

# The prevalence and incidence of insulin dependent diabetes in White (W) and Indian (I) children in Leicester city (UK)

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## SUMMARY

In an attempt to determine the importance of environmental factors in the pathogenesis of IDDM we have examined the incidence (number of new cases/year/100,00) and the prevalence (number of existing cases/1000) of IDDM in the Indian (I) and White (W) population in Leicester, UK. Since the major migration of Indians to Leicester occurred after 1970, we can examine the effects of being born in the UK, or the length of stay in the UK, on the chance of developing IDDM. The prevalence of insulin dependent diabetes defined by wasting, hyperglycaemia and ketonuria, was found from the "U-100" Diabetic Register and from a Leicester City census delineating race which was conducted in 1983. The results are expressed as cases per 1000 for each age range in years and for both racial groups.

Age (Yrs.)	Indians	Whites
0-9	0.3*	0.4
10-15	1.0**	1.9
16-24	0.3***	1.8 P<0.01 (odds ratio)
25-30	0.5***	3.0 P<0.01 (odds ratio)

\* Mainly born in U.K.

\*\*1.5% U.K. born

\*\*\* Mainly non-UK born

The childhood (0-15) incident data from 1970 was compared for the two races. Case numbers were small for "I" so 4 years moving averages were used. This demonstrated a significantly lower "I" incidence in 1970-75 than "W", and a significantly different rate of increase: "I" increasing by 11/100,000/year/decade, "W" increasing by 4/100,000/year/decade.

By 1981, 73% of the "I" diabetic children were born in the UK, whereas only 28% of the "I" non-diabetic children were born in the U.K. If circumstances such as place of birth are important as risk factors from childhood diabetes then, by using our figures from the data of diabetic children who were not born in the UK, we could predict an incidence of 1/100,000 95% confidence limits 0.1-4.0) and a prevalence of 0.2/100 ( C.L. 0.1-0.4) for Indian children in India. If this was confirmed by data from India it would emphasise the importance of environmental factors in the pathogenesis of IDDM.

## INTRODUCTION

Whilst classical concepts of insulin-dependent diabetes in children in the Indian subcontinent is that the rate is very low, when we looked at the prevalence rate of childhood onset diabetes in Indian children in Leicester, we found the rate was not significantly different from that of their White peer group (1). Within the study, however, the youngest showed no difference at all, whereas those aged from 10-15 years showed a prevalence rate which was half that of their White peer group. This difference could have been due to chance, since the difference was not significant, but could have been due to an increased mortality within the Indian population or an actual difference in incidence rate. The disadvantage of prevalence studies is that prevalence represents the sum of incidence and mortality. We decided to investigate it further, both by continuing the prevalence study into the age group to the age of 30, and in view of the change in incidence which had been found in the White population (2), to establish the incidence rate in Indian children and subsequently relate this to place of birth.

## METHODS

Cases of childhood diabetes were ascertained for the Leicester Register from individual Consultant records, supplemented by Specialist Health Visitor records which had started in 1952 (3) and the register of births and deaths from 1920 onwards. The accuracy of ascertainment was determined from two separate sources, one of these being hospital admission data. Inpatient admission books for the Leicestershire hospitals from 1920 onwards have been scrutinised for any case of childhood diabetes which required admission. Secondly we compiled the "U-100" register (all patients living within Leicestershire being centrally registered on conversion to U-100 per ml insulin during 1983), this registration being made independently by the pharmacist, attending physician and the diabetic specialist health visitor. The population at risk was obtained from data published by the office of Population Census and Surveys for the years 1971 and 1981, with definition or race, by the heads of households, together with the Register General Annual Statistical returns. The Leicester City

census performed in 1983 also specifically examined the racial origins of residents within Leicester City. Electoral Rolls were examined for each year, for names suggesting an Indian origin, in order to determine the Indian population for the year 1970 onwards. A hundred of those names were subsequently sampled for each year to find the number of children and the age range represented by each household-this sampling process was related to the censuses in 1981 and 1983.

### Definitions

Childhood-onset diabetes was defined as being insulin-dependent if insulin was started at the time of diagnosis. For the age range 15-30 years, wasting, hyperglycaemia, and ketonuria needed to be present in order to fulfil the diagnosis.

### Statistical Methods

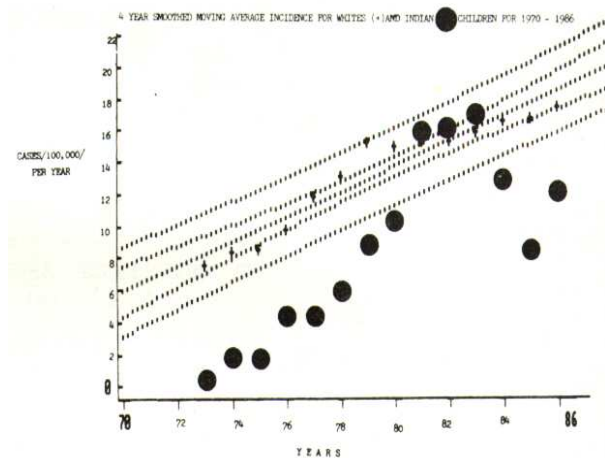
Prevalence rates were calculated by the total number of cases living in 1983 for each age band for the Leicester City population of that particular age-the Odds ratios with 95% confidence limits are shown ( see Table 1). From 1970 to 1976 the incidence rates for Whites are shown with 95% confidence limits around the mean linear regression line, both the 95% confidence limits of the mean regression and of the points.

### RESULTS

Table 1 shows the change in prevalence of insulin dependent diabetes in the Indian population compared with the whites. Figure I shows the incidence in cases per 100,000 per year for Whites and for Indians using a 4 year moving average: Whites show a regression line with 95% confidence limits.

### DISCUSSION

Our previous study showing an increase in the incidence of childhood diabetes in Leicestershire from 3.8/100,000/year in 1951 to 10.6 in the decade 1971-1980, suggested that there was a strong environmental influence provoking many cases of insulin dependent diabetes (2). If this is



AGE	RACE	POPULATION	CASES	PREVA	ODDS	% BORN
0-9	Indian	13,080	4	0.3	1.23	95%
	Whites	26,073	10	0.4	(4.1-0.4)	100%
> 10-15	Indian	7,187	7	1	1.92	50%
	Whites	18,195	34	1.9	(4.4-0.8)	100%
> 16-24	Indian	12,127	4	0.3	5.45	< 5%
	Whites	37,231	67	1.8	(1.8-14.8)	100%
> 25-30	Indian	7,406	4	0.5	5.61	< 5%
	Whites	15,597	47	3.0	(2-15.2)	100%

the case, then migration from an area of low risk of insulin-dependent diabetes to an area of relatively high risk should produce an epidemic amongst those people previously unexposed to the problem of IDDM. For this reason the incidence of childhood diabetes in Indians in the Indian subcontinent is clearly of importance.

We have a relatively small population in Leicester so our figures are of necessity small, but it suggests that previously insulin dependent diabetes was rare. This may have been either because it was a rare event to develop diabetes, or that patients were more likely to die if diabetic and living in India or Africa. In favour of the former explanation, (although the latter may also be important), is the apparent change in incidence over the years in Leicestershire. By using the data of the incidence rate in those who had been born outside the UK, we have predicted an incidence of 1/100,000 with 95% confidence limits of 0.1-4 with a prevalence of 0.2/1000 with confidence limits of 0.1-0.4 for Indian children living in India. This was done in order to test out the hypothesis

that place of birth is important in the migrant group. The results are clearly preliminary and point to the need for a large scale Migrant Indian IDDM Study looking at rates from the Indian subcontinent, and areas that Indian people have migrated to perhaps the Australasias, the Americas as well as other places within the UK. We have already started a prospective study in collaboration with other centers in the UK in order to examine the incidence further, which should be made particularly in view of the new UK 1991 census, which will ask all people about their racial background.

## REFERENCES

1. Samanta A, Burden AC, Jones GR, et al. Prevalence of Insulin dependent Diabetes Mellitus in Asian Children. *Diabetic Medicine* 1987;41:65-67.
2. Burden AC, Hearnshaw JR, Swift PGF. Childhood diabetes Mellitus: and increasing incidence. *Diabetic Medicine* 1989;6:334-336.