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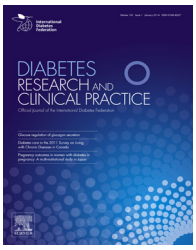

Understanding perceived risk of type 2 diabetes in healthy middle-aged adults: A cross-sectional study of associations with modelled risk, clinical risk factors, and psychological factors

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ABSTRACT

Aims: To determine the perceived risk of type 2 diabetes in a sample of healthy middle-aged adults and examine the association between perceived risk and modelled risk, clinical risk factors, and psychological factors theorised to be antecedents of behaviour change.

Methods: An exploratory, cross-sectional analysis of perceived risk of type 2 diabetes (framed according to time and in comparison with peers) was conducted using baseline data collected from 569 participants of the Diabetes Risk Communication Trial (Cambridgeshire, UK). Type 2 diabetes risk factors were measured during a health assessment and the Framingham Offspring Diabetes Risk Score was used to model risk. Questionnaires assessed psychological factors including anxiety, diabetes-related worry, behavioural intentions, and other theory-based antecedents of behaviour change. Multivariable regression analyses were used to examine associations between perceived risk and potential correlates.

Results: Participants with a high perceived risk were at higher risk according to the Framingham Offspring Diabetes Risk Score ($p < 0.001$). Higher perceived risk was observed in those with a higher body fat percentage, lower self-rated health, higher diabetes-related worry, and lower self-efficacy for adhering to governmental recommendations for physical activity (all $p < 0.001$). The framing of perceived risk according to time and in comparison with peers did not influence these results.

Conclusions: High perceived risk of type 2 diabetes is associated with higher risk of developing the disease, and a decreased likelihood of engagement in risk-reducing health behaviours. Risk communication interventions should target high-risk individuals with messages about the effectiveness of prevention strategies.

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1. Introduction

The prevalence of type 2 diabetes (T2D) is rising rapidly worldwide, and it is projected that by the year 2035 there will be 592 million individuals with the disease [1]. T2D is associated with costly increases in morbidity and mortality such that the burden attributable to the disease is threatening the health systems and economies of both developed and developing countries alike [2]. Fortunately, research has shown that the development of T2D can be delayed and all together prevented through health behaviour change [3]. Several randomised controlled trials among those at high risk have reported reductions in the incidence of T2D by approximately 50% following interventions resulting in moderate weight loss (defined as 5–10% of body weight) through healthy changes in physical activity and diet [3]. Attempts to translate these research findings into healthcare and community settings have been undertaken [4], and the screening of individuals at high risk has been recommended by prominent health organisations [5].

In order for translation efforts to be effective, they must target individuals at high risk of T2D who have the greatest potential to benefit from prevention or screening programmes. Several valid risk prediction models have been developed to identify such individuals [6]. Models based solely on routinely collected data (e.g., age, sex, family history, height, weight, etc.) have been incorporated into user-friendly risk assessment tools, and diabetes awareness campaigns have promoted their use among both clinicians and members of the general public [7]. Despite the ubiquity of these tools, it is unclear if individuals at high risk for T2D actually perceive themselves to be at increased risk. If high-risk individuals do not believe that they are at increased risk, they may not be responsive to efforts aimed at promoting risk-reducing behaviours (e.g., engagement in physical activity and a healthy diet) or screening.

Perceived risk is a central construct in several health behaviour theories. Each similarly posits that the motivation to engage in risk-reducing health behaviours or to undergo screening is largely dependent upon whether or not an individual is aware of their susceptibility for a disease [8]. A variety of measures have been used to assess perceived risk, however, there is little agreement on which measures provide the best operationalisation of the construct [9]. It is unclear if framing measures (i.e., presenting them in reference to a specific schema) according to time (e.g., 10 years or a lifetime) and/or in comparison with peers influences an individual's assessment of their risk [10].

The majority of studies that have assessed perceived risk of T2D have focused on differences according to family history and report that individuals determined to be at high risk based on a positive family history are frequently unaware of their increased risk [11]. Although family history is a significant risk factor for T2D, it is only one of several important influences on risk [6]. Very few studies have examined the association between perceived risk and modelled risk calculated using a validated epidemiological model for predicting incident T2D that incorporates multiple risk factors. Those that have report inconsistent findings [12–14], and associations between perceived risk of T2D and cognitive and emotional antecedents to behaviour change that are often the target of interventions have scarcely been studied and remain unclear [14].

In the present study, we examined perceived risk of T2D in a population-based sample of healthy middle-aged adults. We determined whether or not framing according to time and in comparison with peers influenced the measurement of perceived risk and evaluated if measures were in accordance with modelled risk and other risk factors. We also explored the associations between perceived risk and multiple theory-based antecedents of behaviour change. In order for T2D prevention programmes to successfully reach their intended targets, high-risk individuals must first acknowledge that they are at high risk. A deeper understanding of the factors associated with perceived risk might inform the development of more effective risk communication and prevention efforts.

2. Materials and methods

2.1. Design

This cross-sectional study utilised baseline data collected as part of a randomised controlled trial, the Diabetes Risk Communication Trial (DRCT) [15]. All of the variables in the present study were collected at baseline, prior to randomisation and receipt of any intervention materials. The study obtained full ethical approval from the Cambridgeshire 1 Research Ethics Committee on the 21st of October 2010 (reference number 10/H0304/78).

2.2. Participants and setting

Participants of the DRCT were recruited from the Fenland Study, an ongoing population-based, observational study investigating the influence of lifestyle and genetic factors on the development of diabetes, obesity, and related metabolic disorders [16]. Patients born between 1950 and 1975 and registered with participating general practices in Cambridgeshire, UK were invited to take part. Exclusion criteria assessed by general practitioners included being diagnosed with diabetes, a terminal illness with a prognosis of less than one year, or a psychotic illness. Those who were pregnant or lactating, or unable to walk unaided were also excluded. Between February and September 2011, invitations to take part in the DRCT were sent to those who (1) had agreed to be contacted regarding future studies; (2) had sufficient data to calculate their genetic and phenotypic risk of T2D; (3) wore a combined heart rate monitor and accelerometer to measure free-living physical activity for three or more full days without experiencing a severe skin reaction; and (4) provided at least three days worth of complete physical activity data. Upon response, those who reported being diagnosed with diabetes or actively participating in another study were excluded.

2.3. Measures

During the Fenland Study, participants underwent a health assessment. Anthropometric (e.g., height, weight, waist circumference), body composition (e.g., body fat percentage and