Impact of communicating familial risk of diabetes on illness perceptions and self-reported behavioural outcomes: A randomized controlled trial

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Objective: To assess the potential effectiveness of communicating familial risk of diabetes on illness perceptions and self-reported behavioural outcomes.

Research design and methods: Individuals with a family history of diabetes were randomized to receive risk information based on familial and general risk factors (n=59) or general risk factors alone (n=59). Outcomes were assessed using questionnaires at baseline, 1-week, and 3-months.

Results: Compared to those receiving general risk information, those receiving familial risk information perceived heredity to be a more important cause of diabetes (p<0.01) at 1-week follow-up, and perceived greater control over preventing diabetes (p<0.05) and reported having eaten more healthily (p=0.01) after three months. Behavioural intentions did not differ between the groups.

Conclusions: Communicating familial risk increased personal control and thus did not result in fatalism. Although the intervention did not influence intentions to change behaviour, there was some evidence to suggest it increases healthy behaviour.

Trial registered as: ISRCTN20442834.
Prevention of type 2 diabetes is especially important for people with a positive family history of diabetes, since this is one of the strongest risk factors (1). Individuals with a positive family history have difficulty understanding the causes of diabetes (2), underestimate their risk (3), and are less likely than those without a family history to believe that diabetes is preventable (4). Family history information might be used to raise awareness of individual risk and thereby positively influence preventive behaviours to reduce the risk (5). However, the belief that diabetes is determined mainly by genetic predisposition may prevent individuals from engaging in risk-reducing behaviour as a result of fatalism (2, 6, 7). The aim of this study was to assess the potential effectiveness of communicating familial risk of diabetes on illness perceptions and self-reported behavioural outcomes.

RESEARCH DESIGN AND METHODS

In 2007, a randomized trial was conducted among individuals at risk for diabetes who had participated in a diabetes screening program five years earlier (8). People (aged ≤ 75 years) with self-reported family history (≥ 1 first-degree relative) and highest diabetes risk scores on a symptom risk questionnaire (8) were invited (n=233). Exclusion criteria were: being diagnosed with diabetes and not understanding Dutch. The VU University Medical Center Ethical Committee approved the protocol.

Participants were randomized by computerized and concealed block randomization and received risk information based on familial risk and general risk factors, or based on general risk factors alone during a personal consultation with a researcher (MP) at a Diabetes Research Centre. Five-year diabetes risk was estimated using a validated Diabetes Risk Test (9) and communicated to each participant using a graphical bar chart. In the intervention group alone, a family tree was constructed, familial risk was discussed, and the multifactorial character of diabetes was explained, indicating the nature of the risk in the bar chart. All participants received information on diabetes, including preventive measures.

Sample size calculation was performed on intention to change behaviour (diet, physical activity, diabetes testing). With a mean difference of 2.00 in the intervention group compared to 1.00 in the control group, for 80% power (SD 1.6, P<0.05), 41 individuals per group were needed. Outcome measures were assessed at baseline, 1-week- and 3-month follow-up, including behavioural intentions, self-reported behaviours, illness perceptions (causal beliefs, perceived consequences of diabetes, personal control over preventing diabetes), perceived susceptibility to diabetes, diabetes risk worry, and psychological well-being (for detailed description see table 1). The effect of the intervention on outcome measures was investigated using analysis of covariance (ANCOVA) for follow-up measurements with baseline measures as covariates.

RESULTS

Of 233 participants invited, 187 (80%) responded to the invitation, and 118 (51%) agreed to participate and were randomized: n=59 in each group (see Figure A1 available in the online appendix at http://care.diabetesjournals.org). Ten individuals did not receive the consultation and were excluded. Participants were Dutch Caucasian. Mean age at baseline was 67.1 years (SD 5.3); 43% were men; 5% completed higher vocational training or university; mean body mass index (kg/m²) was 28.3 (SD 4.3); 52% and 31% reported having high blood pressure and high cholesterol, respectively. The median number of first-degree relatives was one (range 1-7). At baseline there were no
significant differences between the groups for participant characteristics.

For all variables used in our analyses, 10% and 18% of the data were missing at 1-week- and 3-month follow-up, respectively. There were no differences at baseline in outcome variables between participants with missing data at follow-up and those for whom complete data were obtained.

The intervention had no effect on behavioural intentions (table1). People who had received the intervention reported having eaten more healthily than those in the control group in the previous three months (p=0.01). Being more physically active showed a marginal significant difference (p=0.08). There was a significant increase in perceiving heredity as a cause of diabetes in the intervention group at 1-week (p<0.01) compared to the control group. Perceived consequences of diabetes increased in the control group and slightly decreased in the intervention group at 1-week (p=0.02). The intervention group perceived greater personal control over preventing diabetes than the control group at 3-month follow-up (p=0.03), an effect that was of borderline significance after one week (p=0.06). Communicating familial risk information did not affect perceived susceptibility, worry, or psychological well-being.

CONCLUSIONS

Our study shows that an intervention in which familial risk of diabetes is communicated did not result in fatalism, and actually led to increased perceived control over preventing diabetes. While at one week both groups had increased their intentions to change their health behaviour, participants receiving familial risk information reported having eaten more healthily three months after the consultation. A possible explanation might be that familial risk information, being more novel and more personally relevant, was better retained. In line with a recent cross-sectional study (10), our study suggests that informing people of their risk of diabetes attributable to their family history could increase their engagement in risk-reducing behaviours. In addition, our results and others (11) show that discussing familial diabetes risk does not adversely affect psychological well-being.

Although an earlier theory-based behavioural intervention aimed at increasing physical activity of people at familial risk of diabetes was no more effective than information given in an advice leaflet (12), it is promising that some positive results of communicating familial risk in our minimal design were found. Both groups received a personal consultation differing only in the type of risk information (familial versus general risk information) that was given. This study, though small, is one of the first to examine this issue. Since measures of behaviour and personal control were based on single items and the measures of behaviour were self-reported, the effects of the intervention must be considered tentative. Additionally, participants were recruited from a previous diabetes screening study, thereby limiting generalization.

More robust trials are needed to confirm these findings, using objective measures of health-related behaviour in larger samples. Additionally, more research is needed in the area of risk communication and fatalistic attitudes, particularly with the introduction of more genetic information available in addition to family history.

ACKNOWLEDGEMENTS

This study was supported by the Centre for Medical Systems Biology (CMSB) in the framework of the Netherlands Genomics Initiative (NGI).
REFERENCES
Table 1. Outcomes of the ANCOVA analyses at baseline, 1-week- and 3-month follow-up*

<table>
<thead>
<tr>
<th></th>
<th>Intervention group</th>
<th>Control group</th>
<th>p-value baseline and 1-week</th>
<th>p-value baseline and 3-month</th>
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<tr>
<td></td>
<td>baseline mean (sd)</td>
<td>N = 54</td>
<td>1-week mean (sd) N = 53</td>
<td>3-month mean (sd) N = 46</td>
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<td>Behavioural intentions (scale 1 – 7)</td>
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<td></td>
<td>physical activity</td>
<td>3.3 (2.2)</td>
<td>4.1 (2.2)</td>
<td>-</td>
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<tr>
<td></td>
<td>test for diabetes</td>
<td>3.7 (2.3)</td>
<td>4.1 (2.3)</td>
<td>-</td>
</tr>
<tr>
<td>Health behaviour (scale 1 – 7)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>healthy diet</td>
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<td>5.2 (1.8)</td>
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<td></td>
<td>heredity</td>
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<td>2.7 (0.7)</td>
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<td>3.2 (1.3)</td>
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<td>STAI</td>
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<td>1.9 (0.6)</td>
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</tbody>
</table>

* Unadjusted analyses are presented, since predefined variables did not affect the outcome of the trial.
† Baseline measures were unavailable for one person in the control group.
‡ P-values based on analyses of covariance (ANCOVA).
§ Intention to eat more healthily (at least 2 pieces of fruit and 200 grams of vegetables a day and low saturated fat nutrition) or to increase physical activity (at least 30 minutes of moderate activity at least 5 days a week) within the following month were assessed (completely applicable to me (1) – completely inapplicable to me (7)).
¶ Participants were asked to indicate whether they had changed their behaviour in the previous 3 months (completely disagree (1) – completely agree (7)).
†† Participants were asked to indicate the extent to which they believed that a given cause could be a cause of diabetes (definitely not (1) – definitely (5)), based on the Revised Illness Perception Questionnaire (IPQ-R) (13). A heredity sub-scale was comprised of two items: “heredity, diabetes runs in the family” and “predisposition” (α = .62). A lifestyle sub-scale was comprised of three items: “unhealthy diet or eating habit”, “lack of physical activity”, and “being overweight” (α = .75).
Impact of communicating familial risk of diabetes

* Perceived consequences was assessed using a 6-item scale \((\alpha = .86)\), based on the IPQ-R (13).
** Personal control over developing diabetes was assessed using a single item “There is a lot I can do to prevent getting diabetes” (completely disagree (1) – completely agree (5)), based on the IPQ-R (13).
*** Perceived susceptibility was assessed using the mean score of three items \((\alpha = .88)\): “How likely do you think it is that you will get diabetes within the next 5 years?” (very likely (1) – very unlikely (7)), “Based on your feelings, how big is the chance of you getting diabetes within the next 5 years” (very low (1) – very high (7)), and “In your opinion, what is the chance of you getting diabetes compared to an average man/woman your age?” (a lot lower (1) – a lot higher (7)).
‡‡ Participants were asked to indicate their feelings when thinking about their chance of getting diabetes using a 7-point rating scale for two worry items (fear, worry) \((\alpha = .86)\).
§§ The Positive \((\alpha = .88)\) and Negative Affect scale \((\alpha = .84)\) (PANAS) (14) was used to assess general mood states, and the Dutch short form of the State-Trait Anxiety Inventory (STAI) (15) \((\alpha = .87)\) was used to assess anxiety at the time of assessment.