Trend Study of Autistic Spectrum Disorders at Queen Sirikit National Institute of Child Health

Ratanotai Plubrukarn, MD, MHP Ed*, Vinadda Piyasil, MD*,
Pranee Moungnoi, MD*, Somsong Tanprasert, RN, M Ed (Education Psychology)**,
Vilairat Chutchawalitsakul, RN, MA (Development Psychology)**

** Child and Adolescent Psychiatry Department, Queen Sirikit National Institute of Child Health*
*** Pediatric Nursing Department, Queen Sirikit National Institute of Child Health*

Background: *Increases in the incidence and prevalence of autistic spectrum disorders have been reported recently in the United States and Europe, but there are only a few reports on the trend of this problem in Thailand.*
Objectives: *To study trend in autistic spectrum disorder patients and to find the factors that correlate with the incidence of this disorder at Queen Sirikit National Institute of Child Health.*
Material and Method: *A hospital-based prospective trend study was conducted in patients aged less than 12 years old, who attended the Child and Adolescent Department, Queen Sirikit National Institute of Child Health, Bangkok, form January 1998 to December 2002. Autistic spectrum disorders were defined as autistic disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS), and Asperger's disorder. Related factors were recorded and analyzed. Aged-adjusted incidence rate in both sexes and proportion rates of related factors were calculated by using the direct method. Standard t-test and correlation coefficient were performed to test for statistically significant difference in the prevalence rate in each group.*
Results: *There were 610 new patients aged less than 12 years who displayed behavior consistent with autistic spectrum disorders. The increasing trend in the incidence of autistic spectrum disorder is observed ($r = 0.935$, $p = 0.02$). The incidence rate of autistic spectrum disorders among out patients less than 12 years has increased from 1.43 per 10,000 in 1998 to 6.94 per 10,000 in 2002. The correlation factors "an only one child in the family" is observed ($r = 0.9$, $p = 0.038$).*
Conclusion: *During the 5 years of the study, a significant increase in the incidence of autistic spectrum disorders was observed at Queen Sirikit National Institute of Child Health. Increase in the incidence of ASD in this center cannot explain by any solid evidence from the present study.*

Keywords: *Trend, Autistic spectrum disorder*

J Med Assoc Thai 2005; 88(7): 891-7
Full text. e-Journal: *http://www.medassocthai.org/journal*

According to the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV), pervasive developmental disorders (PDD) are described as pervasive impairment in developmental areas including social interaction, communication and stereotyped behavior, interests and activities. The disorders include autistic disorders, Asperger's disorders, childhood disintegrative disorders (CDD), Rett's disorders, and pervasive developmental disorder not otherwise specified (PDD-NOS)[1-3]. Groups of developmental impairment include: reciprocal social skills, language development, and range of behavioral repertoire. The disorders are manifested early in life and have persistent impairment[2]. Autistic disorders or infantile autism, the best known of the disorders, are characterized by sustained impairments in reciprocal social interaction, communication deviance, and restricted, stereotypical behavioral patterns. Abnormal functioning in at least one of these areas must be present by age 3[2,3]. Asperger's disorder is a condition, in which the child shows marked impairment in social

Correspondence to : Plubrukarn R, Child and Adolescent Psychiatry Department, Queen Sirikit National Institute of Child Health, Bangkok 10400, Thailand.

relatedness and repetitive and stereotyped patterns of behavior without delay in language and cognitive development[2,3]. In childhood disintegrative disorder (CDD), development progresses normally for the first 2 years, after which the child shows a loss of previously acquired skills in two or more of the following areas i.e. language use, social responsiveness, play, motor skills, and bladder or bowel control[2,3]. Rett's disorder appears to occur exclusively in girls; it is characterized by normal development for at least 6 months, stereotyped hand movements, loss of purposeful motions, diminishing social engagement, poor co-ordination, and decreasing language use[2,3]. DSM-IV has classified PDD-NOS for patients who show a qualitative impairment in reciprocal social interactions, verbal and non-verbal communication but do not meet the full criteria of autistic disorder[2]. Autistic spectrum disorder (ASD) is a well-known term which includes autistic disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS), and Asperger's disorder, while two rare conditions CDD and Rett's disorders are left out[4].

In 1999, Fombonne had reviewed 23 surveys of autism published in the English language between 1966 and 1998. Across surveys the estimated median prevalence was 5.2/10,000 for autism, the male to female ratio of 3.8:1 and a minimum estimation of 18.7/10000 for all forms of pervasive developmental disorders. The prevalence rates significantly increased with publication year; the median rate was 7.2/10,000 for 11 surveys, conducted since 1989[4]. After the year 2000, increases in the prevalence of PDD have been noticed in the United States, Europe and other countries. The prevalence varied from 0.5-5 per 1,000 for autistic disorder and 4.5-6.7 per 1,000 for autistic spectrum disorder[5-19]. One study reported the prevalence of autism, which had apparently risen from 1979 to 1992, reached a plateau from 1992 to 1996 at a rate of 2.6 per 1000 live births[20]. Another study in the United States showed the prevalence among children, aged 6 to 11 years, increased from 3 per 10,000 in 1991-1992 to 52 per 10,000 in 2001-2002[21]. Reasons for these increases were discussed. They included changes in diagnostic criteria, development of the concept of the wide autistic spectrum, different methods used in studies, growing awareness and knowledge among parents and professional workers and the development of specialist services, as well as the possibility of a true increase in numbers[18,19]. Various environmental factors such as vaccine for measles, mumps and rubella (MMR), environmental toxins, and perinatal complications had been suggested to relate with the increases in the prevalence[22-25], however, no solid evidence was found. Whereas there was strong data that complex genetic factors had played a role in the etiology[17-19,26]. Thus, the evidence suggests that the majority of the reported rise in incidence and prevalence was due to changes in diagnostic criteria and increasing awareness and recognition of autistic spectrum disorders. Whether there is also a genuine rise in incidence remains an open question.

In Thailand reports on the epidemiological study of autism and autistic spectrum disorder (ASD) are quite rare so the present study was conducted.

Objectives

To study the trend in autistic spectrum disorders patients and to find the factors that correlated with this disorder at Queen Sirikit National Institute of Child Health.

Material and Method

Annual out patient cases of autistic spectrum disorders at Child and Adolescent Clinic, Queen Sirikit National Institute of Child Health from 1st January 1998 to 31st December 2002 were analyzed. Data including age, sex and diagnosis was recorded. Aged-adjusted prevalence rate in both sexes was calculated by using the direct method. Standard t-test and correlation coefficient were performed to test for statistically significant difference in the incidence rate of each group. Related factors including complications during pregnancy, type of delivery, maternal age, birth weight, family history of PDD, the first child in the family, a single child in the family, head circumference, history of convulsion, head trauma, and history of receiving MMR or Measles vaccine, were recorded. Proportion rates of related factors were calculated by using direct method. Standard t-test and correlation analysis were also performed to test for statistically significant difference in the prevalence rate of these factors. P-value < 0.05 was considered to be significant difference.

Results

During the study period, there were 610 new cases with behavior consistent with DSM-IV criteria for PDD. Five hundred and fifty seven children met the criteria for Autistic Disorder, 42 met the criteria for Pervasive developmental disorder not otherwise specified (PDD-NOS), while 11 children were consistent with Asperger's disorder as shown in Table 1.

In 1998 there were 47 (7.7%) new cases with Autistic Spectrum Disorders who attended at Child and Adolescent Clinic, Queen Sirikit National Institute of Child Health, after that the number was increased year by year in both sexes with an average ratio of male:female ranging from 3.3:1 to 4.6:1 and mean age of diagnosis ranged from 3.34 ± 1.6 years to 4.03 ± 2.34 years, meanwhile the total number of patients, who attended the hospital were not increased as shown in Table 2.

From Table 3, it is shown that 41.64% of all new patients were diagnosed at the age between1 year to less than 3 years, 37.7% were diagnosed at the age between 3 years to less than 5 years, and 17.37% were diagnosed at the age between 5 years to less than 10 years. It was noticed that only one child in the present study was diagnosed at the aged less than one year.

The incidence rate of the new cases with ASD to the total number of all patients who attended the Queen Sirikit National Institute of Child Health was significantly increased annually from 1.43:10,000 in 1998 to 6.94:10,000 in 2002 ($r = 0.935$, and $p = 0.02$). Age-adjusted rate showed no difference in number. It was also found that the number of new cases rose

Table 1. Number of patients with the diagnoses based on DSM-IV criteria (1998 to 2002)

Diagnosis	Year					Total	Per cent
	1998	1999	2000	2001	2002		
Autistic disorder	41	80	85	138	213	557	91.3
PDD-NOS	4	2	2	9	9	42	6.9
Asperger's disorder	2	1	3	4	1	11	1.8
Total (%)	47 (7.7)	83 (13.6)	90 (14.8)	151 (24.7)	239 (39.2)	610	100.0

Table 2. Number of total patients, new ASD patients, male to female ratio and mean age of the ASD patients (1998-2002)

	Year				
	1998	1999	2000	2001	2002
Total patients attended to the hospital	329,498	339,105	343,479	369,544	344,433
New ASD patients	47	83	90	151	239
New male ASD patients	38	67	74	116	191
New female ASD patients	9	16	16	35	48
male:female ratio	4.2:1	4.2:1	4.6:1	3.3:1	3.98:1
Mean age ± SD	3.34±1.6	3.62±2.13	3.87±2.08	4.11±2.31	4.03±2.34

SD = Standard deviation

Table 3. Age and sex distribution of ASD patients (1998-2002)

Age group (Years)	Gender	Year of diagnosis					Total patients	Per cent
		1998	1999	2000	2001	2002		
<1	Male	1	0	0	0	0	1	0.17
	Female	0	0	0	0	0	0	0.00
1 - <3	Male	18	36	28	40	84	206	33.77
	Female	3	9	8	10	18	48	7.87
3 - <5	Male	15	21	32	51	62	181	29.67
	Female	5	4	6	16	18	49	8.03
5 - <10	Male	4	7	12	24	38	85	13.93
	Female	1	3	2	5	10	21	3.44
>10-12	Male	0	3	2	1	7	13	2.13
	Female	0	0	0	4	2	6	0.98
Total		47	83	90	151	239	610	100.00

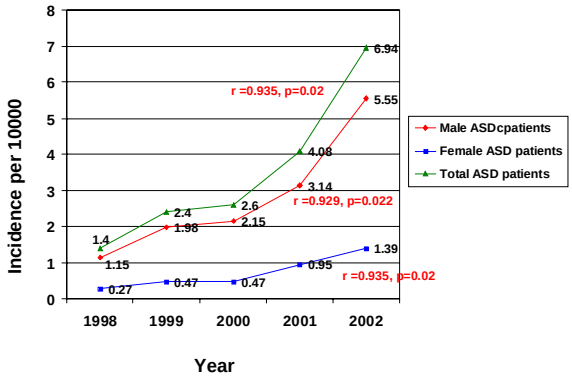

Fig. 1 Incidence of ASD during 1998-2002

substantially over time within both genders (r = 0.929, p = 0.022 in male; r = 0.942, p = 0.016 in female) as shown in Fig. 1.

Factors related to etiology of Autistic Spectrum Disorders were also recorded and analyzed year by year. These factors included: Complication during pregnancy, types of delivery, family history of PDD, maternal age during pregnancy, birth weight, family history of ASD, the first rank offspring, a single child in the family, macrocephaly, microcephaly, history of convulsion, history of head trauma, and history of receiving Measles or MMR vaccines (Table 4). After using the Standard t-test and correlation coefficient to test for statistically significant difference in the trend of all related factors, it was found that an only one child in the family was the only one factor that shows statistically significant increase in the proportion during this five-year trend study (r = 0.9, p = 0.038).

Discussion

In the present study the incidence of ASD is increased substantially over time (5 years) within both genders and increased from year to year (r = 0.935, p = 0.02). The incidence of ASD among our patients aged less than 12 years, increased from 1.43 per 10,000 in 1998 to 6.94 per 10,000 in 2002. The result shows that the problem is really increasing in this center. Since Queen Sirikit National Institute of Child Health has been the center for referral of all childhood diseases and illnesses all over the country, then it may reflect that ASD in Thailand are also increasing. This is supported by a recent survey in 1,367 children aged 1- 6 years from the Public Health Region in the middle part of Thailand which showed that the prevalence rate of ASD was 12.5%, however, the instrument test using in the survey was just a screening tool[27].

The characteristic of autism was described by Leo Kanner in1943. After that, it seemed to be a rare condition with the prevalence rate of 2-4:10,000[1,17]. In the present century, several studies from different countries reported an annual increase in the prevalence of Autistic disorder with the number ranged between 10 to 60 per 10,000 for autistic disorders and even more for the whole group of autistic spectrums[5-19]. One of the studies showed the estimated prevalence of ASD to be 62.6 per 10,000, 16.8 per 10,000 for autistic

Table 4. Percentage of factors related to possible etiology of ASD (1998-2002)

Related factors	Proportion per 100					Correlation coefficient	p value
	1998	1999	2000	2001	2002		
Complications during pregnancy	31.9	39.8	46.7	41.7	30.1	-0.038	0.951
Delivery by caesarean section	29.8	33.7	22.2	34.4	30.1	0.042	0.946
Delivery by vacuum extraction	2.1	2.4	7.8	2.0	2.1	-0.025	0.968
Maternal age < 17 during pregnancy	2.2	3.8	2.2	0.7	3.8	0.012	0.985
Maternal age > 35 during pregnancy	8.7	11.3	12.2	10.0	6.8	-0.377	0.531
Birth weight < 2500 grams	10.9	11.0	6.7	8.7	9.2	-0.509	0.382
Family history of PDD	8.5	9.6	15.6	11.3	5.4	-0.0189	0.761
The first child's ranking	55.3	57.8	57.8	66.2	62.3	0.816	0.092
An only one child	38.3	42.2	46.7	53.6	49.8	0.900*	0.038*
Macrocephaly	20.0	21.6	13.5	14.9	15.4	-0.716	0.174
Microcephaly	20.0	21.6	16.2	19.4	23.1	0.244	0.693
History of convulsion	12.8	18.1	14.4	11.3	8.8	-0.672	0.214
History of head trauma	38.3	48.2	44.4	27.8	25.5	-0.729	0.163
MMR/Measles vaccine	97.9	90.4	95.6	96.0	95.4	0.034	0.957

* p value < 0.05

disorder and 45.8/10,000 for other PDD[12]. Another study showed a dramatic increase in prevalence of ASD in children aged 6-11 years, from 3:10,000 during 1991-1992 to 52:10,000 during 2001-2002[21]. From those previous studies, most of them were population-based studies. However, there was a report on children referred for suspected ASD to Child and Adolescent Mental Health Service in Australia during 1997, and the findings were compared with those from a similar study in 1989. It was found that there was a 200% increase in positive diagnoses of ASD in 1997 despite a 0.5% decrease in population. Wider age range and 26% increase in milder cases were found and male to female ratio was decreased from 8:1 in 1989 to 3.5:1 in 1997[28]. In the present study, it is also noticed that male to female ratio ranged from 4.6:1 to 3.3:1 and there is a wider age range but the severity of disorder has not yet been analyzed.

Many authors have tried to explain the reasons why prevalence of ASD is increasing. They were likely due to many factors such as increased recognition, the broadening of the diagnostic concept overtime including not only full syndrome of autistic disorder but also less severe symptoms such as atypical autism, PDD-NOS and Asperger's syndrome, a greater willingness on the part of educationalists and families to accept the diagnostic label, and better recording systems[18,19]. In the present study the number of PDD-NOS and Asperger's syndrome has not increased while the number of autistic disorders is rising year by year from 41 in 1998 to 213 in 2002 as shown in Table 1. It can be explained that increase in public awareness and positive attitude about the result of multi disciplinary team approaches may be the underlying motivation to seek help from health personnel. Thus, further exploration is needed to confirm this hypothesis. However, a genuine rise in incidence of ASD may be another explanation as shown by Fombonne who concluded that rates of PDD are higher than previously reported and attention should be drawn to the important needs of a substantial minority of preschool children[29].

Factors that were claimed to relate with etiology of ASD from previous reviews[4,16,20,26-34] were analyzed to see whether they were increased in this study. In the present study there is no correlation of these factors with the increasing prevalence of ASD, but it was found that an only one child in the family was the only factor that showed a statistical significant increase in the proportion during this five-year trend study ($r = 0.9$, $p = 0.038$). This may not be a pertinent finding, since data from the Household Socio-economic Survey, National Statistical office, Thailand showed that average household in the year 1998, 1999, 2000, 2001 and 2002 were 3.7, 3.7, 3.6, 3.6 and 3.5 respectively[35]. It may imply that trend of the Thai family to have only one or two children is increasing resulted from the success of the National Family planning program. However, until now there were no specific factors that had evidence proved to be etiologic factors of ASD[16,23].

In conclusion, significant increase in the incidence of autistic spectrum disorders has been observed in this center during this five-year trend study while no corresponding possible etiologic factors have increased as an explanation for this trend except for the factor "an only one child in the family". Changes in actual disease incidence could not be assessed with these data. Thus, increase in the incidence of these problems is likely due to broader changes in diagnostic criteria and parental awareness and may imply that autism spectrum disorder has been under-diagnosed in the past. However, further investigations for actual disease incidence of pervasive development disorder as well as possible etiology need to be done.

Acknowlegment

The authors wish to thank Dr. Siripen Kalayanaruj, Dr. Mukda Wangveeravong, and Dr. Boonchian Pansatienkul for their helpful advice and we wish to thank Dr. Surapee Roungsuwan, Director of Queen Sirikit National Institute of Child Health for her permission and support for the present study.

Abbreviation

PDD, Pervasive developmental disorders; ASD, Autistic spectrum disorders; DSM-IV, Diagnostic and statistical manual of mental disorders 4th edition; MMR, Mump measles rubella vaccines; PDD-NOS, Pervasive developmental disorder not otherwise specified; CDD, Childhood disintegrative disorders

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Washington, DC: American Psychiatric Press, 1994: 63-5.
2. American Academy of Pediatrics: The pediatrician's role in the diagnosis and management of autistic spectrum disorder in children. Pediatrics 2001; 107: 1221-6.

3. The ICD-10 Classification of Mental and Behavioral Disorders. Diagnostic criteria for research. World Health Organization, Geneva, 1993: 355-7.
4. Fombonne E. The epidemiology of autism: a review. Psychol Med 1999; 29: 769-86.
5. Hillman RE, Kanafani N, Takahashi TN, Miles JH. Prevalence of autism in Missouri: changing trends and the effect of a comprehensive state autism project. Mo Med 2000; 97: 159-63.
6. Powell JE, Edwards A, Edwards M, Pandit BS, Sungum-Paliwal SR, Whitehouse W. Changes in the incidence of childhood autism and other autistic spectrum disorders in preschool children from two areas of the West Midlands, UK. Dev Med Child Neurol 2000; 42: 624-8.
7. Bernard-Opitz V, Kwook KW, Sapuan S. Epidemiology of autism in Singapore: findings of the first autism survey. Int J Rehabil Res 2001; 24: 1-6.
8. Magnusson P, Saemundsen E. Prevalence of autism in Iceland. J Autism Dev Disord 2001; 31: 153-63.
9. Davidovitch M, Holtzman G, Tirosh E.Autism in the Haifa area - an epidemiological perspective. Isr Med Assoc J 2001; 3: 188-9.
10. Fombonne E. Is there epidemic of autism? Pediatrics 2001; 107: 411-2.
11. Bertrand J, Mars A, Boyle C, Bove F, Yeargin-Allsopp M, Decoufle P. Prevalence of autism in a United States population: the Brick Township, New Jersey, investigation. Pediatrics 2001; 108: 1155-61.
12. Chakrabarti S, Fombonne E. Pervasive developmental disorders in preschool children. JAMA 2001; 285: 3093-9.
13. Croen LA, Grether JK, Hoogstrate J, Selvin S. The changing prevalence of autism in California. J Autism Dev Disord 2002; 32: 207-15.
14. Charman T. The prevalence of autism spectrum disorders. Recent evidence and future challenges. Eur Child Adolesc Psychiatry 2002; 11: 249-56.
15. Fiona JS, Baron-Cohen S, Bolton P, Brayne C. Brief report: prevalence of autism spectrum conditions in children aged 5-11 years in Cambridge shire, UK. Autism 2002; 6: 231-7.
16. Rapin I. The autistic-spectrum disorders. N Engl J Med 2002; 347: 302-3.
17. Wing L, Potter D. The epidemiology of autistic spectrum disorders: is the prevalence rising? Ment Retard Dev Disabil Res Rev 2002; 8: 151-61.
18. Gurney JG, Fritz MS, Ness KK, Sievers P, Newschaffer CJ, Shapiro EG. Analysis of prevalence trends of autism spectrum disorder in Minnesota. Arch Pediatr Adolesc Med 2003; 157: 622-7.
19. Yeargin-Allsopp M, Rice C, Karapurkar T, Doernberg N, Boyle C, Murphy C. Prevalence of autism in a US metropolitan area. JAMA 2003; 289: 49-55.
20. Lingam R, Simmons A, Andrews N, Miller E, Stowe J, Taylor B. Prevalence of autism and parentally reported triggers in a north east London population. Arch Dis Child 2003; 88: 666-70.
21. Webb E, Morey J, Thompsen W, Butler C, Barber M, Fraser WI. Prevalence of autistic spectrum disorder in children attending mainstream schools in a Welsh education authority. Dev Med Child Neurol 2003; 45: 377-84.
22. Kaye J, del Mar Melero-Montes M, Jick H. Mumps, measles, and rubella vaccine and the incidence of autism recorded by general practitioners: a time trend analysis. BMJ 2001; 322: 460-3.
23. Juul-Dam N, Townsend J, Courchesne E. Prenatal, perinatal, and neonatal factors in autism, pervasive developmental disorder-not otherwise specified, and the general population. Pediatrics 2001; 107: E63.
24. Wilkerson DS, Volpe AG, Dean RS, Titus JB. Perinatal complications as predictors of infantile autism. Int J Neurosci 2002; 112: 1085-98.
25. Hultman CM, Sparen P, Cnattingius S. Perinatal risk factors for infantile autism. Epidemiology 2002; 13: 417-23.
26. Tanguay PE. Pervasive developmental disorders: a 10-year review. J Am Acad Child Adolesc Psychiatry 2000; 39: 1079-95.
27. Chantree K, Wapet R, Panyavachirachai P, Chokechaipaisarn M. The study of prevalence and related factors of autism and mental retardation in children between 1-6 years at Public Health Region 2. The 3rd International Conference on Mental Health and Substance Dependence. 2004: 212.
28. Baker HC. A comparison study of autism spectrum disorder referrals 1997 and 1989. J Autism Dev Disord 2002; 32: 121-5.
29. Fombonne E. The prevalence of autism. JAMA 2003; 289: 87-9.
30. Hallmayer J, Glasson EJ, Bower C, Petterson B, Croen L, Grether J, et al. On the twin risk in autism.

Am J Hum Genet 2002; 71: 941-6.
31. Fidler DJ, Bailey JN, Smalley SL. Macrocephaly in autism and other pervasive developmental disorders. Dev Med Child Neurol 2000; 42: 737-40.
32. Bonde E. Comorbidity and subgroups in childhood autism. Eur Child Adolesc Psychiatry 2000; 9: 7-10.
33. Giovanardi Rossi P, Posar A, Parmeggiani A. Epilepsy in adolescents and young adults with autistic disorder. Brain Dev 2000; 22: 102-6.
34. Tuchman R, Rapin I. Epilepsy in autism. Lancet Neurol 2002; 1: 352-8.
35. Report of household social-economic survey. National statistics office Thailand. Household census 2002[Online]. Available from: www.nso.go.th/eng/stat [Access 2005 Feb 1].

การศึกษาแนวโน้มของเด็กออทิสติกในสถาบันสุขภาพเด็กแห่งชาติมหาราชินี

รัตโนทัย พลับรู้การ, วินัดดา ปิยะศิลป์, ปราณี เมืองน้อย, สมทรง ตันประเสริฐ, วิไลรัตน์ ชัชชวลิตสกุล

ความเป็นมา: *รายงานจากสหรัฐอเมริกาและประเทศในทวีปยุโรปในระยะนี้ต่างกล่าวว่าอุบัติการณ์และความชุกของเด็กออทิสติกเพิ่มขึ้น แต่ในประเทศไทยมีรายงานการศึกษาแนวโน้มของภาวะนี้ค่อนข้างน้อย*

วัตถุประสงค์: *ศึกษาแนวโน้มอุบัติการณ์ของเด็กออทิสติก และ ปัจจัยที่เกี่ยวข้องในกลุ่มเด็กที่ศึกษาว่า มีแนวโน้มอย่างไรในสถาบันสุขภาพเด็กแห่งชาติมหาราชินี ในช่วงระยะเวลา 5ปี*

วัสดุและวิธีการ: *เป็นการศึกษาไปข้างหน้าเพื่อดูแนวโน้มของผู้ป่วยใหม่ที่ได้รับการวินิจฉัยว่าเป็นเด็กออทิสติก ซึ่งครอบคลุม Autistic disorder, Pervasive developmental disorder-not otherwise specified (PDD-NOS), และ Asperger's disorders ที่มาตรวจที่แผนกจิตเวชเด็กและวัยรุ่น สถาบันสุขภาพเด็กแห่งชาติมหาราชินีระหว่างเดือนมกราคม พ.ศ. 2540 ถึงเดือน ธันวาคม พ.ศ. 2545 และทำการบันทึกปัจจัยที่เกี่ยวข้อง จากนั้นได้วิเคราะห์ข้อมูลของอุบัติการณ์ของโรคและปัจจัยต่าง ๆ ด้วยสถิติเชิงพรรณนา คำนวณอุบัติการณ์ ปรับมาตรฐานของอุบัติการณ์ตามอายุ ทดสอบความแตกต่างระหว่างอัตราอุบัติการณ์ 2 ชุด โดยใช้ standard t-test และทดสอบความสัมพันธ์ระหว่างระยะเวลา กับอัตราอุบัติการณ์ โดยการวิเคราะห์ค่าสหสัมพันธ์*

ผลการศึกษา: *มีผู้ป่วยใหม่ที่อายุน้อยกว่า 12 ปีจำนวน 610 ราย ที่ได้รับการวินิจฉัยว่าเป็น autistic spectrum disorders ตามเกณฑ์การวินิจฉัยโรคของ DSM-IV พบว่ามีแนวโน้มปัญหาเพิ่มขึ้นทุกปี ทั้งเพศหญิงและเพศชาย ($r = 0.935$, $p = 0.02$) โดยมีอุบัติการณ์ต่อจำนวนผู้ป่วยนอกทั้งหมดที่มีอายุต่ำกว่า 12 ปีในปี พ.ศ. 2540 เท่ากับ 1.43 ต่อ 10, 000 และในปี พ.ศ. 2545 อุบัติการณ์เพิ่มเป็น 6.93 ต่อ 10,000 สำหรับการศึกษาปัจจัยที่เกี่ยวข้อง พบว่าการเป็นบุตรคนเดียวของครอบครัว มีสัดส่วนเพิ่มขึ้นในกลุ่มที่ศึกษาอย่างมีนัยสำคัญทางสถิติ ($r = 0.90$, $p = 0.038$)*

สรุป: *ในระยะเวลา 5 ปี ที่ทำการศึกษา พบว่าปัญหาเด็กออทิสติกมีแนวโน้มเพิ่มขึ้นในสถาบันสุขภาพเด็กแห่งชาติมหาราชินีอย่างมีนัยสำคัญทางสถิติ สำหรับสาเหตุของการเพิ่มขึ้นของปัญหาเด็กออทิสติกยังไม่มีหลักฐานชัดเจนที่สามารถอธิบายจากปัจจัยต่าง ๆ ที่ทำการศึกษาในครั้งนี้*