The Difference of Risk Perception after Patient Education by Genogram Simulation and Paperbased Diabetes Risk Calculator on Patient with Diabetes Family History

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**Background** : *Recent evidence family history of diabetes is an independent risk factor for type 2 Diabetes Mellitus. Therefore, current prevention of this group is necessary patient education that can changes healthy behavior through the formation of intention and awareness of those risks. Some interventions hypothesized can improve risk perception in order to intention to change behavior. Objective:* *To determine the difference of risk perception after patient education using genogram simulation and paper-based diabetes risk calculator. The design study was a non-randomized controlled trial. Subjects were identified with restriction criteria: Patient with a family history of type 2 Diabetes Mellitus, 19-50 years old, and had no evidence of Diabetes. The subjects were 35 patients; divided into control group and 2 intervention groups; they are (1) education using genogram simulation and (2) education using paper-based diabetes risk calculator. Risk perception identified by validated risk perception of developing diabetes questionnaire. Data were analyzed by Kruskall Wallis test continued by Mann Whitney U test with the level of confidence 95%.*

**Results:** *There are significant differences of Risk perception after intervention groups with control, after education used genogram simulation (p=0,001) and also after education used paper-based diabetes risk calculator (p=0,039), but there was no difference in risk perception between intervention groups (p=0,223)*

**Conclusions:** *There are significant differences in risk perception between the control group and interventions group, education used sgenogramimulation and also education used diabetes risk calculators*

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# Keywords: Family history of Diabetes, genogram, Paperbased diabetes risk calculator, risk perception,

# Introduction

Diabetes mellitus is a major public health problem in many areas of the world. Along with the growing number people who suffer from diabetes, there are increasing rates of individuals with family histories of the disease. A family history of diabetes is an independent risk factor for the occurrence of diabetes(1)(2) in other words, it is not dependent on other risk factors like insulin resistance, pancreatic β cell function, or body mass index. Individuals who have a family history of diabetes have a risk for developing diabetes of between 1.8 (1) and 2.8 times (2) the rate of individuals who do not have family histories of diabetes. The risk is greater when the history of diabetes is from the mother’s side of the family (3)

Diabetes prevention for individuals with risk factors for developing the disease include a range of lifestyle and diabetes-prevention programs. However, such efforts often encounter constraints. At-risk individuals may find it difficult to understand the causes of diabetes and may underestimate their own risk (4). They may also be less in touch with themselves (5) and less likely to believe that diabetes can be prevented. Communication with individuals with a family history of diabetes should provide information about the disease, raise awareness of the risks, and motivate and influence the adoption of preventative behaviours to reduce risk (5).

Family physicians often keep family folders containing medical records and other information on family members, as well as genograms, or family trees (6). Genograms are also used in career counselling, family therapy, and palliative care. There is no apparent evidence in the literature that genograms, along with the clinical and social histories of individuals and families, has ever been used to motivate individuals to adopt preventative behaviours. Physicians could use such information to help patients understand their particular vulnerabilities to diabetes. Paper-based risk calculators, which are used to predict a person's risk for diabetes in the future, can also be used as educational tools to improve risk perception among people at risk.

Risk perception has been defined in number of ways, but it is often described as an individual’s perception of the likelihood that he or she will experience the effect of danger (7). Risk perception refers to people’s subjective judgements about the likelihood of negative occurrences, such as injury, illness, disease, and death. All risk concepts have one element in common: a distinction between reality and possibility. Risk perception has two main dimensions: the cognitive dimension, which relates to how much people know about and understand risks, and the emotional dimension, which relates to how they feel about risks (8)

# Objective

Our objective was to determine the differences in diabetes risk perception in primary-care patients with family histories of diabetes after patient education using genogram simulation and a paper-based diabetes risk calculator.

# Research Design and Methods

We recruited 35 non-diabetic primary-care patients between 19 and 50 years old with family histories of diabetes. They were divided into one control group and two intervention groups. Both intervention groups received diabetes education, the first using genogram simulation and the second using a paper-based diabetes risk calculator. Simulation of the genogram is healthy lifestyle improvement education by using the patient's family genogram, describes the risks including family members of the patient. While education with paperbased risk calculator is education regarding healthy lifestyle improvements by explaining and calculate directly the risk of disease. We made standard clinical measurements, collected fasting blood samples, and used the validated Risk Perception Survey for Developing Diabetes questionnaire. There are four measurements of risk perception in the Risk Perception Survey for Developing Diabetes questionnaire: personal control, knowledge of risk, worries, and optimistic bias. Knowledge of risk assesses whether individuals are aware of the various risk factors for developing diabetes, including lifestyle, age, and ethnicity. Worries account for individuals’ concerns regarding the risks they face. Optimistic bias measures the degree to which individuals are inappropriately optimistic about the risks they face. Data were analysed using the Kruskall-Wallis test and the Mann-Whitney U test with a 95% level of confidence.

# Results and Discussion

Optimistic bias or unrealistic optimism is commonly defined as the mistaken belief that one's chances of experiencing a negative event are lower (or a positive event higher) than that one's peers. which exists for both men and women across age and educational levels (9). When the majority of a group of people perceive their chances of negative events happening to them as less than average, then clearly this is just not optimistic but also unrealistic.

In this study, risk perception differed significantly between the intervention groups (regardless of educational tools used) and the control group. There was no significant difference in risk perception between patients that were educated using genogram simulation and the paper-based risk calculator. This suggests that regardless of delivery, exposure to the message will improve understanding and perception of risk over time.

A verbal explanation by a doctor of the risk of developing diabetes due to family history may be difficult to understand, but when explained using a genogram, risk information is delivered with visual symbols that make the information more easily understood. This is in accordance with Dale’s theory of the cone of experience(10), where the use of visual symbols reduces the level of abstraction and makes information more concrete. The ability to better understand risks by using a genogram should improve attitudes and ultimately motivate individuals to adopt preventative behaviours.

This research shows that physicians interested in diabetes education should first use a paper-based risk calculator, followed by genogram simulation. In terms of the knowledge of risk and worries measures, education using genogram simulation was superior to the paper-based risk calculator. Education using genogram simulation resulted in more significant worries compared to the risk calculator. This may be because the genogram simulation presents the risk of developing diabetes as an unmodifiable fate.

In a study by Hivert (9), family history significantly increased risk perception for developing diabetes compared with the high weight and low physical activity, as well as blood sugar checks and genetic tests. As we know, that self effication or personal control is the degree to which individuals feel their behaviours can affect health outcomes.Education using a paper-based risk calculator results in better self-effication because individuals are invited to recognize each risk factor — not only genetic factors or family history, but also lifestyle, fibre intake, body mass index, medical conditions such as hypertension, and the use of steroids. The introduction of these risk factors causes individuals to recognize the risks more objectively and results in higher rates of self-improvement.

References

1. Sakurai, M., Nakamura, K., Miura, K., Takamura, T., Yoshita, K., & Sasaki, S. (2013). Family history of diabetes , lifestyle factors , and the 7-year incident risk of type 2 diabetes mellitus in middle-aged Japanese men and women, *4*(3), 261–268. <http://doi.org/10.1111/jdi.12033>
2. Koloverou, E., Panagiotakos, D. B., Pitsavos, C., Chrysohoou, C., Georgousopoulou, E. N., Pitaraki, E., … Stefanadis, C. (2014). O RIGINAL D ATA 10-year Incidence of Diabetes and Associated Risk Factors in Greece : the ATTICA study ( 2002-2012 ), 181–189. <http://doi.org/10.1900/RDS.2014.11.181>
3. Tan, jonathan T., Tan, L. S. U. M., Chia, K. S., Chew, S. K., & Tai, E. S. (2008). A family history of type 2 diabetes is associated with glucose intolerance in a South East Asian population. Diabetes Research and Clinical Practice.
4. Adriaanse, M. C., & Snoek, F. J. (2006). The psychological impact of screening for type 2 diabetes. *Diabetes/Metabolism Research & Reviews*. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=cin20&AN=2009277018&site=ehost-live
5. Myers, M., SL, F., L, A., JL, H., & Koehly LM. (2015). Talking About Type 2 Diabetes: Family Communication From the Perspective of At-Risk Relatives. *Diabetes Educator December*. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=ovftq&AN=00003476-201512000-00008
6. Crouch, M. A., & Roberts, L. (Eds. . (1987). *The family in medical practice: A family systems primer*. Springer - Verlag.
7. Short Jr, J. F. (1984). The social fabric of risk: towards the social transformation of risk analysis. Am. Sociol. Rev., 49(Dec.), 711-725
8. Hye, Jin-Paek and Thomas Hove (2017).Risk perceptions and Risk Characteristic, Oxford Research encyclopedia of Communication. DOI: 10.1093/acrefor/9780190228613.013
9. Hivert, MF, Warner, AS, Shrader, PS, Grant, RW, Meigs JB. Diabetes Risk Perception and Intention to Adopt Healthy Lifestyles Among Primary Care Patients. Diabetes Care, Volume 32, number 10, Oct 2009.care.diabetesjournal
10. Weinstein, N.D. (1980).Unrealistic optimism about future life events. J.Pers. Soc. Psycchol., 39(5), 806-820
11. Dale, E. (1969). Audio visual methods in teaching.