

PREVALENCE OF DIABETES IN THE YOUNG IN SOUTH INDIA

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ABSTRACT

Students from nine schools and one college in Madras city, were screened for diabetes by oral glucose tolerance test. The criteria recommended by the World Health Organization was adopted to classify glucose tolerance.

Among 3,515 students, between 5 and 19 years of age, participated in this survey, 1982 (56.4%) were males and 1,533 were (43.6%) females. Family history of diabetes was positive in 302 (8.6%) students. There was no overt case of diabetes of any type. Three (0.09%) males had renal glycosuria.

It is therefore concluded that insulin-dependent diabetes, non-insulin dependent diabetes or any other type of diabetes in the young is rare in South India.

Key words: *Prevalence, Diabetes mellitus, Oral glucose tolerance test, Glycosuria, Insulin-dependent-diabetes mellitus, Non-insulin-dependent diabetes mellitus.*

It is needless to emphasize the importance of epidemiological information in any given population for planning control and prevention of diabetes mellitus. The paucity of information available on the prevalence rates of diabetes in the young, living in Southern India, prompted this population-based epidemiological investigation.

Screening the school population to determine the prevalence of diabetes in the young is not unknown(1-4). So in Madras city, 10,513 school students between 3 and 20 years' Of age were screened initially by testing post-prandial urine for glycosuria(5). However, no case of diabetes was encountered in this survey. Since urine examination alone is not sufficient to detect mild non-insulin dependent diabetes (NIDDM) or slow progressing insulin-dependent diabetes (IDDM), further screening by oral glucose tolerance test (OGTT) was undertaken. The results of this investigation form the subject matter of the current report.

Subjects and Methods

Students aged 5 to 19 years, studying in two primary, seven secondary schools and one Technical Training College in Madras city were selected to participate in the program of diabetes

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detection in the young. The sample size of asymptomatic, non-diabetic subjects was adequate to determine a prevalence of 0.2% with a maximum permissible error of 0.15% with 95% confidence. Written permission from parents or guardian of the students to undergo oral glucose tolerance test (OGTT) was obtained prior to screening.

Initially the list of students with permission to participate in the screening program was prepared. Their date of birth, sex, height, weight, socio-economic status, family history of diabetes and any significant illness were recorded. A brief physical examination was also conducted before screening for diabetes.

The amount of glucose required for each student was calculated as 1.75 g/kg body weight to a maximum of 75 g as recommended by the WHO(6). The required amount of glucose was measured, packed and labelled for each student.

OGTT was performed at 8 a.m. in the school premises. Each student was allotted a code number. After identifying the glucose packet for each one of them, glucose was dissolved in 200 ml of water. The students were asked to drink the glucose under supervision and the time of glucose administration was recorded individually. At the end of two hours, urine samples were collected and tested for glucose with Diastix. One venous blood sample was collected from each student for glucose estimation. This method of estimating two hour blood glucose alone for the diagnosis of diabetes is recommended by the WHO for epidemiologic surveys.

Venous plasma glucose was estimat-

ed by semi-automatic analyzer using glucose-oxidase method. Complete OGTT was performed on those with glycosuria and/or hyperglycemia.

The criteria recommended by the WHO(6) to classify glucose tolerance were adopted. If two hour venous blood glucose level was 200 mg/dl or more, it was considered to be diagnostic of diabetes. The data was analyzed by IBM computer.

Results

A total of 3,515 students (1,982 (56.4%) males and 1,533 (43.6%) females), participated in the screening program. At least one relative of 302 (8.6%) students was suffering from diabetes. The age and sex distribution of the students screened is shown in *Table I*. Two girls and three boys had glycosuria with normal blood glucose levels during the initial "screening. The second complete OGTT results of these were suggestive of renal glycosuria in three (0.09%). The details are summarized in *Table II*. There were no cases of diabetes, known or newly diagnosed.

Discussion

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TABLE I—Age and Sex Distribution of Population Screened

Age (Yrs)	Males n (%)	Females n (%)	Total n (%)
5-9	284	241	525 (14.9)
10-14	1298	989	2287 (65.1)
15-19	400	303	703 (20.0)
Total	1982 (56.4)	1533 (43.6)	3515 (100)

TABLE II—OGTT Results of Cases of Glycosuria

Cases	Age (yr)	Sex	OGTT Results					
			Fasting	½h	1h	1 ½h	2h	
Case 1*	11	M	BG	69	97	83	82	71
			US	2+	2+	2+	3+	2+
Case 2*	18	M	BG	83	119	114	100	94
			US	nil	1+	1+	1+	1+
Case 3*	14	M	BG	88	96	101	94	89
			US	1+	3+	4+	4+	2+

* Diagnosis: Renal glycosuria

BG: Blood glucose (mg/dl)

US: Urine sugar

search conducted a Multicentric National Study(7) on diabetes mellitus in India during 1972-1975, with diagnostic criteria different from WHO recommendations(6). Further, the survey sample did not include subjects under 15 years of age. Recent reports(8-10) on diabetes in the young Indians are based exclusively on diabetes clinic population studies. There is thus a paucity of population-based reports on epidemiology of diabetes in young Indians.

Diabetes in the young is mostly insulin-dependent (IDDM) though NIDDM is not unknown. In tropics, pancreatic diabetes is an additional risk(11,12).

Insulin-dependent diabetes is reportedly of high incidence and prevalence in western countries and low in few other countries(13). A few cases of IDDM have been detected during mass urine examination for glucose in some countries(1-3). In South India, we did not find any

case of IDDM either among the 10,513 school students, aged 3 to 20 years, screened by urine examination(5) or among 3,515 students screened by OGTT in the present study.

Non-insulin dependent diabetes on the contrary is reported to be not so rare as IDDM in the young(4). Among the diabetes clinic population, 1.2% in Madras(8) and 14% in central Kerala(9) were reported to be NIDDM cases while no case was reported from Orissa(10). However, in the present population study in Madras city no case of NIDDM was encountered.

Malnutrition related diabetes mellitus is yet another risk in young Indians(11,12). Even this condition was not encountered in our survey though 352 (10%) of the students screened were suffering from first degree malnutrition as per IAP classification (14).

Glycosuria initially detected in 5 students had persisted only in three. The OGTT results of these, however were diagnostic of renal glycosuria rather than diabetes.

The present and previous epidemiologic surveys in Madras city suggest that diabetes in the young is not a serious public health problem. However, epidemiologic studies in other regions of the country are necessary to know the regional differences in the prevalence of diabetes in young Indians.

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