

DIABETICS

INTER-RACIAL COMPARISONS, I*

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A study was undertaken at the Diabetes Clinic to ascertain the prevalence of certain characteristics in the 3 main ethnic groups in Cape Town, i.e. White, Coloured† and Bantu. The White group was sub-divided into Jews and non-Jews,** and Moslems were also split off from the Coloured group. There were 100 patients in each of the Jewish, Moslem and Bantu groups and 150 patients in the White (excluding Jews) and Coloured groups. All patients were over 20 years of age. New patients were not included, otherwise there was no selection, except that in order to obtain 100 Bantu diabetics it was necessary to include a few new patients. Statistical randomization was not attempted.

Throughout this article the term 'White' excludes Jews, and 'Coloured' excludes the Moslem subgroup.

GENERAL PROCEDURE

Information regarding the patient's diabetes, height and weight, obstetrical history, therapy and diet was collected on punch-cards and manually punched out at the relevant numbers following a numbered key. The accumulated data were calculated in percentages. The individuals were not questioned about the purity of their racial grouping; for instance those who adhered to a Moslem religion were simply classified 'Moslem'. Thus, although the Moslem

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†The term 'Coloured' indicates a mixed race of Hottentot, Malay, European and Bantu, which has maintained itself as a distinct ethnic group for the past 100 years. Moslem immigrants from the East are known as 'Cape Malays', but these have mixed to some extent with the Coloured community.

**This was done because the characteristics of diabetes in Jews were found to be different from those of other groups of people in some parts of the world—e.g. the Eastern seaboard of North America.

group consisted largely of 'Cape Malays',† there is certainly a considerable admixture of 'Cape Coloured'.

In order to correct certain of our figures to apply to whole populations at risk, the 1951 census figures for Cape Town municipality plus the Cape Peninsula have been used by courtesy of the Director of Census and Statistics.

RESULTS

Family History

Knowledge of diabetes in members of the family (up to third degree relatives) was more frequent in the Jewish group—55% of patients interviewed knew of a blood relation with diabetes. Other figures were: White 39%; Coloured 30%; Moslem 31%, while only 8% of the Bantu were aware of any family history.

Sex

As seen from Table I, women heavily outnumbered men in all ethnic groups. It is possible that the bias in this survey was in favour of including more female than male diabetics because: (1) men may tend to come less frequently to a clinic because of work commitments, and (2) attending men may have been less available for inter-

TABLE I. SEX DISTRIBUTION

	Female		Male		Corrected female/male ratio*
	Number	%	Number	%	
White ..	104	69.3	46	30.7	2.0:1
Jewish ..	75	75	25	25	
Coloured ..	128	82.6	27	17.4	4.0:1
Moslem ..	78	78	22	22	
Bantu ..	63	63	37	37	4.3:1
All races ..	448	74	157	26	

*Corrected for sex distribution of the general population at risk. Note the female preponderance in all groups (see text).

view than women for the same reason. The importance of this bias is thought not to be great.

From census figures giving the sex distributions of different ages in the 3 different ethnic groups (White, Coloured and Bantu), we were able to correct the ratio of female to male diabetics to apply to the whole population of the Cape. (Correction could not be made for Jews and Moslems.) It appears that White (non-Jew) women diabetics outnumber men by 2 to 1, but in all other 4 groups the ratio is close to 4 to 1.

Age in 1963

The age distribution of patients attending the clinic differed considerably in the various racial groups. Over 50% of the White people (including Jews) were more than 60 years old, whereas in the other 3 groups the majority of patients were between 45 and 60, and these groups contained fewer patients older than 60. These differences largely correspond to the age structure of the general population in the different ethnic groups (see below).

Age at Diagnosis†

The age distribution of the population of Cape Town differs considerably in the different races (Table II, Fig. 1). For this reason no real comparison of the age at diagnosis in the different race groups could be obtained by simply

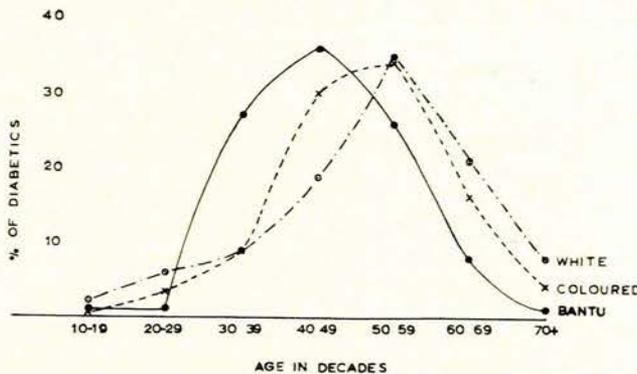


Fig. 1. Distribution of age at diagnosis in different races. (Uncorrected for age distribution in general population.) Note apparent differences in older age groups.

†The term 'age at diagnosis' is used in preference to 'age at onset' because the latter is usually impossible to assess. Nevertheless, it is assumed that 'age at diagnosis' has a reasonable relation to the development of clinical diabetes.

comparing the percentages in each group attending the clinic. The census figures give us the percentage of each race in each age group for White people (including Jews), Coloured (including Moslem) and Bantu. From these figures the expected age distribution at diagnosis of each group could be calculated by using the distribution in the White group as standard. By comparing the expected age distribution at diagnosis with that actually found, the trend in the development of diabetes in each decade in the different groups could be obtained (Table II, Figs. 2 and 3).

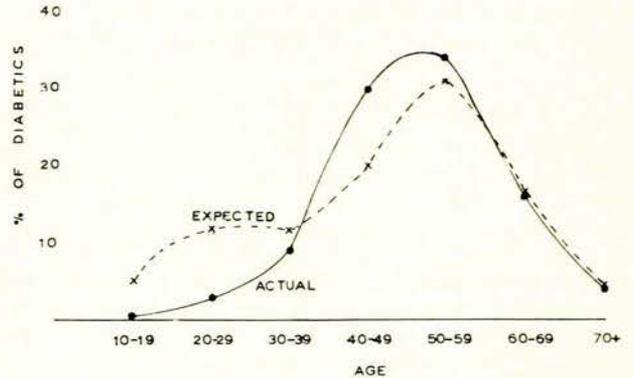


Fig. 2. Distribution of age at diagnosis in Coloured group in comparison with expected distribution based on White group. The 'expected' distribution is based on a correction for the age-distribution of the Coloured population at risk. Note great deficiency of young diabetics.

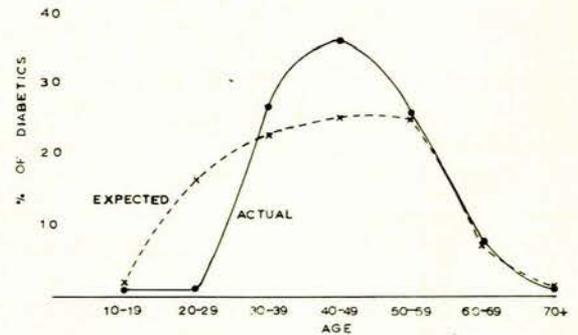


Fig. 3. Distribution of age at diagnosis in Bantu in comparison with expected distribution based on White group. The 'expected' distribution is based on a correction for the age-distribution of Bantu at risk. Note again deficiency of young diabetics.

TABLE II. DISTRIBUTION OF AGE AT DIAGNOSIS IN DIFFERENT RACIAL GROUPS WITH CORRECTION FOR AGE-DISTRIBUTION IN POPULATION AT RISK

Age group	Whites		Coloured			Bantu		
	% Gen. pop. in each age group	Actual % diabetes in each group	% Gen. pop.	Expected % diabetics in each group based on Whites	Actual % diabetics	% Gen. pop.	Expected % diabetics	Actual % diabetics
10-19	15.9	2.0	23.5	5.02	0.6	9.2	1.9	1.0
20-29	16.6	6.0	19.9	11.75	3.2	30.5	17.0	1.0
30-39	14.9	8.7	11.7	9.0	11.6	25.4	22.7	27.0
40-49	13.7	18.7	8.84	19.8	29.7	11.9	25.0	36.0
50-59	9.13	35.3	4.93	31.3	34.2	4.2	25.1	26.0
60-69	6.10	21.3	2.88	16.4	16.8	1.24	6.8	8.0
70+	4.66	8.0	1.61	4.56	3.9	0.54	1.5	1.0

Note fewer diabetics diagnosed at young ages than expected in Coloured and Bantu (figures in italics).

In both the non-White groups the actual percentage of patients developing diabetes below the age of 30 was far lower than the expected percentage. Conversely, above the age of 30 the actual percentage of non-White subjects developing diabetes exceeded the expected percentage based on the White group. The modal age for diagnosis in the White and Coloured groups was 50-59, but 40-49 in the Bantu, and this difference appears not to be caused entirely by age distributions in the populations at risk.

Obstetrical History (Married Women Only)

Miscarriages. Nearly half the women had had 1 or more miscarriages, and there was little difference between the different racial groups.

Stillbirths. 15% of White women interviewed had had 1 or more stillborn infant as against close to 25% in the non-White groups. Actual figures are: White 15%; Jew 15%; Coloured 26%; Moslem 24%; and Bantu 24%. We cannot compare these figures with the general population of Cape Town, since no comparable recent statistics are available. More detailed figures were obtained by us previously and reported in 1952.¹

Parity and weight. Parity was classified into the following groups: nil, 1-3, 4-6, 7-9, and 10+. It was found that 62% of those women who had had over 7 pregnancies were more than 10% overweight. On the other hand, in the lower parity groups (nil and 1-3 pregnancies) only 27% and 42% respectively were similarly overweight (Fig. 4).

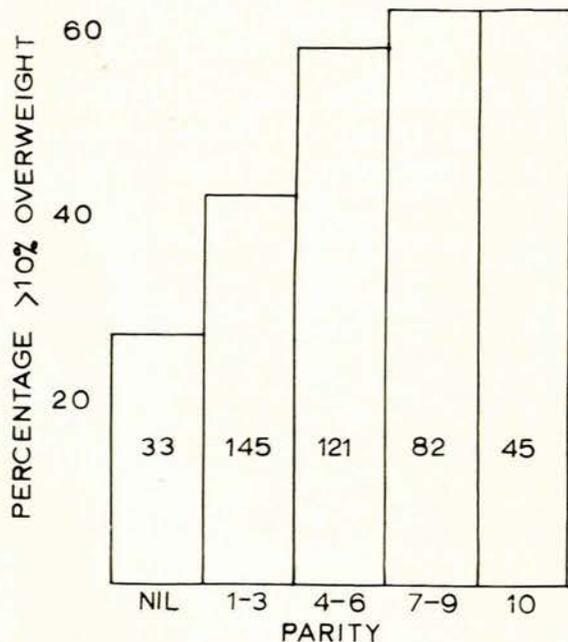


Fig. 4. Parity and overweight. Figures in blocks indicate actual numbers of diabetics in each parity group. Note increasing weight with increasing parity.

The parity distribution in different race groups was also studied (Table III, Fig. 5). Since some women of child-bearing age were included it is obvious that the figures for parity may be regarded only as the *minimum* numbers of pregnancies.

The White groups had the highest number of nulliparae (12.5% White; 8.6% Jew), with the Jewish group also having the smallest families. 64% of Jews had 1-3 children, against 43.7% of White non-Jews, and lower percentages of the non-White groups: Coloured 22.4%; Moslem 19.2% and Bantu 31.3%. Moslem families tended to be so large that almost a quarter (23.3%) had undergone 10 or more full-term pregnancies.

TABLE III. PARITY STRUCTURE IN MARRIED WOMEN

	White	Jewish	Coloured	Moslem	Bantu
Total women	96	70	116	75	61
Parity:					
Nil	12.5	8.6	6.0	8.2	3.3
1, 2, 3	43.7	64.3	22.4	19.2	31.3
4, 5, 6	27.1	18.6	28.4	27.4	44.3
7, 8, 9	12.5	8.6	26.7	23.3	16.4
10, 10+	4.2	0.0	16.4	23.3	4.9

Parity figures are percentages of total in each race. Note modal family number for Whites 1-3; for non-Whites 4-6, but large proportion above 6 in Coloured and Moslem groups.

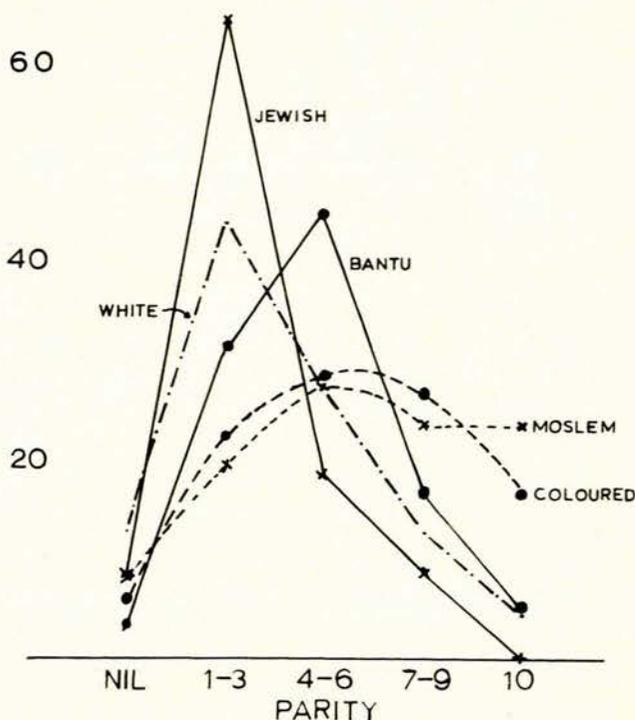


Fig. 5. Parity distribution in married women in different racial groups. Moslem and Coloured groups have largest families.

Of the Bantu 44.3% had parity figures of 4, 5 or 6, and relatively few had families larger than this. Only 3% of Bantu had no children.

Unfortunately no similar figures applying to non-diabetic women in the various ethnic groups are available for comparison.

Weight (Table IV)

The weights of patients at their first attendance at the Diabetes Clinic were recorded as well as those in 1960 and

TABLE IV. SELECTED WEIGHT DISTRIBUTIONS IN DIFFERENT RACIAL GROUPS

	White		Jewish		Coloured		Moslem		Bantu		All races	
	At diagnosis	In 1963										
5% over standard	48.0	43.3	42.0	37.0	52.9	54.8	59.0	64.0	68.0	54.0	53.5	53.1
15% over standard	30.7	26.7	18.2	14.0	38.1	34.2	42.0	38.0	42.0	47.0	34.3	32.4
15% under standard	12.7	11.3	8.1	11.0	8.4	9.0	12.0	12.0	6.0	6.0	9.4	10.1

Note virtually no improvement in overweight situation. All figures are percentages.

at the time of the study in 1963. For assessment, tables giving *standard*² and not *recommended* weights for groups at different ages and of varying heights were used (in this way the diabetic population is comparable to the general population and not the theoretical recommended ideal weight). 'Obesity' is considered to exist if a patient is more than 15% over standard weight.

Dietitians using flannelgraphs, books and pictures, have been advising individuals and groups about the importance of their diet much more intensively since 1960.

At diagnosis 53% of all patients were 5% or more overweight and 34.3% were obese. In 1963 53% of all patients were still 5% or more over their standard weight and 32.4% were obese. At the time of diagnosis the Bantu group was the fattest and the Jewish group was the lightest (38% White; 25% Jew; 44% Coloured; 51% Moslem, and 60% Bantu were more than 10% overweight).

Between 1960 and 1963 there was a fall of approximately 4% in the number of obese people in all groups except the Bantu, in whom the number of obese patients rose by 5%.

Fig. 6 illustrates the percentage obesity in the different races and the changes that have occurred.

Sex differences in overweight. 41% of all the women were obese, as against only 18% of men. This rather more than 2:1 ratio was found in all racial groups. No differ-

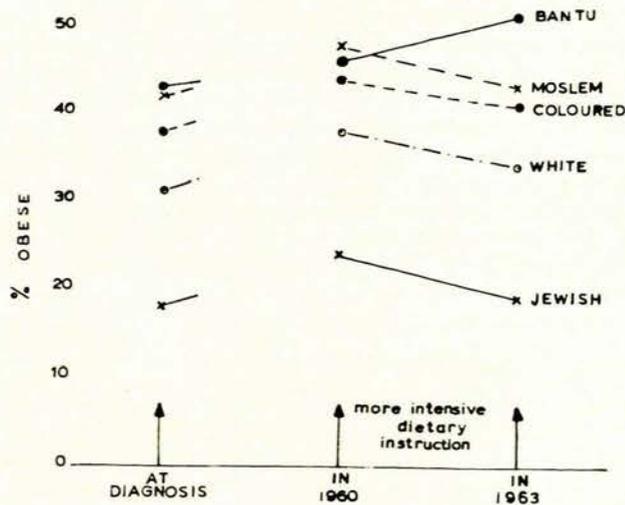


Fig. 6. Obesity in 600 diabetics before and after dietary instruction. 'Obese' indicates at least 15% over standard weight; 34.3% of total (all races) were obese at diagnosis. Poor response of obese patients to attempts at weight reduction.

ence in response to dietary therapy could be found between men and women. (These results are not tabulated or graphed.)

Therapy (Table V)

Approximately 70% of all racial groups except Moslems were receiving some single form of oral agent. Over 80% of the Moslems were on tablets alone. Control with more than 1 type of tablet had been attempted in a large percentage of cases. In 28% of all subjects tolbutamide had been discontinued in an effort to obtain better control with some other agent.

[Acetohexamide had only recently been introduced at the time of this survey and is not considered, though actually 5 patients in all (0.8%) were taking this drug.]

Of the White group 23%; Jews 20%; Coloured 21%; Moslem 13%, and Bantu 27% were receiving insulin either alone or in combination with oral agents.

There were few patients being controlled by diet alone: 12% White; 11% Coloured; 4% Moslem; and 7% Bantu—giving a mean of 8% for the entire group.

DISCUSSION

Family History

It is interesting that a positive family history of diabetes was most commonly found in Jews, who had the smallest families of all, and least commonly found in the Bantu, who had larger families. The differences must be accounted for by either or both (1) the incidence of diabetes being high in Jews and lowest in the Bantu (which is probably true) or (2) the Jews being most aware of diabetes and also most knowledgeable about their relatives and the Bantu being least aware and least knowledgeable. This is probably also true.

Sex

It is usual among White countries to find women diabetics outnumbering men over the age of 30 or 40 (discussed in detail by one of us elsewhere³). It was unexpected that the female to male ratio was so high (about 4:1) in all groups except the White non-Jews. Among the Bantu there are reports from other parts of South Africa suggesting a lesser difference between the sexes,^{4,5} while a survey in Johannesburg⁶ and a study from Salisbury (Rhodesia)⁷ plainly showed a greater prevalence of diabetes among males. Obesity may be one factor in the Cape that produces overt diabetes in women, and female Bantu diabetics were far more often obese than their menfolk.

Age at Diagnosis

The apparent differences in age at diagnosis of diabetes in the 3 different groups (White, Coloured and Bantu,

TABLE V. THERAPY STRUCTURE (1963)

	White	Jewish	Coloured	Moslem	Bantu	All races
Insulin as sole drug	19.4	18.0	17.4	10.6	23.0	17.7
Sulphonylurea as sole drug	46.4	52.0	51.6	60.0	58.0	53.9
Diguanide as sole drug	5.8	5.0	0.0	2.0	1.0	2.7
Diguanide + sulphonylurea	14.6	12.0	20.7	22.0	8.0	14.7
Diguanide + insulin	3.2	2.0	3.9	2.0	3.0	3.0
Diet alone	11.6	11.0	6.4	4.0	7.0	8.0
Changed from insulin to oral drugs	16.1	13.0	19.3	15.4	9.8	14.7
Taken off oral drugs (complete failures)	1.9	5.0	5.8	3.9	12.8	5.9

All figures are percentages.

Fig. 1) largely disappear when the figures are corrected for the age distribution of the general population at risk (Figs. 2, 3). The exception is at the young ages—the actual number of diabetics under the age of 30 is far less than the expected number in both Coloured and Bantu. In other words, youth-onset diabetes is much rarer in both Coloured and Bantu than in White people. This is most interesting and accords both with our clinical impression and with Seftel's comment that in 14 years of experience among non-White diabetes clinics in Johannesburg he has not seen a single child under 10 years of age.⁸

Parity (Table III, Fig. 5)

Since the 2 White groups tended to be older than the non-White and also to have smaller families, the different age-distribution in the different groups tends to minimize rather than accentuate the differences in parity. The fecundity of the Coloured and Moslem groups is remarkable. The 23% of Moslems who are 10 or more parous is indeed too low a figure, because some of the interviewed women will certainly have more children yet.

The Bantu families were not nearly as large as those of the Coloured groups, 4-6 children being usual.

Parity and weight. Among the general population it is commonly accepted that weight tends to rise with parity. We have found the same phenomenon in our diabetics as shown in Fig. 4. This tendency to increased weight with increasing parity appears to apply to all racial groups except the Bantu, but figures are not sufficient for detailed analysis.

Weight

Many of our patients were overweight at the time of their initial attendance at the clinic. Thus 34.3% were considered obese (i.e. 15% over standard weight) and 53.5% were 5% or more overweight. Nevertheless, these figures are considerably less than those reported from several other clinics, especially from America,⁹⁻¹² though they are very similar to those found in less overfed countries (e.g. the Netherlands).¹³

It was surprising to us to find that the least overweight group was the Jewish (only 18% were obese). In earlier work Joslin *et al.* found that Jewish adult diabetics were frequently more obese than other patients.⁹ Possible reasons for this discrepancy include (1) sampling error by us (unlikely), (2) Cape Jews being in general more concerned with their figures than American Jews, and (3) the difference in time of the two investigations.

The 3 Coloured groups were similar to each other as regards weight (around 40% obese initially). As was

expected, women were much more often obese than men in all racial groups.

In 1960 there was little difference from the weights recorded at the time of diagnosis, but more intensive dietary instruction was instituted in that year and it was hoped that a third assessment of weights might show the good effects of this. Certainly there was a small drop in the percentage of obesity in all groups except in the Bantu, where the obesity rate rose from 46% to 51%! This total apparent lack of effect of dietary instruction in the Bantu is presumably due to (1) incomplete rapport and inability of this group to understand sufficiently, and (2) the difficulty of a low-income group in purchasing a reasonably pleasant low-calorie diet. This unfortunate lack of result occurred despite our formulation and explanation of a special low-income low-calorie diet written in Xhosa and designed particularly for Bantu patients.

It must be admitted that the over-all effect of dietary instruction on weight loss appears to have been very slight indeed.

Therapy

Diet only. Disappointingly few diabetics were being controlled by dietary measures alone—this itself indicates a considerable amount of failure in this connection. It was to be expected that rather more White people were on 'diet only' (12%) than non-White (6%).

Tablets. The overwhelming majority of patients now take tablets, single or in combination, and this is perhaps a reasonable state of affairs where dietary means alone are insufficient. Sulphonylureas are the most popular, tolbutamide and chlorpropamide being used in approximately equal amounts. About 28% of all patients were seemingly tolbutamide failures (not necessarily pure drug failures) and about 9% were chlorpropamide failures. The combination of a sulphonylurea with a diguanide seems to be gaining in favour, though the diguanides were seldom being used alone.

Insulin was being used in some 18% of all patients, while nearly this number (15%) had switched from insulin to oral drugs. On the other hand only 6% of all cases were total failures to oral drug therapy and needed insulin after trial of tablets. It is plain that the maximal combination of sulphonylureas plus diguanides is very potent indeed and comparatively seldom fails in the older patient provided he will maintain a reasonable diet.

SUMMARY

A study has been made of certain characteristics of diabetes of different ethnic groups attending a diabetes clinic.

Diabetes known in patients' relatives was most common in Jews, least common in Bantu. Men outnumbered women by approximately 4:1 in all groups except the White (non-Jews) where the ratio was nearer 2:1.

It was confirmed that youth-onset diabetes appears to be particularly rare in all non-White groups.

Moslem women were most highly parous; Jews had the smallest families. Weight rose with increasing parity.

Some 34% of all patients were considered obese at the onset of diabetes, and some 53% were overweight. This is considerably less than other clinics have reported. Loss of weight after attendance at clinic was very disappointing indeed. This is mirrored in the small number (8%) of all patients who were on dietary therapy alone. Tablets for diabetes are being used in most cases, and they have partially supplanted insulin.

We wish to thank all the physicians at the Diabetes Clinic for allowing us free interviews with their patients and access to their records: the Medical Superintendent and Dr. B.

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