

THE EPIDEMIOLOGY OF JUVENILE-ONSET INSULIN-DEPENDENT DIABETES MELLITUS IN TURKISH CHILDREN A Retrospective Analysis of 477 Cases*

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SUMMARY: Kandemir N, Açıkgöz E, Yordam N. (Endocrinology Unit, Department of Pediatrics, Hacettepe University Faculty of Medicine, Ankara, Turkey). The epidemiology of juvenile-onset insulin-dependent diabetes mellitus in Turkish children. A retrospective analysis of 477 cases. Turk J Pediatr 1994; 36: 191-195.

The hospital records of 477 patients under 18 years of age with insulin-dependent diabetes mellitus (IDDM) who were followed in the Endocrinology Unit of Hacettepe University Children's Hospital between the years 1969 and 1991 were analyzed for age, sex, residence at time of diagnosis, date of onset of symptoms, date of diagnosis, family history of IDDM, and consanguinity between parents. The distribution of age at diagnosis showed a small peak between 4 and 6 years of age and a main peak between 12 and 14 years. In girls, the main peak appeared between 10 and 12 years, and in boys between 12 and 14. A significant difference was not seen between sexes (239 males and 236 females). The frequency of diagnosis showed seasonal variations the lowest in autumn and the highest in winter. Consanguinity between parents was 23.9 percent, and 10.3 percent of the patients had IDDM in first degree relatives. Key words: diabetes, juvenile, epidemiology, Turkey.

Diabetes mellitus is a common chronic disease in childhood. The etiology of this disease, which may lead to serious complications and early death, is still unknown. Epidemiologic and experimental evidence suggests that non-inheritable environmental factors may be causal in the genetically susceptible individual. Therefore, the epidemiology of insulin-dependent diabetes mellitus (IDDM) has been subjected to intense research world wide during the last 10 to 20 years.

In previous studies, it was reported that the onset of the disease occurred most frequently between 10 and 14 years of age, and a small peak of incidence could be seen between 5 and 7 years of age¹⁻⁴.

Investigations that have reported on the seasonal variation in the incidence of IDDM indicate that the greatest frequency occurs in autumn and winter, and the least in summer⁴⁻⁷. Ethnic differences and geographically diverse environments

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are likely to give rise to a spectrum of the diabetes mechanisms and manifestations. Consequently, the epidemiologic and familial characteristics of IDDM are described below in 477 patients under 18 years of age who were followed in the Endocrinology Unit of Hacettepe University Children's Hospital.

Material and Methods

All patients with IDDM followed in the Endocrinology Unit of Hacettepe University Children's Hospital between the years 1969 and 1991 were included in the study.

The study was limited to children under 18 years of age who required insulin. The small number of children presenting with abnormalities in glucose tolerance tests who could be managed with diet alone or diet plus oral hypoglycemic agents were not included in the study.

Date of birth, sex, residence at time of onset, date of onset of symptoms and diagnosis, associated infections, family history of IDDM and consanguinity between parents were determined from the hospital records of 477 children.

Results

The age at onset of IDDM among the patients ranged from 13 months to 18 years. The mean age was 9.52 ± 3.99 years.

The distribution of age at diagnosis (Fig. 1) showed a main peak between 12 and 14 years. The 12-14 year peak deviates significantly from the average ($p < 0.05$). In

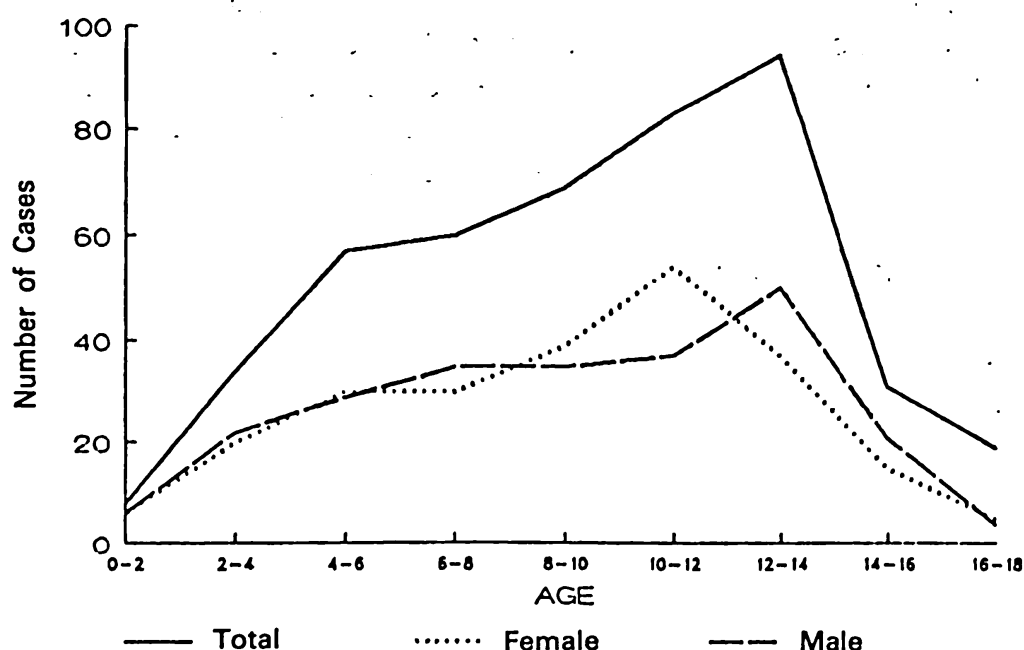


Fig. 1: Age at diagnosis of 477 juvenile-onset insulin-dependent diabetic patients (239 males and 236 females).

girls, the main peak appeared between 10 and 12 years, and in boys between 12 and 14. A significant difference in numbers of patients was not seen between sexes (239 males and 236 females).

In 70.2 percent of the patients (335 cases), the time period was one month from the beginning of symptoms until the diagnosis, and it was longer than one month in 29.8 percent (142 cases).

The data in the present study were plotted according to the month of diagnosis for evaluation of the seasonality of the disease (Fig. 2). The frequency of diagnosis showed seasonal variations, with the lowest frequency occurring in autumn (17.1%) and the highest in winter (40.1%) ($p < 0.05$). In 44.9 percent of the patients, associated infections occurred at the time of diagnosis (19% upper respiratory infections, 8.8% urinary tract infections, 4% lower respiratory infections and 13.1% other infections). There was a higher incidence of associated infections in the 0 to 6 years age-group (51.3%) than in the 6 to 12 and 12 to 18 years age-groups (35.0% and 33.3%, respectively).

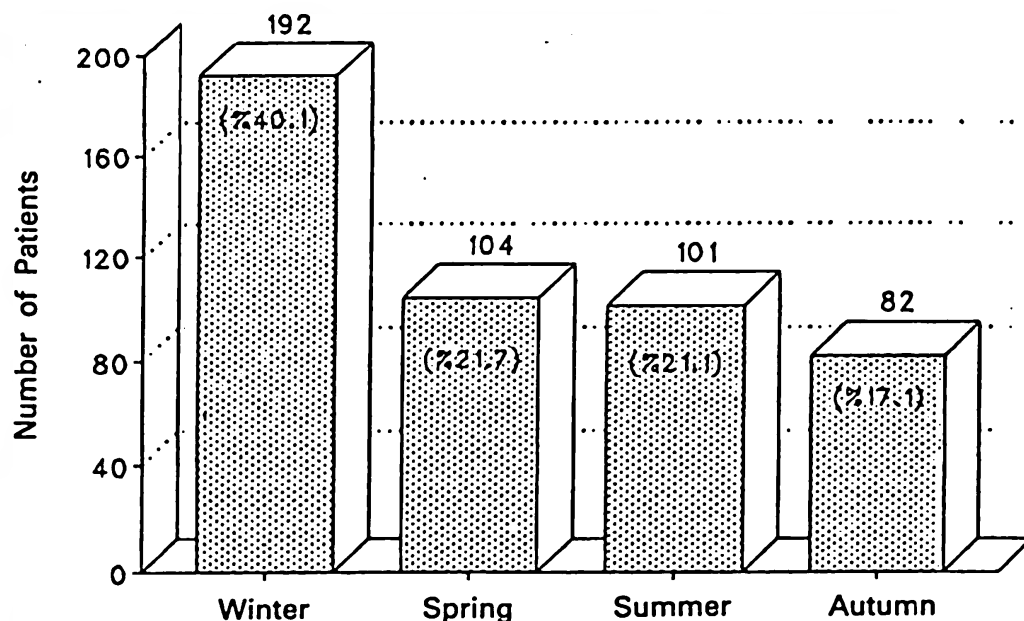


Fig. 2: Seasonal variation in the diagnosis of juvenile-onset insulin-dependent diabetes mellitus in Turkey (1969-1991).

Consanguinity between parents was present in 23.9% of the patients, and 10.3% of the patients had type I diabetes mellitus in first degree relatives.

The geographic distribution of patients was evaluated according to the seven geographic regions in Turkey. The patients were admitted mostly from the Central Anatolia region (66.2%), but all other regions were represented in small numbers: 11.0% Black Sea region, 5.9% Marmara region, 4.4% Aegean region, 7.0% Mediterranean region, 4.0% East Anatolia region and 1.5% Southeast Anatolia.

Discussion

This study was done retrospectively from a review of hospital records of insulin-dependent diabetics over a 22-year period including patients from all regions of Turkey.

The incidence of IDDM varies with age. Bloom³ reported an initial slight peak in five-year-old children, suggesting the role of starting primary school for this age-group since major environmental changes occur at this stage of childhood. In our country, the age for starting primary school is between 6 and 7 years; however, in this study a marked peak was not observed in this age-group, suggesting that there is probably no association between starting school and the onset of diabetes. Patients 0 to 6 years of age had a higher incidence of infections at the time of diagnosis. The influence of infections as an aggravating factor in early or established diabetes is conceivable, in that infection may act as a nonspecific stress that may precipitate clinical diabetes in an individual with latent or chemical diabetes.

The mean peak in incidence was between 12 and 14 years of age, and earlier for females than for males (10-12 and 12-14 years, respectively). A similar finding was reported from Denmark, Montreal and Chile, suggesting the role of puberty and the growth spurt^{2,4,7}. However, since an objective assessment of pubertal status at the onset of symptoms is lacking in all studies to date, including this one, it cannot be completely ruled out that hormonal changes in the prepubertal years and psychological stresses are of importance in relation to the onset of diabetes.

The seasonality of the onset of disease has been shown in large surveys⁴⁻⁷, with the highest frequency occurring in winter and the lowest in summer. In our study, while we found a similarly higher incidence in winter, we did not find a lower incidence in summer. The high incidence of viral infections such as gastroenteritis and hepatitis during the summer months in our country may play a role. Also, when considering the month of diagnosis rather than the month of onset of symptoms, small differences can be seen in the seasonality of the disease (Fig. 2).

The prevalence of juvenile-onset diabetes among families of diabetics is high. Oakley et al⁸ found that 13 percent of children had a history of diabetes in a first-degree relative, a finding which is similar to Bloom et al's³ estimation (11%). In our study, 10.3 percent of the patients had a first-degree relative receiving insulin treatment. Consanguinity between the parents of diabetics (23.9%) was not significantly different from that of the general population (21.6%)⁹.

The results of this study can shed light on the epidemiological and familial characteristics of juvenile-onset IDDM in Turkish children, because of the limited data published to date on the Turkish population.

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