

Childhood Diabetes Mellitus in developing countries – Survey

C.V. Harinarayan, S. Srikanta, M.M.S. Ahuja

INTRODUCTION

There is paucity of data on childhood diabetes mellitus in developing countries. The problem in developing countries is mostly due to economic impoverishment and illiteracy, associated with limited health care facilities. A questionnaire survey was conducted on the epidemiology, clinical profile and health care facilities as it pertains to childhood diabetes in these populations.

MATERIALS AND METHODS

A questionnaire was sent to 40 developing countries (Asia, South America and Africa). Besides the particulars of the region and the definition of childhood diabetes mellitus used by these centers (15 or 20 years of age at the onset), information was sought in three major areas.

Epidemiology

The prevalence data and methods, incidence data and methods, family history of diabetes mellitus, HLA associations and islet cell antibody (ICAB) studies.

Clinical profile

The proportion of IDDM, NIDDM (controlled with oral hypoglycemic agents for more than two years of diabetes mellitus) and fibrocalculous pancreatic diabetes (documented pancreatic calcification), prevalence of diabetic ketoacidosis at onset and recurrent, pulmonary tuberculosis and chronic diabetic complications, data on life span and mortality, and residual beta cell function (C-peptide studies).

TABLE 1
EPIDEMIOLOGY DATA

S. No.	COUNTRY	CENTRE CODE	ONSET OF DIABETES	PREVALENCE/10 ² DATA	METHOD	INCIDENCE/10 ⁵ DATA	SOURCE	HLA ASSOCIATION	ICAB PREVALENCE
1.	INDONESIA	C-1	< 15 YRS	2.6	BG	-	-	-	-
2.	THAILAND	C-2	< 15 YRS	-	-	0.19	HOSP. REC	DR2	-
3.	THAILAND	C-3	< 15 YRS	0.8	HOSP	0.2	-	DR3	-
4.	FIJI	C-4	< 15 YRS	-	-	-	-	-	-
5.	CHILE	C-5	< 15 YRS	0.24	SCH. REC	1.9	POPULATION	-	-
6.	HONG KONG	C-6	< 15 YRS	-	-	-	-	DR3/DRW9	-
7.	JAPAN	C-7	< 15 YRS	-	UG	1.7	REGISTRY	-	44%
8.	INDIA	C-8		-	-	-	-		
	DELHI	C-8a	15-20 YRS	-	-	-	-	DR3/DR4+DR2	37%
	CUTTACK	C-8b							
	MADRAS (A)	C-8c		-	-	-	-	-	
	MADRAS (B)	C-8d		-	-	-	-	-	
	COCHIN	C-8e		-	-	-	-	-	-

From: Department of Endocrinology, All India Institute of Medical Sciences, New Delhi-110 029

AUTHOR CODE:

C-1 TJOKROPANIVO, JAHYA ADIMASTA, SOEDJONO, HENDROMARTONO, ARI SUTJAJAJA, HANS TANDRA.

C-2 SAHIT VANNASAENG, TUCHINDA C.

C-3 CHANIKA TUCHINDA, KITH ANGASUSINGHA, SATHIT VANASAENG, PIMLAL CHIEWSILP

C-4 ADIAO, PARSHURAM, MARGERET CORENELIUS.

C-5 ELENA CARRASCO, GLORIA LOPEZ, MANUEL GARICA DE LOS RIOS

C-6 LOW L.

C-7 NOBUOMATSUNRA, AKIMASA OKUNO, KAZUHIKO OYANGAI, KENJI FUJIEDA, KOUCHI YANO.

C-8a MENON PSN

C-8b SAMAL KC

C-8c VENKATRAMAN S

C-8d MOHAN V

C-8e

LEGEND: UG-URINE GLUCOSE: BG-BLOOD GLUCOSE: SCH REC-SCHOOL RECORD

Health care

Availability of free and subsidized insulin, glycosylated hemoglobin assay and methods, full time diabetes mellitus nurse and health educator, special organisational set-up for childhood diabetes mellitus and residential camps for children and youth.

RESULTS

Responses were obtained from seven centers. Data from Japan and Hong Kong (economically developed countries in Asia) has also been included.

TABLE 2
CLINICAL DATA

S. No.	COUNTRY	AUTHOR CODE	IDDM	NIDDM	FCPD	DKA COMA AT ONSET	RECCURANCE OF DKA	MORTALITY DATA
1.	INDONESIA	C-1	20%	35%	10%	10%	4%	NO DATA
2.	THAILAND	C-2	87%	13%	-	14%	-	NO DATA
3.	THAILAND	C-3	95%	2%	1%	16.2%	8-10%	NO DATA
4.	FIJI	C-4	100%	NOT TRIED	-	20%	-	NO DATA
5.	CHILE	C-5	99.9%	0.01%	-	15%	-	NO DATA
6.	HONG KONG	C-6	99%	< 1%	-	0 %	-	NO DATA
7.	JAPAN	C-7	95%	NOT USED	< 1%	< 1%	-	NO DATA
8.	INDIA	C-8						
	DELHI	C-8a	99%	0.5%	0.5%	25%	-	NO DATA
	CUTTACK	C-8b	88%	0 %	12%	-	-	NO DATA
	MADRAS (A)	C-8C	95%	1%	4%	-	-	NO DATA
	MADRAS (B)	C-8d	67%	22%	11%	-	-	NO DATA
	COCHIN	C-8e	67%	14%	19%	-	-	NO DATA

TABLE 3
HEALTH CARE

S. No.	COUNTRY	AUTHOR CODE	FREE INSULIN SUPPLY	GLY. HAEMOGLOBIN TECHNIQUE	FULL TIME DIABETES NURSE/ EDUCATORS	ORGANISATIONAL SETUP FOR CHILDHOOD DIABETES	RESIDENTIAL CAMPS
1.	INDONESIA	C-1	NO	COLUMN CHROMATOGRAPHY	ONE	DIABETES FOUNDATION FOR CHILDREN	
2.	THAILAND	C-2	YES	COLORIMETRY	NONE	NO	YES
3.	THAILAND	C-3	YES	COLORIMETRY	NONE	NO	YES
4.	FIJI	C-4	YES	-	ONE	NO	NO
5.	CHILE	C-5	YES	CATION EXCHANGE CHROMATOGRAPHY	NONE	JUVENILE DIABETES FOUNDATION	YES
6.	HONG KONG	C-6	YES	AFFINITY CHROMATOGRAPHY	NONE	HONG KONG DIABETIC MUTUAL AIDE ASSOCIATION	YES
7.	JAPAN	C-7	YES	AFFINITY COLUMN	NONE	HOKKAIDO CHILDHOOD DIABETIC ASSOCIATION	YES
8.	INDIA	C-8					
	DELHI	C-8a	YES	COLORIMETRY	ONE	JUVENILE DIABETES SOCIETY	YES
	CUTTACK	C-8b	YES	COLORIMETRY	-	-	-
	MADRAS (A)	C-8c	YES	COLORIMETRY	-	-	-

Epidemiology

The prevalence of childhood diabetes was reported to be from 0.24/1000 (Chile) to 2.6/1000 (Indonesia). The ascertainment methods included glycosuria screening at school, blood glucose determinations/examinations of school record and hospital data. (Table 1) The childhood diabetes mellitus incidence was reported from 0.19 (Thailand) to 1.9/10⁵ (Chile). This was based both on hospital and population based registries. Family history of IDDM was 4-41%, NIDDM was 33-72%. From both Thailand and India positive association with HLA DR3, DR3/DR4, and Japan DR3/DRW4 was reported. The overall ICAb prevalence (irrespective of duration of diabetes mellitus) was 33-45% (from India and Japan).

Clinical Profile

IDDM constituted nearly 90 to 100% of all children with diabetes mellitus with exception of one center (Table 2).

Four centers reported a higher proportion (upto 35%) of NIDDM in the younger age group (Thailand, Madras B, Cochin, Indonesia). FCPD was reported from Indonesia and India, accounting for 1-2% of childhood diabetes mellitus. [The

lower proportion of IDDM reported from Indonesia (20%; 4/20 cases) is surprising, despite the small sample size]. The incidence of diabetic ketoacidosis at diabetes onset was reported to be from 10-29% in the developing countries, whereas it was 0 to 1% at Hong Kong and Japan respectively.

The incidence of pulmonary tuberculosis was about 5% in childhood diabetes mellitus. There was paucity of systematic data on prevalence of chronic microvascular and macrovascular complications of diabetes mellitus, mortality and life span from the responding centers.

Health Care

A majority of the countries have provision for free and subsidized supply of insulin to economically under privileged children through government sources. Glycated hemoglobin assays, either colorimetry/chromatography, were also available at most of the centers. However, only Fiji and two centers in India had the services of a full time diabetes nurse educator. Most of these countries had some type of organized setup for the care of children with diabetes, and organized residential camps (annual, biannual). But the magnitude of

the childhood diabetes population served by these activities is not available.

DISCUSSION

Childhood diabetes is one of the most common chronic disorders of childhood (besides bronchial asthma) in the developed world. However, due to obvious socio-economic reasons, the management of this disease in developing countries continues to be dismal. There is need for better and valid quantitation of the magnitude of the problem in terms of prevalence, incidence, morbidity and mortality characteristics in these areas. For this purpose both hospital and population-based diabetes registries are mandatory. Diabetes Epidemiology Research International and the WHO are currently attempting the establishment of such registries in the developing world.

Besides providing informative data on geographic, temporal and other variations in disease incidence and profile, which may provide pathogenetic clues for this global disease, data from such registries are invaluable to health planners and administrators in the developing world, as they set up priorities for efficient utilization of scant health care resources towards overall social welfare.

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