

*Originals***Diabetes Mellitus in Kuwait  
Incidence in the First 29 Years of Life**T. H. Taha<sup>1</sup>, M. A. A. Moussa<sup>2</sup>, A. R. Rashid<sup>3</sup> and F. F. Fenech<sup>1</sup><sup>1</sup>Medical Department and <sup>2</sup>Community Medicine Department, Faculty of Medicine, Kuwait University and<sup>3</sup>Ministry of Public Health, Kuwait

**Summary.** The annual incidence of diabetes mellitus among Kuwaiti subjects 0–29 years of age during 1980–1981 was found to be 22.09 per 100,000. There was a very low incidence in the 0–14 and 0–19 year age groups (3.96 per 100,000 and 5.61 per 100,000, respectively). The age distribution at onset shows an increase in incidence with age without exhibiting any remarkable peaks. The total number of female diabetic

patients exceeded the number of males by 32%, the male/female sex ratio being found to be 0.68, which is significantly less than that of the same age group in the general population.

**Key words:** Kuwait, diabetes mellitus, sex difference, age, epidemiology.

Epidemiological studies in various parts of the world have provided evidence that genetic and environmental factors play a role in the pathogenesis of diabetes mellitus [1, 2]. It is the general impression among practising physicians in Kuwait that though diabetes mellitus is very common, incidence in the younger age groups is probably quite low.

The purpose of this study was to carry out a prospective investigation into the incidence of new cases of diabetes mellitus in the Kuwaiti population below the age of 30 years, during the years 1980–1981. To our knowledge, no such data have been reported from this population.

**Subjects and Methods**

Kuwait is a small state about 18,850 km<sup>2</sup> in area with a low population density. In the 1980 census, there were 213,244 Kuwaiti males and 216,762 Kuwaiti females below the age of 30 years.

All Kuwaiti patients aged 0–29 years, diagnosed for the first time between January 1980 and December 1981, were included in the study. Expatriates were not included since many were recent immigrants. We believe that our ascertainment was reliable and complete as in Kuwait all patients diagnosed in a public or private hospital or suspected to have diabetes are referred to one of the six diabetic centres distributed all over the country. As the national health service in Kuwait provides free treatment, almost all patients diagnosed in private hospitals or clinics are referred to diabetic clinics for follow-up.

Data were collected using a standard form noting the name, age, date of birth, sex, date of diagnosis and type of medication. Blood glucose values required for the establishment of the diagnosis according

to 1980 WHO criteria were ascertained [3]. The data were analysed by computer (Hewlett-Packard HP9845, Fort Collins, Colorado, USA).

The incidence of diabetes during a year was computed by dividing the number of newly diagnosed diabetic subjects during that year by the number of people in the susceptible population. Classification of Kuwaiti population by age and sex was obtained from the 1980 census, which is undertaken every 5 years. The 1980 census figures were used for calculating the average annual incidence over the 2 year period of the study. This is justified by the fact that the average annual rate of population growth was only 3.5% for the period 1975–1980. Tests of difference between proportions were used to test significance between ratios.

**Results**

During 1980–1981, there were 190 newly diagnosed patients aged between 0 and 29 years (77 male, 113 female). The sex ratio was 0.68, which is significantly less than that of the overall Kuwaiti population in this age group (0.98,  $p < 0.0001$ ).

The average annual incidence of diabetes for the age group 0–29 years was 22.09 per 100,000 (Table 1). Table 2 shows that the incidence for the age groups 0–14 and 0–19 years was 3.96 per 100,000 and 5.61 per 100,000, respectively. The age distribution at onset below 20 years does not exhibit any remarkable peaks. Eighty per cent of all new cases were in the age group 20–29 years and the majority were not on insulin therapy; on the other hand, all the diabetic patients aged below 20 years were receiving insulin (Table 3). None of the 38 patients in the 0–19 age group was overweight at

diagnosis; 32% presented with ketoacidosis and the rest showed at some time ketonuria in association with hyperglycaemia. In this age group, there was a positive family history in 52.6% of cases. In the 20–29 age group, 50% of the insulin treated patients showed ketonuria at one time, 78% were of average weight and 22% were underweight. On the other hand, 76% of the non-insulin treated group were overweight while the rest exhibited average weight. The number of newly diagnosed insulin-treated diabetic patients was too small to study seasonal variations. However, a higher frequency of cases was noted in March and December.

**Table 1.** The annual incidence of diabetes mellitus 0–29 years of age in the years 1980–1981 in Kuwait

	Annual incidence per 100,000 persons (years)						
	0–4	5–14	15–19	20–29	0–14	0–19	0–29
Males	0.907	4.689	11.613	71.514	3.204	4.690	18.056
Females	1.868	6.558	14.544	93.987	4.730	6.534	26.065
Total	1.380	5.615	13.098	83.461	3.959	5.606	22.093

**Table 2.** Annual incidence of diabetes in Kuwait compared with that in other countries in different age groups

Age groups (years)	Country	Incidence/100,000	Reference
0–14	Japan	3.30	Personal communication
	France	3.70	5
	Kuwait	3.96	This study
	Denmark	14.00	4
	Norway	17.60	4
	Sweden	20.80	4
	Finland	28.60	4
0–19	Kuwait	5.61	This study
	Toronto	9.00	6
	Pittsbergh	10.10–16.00	12
	New Zealand	10.40	7
	Finland	27.30	8
0–29	Denmark	13.20	2
	Kuwait	22.09	This study

## Discussion

The average annual incidence of diabetes mellitus in the present study in the age group up to 19 years is much lower than that reported in European countries and North America. In the age group 0–14 years, the incidence is 3.96 per 100,000 compared with 14 per 100,000 reported in Denmark [4], 20.80 per 100,000 recorded in Sweden [4] and 28.6 per 100,000 in Finland [4]. In contrast, France with an incidence of 3.7 per 100,000 [5] and Japan 3.3 per 100,000 (Kitigawa – personal communication) had an incidence very similar to that found in Kuwait. There was a slight increase in incidence in the 0–19 year age group, but it is lower than that reported from Toronto (9.50 per 100,000) [6], New Zealand (10.4 per 100,000) [7] and much lower than the Finnish findings of 27.3 per 100,000 [8]. The incidence of diabetes mellitus in the age group 0–29 years in Kuwait (22.09 per 100,000) is nearly twice that found in Denmark (13.2 per 100,000) [2]. The majority of new cases of diabetes mellitus in the present study was in the 20–29 year age group, representing 80% of all new cases and accounting for the majority of cases which did not require insulin.

Although there was an increase in the number of diabetic patients with increasing age, no remarkable childhood peaks were detected. This finding is in contrast with the findings of other studies where childhood peaks were reported [2, 9, 10]. However, our number is too small for analysis.

In several studies recording the sex differences, there was a definite male predominance [2, 8, 10]. In the present study, the incidence in females was higher in all age groups. In the New Zealand study [7], there was no significant difference in incidence between the sexes below the age of 16 years. There was also no statistically significant difference in the sex incidence in the Toronto study in children under 19 years [6]. However, in the New Zealand study [7] there was a sudden significant increase in the incidence in females aged 16 years and over when compared with males in the same age group. In Kuwait, there was a definite female predominance in the 20–29 year age group; as in the New Zealand study [7], pregnancy may be the main reason for this difference.

**Table 3.** Kuwaiti diabetic patients classified according to type of treatment

		Age (years)										
		0–<1		1–<5		5–<15		15–<20		20–29		Total
		Insulin	Diet ± oral hypogly-caemic drugs	Insulin	Diet ± oral hypogly-caemic drugs	Insulin	Diet ± oral hypogly-caemic drugs	Insulin	Diet ± oral hypogly-caemic drugs	Insulin	Diet ± oral hypogly-caemic drugs	
Males	0	0		1	0	8	0	7	0	17	44	77
Females	1	0		1	0	11	0	9	0	29	62	113
Total	1	0		2	0	19	0	16	0	46	106	190

The incidence of diabetes mellitus in adolescence in Kuwait is much lower than that reported in Europe and North America [4, 6, 11, 12], and yet the disease is frequent in Kuwait, as can be judged from the high incidence in the 20–29 year age group. Further studies on the incidence of diabetes mellitus in the Kuwaiti population are being carried out and investigation of HLA frequencies in Kuwaitis is in progress.

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