Incidence of Childhood Type 1 (Insulin Dependent) Diabetes Mellitus in Northeastern Thailand

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Abstract

The incidence of type 1 (insulin dependent) diabetes mellitus in children under 15 years from northeastern Thailand was reported. Data of new cases from 1991 to 1995 were collected retrospectively by a mail survey from 257 government hospitals in the northeastern part of Thailand. The incidence rate of type 1 (insulin dependent) diabetes mellitus was 0.3/100,000 (95% confidence interval [CI] = 0.24-0.38). The incidence rate in girls was 2 fold that of boys. More than half of the cases were diagnosed between the ages of 10 and 14. These data indicated that incidence of childhood type 1 diabetes mellitus in Thailand is one of the lowest in the world.

Key word : Childhood IDDM, Incidence, NE Thailand

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There are many geographical differences in the incidence of type 1 (insulin dependent) diabetes mellitus (type 1 DM) in the world[1]. Asia is believed to have one of the lowest type 1 DM incidence[2]. Many regions in Asia such as Japan, Korea, Pakistan, and China reported their type 1 DM incidence rates varied from 0.61/100,000 to 1.02/100,000[3-6]. In Thailand, the previous report of the incidence of type 1 DM of the whole country in 1984 was 0.19/100,000 and 0.17/100,000 in the northeastern part of Thailand[7]. This study describes the average incidence rate of childhood type 1 DM in the northeastern part of Thailand between 1991 and 1995.

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Table 1. Incidence rates of type 1 DM in children in northeastern Thailand from 1991 to 1995.

Study year	Population age under 15 years	type 1 DM cases	Incidence 100,000/year	95% CI
1991	5,425,384	13	0.24	0.13-0.41
1992	4,913,049	16	0.30	0.17-0.49
1993	5,042,746	17	0.34	0.20-0.54
1994	5,135,595	16	0.31	0.18-0.50
1995	5,158,299	15	0.30	0.17-0.50
1991-1995	25,675,073	77	0.30	0.24-0.38

Northeastern Thailand is a vast plateau that borders Laos and Cambodia and comprises a third of the nation's territory. This is the poorest part of the country. There are a total of 257 government hospitals in the 19 provinces in this area. Faculty of Medicine, in Khon Kaen University is the only medical school in the northeastern part of Thailand.

SUBJECTS AND METHOD

A 5-year retrospective study was established. The following criteria were set for eligibility : 1) the age of the patients was below 15 years, 2) the patients were diagnosed as having diabetes between 1 January 1991 and 31 December 1995, 3) The patients must be residents of the 19 provinces of the northeastern part of Thailand. Routine demographic information was recorded for each child, which included name, date of birth, diagnosis, the date of the first insulin injection, sex, and home address. A mail survey was conducted in all 257 hospitals. 143 of the 257 hospitals (55:64%) responded to the first mail survey. The second mail survey was conducted with the rest of the hospitals, which was 114 hospitals. 77 of the 114 hospitals (67.54%) responded to the second mail survey. A total of 220 out of 257 hospitals (85.60%) participated in this study, and type 1 DM patients were identified from 53 hospitals. The annual census reports from the Thai Burea of Census were used for denominators to calculate the annual incidence rates. The average incidence rate from 1991 to 1995 was estimated by pooling all cases and dividing by a total of 5 years population (Table 1). A 95 per cent confidence interval (CI) was derived using a Poisson distribution[8].

RESULTS

Between the years of 1991 and 1995, a total of 77 type 1 DM patients were observed with an incidence rate of 0.3/100,000 (95% CI= 0.24-0.38, Table 1). Of the 77 patients, 26 were boys and 51 girls with a 2/1 sex ratio of female/male. The peak age of onset was between the ages of 10 and 14 in both sexes (Table 2).

DISCUSSION

The incidence of childhood type 1 DM in the northeastern part of Thailand is one of the lowest in the world, including other countries in Asia[3-6]. The average incidence rate from 1991 to 1995 increased about 1.76 fold of the previous report in 1984 (0.30/0.17). Most of the countries also had higher incidence rates, which indicates that environmental factors are important, especially diet and lifestyle[9-12]. The epidemiology of type 1 DM has geographic differences and was determined by factors which correlated to the average yearly temperature of the environment and to the ethnicity of the population[1]. Data in EURODIAB

Table 2. Number of cases of type 1 DM in boys and girls in northeastern Thailand from 1991 to 1995.

Age (years)	Boys	Girls	Total
0-4	3	4	7
5-9	8	12	20
10-14	15	35	50
Total	26	51	77

ACE study from multicenters in Europe confirmed the considerable geographic variation in the incidence of type 1 DM. There was a ten-fold difference between the lowest and the highest rates (4.6/42.9)[13]. Rates in Scandinavia, especially in Finland, were the highest and the Mediterranean countries (excluding Sardinia) had the lowest incidence. A study of the incidence of type 1 DM among Sardinian heritage children born in Lazio (low incidence area) showed that two different ethnic groups living in the same region have a four fold difference in incidence[14]. It suggested that genetic susceptiblity determines the frequency of type 1 DM in response to the environmental challenge. Though genetics may be the contributing factor, studies in identical twins for type 1 DM showed that, despite genetic identity, diabetes will develop in only one of three unaffected twin partners[15]. Studies of migrants also suggested the importance of environmental factors in the origins of type 1 DM[16]. Viral infection was one of the environmental factors which increased the incidence rate of type 1 DM[17,18]. In Thailand, the majority of type 1 DM was found low income and low educated families[17,19]. A study about HLA antigen at Siriraj Hospital found that the HLA DR3 is an important genetic marker of type 1 DM in Thailand[19].

Concerning the sex incidence, there was a predominance of females in northeastern Thailand, compared to the slight predominance of females in Singapore[20]. Female predominance was also found in areas with the lowest incidence in the EURODIAB ACE study[13]. In general, the incidence rates were lowest in the 0-4 age - group and highest in the 10-14 age-group, which may be from more exposure to the environment of the older age-group and hormonal change during puberty.

Although the smallest number of type 1 DM is in this area, all patients require lifelong insulin therapy and have to pay for it themselves, which causes problems due to the low socioeconomic level in this region. The increased incidence rate has made the disease one of the health problems in northeastern Thailand, among other chronic diseases.

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REFERENCES

1. Diabetes epidemiology research international group: Geographicpatterns of childhood insulin-dependent diabetes mellitus. Diabetes 1988;37: 1113-9.
2. Tajima N, Laporte RE. Incidence of IDDM outside Europe. Pediatr Adolesc Endocrinol 1991; 21:1-11.
3. Ko KW, Yang SW, Cho NH. The incidence of IDDM in Seoul from 1985 to 1988. Diabetes Care 1994;17:1473-5.
4. Hua F, Shui-Xian S, Zhao-Wen O, et al. Shanghai, China has the lowest confirmed incidence of childhood diabetes in the world. Diabetes Care 1994;17:1206-8.
5. Japan IDDM Epidemiology study group. Lack of regional variation in IDDM risk in Japan. Diabetes Care 1993;16:796-800.
6. Staines A, Hanif S, Ahmed S, Mckinney PA, Shera S, Bondansky HJ. Incidence of insulin dependent diabetes mellitus in Karachi, Pakistan. Arch Dis Child 1997;76:121-3.
7. Tuchinda C, Wiriyangkula S, Angsusingha K, Punnakanta L, Vannasaeng S. The epidemiology of diabetes mellitus in Thai children in 1984. J Med Assoc Thai 1987;70:36-41.
8. Lilienfeld DE, Stolley PD. Foundations of Epidemiology, 3rd edition. Oxford : Oxford Univ Press,1994:302-3.
9. Joner G, Sovik O. Increasing incidence of diabetes mellitus in Norwegian children 0-14 years of age, 1973-1982. Diabetologia 1989;82:79-83.
10. Bingley PJ, Gale EAM. Incidence of diabetes mellitus in England : a study in the Oxford region, 1985-6. Br Med J 1989;298:558-60.
11. Patterson CC, Thorogood M, Smith PG, Heasman MA, Clarke JR, Mann JJ. Epidemiology of Type 1 (insulin-dependent) diabetes in Scotland 1968-1976: evidence of increasing incidence. Diabebologia 1983;24:238-43.
12. C Levey-Marchal, L Papoz, C de Beaufort, et al. Incidence of Juvenile Type I (insulin-dependent)

diabetes mellitus in France. Diabetologia 1990; 33:465-9.
13. Green A, Gale EAM, Patterson CC. Incidence of childhood-onset insulin-dependent diabetes mellitus : the EURODIAB ACE study. Lancet 1992;339:905-9.
14. Muntoni S, Fonte MT, Stoduto S, et al. Incidence of insulin-dependent diabetes mellitus among Sardinian heritage children born in Lazio region, Italy. Lancet 1997;349:160-2.
15. Bamelt AH, Eff C, Leslie RDG, Puke DA. Diabetes in identical twins : a study of 200 pairs. Diabetologia 1981;20:87-93.
16. Bodansky HJ, Staines A, Stephenson C, Haigh D, Cartwright R. Evidence for an environmental effect in the aetiology of insulin-dependent diabetes mellitus in a transmigratory population. BMJ 1992;304:1020-2.
17. Banatvata JE, Bryant J, Schernthaner G, Coxsackie B. Mumps, rubella and cytomegalovirus specific IgM responses in patients with juvenile onset insulin-dependent diabetes mellitus in Britain, Austria, and Australia. Lancet 1985;1:1409-12.
18. Wagenknceht LE, Roseman JM, Herman WH. Increased incidence of insulin-dependent diabetes mellitus following an epidemic of coxsackievirus B 5. Am J Epidmiol 1991;133:1024-31.
19. Tuchinda C, Angsusingha K, Punnakanta L, Ploybutr S, Siritantikorn S, Chiewsilp P. Diabetes mellitus in Thai children.In : Nitiyanant W, Vichayanrat A, Vannasaeng S (ed) : Diabetes mellitus, Bangkok : Crystal House Press 1985:26-39.
20. Lee WRW, Loke KY, Lim YJ Ooi BC, Rajan U, Thai AC. Incidence trends of childhood IDDM in Singapore. Programme and Abstracts, presented in the 9th Congress of the ASEAN Federation of Endocrine Societies 3rd-6th December 1997 P 93.

อุบัติการณ์ของเบาหวานชนิดพึ่งอินซูลินในเด็กในภาคตะวันออกเฉียงเหนือ

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ได้ทำการศึกษาอุบัติการณ์ของผู้ป่วยเบาหวานเด็กชนิดพึ่งอินซูลินที่มีอายุต่ำกว่า 15 ปี ในเขตภาคตะวันออก-เฉียงเหนือ 19 จังหวัดแบบย้อนหลัง โดยการส่งแบบสอบถามทางไปรษณีย์ไปยังโรงพยาบาลของรัฐบาลทั้งหมด 257 แห่ง ระหว่างปี พ.ศ. 2534 ถึง 2538 รวมระยะเวลา 5 ปี พบผู้ป่วยเบาหวานเด็กทั้งหมด 77 คน อุบัติการณ์ของเบาหวานเด็กเฉลี่ยเท่ากับ 0.3/100,000 ต่อปี (95% CI = 0.24-0.38) มากกว่าร้อยละ 50 ของผู้ป่วยเบาหวานได้รับการวินิจฉัย ระหว่างอายุ 10 ถึง 14 ปี จากข้อมูลนี้ ชี้ให้เห็นว่าอุบัติการณ์ของเบาหวานชนิดพึ่งอินซูลินในเด็กของภาคตะวันออกเฉียงเหนือของไทยจัดอยู่ในกลุ่มที่น้อยที่สุดในโลกโดยพบได้ในเด็กหญิงเป็น 2 เท่าของเด็กชาย เนื่องจากผู้ป่วยเบาหวานเด็กจำเป็นต้องได้รับการรักษาด้วยอินซูลินไปตลอดชีวิต และผู้ป่วยส่วนใหญ่จะยากจนถึงแม้จะมีจำนวนน้อยก็ทำให้โรคนี้ยังคงเป็นหนึ่งในปัญหาทางสาธารณสุขของโรคเรื้อรังในประเทศไทย

คำสำคัญ : เบาหวานชนิดพึ่งอินสุลินในเด็ก, ความชุก, ภาคตะวันออกเฉียงเหนือของประเทศไทย

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