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Epidemiology and screening for autistic pathology in Nghe An province, Vietnam

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ABSTRACT. Autism spectrum disorder (A S D) in children is on the rise and is a concern for parents and the community. There has been no research on the epidemiology of autism in children in general and children under six years old in particular in Nghe An, Vietnam. We examined the prevalence of ASD among children under 6 years of age in this region. We retrospectively studied the medical records of perinatal centers and children's outpatient clinics and hospitals. A relationship was found between cases of autism and risk factors, including congenital asphyxia, sepsis during pregnancy, multiple pregnancies, late reproductive age of the mother, children's watching television time, and parents' spending less time with children.

Key words: Autism spectrum disorder; Vietnam; Evidence- based medicine; Early diagnosis

INTRODUCTION

Autism spectrum disorders are defined as developmental defects that can be characterized as a lack of initiation and maintenance of relationship with society, limitation of the range of interests, and stereotypical repetition of behavioral manifestations (American Psychiatric Association, 2013). Manifestation of ASD

typically begins in childhood, with subsequent persistence throughout later life (World Health Organization, 2019).

Prevalence

Multiple manifestations of autism occur in over 50 million of the world's population (Baxter et al., 2015). According to prevalence data, an average of 1 in 59 children has ASD. (Baio, 2018; Centers for Disease Control, 2020). Nevertheless, there is a tendency towards stabilization of the number of patients with ASD (Xu et al., 2018). Geographically, ASD dominates in East Asia, where the is about 0.51%, which is significantly higher than in Western (0.35%) and South Asia (0.31%). (Qiu et al., 2020). In South Korea, the total prevalence was 10.97 per 100,000 in 2015 (Hong et al., 2020). A significantly larger number of cases of ASD is recorded among the urban population, where the prevalence is 1.238%, while among urban residents, it is 0.580% (Hoang et al., 2019). ASD is significantly more common in boys (Loomes et al., 2017). Girls with ASD still have relatively retained communicative abilities; girls are more sociable than boys with ASD (Ros-Demarize et al., 2020).

Risk factors

Diagnostic measures for ASD are mainly associated with the detection of behavioral symptom complexes during physical examination, despite the genetic and neurobiological studies of this pathology. (Hyman et al., 2020). ASD is a multifactorial disease caused by various modifiable and unmodifiable risk factors (Park et al., 2016). All factors that lead to ASD development can be divided into three groups: genetic, maternal health, and neurological (Elsabbagh, 2020).

The causation of ASD by genetic predictors is about 50% (Sandin et al., 2014). Studies conducted on twins and probands have shown a high role of genetic and non-genetic factors in predisposition to ASD (Tick et al., 2016). Hereditary predisposition to ASD is due to changes in brain development under the influence of genetic factors (Nakagawa et al., 2019).

Non-modifiable factors that influence the development of ASD in the prenatal period include fertile age over 35 years, racial predisposition (white and Asian races), gestational diabetes and hypertension, the presence of prenatal bleeding and the threat of termination of pregnancy. Perinatal risk factors include a significant number of previous pregnancies (more than 4), breech presentation of the fetus, caesarean section, preeclampsia. In the postpartum period, among the risk factors for ASD are low birth weight, the presence of postpartum hemorrhage, and the male gender of the newborn. (Wang et al., 2017; Lukmanji et al., 2019). Sensitizing the immune response of a pregnant woman is also implicated in ASD and increases susceptibility to autism (Solek et al., 2018; Brown and Conway, 2019). Neonatal jaundice was associated with ASD at 35–37 weeks (aOR = 1.83, 95%CI 105–319), but not $\geq$ 38 weeks gestation (aOR = 0.97, 95% CI 0.76 - 1.24) (Cordero et al., 2020).

To better understand autism in Vietnam, we examined its incidence in various regions of the country in young children.

MATERIAL AND METHODS

A prevalence study was made of 14,000 children, 12-72 months old, in Nghe An involving seven districts in four geographic regions including: Vinh city, Dien Chau, Quynh Luu, Tan Ky, Thanh Chuong, Nghia Dan, and Quy Chau. We retrospectively studied the medical records of perinatal centers and children's outpatient clinics and hospitals. The data were analyzed using statistical methods (packages SPSS version 22, EZR version 1.38 (Saitama Medical Center, Jichi Medical University. To present the typical result for nominal qualitative variables, the mode of indicators, interval estimation of dichotomous variables) were used. When making multiple comparisons between groups, we used the Chi-square test with Bonferroni correction.

Inclusion criteria: children aged 12-72 months, signed voluntary agreement of parents for the participation of children in the study. Exclusion criteria: presence of congenital organic pathology (heart defects, central and peripheral nervous system, hemoblastosis). The study design and informed consent form were reviewed and approved by the institutional expert bioethics committee and the parents or responsible guardians signed informed consent forms.

RESULTS

The autism rate is 1.57%. The rate of mild and moderate autism was 0.88%. The frequency of severe autistism was 0.69% (Table 1).

Table 1. Prevalence of autism in the children aged 12-72 months in Vietnam.

Location	n	Average age in years	Male		Female		Number autistic of children	
			n	%	n	%	male	female
Vinh	3000	3.34±1.1	1664	55.0	1336	44.4	72	15
Dien Chau	3000	3.49±1.4	1620	54.0	1380	46.0	16	7
Quynh Luu	3000	3.93±1.6	1885	62.8	1115	37.2	22	7
Nghia Dan	1500	3.96±1.1	866	57.7	634	42.3	16	9
Thanh Chuong	1500	3.92±1.6	802	53.5	698	46.7	12	5
Tan Ky	1500	3.68±1.1	778	51.8	722	48.2	12	7
Quy Chau	500	3.51±1.1	314	62.8	186	37.2	12	8
Total	14000	3.69±1.3	7929	56.7	6071	43.3	162	58
Significance level of difference in the prevalence of autism between groups, P	< 0. 001							

The incidence of the disease in males > females (73.6% male, 26.4% female). The children with age from 2-3 years old accounted for 42%.

Table 2. The proportion of autistic children by age.

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

p (year old)

Significance level of difference in the prevalence of autism between groups, P	< 0. 001

ASD detected in city area- 87 children or 39.5% of 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 females. Among ASD risk factors, the 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 moderate		Severe	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 it 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 hours per day 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 kindergarten and 54 (43.9%) were educated at home. Among children with severe autism 65 (67%) were educated in kindergarten and 32 (33%) at home.

These risk factors for autistic include pregnancy history, children's watching television time, parents spend less time with children. The parents' attending treatment or education for autism or normal is very important, promoting children's success. The level of Autism assesses Childhood Autism Rating Scale (CARS) (Randall et al., 2018). 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 the CARS (Childhood Autism Rating Scale) scale.

Variable	Linear coefficients	Standard deviations	t	P
Constant	372.078			
Gender	-16.044	0.6667	-2.407	0.0169
Prehistoric maternity	19.131	0.6968	2.746	0.0066
Time watching television	11.930	0.2919	4.086	0.0001
Multivariate correlation: r = 0.3654 R2 = 0.1335				
Level of significance: P < 0.001				

Parents time to play with children was related to the level of severe autism, based on multivariate correlation equation $Y = 45.4967 – 0.4996$ the time playing with children. With $P < 0.05$. In which Y = total marks based on CARS scale (Siller et al., 2014).

DISCUSSION

We examined the prevalence of ASD among children under 6 years of age in Nghe An (Vietnam). Early identification of ASD allows the possibility of early intervention (Zwaigenbaum et al., 2015a). Mass introduction of screening with the introduction of data into medical records will help to improve the efficiency of early diagnosis of ASD (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).

Screening is not the gold standard for diagnosis, but it is important for the additional assessment of ASD. Screening methods are able to determine problems in the behavioral, speech and motor development of a child of 9, 18 and 30 months (Zwaigenbaum et al., 2015b).

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., 2015b; Hyman et al., 2020). Screening for ASD is not mandatory now and is not included in the universal guidelines for pediatrics (Hyman et al., 2020).

Irregular and brief check-ups can hide ASD symptoms even from an experienced doctor (Gabrielsen et al., 2015). The use of survey questionnaires is important in diagnosing ASD, especially the use of the Child Behavior Checklist or the Childhood Autism Assessment Scale. (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, a n d sensory assessment (hearing, vision, sensory processing).

Intervention

We found a significant relationship between cases of autism and children's watching television time; as a result, parents spend less time with children.

The goals of treating children with autism is to compensate for behavioral and communication deficits (Wong et al., 2015).

Interventions for children with ASD are provided through education, developmental therapy, and behavioral intervention. Treatment strategies can vary according to the age and abilities of the child. Families should participate in the choice of intervention options and stay involved in educational and therapeutic decisions (Hyman et al., 2020).

Having a child with ASD makes a significant difference in the life of the family. Thus, more than 50% of the families surveyed reported the need to change the work schedule due to the need for enhanced care for a child with autism. (Clifford and Minnes, 2013). Parental awareness of ASD significantly improves the quality of care for a child with autism (Siller et al., 2014).

CONCLUSIONS

A significant relationship was found between cases of autism and risk factors such as congenital asphyxia, sepsis during pregnancy, multiple pregnancies, late reproductive age of the mother, children's watching television time, parents spend less time with children. Autism significantly predominates in males. The onset of autism is most common in children aged 24-36 months.

The detection and organization of treatment and teaching of children are necessary in order to create conditions for child personality development, social integration, and reduce the burden for the patient, 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 needs to develop 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.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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