

DIABETES MELLITUS IN RELATIVES OF URBAN BANTU DIABETICS

W. M. POLITZER, M.D., *South African Institute for Medical Research, Johannesburg*

In an earlier contribution,¹ we found that an examination of 3,121 urban Bantu attending a non-White hospital in Johannesburg showed 18 diabetics (0.58%). Seftel and Abrams² investigated 2,122 Bantu outpatients at Baragwanath Hospital, Johannesburg, and found 18 diabetics (0.85%). In a survey of 5,064 urban Bantu school children³ we found none to be diabetic. All 3 studies were carried out by means of screening tests (Tes-Tape) for the presence of glycosuria, and where positive the blood glucose estimation was performed. These studies show a low prevalence of diabetes mellitus in urban Bantu. It was thought worth while to investigate the occurrence of the disease in relatives of known diabetics, since no study of this nature had been undertaken in the Bantu.

SUBJECTS AND METHODS

An examination was carried out on 56 relations and 7 spouses of 4 known male diabetics, whose ages ranged from 26 to 89 years (mean age 56 years), and of 12 female diabetics whose ages ranged from 43 to 69 years (mean age 56 years). The 16 diabetics were attending the Jabavu and Moroka Clinics, Johannesburg. Details of spouses and relatives are given in Table I.

TABLE I. DETAILS OF RELATIVES OF THE 16 DIABETICS

Sex	Spouse	Relationship					Total
		Off-spring	Grand-daughter	Mother	Brother and sister	Cousin	
Male diabetics (4)	5	30	7	1	2	1	41
Fem. diabetics (12)	2	3	—	2	10	—	15
Total	(16)	33	7	3	12	1	56

The age distribution of the 33 offspring of the diabetics is shown in Table II.

TABLE II. AGE DISTRIBUTION OF OFFSPRING OF DIABETICS

Sex	Age group in years					Total
	0-9	10-19	20-29	30-39	40-49	
Male	3	6	4	5	4	22
Female	3	4	2	1	1	11
Total	6	10	6	6	5	33

The ages of the remaining male relatives ranged from 11 to 38 years (average 26 years), and of the female relatives from 23 to 80 years (average 41 years).

Glucose-tolerance tests were carried out on the members of those families shown in Table I. After an overnight fast, specimens of venous blood were collected in a thymol-fluoride tube. Oral doses of 50 G of glucose in 100 ml. water were given, and specimens of venous blood were obtained after $\frac{1}{2}$, 1, 1 $\frac{1}{2}$ and 2 hours. Blood sugar was determined by means of the Technicon Autoanalyser, using Hoffman's modification.⁴ As in previous studies a blood sugar level above 140 mg./100 ml. was considered abnormal.⁵

RESULTS

The mean glucose-tolerance data of the relatives of 4 male and 12 female diabetics are shown in Table III.

TABLE III. GLUCOSE-TOLERANCE RECORDINGS ON 55 BANTU RELATIVES OF VARIOUS DIABETICS

	41 Males	15 Females
Fasting blood glucose (mg./100 ml.)	84 ± 12	84 ± 8.5
$\frac{1}{2}$ -hour blood glucose (mg./100 ml.)	91 ± 14.7	93 ± 17.5
1-hour blood glucose (mg./100 ml.)	90 ± 11.8	101 ± 17.9
$\frac{1}{2}$ -hour blood glucose (mg./100 ml.)	91 ± 13.6	94 ± 18.4
2-hour blood glucose (mg./100 ml.)	92 ± 16.4	90 ± 14.4

One 36-year-old male offspring of a diabetic mother, had the following glucose-tolerance figures: fasting blood glucose 239 mg./100 ml.; $\frac{1}{2}$ -hour after 50 G of glucose 263 mg./100

ml.; after 1 $\frac{1}{2}$ hours 255 mg./100 ml.; after 2 hours 260 mg./100 ml. These figures are not included in Table III.

All other relatives and the 7 spouses of the 16 known diabetics were found to have glucose-tolerance curves within the normal limits. Thus only 1 diabetic (1.8%) was encountered in 56 close relatives of 16 diabetics.

DISCUSSION

While heredity in diabetes mellitus is an important aetiological factor, the exact genetic mechanism of inheritance has not yet been established. The literature on the heredity of diabetes mellitus is fully reviewed by Steinberg⁶ who points out that there is a variety of opinions as to how the disease is transmitted.

In this study of 56 close relatives of known Bantu diabetics only 1 case of familial diabetes was found (1.8%). One hundred and ten (24.6%) of 447 Jamaican diabetics investigated by Tulloch⁷ gave a family history of diabetes; 67 cases of these 110 were close relatives. Ford and Glenn⁸ conducted a 3-year survey at Jacksonville, Florida (USA) of the following relatives of diabetics: grandparents, parents, uncles, aunts, brothers, sisters, first cousins, children, nephews, nieces and grandchildren. In the White population, out of 1,278 relatives, 57 diabetics (20 in the 25-44 age group and 37 in the 45 and over age group) were encountered (4.5%). In the Negro population out of 463 relatives, 16 diabetics (1 in the 15-24 age group, 6 in the 25-44 age group and 9 in the 45 and over age group) were encountered (3.5%).

Parks *et al.*⁹ also conducted a survey of the relatives of White and non-White diabetics in 5 Florida counties (USA) and included the following: parents, brothers, sisters, children and grandchildren. Fourteen out of 452 relatives (3.1%) were classified as other blood relatives. Of these 452 relatives tested, 10 diabetics were encountered (1 in the 15-24 age group, 1 in the 25-44 age group and 8 in the 45 and over age group, giving an incidence of 2.2% for a mixed population. White *et al.*¹⁰ showed that 33% of 204 children under the age of 20 years—both of whose parents were diabetic—had diabetes; while, if only 1 parent had the disease, 9% of 185 children were affected.

In our study the incidence of diabetes mellitus in relatives of Bantu diabetics was very similar to the results of Parks' study but lower than that of Ford's study, and low when compared with the findings of White *et al.*

This low figure of 1.8% in a hereditary study of diabetes mellitus is in keeping with the low prevalence of the disease found in the Bantu generally. However, a much larger number of families will have to be investigated to define the situation.

SUMMARY

In a survey conducted on 56 close relatives of 16 known Bantu diabetics, 1 male diabetic of a diabetic mother was detected (1.8%). This percentage is low in comparison with figures reported on in Whites and Negroes in the United States.

I wish to thank the Director of the South African Institute for Medical Research for facilities provided. I also wish to thank the Medical Officers of Health of the City Health Department of Johannesburg for making this investigation possible.

REFERENCES

1. Politzer, W. M. and Schneider, T. (1962): *S. Afr. Med. J.*, **36**, 608.
2. Seftel, H. C. and Abrams, G. J. (1960): *Brit. Med. J.*, **1**, 1207.
3. Politzer, W. M. (1963): *S. Afr. J. Lab. Clin. Med.*, **9**, 109.
4. Hoffman, W. S. (1937): *J. Biol. Chem.*, **120**, 51.
5. Politzer, W. M. (1955): *S. Afr. J. Lab. Clin. Med.*, **1**, 270.
6. Steinberg, A. G. (1961): *Diabetes*, **10**, 269.
7. Tulloch, J. A. (1962): *Diabetes Mellitus in the Tropics*, p. 78. Edinburgh: Livingstone.
8. Ford, M. J. and Glenn, B. (1951): *Sth. Med. J. (Bgham, Ala.)*, **44**, 239.
9. Parks, L. L., Remein, Q. R., Shields, L. S. and Turvaville, J. (1960): *Publ. Hlth Rep. (Wash.)*, **75**, 55.
10. White, P., Guest, G. M., Harwood, R. and Kennedy, W. B. (1955): *Diabetes*, **4**, 313.