Early detection of autism spectrum disorder in Nghe An province, Vietnam

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Abstract. At present, autism spectrum disorder in children is on the rise, is a concern of parents and the whole social community. The incidence of disease is growing up from year to year, the number of ASD children being detected is increasing. There has been no research on the epidemiology of autism in children in general and children under 6 years old in particular in Vietnam and Nghe An. Therefore, the detection and organization of treatment and teaching of children are very necessary in order to create conditions for children personality development, social integration, and reduce the burden for the future growing, reducing the burden on the family and society. Increasing family awareness and understanding of the medical home can promote partnership of the parents and primary care provider in planning and coordinating the child's care and advocating for their needs. Our government need to build services to promote social skills appropriate for work and postsecondary education, access to appropriate medical and behavioral health services, job skills development, and community leisure opportunities.

Key words: autism spectrum disorder; Vietnam, evidence based medicine; early diagnostic; hobblers; children

INTRODUCTION

Autism spectrum disorders (ASD) are a group of complex and heterogeneous developmental conditions characterized by reduced social interaction and communication, as well as restricted range of interests and/or stereotypic behaviors (American Psychiatric Association, 2013). ASDs begin in childhood and tend to persist into adolescence and adulthood (World Health Organization, 2019).

Prevalence

Various forms of autism affect 52 million people worldwide (Baxter et al., 2015). Prevalence of ASD is 1 in 59 children (Baio, 2018; Centers for Disease Control, 2020). Data on national samples suggest that the prevalence of ASD is stabilizing (Xu et al., 2018). ASD prevalence in East Asia (0.51%) is higher than that in West Asia (0.35%) and South Asia (0.31%) (Qiu et al., 2020). In South Korea the total prevalence 10.97 per 100000 in 2015 (Hong et al., 2020). According to research of 2019 the prevalence of ASD in Vietnam was significantly higher in urban - 1.238% than in rural areas 0.580% (Hoang et al., 2019). In addition to well established data on higher ASD prevalence rates in boys (Loomes et al., 2017).

Young girls diagnosed with autism spectrum disorder tend to have greater social communication deficits than young boys and these differences vary by age (Ros-Demarize et al., 2020).

Risk factors

Despite advances in understanding the neurobiology and genetics of ASD, the diagnosis of ASD continues to be based on identifying and reporting behaviorally defined clinical symptoms (Hyman et al., 2020).

ASD is not a single disorder. It is now broadly considered to be a multi-factorial disorder resulting from genetic and non-genetic risk factors and their interaction (Park et al., 2016).

All factors which are leading to ASD development can be divided into three groups: genetic, maternal health, and neurological (Elsabbagh, 2020).

Heritability of ASD and autistic disorder were estimated to be approximately 50% (Sandin et al., 2014). Numerous twin and family studies show that genetic and non-genetic factors contribute to an increased susceptibility to autism (Tick et al., 2016). Genetic risk factors lead to autism by modifying early brain development and functioning (Nakagawa et al., 2019).

Connection between ASD and perinatal period is proved. During the prenatal period, the factors associated with ASD risk were maternal and paternal age≥35 years, mother's and father's race: White and Asian, gestational hypertension, gestational diabetes, maternal and paternal education college graduate+, threatened abortion, and antepartum hemorrhage. During perinatal period, the factors associated with ASD risk were caesarian delivery, gestational age≤36 weeks, parity≥4, spontaneous labor, induced labor, no labor, breech presentation, preeclampsia, and fetal distress. During the postnatal period, the factors associated with ASD risk were low birth weight, postpartum hemorrhage, male gender, and brain anomaly (Wang et al., 2017; Lukmanji et al., 2019). Several factors associated with immune system vulnerability in pregnant mothers are implicated in autism and are thought to interact with genetic factors to increase susceptibility (Solek et al., 2018; Brown and Conway, 2019). Neonatal jaundice was associated with ASD at 35–37 weeks (aOR = 1.83, 95%CI 1.05, 3.19), but not ≥ 38 weeks gestation (aOR = 0.97, 95%CI 0.76, 1.24) (Cordero et al., 2020).

MATERIALS AND METHODS

Prevalence studying. 14.000 children at age from 12-72 months old in Nghe An with 7 representing districts for 4 geographic regions including: Vinh city, Dien Chau, Quynh Luu, Tan Ky, Thanh Chuong, Nghia Dan, Quy Chau.

RESULTS

The autism rate is 1.57%. The rate of mild and moderate autism is 0.88%. Ratio of severe autistic child is 0.69% (Table 1).

Table 1. Characteristics of research samples by district and city

Location	n	Average age	Male		Female		Number of autistic children		P (male-female)
			n	%	n	%	male	female	
Vinh	3000	3.34 ±1.1	1664	55.6	1336	44.4	72	15	>0.05
Dien Chau	3000	3.49 ±1.4	1620	54.0	1380	46.0	16	7	>0.05
Quynh Luu	3000	3.93 ±1.6	1885	62.8	1115	37.2	22	7	>0.05
Nghia Dan	1500	3.96 ±1.1	866	57.7	634	42.3	16	9	> 0.05
Thanh Chuong	1500	3.92 ±1.6	802	53.5	698	46.7	12	5	>0.05
Tan Ky	1500	3.68 ±1.1	778	51.8	722	48.2	12	7	>0.05
Quy Chau	500	3.51 ±1.1	314	62.8	186	37.2	12	8	>0.05
Total	14000	3.69 ±1.3	7929	56.7	6071	43.3	162	58	>0.05

The incidence of the disease in male > female (73.6% male, 26.4% female). The children with age from 2-3 years old accounted the highest rate 42% in total researching.

Table 2. The proportion of autistic children by age

Age	n	%	Male		Female		p (male-female)
			n	%	n	%	
1- < 2 years old	37	16.8	31	83.7	6	16.3	< 0.05
2- < 3 years old	74	33.6	65	87.8	9	12.2	< 0.05
3- < 4 years old	47	21.4	34	72.3	13	17.7	< 0.05
4- < 5 years old	45	20.5	25	55.6	20	44.4	> 0.05
5- ≤ 6 years old	17	7.7	7	41.2	10	58.8	> 0.05
Total	220	100	162	73.6	58	26.4	< 0.05
p (year old)							

ASD detected in city area- 87 children or 39.5% from all cases. Quantity of moderate and severe autism was 123:97 cases (55%:45%). Proportion of moderate and severe autism by gender was 78.4% –male to 21.6% in female.

Among ASD risk factors following were detected. We compared them between different forms of ASD. (Table 3)

Table 3. Comparison of risk factors between mild, moderate and severe autistic children

No.	Prehistoric maternity	Total	Mild and modereate				p
			n	%	n	%	
1	Normal birth	167	108	64.7	59	35.3	<0.001
2	Asphyxiation	12	4	25.0	8	75.0	0.014
3	Premature birth	4	1	25.0	3	75.0	(-)
4	Sepsis in pregnancy	13	4	30.8	9	69.2	0.049
5	Elderly mother	5	1	20.0	4	80.0	(-)
6	Obstetric intervention	8	2	25.0	6	75.0	(-)
7	Twins	2	0	0	2	100	(-)
8	Newborn jaundice	9	3	33.3	5	66.7	(-)
	Total	220	123	55.9	97	44.1	

Average time of TV viewing for children with mild and moderate ASD was 1.76± 0,98, for children with severe ASD was 2.5 ± 0.95 hours per day ($t = 5.636$, $p < 0.001$).

Average time parents were playing with their children was 1.91 ± 0.96 for children with mild and moderate autism and 1.58 ± 0.75 for children with severe ASD ($t = 2.781$, $p<0.0059$).

Among children with mild and moderate autism 69 (56.1%) were educated in kindergartens and 54 (43.9%) were educated at home. Among children with severe autism 65 (67%) were educated in kindergarten and 32 (33%) at home.

Demonstrating the ability to detect early and more attention from parents and the development of health care. These risk factors for autistic include pregnancy history, children's watching television time, parents spend less time with children. The parents' attending in treatment or education for autism or normal is very important, promoting of children's success. The level of Autism assesses CARS scale related with the linear regression, pregnancy history, watching television time and the time playing with children of parents (Table 4).

Table 4. Multivariate regression analysis of factors related to the degree of autism through scale CARS

Variable	Linear coefficients	Standard deviations	t	p
Constant	37.2078			
Gender	-1.6044	0.6667	-2.407	0.0169
Prehistoric maternity	1.9131	0.6968	2.746	0.0066
Time watching television	1.1930	0.2919	4.086	0.0001
Multivariate correlation: $r = 0.3654$ $R_2 = 0.1335$				
Level of significance: $p < 0.001$				

Parents spend time to play with children related to the level of severe autism is shown by multivariate correlation equation $Y = 45.4967 – 0.4996$ the time playing with children. With $p < 0.05$. In which Y = total marks with CARS scale.

DISCUSSION

Early identification of ASD allows the possibility of early intervention (Zwaigenbaum et al., 2015). Efficient screening of all children would be aided by inclusion of valid screening tools in the electronic health record with appropriate compensation for the staff and professional time necessary to complete the administration, scoring, and counseling related to screening (Lipkin and Macias, 2020). Screening tools are designed to help caregivers identify and report symptoms observed in children at high risk for ASD. The screens are based on early manifestations of symptoms of core deficits related to social communication. Some of these early symptoms that may alert the provider to the risk for ASD have been called "red flags" (Hyman et al., 2020).

Results of a screening test are not diagnostic; they help the primary care provider identify children who are at risk for a diagnosis of ASD and require additional evaluation. General developmental screening tools used for screening at ages 9, 18, and 30 months identify language, cognitive, and motor delays but may not be sensitive to social symptoms associated with identification of ASD (Zwaigenbaum et al., 2015).

The M-CHAT is the most studied and widely used tool for screening toddlers (mostly for children between 12-30 months) for ASD (Zwaigenbaum et al., 2015; Hyman et al., 2020). At present, for children older than 30 months, there are no validated screening tools available for use in pediatric practice, nor are there current recommendations by the AAP for universal screening for ASD in that age group (Hyman et al., 2020).

Short clinical visits may not allow even a skilled clinician the opportunity to accurately recognize symptoms of ASD (Gabrielsen et al., 2015). The history of symptoms of ASD can be supported by questionnaires such as the Child Behavior Checklist or Childhood Autism Rating Scale (CARS) (Havdahl et al., 2016; Samms-Vaughan et al., 2017).

Evaluation of Co-occurring Developmental Conditions consist of: cognitive testing, language testing, adaptive function testing, motor assessment, sensory assessement (hearing, vision, sensory processing).

Intervention

The goals of treatment of children with ASD are to

- minimize core deficits (social communication and interaction and restricted or repetitive behaviors and interests) and co-occurring associated impairments (Ameis et al., 2018);
- maximize functional independence by facilitating learning and acquisition of adaptive skills;
- eliminate, minimize, or prevent problem behaviors that may interfere with functional skills (Wong et al., 2015).

Interventions for children with ASD are provided through educational practices, developmental therapies, and behavioral interventions. Treatment strategies may vary by the age and strengths and weaknesses of the child. Families should be involved in the selection of intervention approaches and remain an involved participant in subsequent educational and therapeutic decisions (Hyman et al., 2020).

The impact of having a child with ASD on other family members and on society is considerable. More than half of families report that a parent needs to cut back on work or stop working because of the care needs of the child. Peer support for families of children with ASD is associated with less parental stress, less negative mood, and more positive perceptions (Clifford and Minnes, 2013). Parents who understand more about their child's ASD can advocate for more intensive and appropriate services (Siller et al., 2014).

CONCLUSION

ASD primary prevention solutions: impact on the cause of maternity, impact on genetic factors. ASD secondary prevention solutions: strengthening early detection of autism, control and limit the risk factor. The treatment solution: building autism treatment center in the obstetrical hospital, building training programs for preschool teachers about autism.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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