

Risk perception of type 2 diabetes

Quantitative studies

Author and year	Study aim(s) as relevant to the current review	Country	Participants (number and characteristics)	Design	Measure of perceived risk	Perceived risk results
Forsyth & Goetsch (1997)	To determine whether family history of type 2 diabetes is associated with perceived risk and whether perceived risk of type 2 diabetes is associated with health protective behaviours	USA	DEMOGRAPHICS N=30 people with at least one parents with type 2 diabetes Age: M=32.6 Gender: 18 men, 12 women	Case control, questionnaire	Perceived risk: two items: <i>how likely participants thought they were to develop diabetes in the next 10 years</i> and <i>how likely the subjects believed the average person would be to develop diabetes in the next 10 years</i> (7-point scale: no chance to certain to happen) Health protective behaviours:	People with family history of type 2 diabetes perceived themselves to be significantly more at risk for diabetes than the control group or people with family history of hypertension (both $p < 0.001$). People with family history of type 2 diabetes scored higher on the HPBI scale in comparison to

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					<p>Amended versions of the Health Promotion and Disease Prevention supplement of the National Health Interview Survey (NHIS) assessing physician check-ups, weight reduction, diet, exercise</p> <p>Amended version of the Health Protective Behavior Inventory (HPBI) to rate frequency of participant in health protective behaviours (5-point scale)</p> <p>Family history of diabetes: questionnaire or by recruiting children of people with type 2 diabetes</p>	<p>the control group (no family history of diabetes) ($p < 0.002$) and to the group with family history of hypertension ($p < 0.002$). Diet and exercise did not differ significantly between the groups, possibly because people did not know about the protective effects of these behaviours. Even though groups with family history of disease reported engaging in more health protective behaviours than people without such a family history, people who perceived themselves at greater risk did not necessarily</p>
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						engage in more health protective behaviours.
Farmer, Levy & Turner (1999)	To investigate the extent to which siblings of diabetic subjects perceived themselves likely to develop type 2 diabetes	UK	<p>N=454</p> <p>DEMOGRAPHICS</p> <p>Age: 147-35-54 years; 307-55-74 years</p> <p>Gender: 212 male, 242 female</p> <p>Social group: 170 professional or skilled non-manual; 239 skilled manual or unskilled</p> <p>BMI: 279<29.9; 149≥30</p> <p>Parent with diabetes: 245 no, 209 yes</p>	Cross-sectional, questionnaire	<p>One question: <i>“How likely do you think it is that you will get late-onset diabetes?”</i> (4-point scale: very likely, quite likely, not very likely, not at all likely)</p> <p>Family history of diabetes: Participants were recruited through diabetic patients</p>	<p>37.9% of the siblings of diabetic patients saw themselves as likely to develop type 2 diabetes. Having a parent with diabetes was most strongly associated with perceptions of increased risk (p<.000001). Other factors associated with perceived risk included being female (p=0.003), aged 35-54 years (p=0.003). Perception of diabetes as a serious illness was not significantly associated (p=0.02). BMI and fasting glucose</p>

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						plasma levels did not affect perceived risk.
Harwell, Dettori, Flook, Priest, Williamson, Helgerson & Gohdes (2001)	To investigate the perceptions about risk of type 2 diabetes in a population-based sample of adults ≥ 45 years of age	USA	N=576 217 with family history of diabetes	Cross-sectional, questionnaire	One question: <i>“Do you think you are at risk of diabetes?”</i> Family history of diabetes: self-reported	42% of people with family history of diabetes considered themselves at risk for diabetes. The probability of considering oneself at risk of diabetes was higher among people with family history of diabetes, people under the age of 65, females, obese people and those with high blood pressure. Although family history of diabetes was most strongly associated with an increase in perceived risk, those with a positive family history were less

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						likely to believe diabetes was preventable.
Pierce, Harding, Ridout, Keen & Bradley (2001)	To explore the beliefs of people with one adult with type 2 diabetes about their own risk of developing type 2 diabetes and to define the factors associated with increased risk perception	UK	N=105 DEMOGRAPHICS Gender: 60 women, 45 men Age: median=38; range: 32-47 Race: 79% northern European white; 8% Afro-Caribbean; 13% other Social class: 3% class I; 27% class II; 31% class III non-manual; 18% class III manual; 12% classes IV and V; 9% other class	Cross-sectional, questionnaire	Two questions: "How likely do you think it that you will get diabetes?" and "If neither of your parents had diabetes, how likely do you think it would be that you would get diabetes?" (4-point scale: very likely-not at all likely)	<i>Risk perception:</i> 66% of participants thought that it was not very likely or not at all likely that they would develop diabetes. Compared with their current situation (one parent with type 2 diabetes), 47% thought it would be less likely that they would develop diabetes if neither parent had diabetes; 50% thought it would be as likely and 3% thought it would be more likely. <i>Factors associated with risk perception:</i> Three factors were significantly

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						<p>related to perceived risk of type 2 diabetes: parents having talked to offspring about diabetes risk ($p=0.04$); knowledge of the relationship between atherosclerosis and diabetes ($p=0.04$); frequency of worrying about developing diabetes ($p<0.001$). Variables not found to be significant were: regarding diabetes as serious; knowledge about complications; knowledge about smoking and type 2 diabetes; knowledge of risk factors.</p>
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<p>Kim, Choi, Kim, Oh & Shinn (2002)</p>	<p>To investigate the level of risk perceived by the offspring of type 2 diabetes patients for developing diabetes</p>	<p>South Korea</p>	<p>N=101 Korean soldiers DEMOGRAPHICS Age: median=22, range: 18-28 BMI: mean=22.1 WHR: mean=0.82 FPG level: 4.33 Education: 31.7% attending or graduated from college or university Family history of type 2 diabetes: 55.4% father with type 2 diabetes; 41.6% mother with type 2 diabetes; 3% both parents with type 2 diabetes</p>	<p>Cross-sectional, questionnaire</p>	<p>One question: <i>“Do you think that you may develop diabetes because your parents have diabetes?”</i></p>	<p>10.9% thought they might develop diabetes in the future. Higher education level among diabetic parents was associated with perception of increased diabetic risk (p<0.05).</p>
<p>Adriaanse, Snoek, Dekker, Spijkerman, Nijpels, van der Ploeg & Heine (2003)</p>	<p>To determine the risk perception of type 2 diabetes in the general population</p>	<p>The Netherlands</p>	<p>Total sample: N=7736 Sample participants with a parent or sibling with diabetes: 21.7% (1679) Demographic information about participants with a family history of diabetes is not reported</p>	<p>Cross-sectional, questionnaire</p>	<p>One question: <i>“At this moment, how would you estimate your risk of having diabetes, expressed in percentage?”</i> (10-point scale – 0-100%) Family history of diabetes: self-report</p>	<p>40% of the participants with a parent or sibling with diabetes perceived themselves at risk of diabetes, compared to 20% of participants without family history of diabetes. Higher age (>65), obesity and taking anti-hypertensive drugs was not associated with</p>

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						higher perceived risk.
Nishigaki, Kobayashi, Hitomi, Yokomura, Yokoyama, Seki & Kazuma (2007)	To clarify perceptions of Japanese type 2 diabetes patients regarding risk of diabetes in their offspring as well as perceptions of adult offspring of their own risk for diabetes	Japan	N=164 pairs DEMOGRAPHICS Age: Patients: M=64; Offspring: M=33.4 Gender: Patients: 54.3% male; Offspring: 40.2% male BMI: Patients: M=24; Offspring: M=22.9 Education: Patients: M=12.6 years; Offspring: M=14.3 Living together: 58.6% of the pairs	Cross-sectional, questionnaire	One question: <i>“The likelihood of your offspring/you developing diabetes in comparison to the general Japanese population”</i> (5-point scale: very likely-very unlikely)	74% of the offspring recognised they were at higher risk for diabetes compared to the general population from the perspective of family history, representing significantly higher risk perception in comparison to a lifestyle perspective (p<0.001) and an overall view perspective (p<0.01) Half of the patients believed their offspring is at an increased risk of developing type 2 diabetes due to family history of the condition.
Qureshi & Kai	To determine	US	N=3 323	Cross-sectional,	Several questions:	59% of

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<p>(2008)</p>	<p>whether being informed by a doctor of increased type 2 diabetes risk because of family history is associated with risk awareness and improvement in risk-reducing behaviours</p>		<p>DEMOGRAPHICS Age: 651: 18-34 years; 1781: 35-54 years; 891: 55+ years Gender: 1433 male, 1890 female Education: 955 up to high school; 2215 college and above Income: 859 < \$25k; 1161: \$25-\$59k; 1303: \$60k+ Marital status: 2894 ever married; 390 never married</p>	<p>questionnaire</p>	<p><i>-Has your doctor ever told you that you have a greater chance of getting diabetes because it runs in your family ?</i> <i>-Has your mother ever been diagnosed as having type 2 diabetes ?</i> <i>-Has your father ever been diagnosed as having type 2 diabetes ?</i> <i>-How many of your brothers and sisters have been diagnosed with type 2 diabetes?</i> <i>-How many of your mother's relatives (her sisters, brothers, and parents) were diagnosed with type 2 diabetes ?</i> <i>-How many of your father's relatives (his sisters, brothers</i></p>	<p>respondents with any family history of diabetes had not been informed of their risk of developing type 2 diabetes. Up to 50% of the informed group reported lifestyle changes to prevent type 2 diabetes, compared to 19% of the uninformed group. The informed group was more likely than the uninformed group to recognise their personal risk of type 2 diabetes (56% vs. 14%). 44% of the informed group still considered themselves not to be at risk. 69% of all informed participants,</p>
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					<i>and parents) were diagnosed with type 2 diabetes ?</i>	compared with 32% of uninformed participants discussed diabetes with their family.
Gallivan, Brown, Greenberg & Clark (2009)	To describe predictors of perceived risk for the development of type 2 diabetes	USA	N=1389 DEMOGRAPHICS Demographic information is presented for the whole sample, not separately for people with family history of diabetes	Cross-sectional, telephone survey	Two questions: <i>“Do you feel you could be at risk for diabetes?”</i> and <i>“Why do you feel you are at risk for diabetes?”</i> Family history of diabetes: self-report	Half of the participants who felt at risk for diabetes has an immediate family member with diabetes, compared with 14% of the other group (who do not perceive themselves at risk). Having a family history of diabetes was a significant predictor of perceived risk (p<0.01). Other predictors included younger age (<65) (p<0.01), being of a race or ethnicity other than White,

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						African-American, or Hispanic/Latino, (p<0.05), being obese (p<0.01) and having a diagnosis of pre-diabetes (p<0.01).
Dorman, Valdez, Liu, Wang, Rubenstein, O'Neill, Acheson, Ruffin & Khoury (2012)	To evaluate perceived risk about type 2 diabetes among individuals at increased familial risk of diabetes	USA	<p>Total sample: N=2081</p> <p>Sample participants with family history of diabetes alone: N=267</p> <p>Age: M=48.10</p> <p>Gender: 68.2% female</p> <p>Race: 83.9% White, 7.9% Black, 3.7% Hispanic, 4.5% Other</p> <p>Education: 93.6% >12 years</p> <p>BMI: 39%<25; 29.6% 25 to 30; 31.5%>30</p> <p>Smoking: 7.5% current, 24.3% former, 68.2% never</p> <p>Sample participants with family history of diabetes and CHD or stroke: N=978</p> <p>Age: M=51.86</p> <p>Gender: 72.4% female</p> <p>Race: 87.7% White, 3.9% Black, 3.1% Hispanic, 5.3%</p>	Cross-sectional, questionnaire	One question: <i>"Compared to most people your age and sex, what would you say your chances are for developing diabetes?"</i> (1=much lower than average to 5=much higher than average)	<p>Family history of diabetes: self-report</p> <p>The scores for perceived risk for diabetes became significantly higher as the number of conditions in the family history increased</p> <ul style="list-style-type: none"> -Perceived risk without family history of diabetes=2.58 -Perceived risk with family history of diabetes alone=3.22 -Perceived risk with family history of diabetes and coronary heart disease or stroke=3.26

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			<p>Other</p> <p>Education: 89.7% >12 years</p> <p>BMI: 35.4% <25; 33.1% 25 to 30; 31.5% >30</p> <p>Smoking: 6.9% current, 30.1% former, 63.1% never</p>			-p<0.0001
Reyes-Velázquez & Sealey-Potts (2015)	To examine the relationship between unrealistic optimism, sex and risk perception of type 2 diabetes in college students	USA	<p>N=652</p> <p>21.5% reported having a blood relative with diabetes in their nuclear family.</p> <p>57.9% reported having a blood relative with diabetes in their extended family.</p> <p>Demographic characteristics of the participants with family history of diabetes are not presented</p>	Cross-sectional, questionnaire	<p><i>“Based on your family background, do you think you are at risk of developing type 2 diabetes in your lifetime?”</i> (3-point scale: I am at great risk of developing type 2 diabetes; I am at some risk of developing type 2 diabetes; I am at no risk of developing type 2 diabetes)</p>	Participants who reported having a blood relative with diabetes in their nuclear family had a moderately high risk perception (M=6.58, p=0.000)

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Qualitative studies

Author and year	Study aim(s) as relevant to the current review	Country	Participants (number and characteristics)	Design	Perceived risk results
Cullen & Buzek (2009)	To assess type 2 perceptions and risk factor awareness among African American and Hispanic families with a history of diabetes.	USA	<p>Relatives of people with type 2 diabetes Adolescents and parents with a family history of diabetes: N=39 parents and 21 adolescents</p> <p>DEMOGRAPHICS Age: not specified adolescents: (ninth and tenth graders) Gender: adolescents: 71% female; parents: 95% female Ethnicity: adolescents: 43% African American, 57% Hispanic; parents: 49% African American; 51% Hispanic BMI: 33% of the adolescents and 79% of the parents had BMI>25</p>	Descriptive, interviews, open-ended questions	<i>Diabetes risk perception: 78% of parents reported their risk correctly. 8 parents did not believe they are at risk. 59% felt their children were at risk.</i>
Pijl, Henneman, Claassen, Detmar, Nijpels & Timmermans (2009)	To explore the perceptions of risk with regard to diabetes and the role of family history among people at an increased risk for	The Netherlands	<p>Relatives of people with type 2 diabetes N=9 people with family history of diabetes</p> <p>DEMOGRAPHICS Affected relatives: 1 to 4</p>	Exploratory, qualitative, semi-structured interviews	<i>Perceived risk 4 (9) participants perceived a slightly higher risk when comparing themselves to</i>

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	type 2 diabetes		among first- and second-degree relatives Age: mean=67, range 62-72 Gender: 6 female, 3 male Education: approx. a quarter were highly educated		people of the same age. Some people with family history of diabetes did not perceive themselves to be at risk. Despite risk awareness, a lot of people did not worry about getting diabetes.
Gordon, Walker & Carrick-Sen (2013)	To understand the knowledge and perceptions of type 2 diabetes	UK	Relatives of people with type 2 diabetes N=6 offspring of patients with type 2 diabetes DEMOGRAPHICS Age: 21-38 Gender: 4 male, 2 female Weight status: 2 obese, 2 overweight, 2 healthy weight Education: mixture Work background: most were from working or lower middle class Ethnicity: White	Exploratory qualitative study, semi-structured one-to-one interviews, thematic framework analysis Family history of diabetes: recruited people with type 2 diabetes and asked them to pass information on to relatives	<i>Risk:</i> Three participants believed their risk is the same as the general population and three believed it was higher. There was no correlation between perceived risk and weight status. <i>Loading the dice:</i> those who believed to be at increased risk examined different lifestyle and family risk factors. Those who believed to be at the same risk as the

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					general population offset negative lifestyle factors with positive behaviours. Of those who rated themselves at increased risk, where the onset of type 2 diabetes was deemed inevitable, the time to onset was postponed to an age similar to that of their parents' diagnosis
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