FREQUENCY OF DIABETES MELLITUS IN SCHOOL GOING CHILDREN OF ISLAMABAD

Pages with reference to book, From 111 To 113

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Abstract

A pilot investigation was conducted to study the frequency of diabetes mellitus and to elucidate the significance of genetic factors in the development of this disease in school going children of Islamabad. Out of one thousand children examined 3.7% were diabetic, of which 1.5% were males and 2.2% were females. The parents of diabetic children were also examined and they too were found to be diabetic (JPMA 30:111, 1980).

Introduction

Because a specific method of identifying diabetic subjects is lacking, records of the prevalence (percentage of population affected) and the incidence (number of new cases per year) of diabetes have been approximate at best. However, it is clear that diabetes is one of the most common chronic diseases affecting 1-5 percent of the total population. The prevalence of diabetes appears to increase in individuals with increasing age, obesity and is greater in females than in males. Approximately 10 times as many cases of diabetes are diagnosed in people over the age of 45 as in those under 45. The incidence in the females is approximately 25 percent higher than in the males. The incidence of diabetes can only be estimated from data from the annual number of newly diagnosed cases, because information of the true appearance of new disease is lacking even in industrialized countries like the U.S.A., Canada and England. The available information on this aspect is scanty but estimates made to date show that 5-10 percent of the total population per year suffers from diabetes making about 200,000 new cases per year. As in other parts of the world, studies relating to the occurrence of diabetes in the total population in Pakistan have also not been given any attention.

As regards the familial nature of diabetes, it was first recognised as early as 1574 by Rondolet and again in 1950 by Harris. Yet, even in 1980 the nature of the primary inheritance defect or defects causing diabetes has not been understood and almost all modes of inheritance have been proposed as mechanism of transmittance of diabetes mellitus (Rimoin, 1967).

An attempt to elucidate the significance of the genetic factors and also the frequency of diabetes mellitus in school going children below the age of 10 was made. A survey area in Islamabad city was chosen for this study.

Material and Methods

The study was carried out on school-going children of Islamabad. Families were visited at their residence and children were selected between the age of 5-10 years.

Some difficulty in collecting data was encountered due to unwillingness of some families to cooperate in furnishing information and for samples. So, the data contain information only from the families which responded fully. Furthermore, selection of families and survey localities was made randomly.

Urine samples were collected in test tubes for determination of sugar by using clinitest tablets. One clinitest tablet was dissolved in a mixture of ten drops of water and five drops of urine. Total absence of sugar in the urine is indicated by development of clear blue colour, but if sugar is present the solution

changes to green or orange according to the amount of sugar present. The development of green colour was taken to indicate here prediabetic condition. This method of testing the urine gives a quantitative guide for estimation of sugar.

Results

Out of one thousand primary school children examined 3.7% were diabetic, of which 1.5% were males and 2.2% were females. The incidence of prediabetic condition among males and females was 3% and 6% respectively.
When parents of diabetic children were examined, it was noted that in 44% cases the father was diabetic and in 33% cases the mother was diabetic. In the remaining 23%, cases, both parents were diabetic.

Discussion

Rimoin (1971) has extensively reviewed the nature of the controversy concerning the genetic basis of diabetes mellitus. Simpson (1968) has demonstrated that the frequency of diabetes mellitus is higher in relatives of diabetic patients than in the control population (non diabetic parental history). It has been further shown that when both members of a pair of monozygotic twins are compared with diazygotic twins the rate of occurrence of diabetes is greater in the former cases (White, 1965; Harvald and Hauge, 1963). However, the precise analysis of the genetic basis of diabetes has turned out to be geneticists' nightmare (Neel, 1970; Neel and Fajan, 1965). The review by Neel (1970) provides a good summary of the difficulties involved in research in this held.
According to him several factors are involved, namely (1) age, (2) nutritional background, (3) Genetic heterogeneity, (4) Precise diagnostic criteria and genetic markers, and (5) Lack of information on the nature of the basic defect. In our survey we have noted that of the total school going children examined 3.7% were diabetic, of which 1.5 percent were males while in the case of the females the percentage was 2.2. It is also true that in prediabetic cases the percentage of females was higher than that of the males. The present study, thus confirms the previous reports of WHO that in the diabetic population, a high percentage of females than the males suffers from diabetes.
As regard the genetic basis of this disease, it is clear from the present study that all parents who were tested had diabetic children. This observation is true regardless of whether both parents were diabetic or only one parent was diabetic. It is, therefore, concluded that children inherit this disease from both the parents. It is interesting that the frequency of diabetes is higher in children whose father rather than the mother is diabetic. Whatever the exact mode of inheritance of diabetes, the frequency of this disease is very high in Pakistani children (atleast 3-7%).
Since diabetes was commonly a lethal disease until 50 year ago ,one would have expected gradual elimination of gene or genes leading to diabetes. On the contrary, it is still a frequent disease. Since, there is no reason to believe that mutations of genes causing diabetes are more common than other mutations, and since it has not been proved that the carriers of this disease have an increased number of offspring, (hence carries of diabetes genes) the yet as undetected advantage of the diabetic gene or genes unrelated to the disease itself must be seriously considered.

References

1. Harris, H. (1950) The familial distribution of diabetes mellitus: A study of the relatives of 1241 diabetic propositi. Ann. Eugenics, 15:95.
2. Harvald, B. and Hauge, M. (1963) Selection in diabetes in modern society. Acta Med. Scand.,

173:459.
3. Neel, J.V., Fajan, S.S. (1965) In genetics and the Epidemiology of Chronic diseases. Public health service publication No. 1163.
4. Neel, J.V. Current concepts of the genetic basis of diabetes mellitus and the biological significance of diabetic predisposition. Diabetes, edited by J. Ostman. Amsterdam: Excerpta Medica Foundation, p. 68-78. 1970.
5. Rimoin, D.L. (1967) Genetic of diabetes mellitus. Diabetes, 16:346.
6. Rimoin, D.L. (1971) Inheritance in diabetes mellitus.Med. Clin. N. Amer., 55:807.
7. Simpson, N.E. (1968) Heritabilities of liability to diabetes when sex and age at onset are considered. Ann. Human Genet., 32:283.
8. White, P. (1965) The genetics of diabetes: a study of 233 families of Juveline diabetes. Ann. Human Genet., 26:1.