

A decade of epidemiology of diabetes

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Clinical epidemiology has by now earned a status of distinct speciality. The number of investigators that now attend an International meeting of epidemiologist is a direct testimony of this.

Taking into consideration a set of epidemiological and biostatistical strategies developed and standardized to study the distribution and determinants of disease in geographically and ethnically different population groups should evoke intervention perspectives to improve health care facilities and quality of life for diabetes. Such information should also provide clues to the preventive measures for restraining the epidemic like increase in diabetes with acculturation. This presentation is to review the epidemiology of diabetes in the last decade and deliberations during the recent 14th IDF Congress in Washington, June 1991.

Today IDDM and NIDDM are recognised as distinct entities specially regarding etiopathogenesis, epidemiology, clinical profile and the natural history.

In IDDM, characterization by HLA class II haplotype DR3, DQ2, DR4, DQ8, presence of islet cell antibodies and low or absent C-peptide is possible in majority. Such features are not forthcoming in NIDDM while hyperinsulinemia and insulin resistance metabolically are often observed in this latter group. NIDDM is 7-8 times more frequent than IDDM in most populations of the world.

Thus in reference to epidemiological studies in the context of IDDM, plan of registration, ascertainment is through childhood diabetes registeries, while for NIDDM population screening in a representative sample is recommended. Two hour post-75 g oral glucose load blood glucose value is the denominator. WHO criteria (1987) for diagnosis of diabetes and IGT are being adopted in all prevalence studies. Summary of some of the reported studies at IDF is as follows:

IDDM: Recent studies confirm major differences in the prevalence incidence of IDDM across Europe, ranging from high risk levels in Nordic countries (Finland 30/100000), median risk in central Europe (15/100000) and relatively low risk in Eastern

Europe (5/100000). Countries in Asia have a lowest prevalence of IDDM according to the recent studies while unawareness and under-reporting may be the contribution for this status. Recent studies in Sardinia (1989) (1) bring in unexpected high rates and this has been thus designated as HOT SPOT (2,3). In the same manner, incidence rates are high in North Europe, Finland (48.5/100000/year) while Sardinia has second high rate (31.8/100000/year). Such figures refute correlation between incidence of IDDM and latitude (Anders et al 1991) (1). Evidence for epidemic pattern is as well not substantiated. Of the genetics markers RFLP studies demonstrate absence of aspartate in the 57th position on the beta chain of the HLA DQ gene (HLA, DQ beta Asp 57 negative).

The presence of 64K antibodies may well be the most important predictive marker for impending IDDM in the future.

NIDDM: Geographic pattern of diabetes mellitus and impaired glucose tolerance (IGT) in 56 diverse population world wide in age range 30-64 years has been calculated according to standard WHO diagnostic criteria (4).

Diabetes mellitus-IGT is absent or rare in some Melanesian population (Pacific): rural Bantu (Tanzania) and Mapuche Indians (Chile).

In communities of European origin, diabetes mellitus or IGT prevalence varies from 3-10% and from 3-15% respectively. Migrant Indians and Chinese and Mexican American groups are at a higher risk, diabetes-IGT prevalence being 15-20%. Highest diabetes mellitus prevalence has been found in Pima and Papoyo Indians (50%) and the Nauruans (45%), IGT reaching its highest prevalence (23%) in the urban population of Kiribati (Micronesia) as reported by Hillary King et al in 1991 (3). In a 12-year follow up study in Baltimore fasting blood glucose 115-139 mg% was exponentially related to the development of diabetes (5). According to NDDG criteria fasting blood glucose more than 140 mg% is diabetes.

In adult migrant Asian Indians, Mcheigue (6), and Cruickshank (7) from UK report a figure of 19% & 30% for diabetes respectively. Studies in migrant Indians in Malaysia bring out prevalence rate of 9%

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(Rao PV personal communication) (8).

In Asian Indians, higher mean serum insulin levels (2 hr. post glucose load) and higher mean waist hip girth ratio are being considered to contribute towards greater cardiovascular risk in such populations.

IGT: In a prospective study of IGT in South Africa (9) abnormal ECG was higher in the IGT group (40.4%) compared to diabetes mellitus group which was (34.2%). Associated risk factors in IGT include age, 2 hr. plasma glucose and serum uric acid. In Chinese study of Beijing and Da Qing (10) IGT is 5.5/1000 and in this group high blood pressure is observed in 28%, hyperlipidaemia in 32% while age and sex adjusted coronary artery disease is present in 3.3%; in diabetes group it is 3.5%.

In India in a semi urban adult population IGT was observed in 6.3% (diabetes 4.2%). In this group on prospective follow-up for 3 years, coronary artery disease was observed 3.24% while in the diabetes group its 2.7%. In this cohort mortality in IGT was 4.6% and in diabetes it was 5.1 % (11).

SECULAR TREND IN PREVALENCE OF DIABETES IN THE LAST DECADE:

In United States from 1980 through 1987, the number of persons who self reported having diabetes increased by more than 17%. This figure is derived from the data from National Health Interview Survey (NHIS), an annual household survey of approximately 120000 US residents.

In a recent study in Finland (age 45-64 years; according to the WHO criteria) age standardized prevalence of diabetes is 5.7% in men and 4.6% in women (12). Similar secular trend is being observed in other countries in Europe. Netherland (using a dynamic statistical mode) forecasts an increase by 46% in diabetes by years 2000 A.D.

INDIA'S PRESENT POSITION:

Interrelationships of undernutrition as a risk factor for diabetes has been refuted by number of studies both from India and other developing countries (13, 14).

Restudy of rural population of 9950 screenees from different parts of India based on post-glucose load capillary blood glucose based on WHO criteria, bring out the prevalence rate of 1.3%. In ICMR study in 1975 overall figure for rural India was 1.5%

(15). In the recent select urban studies in India, prevalence of diabetes have indicated a phenomenal increase over a decade. First study was based on questionnaire in an affluent population of Daryaganj Delhi (total 3253) and stated prevalence rate of 3.1% (16). Other study was on hospital registered population (total 678) in Kudremukh, Chickmagalore, Karnataka screened by blood glucose value, WHO criteria, prevalence rate was 5%. In those above age 40 years, there is staggering figure of 21% (17). Systematic epidemiological studies in randomised large population in urban India are still awaited.

Doing some crystal gazing, one need to introspectively seek further elaboration as to the following questions:

- I. What steps are required to correctly estimate the magnitude of IDDM in developing countries. Global studies as DIAMOND by establishing Childhood Diabetes registries for investigating the geographical secular trend could provide comparative data in different ethnic groups and environmental locations. It is expected that in next 10 years (1990-99), standardized information on incidence, risk factors and mortality associated with diabetes will become available through agencies of DIAMOND.
- II. Risk factors for diabetes and cardiovascular disease in India are not similar to those applicable to the Western population. Again what is so distinctive between rural and urban life styles to account for differences in prevalence in these subjects observed so far? The increased susceptibility to diabetes in the overseas migrant population is awaiting research inputs.
- III. In Western countries large vessel disease predominates amongst diabetics. This is now being reduced by suitable changes in diet, increase in physical activity and abandoning of smoking. In India, abundance of small vessel disease is being observed. What is the scope of institution and evaluation of suitable intervention studies for amelioration of small vessel disease in our diabetic population?

There are several lacune in regard to some basic information on the epidemiology of diabetes and more needs to be investigated so that likelihood of an alarming increase in diabetes can be thwarted. The main goal of International scientific community

is to bring about prevention of this chronic disease and its long term sequelae.

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