). Therefore, family income is an essential element in ensuring that children with ASD have access to care (Callander & Lindsay, 2018).

1.4. This Study

ASD has a severe impact not only on the lives and mental health of children but also on the financial well-being of society as a whole. Even though more youngsters are being diagnosed with ASD, not nearly enough attention is being paid to the condition. The prevalence of ASD among children in Vietnam, as well as the features of children with ASD as measured by the CARS scale, have not been thoroughly evaluated. In this study, we aim to ascertain the prevalence of ASD, the features of ASD that are often seen in children, and any disparity in the mean ASD score between disadvantaged and non-disadvantaged households.

2. METHODS

2.1. Research Hypotheses

H_{01}: There is not a high frequency of ASD in children.

H_{02}: Verbal and non-verbal communication are not common characteristics of ASD in children.

H_{03}: There is no significant difference in the average ASD score according to family economic condition.

2.2. Participants

Sixty children with confirmed or suspected ASD who attended part-time school, individual hours, and could be evaluated at the Nhan Tam Children's Education and Counseling Center and Quang Ngai Provincial Psychiatric Hospital were eligible to participate in the study. These 60 children included 48 males and 12 females; most were aged 36–48 months (n=35); most were Kinh ethnicity (n=58); most came from a non-disadvantaged family economic situation (n=57), and most had a religious affiliation (n=42), as Table 1 presents.

Table 1. Participants' characteristics and scores on the childhood autism rating scale (CARS).

Variables	CARS			
	n (%) (N=60)	Mean	Standard deviation	p
Age				
24 − 36 Months	14 (23.3)	40.5	1.3	0.745
36 − 48 Months	35 (58.4)	40.1	0.7	
48 − 72 Months	11 (18.3)	39.2	0.8	
Gender				
Male	48 (80)	40.0	4.3	0.945
Female	12 (20)	40.1	3.8	
Ethnicity				
Kinh	58 (96.7)	39.9	4.1	0.397
Ethnic minority	2 (3.3)	42.5	7.8	
Family income				
Non-disadvantaged	57 (95)	39.6	3.8	<0.001***
Disadvantaged	3 (5)	48.0	4.0	
Religion				
Yes	42 (70)	40.1	4.7	0.793
No	18 (30)	39.8	2.6	

Note: ***p<0.001.

Table 1 shows a significant difference in the average ASD score according to family economic condition between disadvantaged families (M = 48, SD = 4) and non-disadvantaged families (M = 39.6, SD = 3.8); p < 0.001). Therefore, the null hypothesis (H$_{03}$) was rejected.

There was no significant difference in the average ASD score according to age group (p > 0.05). Neither were there significant differences in the average CARS score for gender (p = 0.945 > 0.05), ethnicity (p = 0.397 > 0.05), or religion (p = 0.793 > 0.05).

2.3. Procedure

Participants' parents or carers gave informed consent and read the anonymity and confidentiality restrictions before completing the survey. They were informed of the aims of the study and requested to supply socio-demographic information, such as gender, age, ethnicity, and family income. Participants were not compensated for their participation and were free to quit at any time.

ASD scores were obtained using a Vietnamese translation of the CARS scale. A native Vietnamese speaker created the forward translation of the scale. By comparing their own versions of the original Vietnamese translation, the research group members reached a consensus on the final translation for backward translation.

The back-translation from Vietnamese to English was performed by a professional translator who was a fluent speaker of both English and Vietnamese without providing information on the original scale. The researchers compared the reverse translation and the original to see if there were any significant differences or conflicts between the two.

2.4. Measures

According to Volkmar, Chawarska, and Klin (2005), the CARS scale is utilized in several therapeutic settings and studies to assess the severity of ASD by observing children. The scale examines 14 categories of behavior that are typically impacted by severe difficulties in autism, plus one category of overall autism perceptions, with the aim of distinguishing children with autism from those with other developmental impairments. The 14 categories are Impairment in Human Relationships, Imitative Conduct, Emotional Reaction, Body Utilization, Object Utilization, Change Adaptation, Visual Response, Listening Response, Perceptual Response, Anxiety Reaction, Verbal Communication, Non-Verbal Communication, Activity Level, and Intellectual Functioning, as well as a General Impression. The examiner assigned a score between 1 and 4 for each item, where 1 represents age-appropriate behavior and 4 represents a significant departure from age-appropriate norms. The sum of the individual item scores classifies the child as not autistic (below 30), mildly or moderately autistic (30–36.5), or severely autistic (above 36.5) The developers of the scale also advised counting the number of items for which a child had a score of 3 or higher to determine the severity of autism. A diagnosis of severe autism is warranted if at least five criteria are met (Schopler et al., 1980).

Reliability estimates are stated in the CARS handbook (Schopler et al., 1988). The test-retest reliability for 91 instances was 0.88 (r = 0.94) after a 12-month gap. Many studies have discovered lower alpha coefficients for the childhood and adolescent groups (r = 0.79 and 0.73, respectively) in independent studies of CARS (Garfin & McCallon, 1988). A 1988 study comparing autistic and non-autistic handicapped teenagers found statistically significant variations in the overall CARS scores of the two groups (Garfin & McCallon, 1988).

2.5. Statistics

For data processing, version 22.0 of the Statistical Package for the Social Sciences (SPSS) was used. Descriptive statistics were used to describe participants' characteristics. A one-way analysis of variance (ANOVA) was used to examine any statistical differences based on age, gender, ethnicity, family economic condition, and religion.

3. RESULTS

As shown in Table 2, the participants' average CARS score was M = 40.0 (SD = 4.2). According to our statistics, 75% of these children with ASD exhibited severe symptoms, whereas 25% presented mild to moderate symptoms. Therefore, null hypothesis H_{01} was rejected.

Table 2. Level of autism spectrum disorder in children.

Level of ASD	N	Percentage (%)	Mean ± Standard deviation
Mild - moderate	15	25	
Severe	45	75	40.0 ± 4.2
Total	60	100	

Several international and Vietnamese studies have indicated that the prevalence of children with severe autism is greater than that of children with mild to moderate autism. This may suggest that families of children with moderate to severe autism have inaccurate beliefs. Since early intervention strategies are often misunderstood or confused with other developmental diseases and impairments that may resolve on their own, they get little attention, as Table 3 presents.

Table 3. Characteristics of autism spectrum disorder in children.

No	Characteristics of ASD	Mean	Standard deviation
1	Impairment in human relationships	2.7	0.5
2	Imitative conduct	2.7	0.5
3	Emotional reaction	2.2	0.5
4	Body usage	2.7	0.5
5	Object use (Toys and other materials)	2.6	0.5
6	Change adaptation	2.3	0.4
7	Visual response	2.7	0.5
8	Listening response	2.3	0.4
9	Perceptual response	2.1	0.3
10	Anxiety reaction	2.3	0.5
11	Verbal communication	3.2	0.3
12	Nonverbal communication	3.2	0.3
13	Activity level	2.9	0.3
14	Intellectual functioning	3.1	0.2
15	General impressions	3.0	0.3

Table 3 shows that Quang Ngai children with ASD most frequently exhibit defects in verbal and nonverbal communication, followed by the level of intellectual functioning. The least common characteristics were visual, olfactory, and tactile responsiveness and problems with abnormal emotional expression. Therefore, null hypothesis H_{02} was rejected.

4. DISCUSSION

The main purposes of the present study were to investigate (i) the prevalence of ASD in children, (ii) the features of ASD most often observed in children, and (iii) any disparity in the mean ASD score between disadvantaged and non-disadvantaged families.

Our data indicate that the ratio of males to females was 4:1, which is similar to the findings of Fombonne, MacFarlane, and Salem (2021). Their investigation assessed 141 studies published between 1966 and 2020; 114 studies with sex data yielded a median sex ratio of 4:1. According to the non-significant Spearman connection between sex ratio and year of publication, a sex ratio of 4:1 corresponds to seeing 80-81% men in a surveyed sample, and this has not changed over time (Fombonne et al., 2021). Research consistent with the higher male-to-female

ratio includes reliable and valid studies from countries such as Japan (77.2% and 75.8%) (Kurita, Miyake, & Katsuno, 1989; Tachimori et al., 2003), the U.S. (82%) (Sturmey et al., 1992), and Spain (74.5%) (Villamisar & Muela, 2000).

According to our research findings, 75.0% of ASD cases are classified as severe, while 25% are classified as mild to moderate. Thus, the incidence of children with severe autism is greater than that of children with mild-to-moderate autism, which is comparable to the findings of Kien (2014) study on children with ASD between 18 and 60 months of age in Thai Nguyen province: 59.2% had a severe case, whereas 40.8% had a mild to moderate case (Kien, 2014). According to the findings of Duc et al. (2021) research on the prevalence of ASD in children aged 24–72 months in the province of Quang Ngai, children with severe autism accounted for 63.57% and children with moderate autism accounted for 36.4% (Duc et al., 2021). In Giang (2010a) research on ASD in children aged 18 to 36 months at the National Children's Hospital, the incidence of severe autism was greater than that found in previous studies, at 85.7%. This may be because the children in the study were younger and whose language, non-verbal communication, and behavioral impairments were severe and for whom, therefore, intervention and social learning via activities were necessary. In addition, children's everyday activities progressively mitigate the flaws, reducing the severity of ASD (Giang, 2010a). Hussein, Taha, and Almanasef (2011) observed a group of ASD patients in Egypt and found 10% with a severe level, 85% with a moderate level, and 5% with a mild level of ASD; the group diagnosis was 17.4% with a severe level, 34.8% with a medium level, and 47.4% with a mild level (Hussein et al., 2011). In Vietnam, the research has indicated that among children, the prevalence of severe ASD is much greater than that of mild-to-moderate ASD. This demonstrates that the symptoms severely impair the quality of life of the family and the child.

Our study shows that children have the most severe difficulties in both verbal and non-verbal communication. In this, our findings are similar to those of Giang (2010b) and Kien (2014). These are the most visible, recognized, and defining characteristics of children with ASD. The majority of families are worried and seek expert assistance when their 24-month-old does not speak or uses words out of context. Children may mix comprehensible words with others that are not clear, mechanical repetition, or nonsensical pronunciation when speaking. Occasionally, youngsters produce peculiar noises. While infants lack sufficient language to express themselves, they also have trouble utilizing gestures and facial expressions to communicate their desires and cannot comprehend the nonverbal communication of others (Giang, 2010a; Kien, 2014).

Concerning the family's economic circumstances, we found a substantial difference in the average ASD score between disadvantaged and non-disadvantaged households. Children from disadvantaged families had higher ASD scores than those from non-disadvantaged families, although the proportion of children from non-disadvantaged families was significantly higher. This is similar to the synthesis of Fombonne et al. (2021) that the prevalence of ASD was higher in high- and upper-middle-income families than in low-middle- or low-income families. Even when children's behavioral and adaptive characteristics are considered, Emily and Grace (2015) showed a strong association between parental income and children's intelligence. This may be especially significant for children with ASD since prior research has shown that families with ASD suffer a greater financial burden (due to the child's condition) than families with children with attention deficit hyperactivity disorder (Zablotsky, Kalb, Freedman, Vasa, & Stuart, 2014). In addition, family income was reported more frequently in this research than in earlier studies of families with children with various diseases (Hu, Wang, & Fei, 2012; Wang et al., 2004).

5. LIMITATIONS

This research has certain limitations. First, we recruited participants using convenience sampling, restricting the generalizability of the research to a representative sample of the Vietnamese community. The majority of the study's participants attended the Nhan Tam Children's Education and Counseling Center and the Quang Ngai Provincial Psychiatric Hospital. Consequently, the study's results are restricted to this population. With this constraint in mind, further research with large and varied sample sizes is advisable. Second, due to the cross-

sectional nature of our research, causal conclusions cannot be drawn. Consequently, prospective modeling should be used to examine the correlation between ASD level and family income, as well as the implications of this association. In future research, a longitudinal design is recommended to establish a cause-and-effect correlation.

6. CONCLUSION

The results of our research have shown that children who have ASD are significantly impacted, affecting their verbal and nonverbal communication abilities as well as their intellectual development. This should serve as a caution to educators, therapists, and parents, who need to pay extra special attention to the infants and young children in their care. Previous studies have suggested that exposing children with ASD to typically developing children's social communication and behaviors benefits them. It has been suggested that this exposure enhances verbal and social abilities and nurtures intellectual potential (Harrower & Dunlap, 2001). In typical school settings, children with ASD show improvements in social communication, IQ, and adaptive behaviors (Fisher & Meyer, 2002; Nahmias, Kase, & Mandell, 2014; Stahmer, Akshoomoff, & Cunningham, 2011). Ethics also urge mainstream schooling as a basic human right of children with ASD and their families (Allan, 2007). In contrast, children with ASD in exclusive special education settings benefit from more rigorous, systematic, and coordinated intervention programs handled by more experienced professionals and specialized facilities (Mesibov & Shea, 1996). Many studies have shown that young children with ASD who are placed in special education settings and receive intensive treatments improve in cognitive, social, and adaptive skills (Harris, Handleman, Gordon, Kristoff, & Fuentes, 1991; Rogers, 2016; Rogers & Vismara, 2008). This is the basis for educators, clinicians, and sociologists to implement education, intervention, and treatment for children with ASD and enhance awareness about this condition so that parents pay more attention to their children.

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