

PERINATAL AND NEONATAL FACTORS ASSOCIATED WITH THE DEVELOPMENT AND SEVERITY OF AUTISM SPECTRUM DISORDER

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INTRODUCTION

Autism spectrum disorder (ASD) is a complex neurodevelopmental disability characterized by

- social impairments;
- communication difficulties; and
- restricted, repetitive, and stereotyped patterns of behavior.

Prevalence^{1,2}

- About 1 in 68 children (14.7 per 1000).
- Increased 289.5% from 1997-2008.
- Five times more common among boys.
- 83% co-occurrence of non-ASD disorders
- Genetic factors estimated to account for 35-40% of development of an ASD.
- Prenatal, perinatal and neonatal factors hypothesized as risk factors;³ however, there is limited evidence.

OBJECTIVE

To estimate the association of breastfeeding, low birth weight, maternal age at childbirth, and birth order with the development and severity of Autism Spectrum Disorder (ASD).

METHODS

Data Source

2011-2012 National Survey of Children's Health (NSCH); 19,957 children aged 2 – 5 years.

Statistical Modeling

- Binary and ordinal multivariable logistic regression modeling of presence and severity of ASD,
- Estimated adjusted odds ratios (aOR) for breastfeeding status, maternal age at the time of childbirth, birth weight and birth order and ASD, adjusting for age, gender, race and poverty level.

RESULTS

Key Findings

- The prevalence of ASD among boys was three times higher than among girls.
- Children with low birth weights (< 2500 g) were twice as likely to have ASD than children with higher birth weights.
- Children with ASD who were breastfed for six or more months had lower odds of having a severe form of ASD, as compared to children with ASD who were never breastfed or breastfed for less than six months.
- Children born to mothers aged 25-30 years had higher odds for severe ASD, as compared to children of younger mothers (under 20 years at childbirth.).

Table 1. Multivariate logistic regression analyses of factors associated with ASD among children aged 2-5 years. National Survey of Children's Health, 2011-2012.

Variables	Number of Children (Participants)	Number of Children with ASD	Odds Ratio	Odds Ratio (95% Confidence Interval)
Birth Weight, grams				
<2500	1861	44		2.0 (1.1, 3.8)*
>= 2500 (Ref)	17475	232		1.0
Birth Order				
Only child	7583	112		2.3 (0.8, 6.4)
Oldest child	3660	57		2.5 (0.8, 7.7)
Second child	5930	83		3.8 (1.4, 10.0)*
Third child	1988	20		1.8 (0.6, 5.8)
Fourth child (Ref)	796	11		1.0
Age, y	19926	283		1.9 (1.5, 2.4)*
Gender				
Male	10192	212		3.2 (1.9, 5.6)*
Female (Ref)	9750	70		1.0
Poverty Level				
400% or more FPL	6451	71		0.4 (0.2, 0.9)*
200-399% FPL	5827	75		0.5 (0.2, 1.4)
100-199% FPL	3909	63		0.7 (0.4, 1.4)
< 100% FPL (Ref)	3770	74		1.0

CONCLUSIONS

- Birth weight, birth order, age and gender were significantly associated with the development of ASD.
- Children with lower birth weight and second birth order were more likely to have ASD.
- Children who were breastfed for six or more months had decreased risk for severe ASD.
- The results of our study are beneficial for elucidating etiology of ASD and for disease prevention. Future studies are needed to further explore the role of perinatal and prenatal determinants on the development of ASD.

REFERENCES

1. CDC. Autism Spectrum Disorders. <http://www.cdc.gov/ncbddd/autism/data.html> accessed April 7, 2015.
2. Kogan, M. D., Blumberg, S. J., Schieve, L. A., Boyle, C. A., Perrin, J. M., Ghandour, R. M., ... & van Dyck, P. C. (2009). Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics*, 124(5), 1395-1403.
3. Froehlich-Santino, W., Tobon, A. L., Cleveland, S., Torres, A., Phillips, J., Cohen, B., ... & Hallmayer, J. (2014). Prenatal and perinatal risk factors in a twin study of autism spectrum disorders. *Journal of psychiatric research*, 54, 100-108.