

The Lifespan of Parents of Diabetic Subjects

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Summary. Fathers of diabetic men or women live longer than the mothers of these patients. This unusual feature is due to diminished lifespan of the mothers and perhaps to an unusual longevity of the fathers. The latter phenomenon seems to be restricted, at least in men, to propositi with the non insulin dependent type of diabetes. — The shorter lifespan of the mothers of diabetics is found both in obese and in thin propositi. The extra

longevity of the fathers, however, is not found in the latter propositi. — Thin men, both diabetic and non diabetic, have fathers who live longer than the fathers of obese men.

Key words: Parents of diabetics, longevity, body weight, thrifty genotype.

In 1967 we reported that fathers of diabetic patients lived longer than mothers of diabetic patients and apparently also than fathers of non diabetic patients [1]. These data have been confirmed and extended in 4 subsequent studies, done in 3 different Departments of Internal Medicine. Hoping to find out by what mechanism the fathers of the diabetic men lived longer we looked for factors related to their longevity and present in their diabetic offspring.

Methods

Consecutive charts of ambulant or hospitalized patients were reviewed not only in our Department of Internal Medicine (Leuven) but thanks to the courtesy of Dr. J. Pirart and Dr. Fr. Lavenne also in similar Departments in Brussels (Cliniques César De Paepe) and in Louvain (Cliniques St. Pierre). Data were collected during the years 1967, 1970 and 1972 in Leuven, during 1970 in Brussels and during 1971 in Louvain. In all we collected data on 820 diabetics and 635 non diabetic subjects (Table 1). The non diabetics were strictly similar to the diabetics as far as social status was concerned. Only Belgians were selected for this study.

The main objective was to compare the lifespan of the parents of the propositi. Therefore only subjects 50 years old or older were retained for study so that the majority of their parents (96% of the fathers and 95% of the mothers) had died at the time of study. The age of the living parents was, however, included in our calculations since otherwise some of the longer living parents would have been omitted. The lifespan recorded is thus somewhat shorter than it is in fact. On the other hand, we set a maximum of 65 years for our propositi, so as to minimize the effect of secular changes. The mean age of all diabetic propositi was 58.93 ± 6.42 years and of all non-diabetic propositi 57.84 ± 7.36 ; in subgroups the mean age of the propositi did vary between 55.74 ± 6.02 and 60.04 ± 6.32 years.

Only overt diabetics were retained for the diabetic group. The non diabetics were patients in whom this diagnosis was not mentioned in their charts and who had at least one normal fasting blood sugar and no glucosuria. Ninety-seven subjects (50 men and 47 women) selected as non-diabetic by more stringent criteria, i.e. a normal oral glucose tolerance test, had parents with similar lifespans to the whole non diabetic group (fathers: 69.22

± 11.60 vs 69.78 ± 13.37 and mothers: 71.65 ± 12.90 vs 70.53 ± 13.50).

In the two initial studies only the age of the propositi and the lifespan of their parents were recorded. Data on treatment and metabolic control were available in only 324 diabetics of the 3 last studies; 227 of them (111 men and 116 women) were classified as non insulin dependent and 97 (51 men and 46 women) as insulin dependent.

Body weight and body height were recorded in 214 diabetics (both insulin dependent and non insulin dependent) as well as in 209 non-diabetics. As indicated in Table 1 part of the male control group was selected on the base of extremes in body weight. This was done in order to have comparable numbers of thin and obese diabetics and non-diabetics.

Table 1. Origin of the data

Department year	Diabetic		Non-diabetic	
	men	women	men	women
1. Leuven 1967	54	85	106	104
2. Leuven 1970	58	65	64	68
3. Brussels 1970	111	100	52	66
4. Louvain 1971	82	—	50	—
5. Leuven 1972	80	185	88 ^a	37
	385	435	360	275

^a This control group consisted of men with a body weight in kg either equal or lower than their body height in cm minus 100 or 15% above this index.

The significance of the observed differences was assessed by means of Student's T test. In the text and tables means ± 1 standard deviation are given.

Results

1. *Fathers of diabetic propositi live longer than mothers of these propositi* (Table 2). Our initial finding (1) that fathers of diabetic propositi live longer than the mothers of these propositi (73.6 ± 10.2 vs 67.9 ± 14.4 ; $n = 139$; $P < 0.001$) was confirmed in a second study done in Leuven in 1970 (73.9 ± 11.6 vs 70.8 ± 13.3 ; $n = 123$; $P < 0.01$). For all 5 groups studied and a total of 820 diabetics this difference amounted to 2.32 years and was highly significant ($P < 0.005$). Similar

figures were found when male and female propositi were considered separately. In non diabetics, as expected, the mothers lived somewhat (0.74 years) longer than the fathers.

The phenomenon of fathers living longer than mothers is due not only to a diminished lifespan of the mothers, but apparently also to an unusual longevity of the fathers of diabetics. Mothers of diabetics have indeed a shorter (1.64 years) lifespan than mothers of non diabetics (68.89 ± 14.18 vs 70.53 ± 13.58 years; $P < 0.05$). On the other hand and as already noted in our first study (1), fathers of diabetics seem to live longer than fathers of non diabetics, the difference

weight equal or higher than 80 kg had a mean lifespan of 67.46 ± 13.99 years. For male diabetics of the same body weight the lifespan of the mothers was similarly low, being respectively 67.35 ± 17.90 ($n = 14$) and 68.84 ± 15.64 ($n = 37$). In this as well as in the next paragraph no distinction was made between insulin dependent and non-insulin dependent diabetics.

4. *The body weight of the diabetic propositi and the lifespan of the fathers.* When only thin propositi were compared the fathers of diabetics did not live longer than the fathers of non-diabetics. Thirty-six diabetic women with a body weight equal or below 59 kg had

Table 2. *Fathers of diabetic propositi live longer than the mothers of these propositi (mean \pm SD)*

Diabetic	Age of propositi (number)	Lifespan Father	Mother	Non-diabetics	Age of propositi (number)	Lifespan Father	Mother
Male propositi (385)	58.86 ± 6.41	71.58 ± 12.09	69.16 ± 14.72^a	Male propositi (360)	58.33 ± 6.90	69.75 ± 13.45^b	70.82 ± 13.20
Female propositi (435)	58.98 ± 6.45	71.15 ± 12.65	68.70 ± 13.68^a	Female propositi (275)	57.25 ± 7.89	69.90 ± 13.27	70.14 ± 14.07
All propositi (820)	58.93 ± 6.42	71.21 ± 12.39	68.89 ± 14.18^a	All propositi (635)	57.84 ± 7.36	69.79 ± 13.77^b	70.53 ± 13.58^b

^a The difference from the fathers is significant at least to the 1% level

^b The difference from the diabetic group is significant at least to the 5% level

Table 3. *Non insulin dependent versus insulin dependent diabetics (mean \pm SD)*

Diabetics	Age of propositi (number)	Lifespan Fathers	Mothers
All non insulin dependent diabetics	58.81 ± 5.71 (227)	71.92 ± 11.07	69.15 ± 13.06^a
All insulin dependent diabetics	58.28 ± 5.53 (97)	70.61 ± 12.95	70.23 ± 13.99
Male non insulin dependent diabetics	58.41 ± 4.74 (111)	71.81 ± 11.54	69.61 ± 13.51
Male insulin dependent diabetics	56.49 ± 4.37 (51)	69.51 ± 11.36	71.10 ± 14.86
Female non insulin dependent diabetics	57.22 ± 6.47 (116)	72.02 ± 10.65	68.70 ± 12.68^a
Female insulin dependent diabetics	60.04 ± 6.32 (46)	71.83 ± 14.55	69.26 ± 13.05

^a The difference from the fathers is significant at least to the 5% level

being significant ($P < 0.05$) in our total group of subjects as well as in the group of male propositi.

2. *Non insulin dependent versus insulin dependent diabetes in the propositi* (Table 3). The longevity of the fathers of diabetics seems to be restricted to the non insulin dependent group. Indeed, fathers of insulin dependent diabetics did not live longer than the mothers of these patients. The group of male propositi could be the cause of this discrepancy.

3. *The body weight of the diabetic propositi and the lifespan of their mothers.* The lifespan of mothers of diabetics is decreased both in the group of thin propositi and in the group of obese ones. Thirty-six diabetic women with a body weight equal or below 59 kg had mothers with a mean lifespan of 68.31 ± 11.12 years, while 50 diabetic women with a body

fathers with a mean lifespan of 73.44 ± 9.58 years, while 34 fathers of non-diabetic propositi of the same body weight had fathers living 73.12 ± 11.33 years. Similarly in men, diabetic propositi with a body weight below 70 kg had fathers with a mean lifespan of 72.04 ± 11.41 ($n = 44$) and non diabetics fathers with a lifespan of 71.48 ± 14.42 ($n = 80$).

Furthermore, taking body height into account and pooling both the diabetic and the non diabetic propositi, it appeared that men with a body weight in kg lower or equal than their body height in cm minus 100 (Broca index) had fathers living longer than propositi with a body height 15 per cent above the Broca index (74.35 ± 12.53 years; $n = 87$ vs 68.88 ± 11.83 years; $n = 62$; $P < 0.005$). In female propositi such a difference was not found.

Discussion

It is odd that among parents of controls the age of death of mothers and fathers does not differ much (69.79 vs 70.53 years, Table 2), whereas in almost all Western countries women outlive men by 4–5 years. As discussed in our previous paper (1) this is due to the fact that the subjects studied here reached adulthood since they produced a child. Belgian statistics show that adult women of age 30–32 in 1928 outlive men by only 2.4 years. This difference becomes even smaller when fertile men and women are compared.

The mechanism underlying the shorter lifespan of mothers of diabetic subjects as compared to mothers of non diabetic subjects remains unsolved. The latter abnormality is not due to some part of the mothers in the group having overt diabetes themselves. Indeed, in our first series of 139 diabetic propositi only 16 mothers had overt diabetes. Moreover, the lifespan of the 123 mothers without overt diabetes was not higher than the lifespan of the whole series (67.6 ± 13.8 vs 67.9 ± 14.4 years) and the 16 diabetic mothers had a mean lifespan of 75.2 years [1]. Thus, some fundamental diabetogenic factor seems to be detrimental in women although it does not necessarily express itself as overt diabetes. Theoretically this detrimental factor could be obesity. But in view of the fact that mothers of thin diabetics also have a shorter lifespan this hypothesis is not satisfactory. One does not, indeed, expect the mothers of the latter group of propositi to be obese.

On the other hand, transmission of diabetes mellitus to children seems not to carry the same penalty for the group of fathers. We even thought it could be beneficial for them [1]. This hypothesis, however, has to be abandoned when thin diabetics are compared with thin non diabetics. The possibility that other groups of diabetics have fathers with an extra longevity has to be further explored. Perhaps more stringent criteria should be used to ascertain obese diabetic and non diabetic subjects.

In *conclusion*, the only difference to be related with certainty to diabetes is the early death of the mothers of diabetics.

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Reference

1. De Moor, P., Meulepas, E.: J. Clin. Endocrinol. and Metab. 27, 429–430 (1967).

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