Risk and prevention of type II diabetes: offspring's views

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SUMMARY

Background: *People with a parent with type II diabetes have an increased risk of the disease. There is increasing evidence for the possibility of prevention, particularly by attaining and maintaining normal weight and adequate levels of physical exercise. No prior studies have reported awareness of risk and prevention in this high-risk group.*

Aim: *To explore beliefs about personal risk of diabetes and prevention in people with a parent with type II diabetes.*

Design of study: *A total of 254 adults with type II diabetes were identified from five randomly selected practices in south London. Self-report questionnaires were sent to 152 eligible offspring of these patients. A total of 105 of the offspring returned the self-report questionnaires and participated in the study.*

Setting: *Five randomly selected practices in south London.*

Methods: *Patients with type II diabetes in five randomly selected practices in south London were asked if we might contact their offspring. One randomly selected offspring (over 18 years of age) from each family completed a self-report questionnaire.*

Results: *Of 254 adults with type II diabetes 152 had eligible offspring. A total of 105 (69%) of the offspring participated in the study. A total of 69 (66%) of these offspring believed their personal risk of developing diabetes was 'low'. At least 28 (28%) and maybe as many as 73 (70%) underestimated the risk of diabetes in offspring. Compared with the number thinking their current risk was low significantly more (95 versus 69) thought that their risk would be low if neither of their parents had diabetes. Fifty-seven (54%) thought prevention was possible. Sixteen thought taking more exercise was important for prevention and only seven thought that weight control was important. Many had good general knowledge about diabetes and its complications but awareness of the relationship between diabetes and cardiovascular disease was poor.*

Conclusions: *People with a parent with type II diabetes are usually aware that they have an increased risk of diabetes. However, they often underestimate that risk and know little about potentially useful preventive strategies. They need accurate information about these matters if they are to reduce their risk of diabetes and its complications.*

Keywords: *type II diabetes; heredity; disease prevention; risk.*

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Introduction

THERE is a global increase in type II diabetes[1] related to increasing obesity[2] and decreasing physical activity.[3] Evidence is mounting that increasing physical activity and avoiding obesity can be an effective strategy for primary prevention.[4] Primary preventive strategies based on high-risk populations have been shown to be cost-effective in modelling studies.[5] One such high-risk group is the children of people with type II diabetes. Offspring of one parent with type II diabetes mellitus have a two to fourfold relative risk of developing the disease[6] equivalent to a 20–40% absolute risk.[7] The risk is even higher if both parents are affected and in some ethnic minority populations.[6]

Engaging these people in preventive activity requires their awareness of their risk and the possibilities for prevention. Prior to this study we did not know whether offspring of people with type II diabetes were aware of their risk of developing the disease, or of the preventive strategies (maintaining adequate levels of physical exercise and avoiding obesity) most likely to be effective.

The aims of the current study were to:

- explore the beliefs held by a group of adults (with one parent with type II diabetes) about their own risk of developing type II diabetes and the possibilities for prevention,
- define factors associated with increased perception of personal risk, and to
- inform the targeting of diabetes health education.

Methods

The sample

Forty practices (25% of the total) in Camberwell, south London, were part of a shared care scheme and therefore known to have diabetes registers. Five randomly selected practices all participated. All patients with type II diabetes were identified and permission requested to contact their adult offspring. Patients with concurrent severe illness or psychological or social problems were excluded on their general practitioners' (GPs') recommendations.

Offspring were eligible for the study if they were over 18; did not have diabetes; had only one parent with diabetes; and were living within 25 miles of London Bridge (to facilitate interviewing). One eligible offspring was randomly selected from each family and contacted by telephone.

As part of semi-structured interviews conducted by a research nurse in 1994 the offspring were asked to complete a questionnaire based on one developed for, and validated in, a study of beliefs held by parents with type II diabetes.[7]

The offspring questionnaire was piloted with 20 offspring from a practice in south-east London independent of the main study.

The questionnaire

Topics included: personal risk of diabetes; risk of diabetes in families in general; frequency of worrying about developing diabetes; prevention of diabetes; knowledge of risk factors for diabetes; and early detection of type II diabetes (Figure 1).

Four questions taken from the Charing Cross questionnaire[8] assessed knowledge of diabetes complications, the role of glycaemic control in reducing complications, the effect of smoking in diabetes, and the relationship between atherosclerosis and diabetes.

Approval was obtained from the Guy's Hospital Trust and the Camberwell Local Research Ethical Committees.

Statistical methods

A Wilcoxon matched pairs test was used to compare differences in estimates of the number of children at risk of developing type II diabetes if none, one or both of their parents had type II diabetes. For categorical data, McNemar's tests were used.

Chi-squared tests were used to detect any significant association between personal risk estimate and frequency of worry about developing diabetes, whether responders' parents had talked to them about diabetes risk, beliefs about prevention, and knowledge about diabetes.

Results

The responders

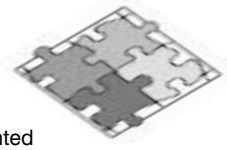
Of 254 adults with type II diabetes, 152 had eligible offspring. Of 152 offspring approached 105 (69%) participated. The age and sex of participants did not differ significantly from non-participants.

Sixty women and 45 men with a median age of 38 years (interquartile range = 32–47) participated. Eighty-three (79%) were northern European white, eight (8%) Afro-Caribbean, and 14 (13%) were from other racial groups. Comparative figures for Greater London are 79%, 7%, and 16%.[9] Three (3%)

Topic	Question posed	Response options
Personal risk of diabetes	'How likely do you think it is that you will get diabetes?' 'If neither of your parents had diabetes, how likely do you think it would be that you would get diabetes?'	'Very likely' 'Quite likely' 'Not very likely' 'Not at all likely'
Risk in families in general	'In a family of 10 children how many children do you think would develop diabetes in the following situations – if neither parent had type II diabetes; if one parent had it; if both parents had it?'	A number 0 –10
Frequency of worrying about developing diabetes	'Do you worry that you might get diabetes?'	'No' 'Rarely' 'Sometimes' 'Often'
Prevention of diabetes	'Do you think that there is anything that a person can do to reduce their possible risk of getting diabetes?'	'Yes' 'No' 'I do not know'
Knowledge of risk factors for diabetes	'Which of the following things make a person more likely to develop type II diabetes?'	'Having a parent with type II diabetes' 'Having a brother or sister with type II diabetes' 'Being married to someone who has it' 'Age over 40' 'Getting older' 'Being overweight' 'Taking little exercise'
Early detection of type II diabetes	'Could you have type II diabetes without knowing it?' 'Would it matter if you had diabetes and didn't know ?'	'No, not at all' 'Yes for up to a month' 'Yes, for 6 months – 1 year' 'Yes, for more than I year' 'I do not know' 'Yes' 'No' 'I do not know'

Figure 1. The questionnaire.

HOW THIS FITS IN



What do we know?
Offspring of people with type II diabetes are at increased risk of the disease. Type II diabetes may be prevented by attaining and maintaining normal weight and adequate levels of physical activity.

What does this paper add?
Offspring of people with type II diabetes underestimate their risk of developing diabetes and know little about potentially successful preventive strategies. They need information about these matters if they are to reduce their risk of diabetes and its complications.

were from social class I; 28 (27%) were from social class II; 33 (31%) from III non-manual, and 19 (18%) from III manual; 13 (12 %) were from IV and V; 9 (9%) were 'other' (Registrar General's Occupational Social Class, 1990). Comparative figures for economically active people in England were 5% social class I, 27% social class II, 22% III non manual, 20% social class III manual, 21% IV and V, and 4% 'other'.[10]

Responders' risk perceptions

Personal risk. Sixty-six per cent of participants thought that it was not very likely or not at all likely that they would develop diabetes (Table 1). In the hypothetical case where neither parent had diabetes, 91% thought it not very likely or not at all likely that they would develop diabetes. These responses were significantly different (McNemar's $P<0.001$, difference = 25%, 95% confidence interval, 15%–35%). Responders thought that having one parent with diabetes made them more likely to develop diabetes than if neither of their parents had diabetes. Compared with their current situation where one of their parents has diabetes, 49 (47%) thought it would be less likely that they would develop diabetes if neither parent had diabetes; 52 (50%) thought it would be as likely; and three (3%) thought it would be more likely.

Risk in other families. Moving away from personal risk, we asked responders to estimate the numerical risk of type II diabetes in the offspring of other families. In one of these hypothetical families neither parent had type II diabetes and in the other family one parent had it. Responders were aware that having one affected parent, rather than no parental history, increased the offspring risk (Table 2).

Table 3 shows the number and percentage of responders whose estimate of offspring risk was concordant with the literature[6] and those who overestimated and underestimated risk in each of these two hypothetical families. As it would be unreasonable to expect offspring to be able to give precise numerical risk figures and because the epidemiological studies give a range of lifetime risk from 20–40% we have reported the data for the family with one diabetic parent in two ways: in the first instance assuming that the lower risk estimate was the gold standard and in the second that the higher risk figure applied. From Table 3 it can be seen that between 27% and 70% of the group underestimated the numerical risk of diabetes in offspring whose familial risk was analogous to their own.

Beliefs about prevention

Fifty-seven people (54%) thought it was possible for a person to do something to 'reduce their possible risk of getting diabetes', 12 (11%) thought it not possible, and 36 (34%) did not know. Sixteen (28% of 57) responders suggested 'increasing exercise' and seven (12%) 'watching your weight' as useful preventive strategies.

Knowledge of risk factors

Fifty-one responders (49%) recognised a positive parental history as a risk factor for diabetes but fewer recognised being overweight (40 [38%]), getting older (35 [33%]), age over 40 years (29 [28%]), taking little exercise (22 or 21%), or a sibling history of diabetes (8 [8%]) as additional risks.

Table 1. Responders' estimation of their own risk of developing diabetes.

Estimated likelihood of developing diabetes	For themselves *n* (%)	If neither of their parents had diabetes *n* (%)
Very likely	2 (2)	1 (1)
Quite likely	33 (31)	8 (8)
Not very likely	66 (63)	66 (63)
Not at all likely	3 (3)	30 (28)
Did not reply to the question	1 (1)	
Total	105 (100)	105 (100)

Table 2. Offspring risk in families in general.

	Median (IQR) estimate of number of affected children	Median differences	Wilcoxon test on difference *P*	*n*
A. 'Suppose a couple, neither of whom has diabetes, had 10 children. How many of their children would develop diabetes during their life?'	1 (0–1)	B–A 1.5 (1.5–2)	< 0.001	101
B. 'Suppose a couple, one of whom has type II diabetes, had 10 children. How many of their children would develop diabetes during their life?'	2 (1–4)			

Table 3. Numbers (%) of responders whose estimate of offspring risk was concordant with the literature and numbers (%) who overestimated and underestimated offspring risk of developing diabetes.

	Where neither parent has type II diabetes (assuming the best estimate from the literature is 1)	Where one parent has type II diabetes	
		(assuming the best estimate from the literature is 2)	(assuming the best estimate from the literature is 4)
Risk concordant with the literature[a]	50 (48)	27 (25)	10 (9)
Overestimating risk	18 (17)	47 (45)	19 (18)
Underestimating risk	33 (31)	28 (27)	73 (70)
Not replying to the question	4 (4)	3 (3)	3 (3)
Total	105 (100)	105 (100)	105 (100)

[a] Most of the literature gives relative risk rather than absolute risk. Offspring with one parent with NIDDM have a two to fourfold greater risk of NIDDM,[6] compared with people without parental NIDDM. Assuming that the lifetime risk of NIDDM in the UK is of the order of 1 in 10, then one would expect that between 2 and 4 of the children in a family of 10 with one affected parent would develop NIDDM over a lifetime of 75 years.[7]

Table 4. Knowledge of complications and importance of control of diabetes: number (%) answering 'yes'.

	Eyes	Feet	Heart	Kidneys	Lungs
People with diabetes are more likely to have problems with:	80 (76)	72 (69)	44 (42)	[a]–	6 (6)
Keeping diabetes well controlled can lower the risk of damage to:	79 (75)	66 (63)	[a]–	44 (42)	7 (7)

[a]Question not asked.

Table 5. Significant relationships between estimating personal risk as 'high' or 'low' and other variables.

Belief held by responder	Number (%) out of 104		*P*-value from chi-squared test
	Personal risk estimate 'high'	Personal risk estimate 'low'	
Worried about developing diabetes	18 (17)	12 (12)	< 0.001
Not worried about developing diabetes	17 (16)	57 (55)	
Parents had discussed diabetes risk with them	15 (15)	16 (15)	0.04
Parents had not discussed diabetes risk	20 (19)	53 (50)	
Knew about the relationship between atherosclerosis and diabetes	16 (16)	18 (17)	0.04
Did not know about atherosclerosis and diabetes	19 (18)	51 (49)	

Early detection of type II diabetes

Responders believed early detection of diabetes was important. Eighty-eight (84%) agreed that 'it would matter if you had diabetes and didn't know', 13 people (12%) did not know whether it would matter or not, and 13 (12%) thought it would not matter if you had diabetes and didn't know. However, they showed little awareness of the possible time lag between the onset of the disease and diagnosis. Only 28 (27%) correctly stated that it would be possible to have the disease for more than a year without knowing it.

Knowledge about diabetes and the importance of good control (Table 4)

Heart disease was the least well recognised complication. Forty-eight (46%) responders were unable to answer a question about the relationship between atherosclerosis and diabetes. Only 35 (33%) were aware that 'hardening and narrowing of the arteries' 'can come earlier in people with diabetes' and 20 (19%) thought that this risk was not increased in people with diabetes.

Talking with their parents about diabetes risk

Thirty-one responders (30%) said that their parents had talked to them directly about the possibility of getting diabetes and 74 (70%) said that they had not.

Worry about developing diabetes

The majority of responders (83 [79%]) classed diabetes as 'quite serious', 'serious' or 'very serious', with only 18% believing that it was a 'mild' or 'not serious' disease. However, most were not worried about developing diabetes. When asked 'do you worry that you might get diabetes?' 50 (48%) replied 'no', 25 (24%) 'rarely' worried, 26 (25%) 'sometimes' worried, and only 4 (4%) 'often' worried.

Factors associated with higher estimate of personal diabetes risk

For these analyses responders were divided into those who thought that their risk was 'high' (i.e. thought that they were 'quite likely' or 'very likely' to develop diabetes) and those who thought that their risk was 'low' ('not likely' or 'not at all likely' to develop diabetes). Thirty-five (33%) thought their risk was 'high' and 69 (67%) thought their risk was 'low'.

Three variables were found to be significantly related to responders' personal risk perceptions (Table 5): parents having talked to the offspring about diabetes risk; knowl-

edge of the relationship between atherosclerosis and diabetes; and frequency of worrying about developing diabetes. Variables not found to be significantly associated were: regarding diabetes as serious; knowledge about the complications of diabetes and their prevention; knowledge about smoking and diabetes; and knowledge of the risk factors for diabetes.

Discussion

This study was specific to a particular group of people in a particular geographical, social, and historical context. The offspring were approaching middle age. Their ethnic origins were similar to that of the population of inner London.[9] Social classes IV and V were under-represented in the study group compared with national data.[10] The study was too small to compare beliefs of responders from minority ethnic groups with those of northern European white responders. Care must be taken if extrapolating these results to different situations. With time, peoples' beliefs change and people from different ethnic and social backgrounds may well hold different views.[11,12]

Unless people regard a condition as serious, feel vulnerable to it,[13] and feel that there is something that they can do to avoid it,[14] they are unlikely to take preventive action. Despite recognising that their positive parental history increased their diabetes risk the majority of responders did not feel personally vulnerable to diabetes. Moreover, they also underestimated the numerical risk of diabetes in people with a family history analogous to their own.

In addition we found that substantial numbers of responders had little knowledge of the risk factors for diabetes, the possibilities for prevention, and preventive strategies most likely to be successful. They were unaware of the relationship between diabetes and cardiovascular disease (important, as cardiovascular disease is the commonest complication of diabetes; 59% of people with diabetes die of macrovascular disease;[15] diabetes doubles, and even impaired glucose tolerance[16] increases cardiovascular risk). Furthermore, offspring were unaware of the time lag between the onset of diabetes and diagnosis — estimated to be a decade, on average.[17]

In the absence of this knowledge it is unlikely that offspring will be able to take timely actions to reduce their risk of developing diabetes and its complications. These actions might include keeping their weight down, being physically active, not smoking, maintaining normal blood pressure and lipid profiles, and seeking early diagnosis.

Education about the magnitude of familial risk might increase offsprings' risk perception. However, our results suggest that increasing offsprings' personal risk perception might increase their levels of worry. The relationship between estimating personal risk as high and frequency of worrying about developing diabetes has been previously described.[7] While it is necessary that offspring are concerned about diabetes to the extent that they are motivated to take preventive action, if worry is increased beyond this level it may become counterproductive, resulting in denial or pathological anxiety or depression. The possible psychological effects of raising offsprings' personal risk perceptions are the focus of a separate report.[18]

Surprisingly, although parental influence did affect offsprings' personal risk estimates, factual knowledge of many aspects of diabetes did not. This suggests that simple provision of information may not be enough. More attention needs to be paid to precisely what information is being delivered and to the communication channels used.

Implications

General practitioners are familiar with the concept that type II diabetes 'runs in families'. Indeed, it is a standard part of a 'new patient interview' to ask about a family history of diabetes. Typically this is documented but insufficient use is made of the information. Given what is currently known about the latency of diabetes, risk factors, and prevention, now is the time for primary care to be more proactive in educating offspring about risks and prevention.

Unless offspring are well-informed, opportunities for both primary and secondary prevention will be lost. They will not understand the importance of modifying their lifestyles for avoiding diabetes (primary prevention) nor will they understand the risk of cardiovascular complications. Moreover, in the absence of systematic screening programmes, it is unlikely that the gap between developing the disease and its detection will be any less than it was in the past. Currently, half of the people with type II diabetes are found to have complications at diagnosis.[19] This delay presents a missed opportunity for secondary prevention.

Any educational initiative of this nature is most appropriately based in general practice as it is the primary care team that has regular contact with these people and is likely to know their families.

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