

DIABETES IN THE TROPICS : INDIAN PERSPECTIVE

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Introduction

In describing diabetes in the tropics, one has to include the subtropics upto 30th parallel north and south of the Equator as the distribution and pattern of diabetes may be similar in many of the developing countries within this zone. As in the West, Type-2 or Non-insulin Dependent Diabetes (NIDDM) is the most common form of the disease (More than 95%) among older patients but wide differences are noted in the pattern of diabetes among those with onset by 30 years of age. Generally Type-1 or Insulin dependent Diabetes (IDDM) accounts for almost all such patients in the developed western countries. In the tropics and subtropics the incidence of IDDM is much lower. Most of the young patients seen in hospitals belong to one or the other type of malnutrition related Diabetes Mellitus (MRDM) Further NIDDM in the young is reported to be more common among the populations under discussion.

Epidemiology.

Diabetes was relatively rare among the native populations living in and around the tropical belt until some 4 decades ago. In recent years political changes and economic prosperity have altered the dietary habits and life style in several tropical and subtropical countries. Further massive migration of people from rural to urban centres and from back ward to more advanced areas have provided scope for alteration in the living pattern. The

impact of these changes have been impressively reflected by the high rise in morbidity and mortality from diabetes particularly in some Pacific Islands such as Nauru, Raratonga, Guam, Fiji, Papua New Guinea and Hawaii. Some native ethnic groups of tropical zone viz. Micronesians (Nauru) Polynesians (Maories) and Melanesians (Fiji) and Indians appear to be genetically more susceptible to develop diabetes than caucasians. Prevalence rates of diabetes in India, among Indians migrated to other countries and in natives of some pacific Islands following Western acculturation are presented in Table 1, 2 & 3. Diabetes is still uncommon among natives of China, Ethiopia, Central Africa and Tribals of India and relatively so in Malaysia, Indonesia, Philipines, West Indies and Latin American Countries.

Table 1

Prevalence of diabetes and IGT in native Indians

Place	Year of report	Prevalence (%)
Orissa	1973— Urban	2.8
	— Rural	1.2
	— Tribal	0.9
Gujarat	1973 — Urban	3.04
	— Rural	1.28
Delhi	1975	4.0
	1986	7.3
Tenali(A.P-)	1981	5.3

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Table 2
Prevalence of diabetes in migrated Indians

Country	Year of report	Prevalence (%)
Fiji	1967	5.7
	1984	12.5
Malaysia	1980	3.4
Singapore	1976	6.1
	1985	8.52
South Africa	1960	5.5
	1985	11.5
U.K.	1980	5.25
	1986	11.2
West Indies	1960	2.0
	1968	4.5

In general clinical types of diabetes as seen in India is representative of the pattern in tropical developing countries round the world.

NIDDM

The notable special features of NIDDM as seen in India are as follows.

(1) There is a male preponderance with male to female ratio 2.5 : 1 among hospital patients and 1.8 : 1 in population survey. The difference is less marked in populations where prevalence of obesity is high.

Incidence of diabetes mellitus is particularly low in China, African countries and tribal Indians.

(2) Peak age incidence around 45 years, is a decade earlier and proportion of patients with NIDDM below 30 years of age (NIDDY) is higher compared to the west.

Clinical Pattern :

Table 3
Prevalence (%) of diabetes and IGT in high risk population of tropical Pacific Islands

Year of study:	1953	1966	1973	1977	1980	1981
Tuvalu (polynesians)				9.8		
Samoa (polynesians)						10.0
Tonga (polynesians)			10.8			
Hawaii (polynesian)	4.9					
Roro Tonga (Maories)		5				
Newzealand (Maories)		8				
Nauru (Micro)				34		
Fiji (Melanesing)					7	
Comparative data on Caucasians and Islanders with Traditional living.						
Pukapakans (polynesians)			0.4 (Males)			
<i>Caucasian :</i>						•--
Hawaiians	0.7					
Australia		2.3				
Newzealand		2.8				

(3) Obesity is much less common. In Government or Municipal hospital Diabetes Clinics less than 10% may be obese and 20% over weight. Majority are standard weight (30%) lean or very lean (40%). The genesis of diabetes in the gross underweight needs evaluation.

(4) Incidence of coronary heart disease (CHD), probable and possible, is lower (20.25%) compared to the West (more than 40%) There is a proportionate decrease in the mortality from CHD.

(5) Mortality from nephropathy is higher (25%) compared to 10-12% in the West.

(6) Infection and neuropathy are the most common complications. Food problems are more due to infection, neuropathy and microangiopathy rather than occlusive disease of the large vessels (macroangiopathy).

DIABETES IN THE YOUNG

IDDM is rare among natives of tropical and subtropical countries of Asia, Africa and Oceania. As in Japan the prevalence rate may be around 1 per 10,000 among school children (S. India, Indonesia), Among Diabetics attending a clinic about 1% may have IDDM. HLA pattern has not been worked out in most countries. Reports from China reveal a dearth of DR 4 haplotype in patients of IDDM. In India DR 3 B₈, B₂₁, and A₂ linkage is over 5 times more common in IDDM than in general population. DR 3 does not appear to have any influence among natives of South Africa where DR 4 is commoner among rare patients with IDDM in West Africa.

Among diabetes with onset of disease by

30 years IDDM may account for 10 to 35% of the patients depending on place of study, general hospital or private clinics. similar proportion of cases (10 to 45%) have early onset NIDDM (MODY). Most of the patients seen in charitable hospitals belong to one or other category of MRDM.

MRDM

Malnutrition related Diabetes Mellitus is prevalent only in developing countries of the tropics and subtropics. The usual presenting features are as follows.

- (1) Age at onset : 10 to 30 years.
- (2) Gross underweight, emaciation (BMI 12-16).
- (3) History of chronic undernutrition from early child hood.
- (4) Moderate severe hyperglycaemia.
- (5) Absence of ketonuria or episodes.
- (6) High insulin requirement, more than 2 U/Kg body weight.

In addition, Fibrocalculous Pancreatic Diabetes (FCPD) is characterised by abdominal pain, steatorrhoea, radiological or ultra-sonographic evidences of pancreatic calculi, ductal dilatation, shrinkage or irregularity of the shape of pancreas with increased echogenesity.

The other type of MRDM, identified by WHO Study Group on Diabetes (1985), Protein deficient Pancreatic Diabetes (PDPD) is a primary form of the disease as there is lack of evidence of generalised pancreatic pathology. Hence the term Protein deficient Diabetes Mellitus (PDDM) is more appropriate and has already found place in international literature. While PDDM may be seen in any geographic area in tropical countries

prevalence of PCPD is more selective, It is particularly common in Kerala (South India), Nigeria and

Table 4
Incidence of clinical types among patients with onset of diabetes by 30 years

Types	Hospital(%)	Domiciliary(%)	
Total(%)	(375)	(100)	
(375)			
IDDM	13	36	19.7
NIDDDY/ EARLY NIDDM	6	45	16.5
PDDM	55	11	43.5
FCPD	26	8	21.3

Brazil. Within India FCPD is very rare all over the Northern, north western and north eastern states, but besides Kerala has been reported from Tamilnadu, Orissa, North Karnataka, Maharashtra, and Andhra Pradesh. At Cuttack, Orissa, where

adequate numbers of both the varieties of MRDM are seen and followed up, the relative incidence of clinical types of diabetes in patients with onset of diabetes by 30 years is as presented in Table-4.

Remarks

Study of diabetes in tropical countries and migrant populations provide unique opportunities for assessment of relative importance of genetics and environment in the genesis and pattern of the disorder as well as for identification of predisposing factors. In areas with traditional living chronic undernutrition appear to be important in determining the clinical features and nature of complications. In addition to MRDM this may have bearing on the genesis of NIDDM in the very lean- There are distinct differences between FCPD and PDDM and these are fully realised at our centre where both types are seen in adequate numbers and have been followed up for over 25 years.