Fatalism and knowledge associated to diabetes mellitus type 2 risk perception in Mexican population during COVID-19 confinement [version 1; peer review: awaiting peer review]

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Abstract

Background: People with fatalistic beliefs and lack of knowledge of healthy lifestyles tend to show conformism and resignation due to their state of health. Even people with fatalism consider that contracting a disease is divine punishment, and this is reflected when they perform in unhealthy behaviours. The relationship between fatalistic beliefs, knowledge about diabetes risk factors, and perception of diabetes risk in Mexican adults during the COVID-19 pandemic were evaluated.

Methods: The study design was cross-sectional and correlational. The study included individuals between 30 and 70 years of age, from a rural community in Guanajuato, Mexico. The data collection was done electronically.

Results: The average age was 29.2 years (SD = 10.5), 55% were women, 52.3% were single, 36.2% had university studies and 57.3% were working. Perceived DMT2 risk was inversely related to fatalistic beliefs. Knowledge level was positively correlated to DMT2 risk perception. In multiple linear regression, pessimism and divine control dimensions were the only predictors of DMT2 risk perception.

Conclusions: In young adults, knowledge increases regarding DMT2 risk perception. But the higher the fatalistic beliefs the lower the level of knowledge and the lower the perception of DMT2 risk.

Keywords

Perception, diabetes mellitus type 2, fatalistic beliefs, knowledge
Introduction
People with chronic diseases such as type 2 diabetes mellitus (T2DM) are the most vulnerable group of people for hospital incidence and mortality during the COVID-19 pandemic (coronavirus disease 2019).1,2 Recent studies reported that during emergency care, people with COVID-19 were diagnosed as new cases of T2DM,3,4 suggesting that people were unaware of their disease until admission to the hospital. Therefore, this situation may have generated concern in the general population about their health status and their perceived risk of T2DM.

The perceived risk of T2DM is the individual’s appreciation of the probability of developing the disease in the future. People who perceive a higher T2DM have more intention and adopt healthier lifestyles to prevent the disease.5 This type of risk perception increases in women, those who are older, have a family history of diabetes, are overweight/obese, consume sugary drinks, do not consume fruits and vegetables, have a previous diagnosis of hypertension, have knowledge about the risk factors for T2DM and have a poor perception of their health status.6–10 However, a study conducted in Alemannia, reports that people with prediabetes and undiagnosed T2DM report low risk perception,11 the same as in the Mexican population.12 The low risk perception of T2DM may be due to different factors such as beliefs that diseases are unpredictable, or fatalistic beliefs.13 Fatalistic beliefs are considered as the idea that there is a force superior to the human being that determines the facts of life; this belief is referred to as external locus, luck, fate, destiny, or divine control.14 People with fatalistic beliefs adopt pessimistic or despair behaviors, whose behavior results in thoughts that death and disease are inevitable.15 This type of belief is considered an important coping factor when faced with the diagnosis of a chronic disease,16 that is to say people with higher fatalistic beliefs use health services less, abandon treatments, and show higher mortality rates.17,18

Other studies report that fatalistic beliefs minimize and underestimate health risk because people do not comply with preventive behaviors,19–23 for example, preventive measures to avoid infection by COVID-19, therefore people with fatalistic beliefs may underestimate the risk of chronic diseases such as T2DM. So far, the association between fatalistic beliefs, knowledge, and perceived risk of T2DM has not been demonstrated. How people perceive themselves and feel vulnerable to developing chronic diseases is a predictor for lifestyle change and disease prevention. However, fatalistic beliefs may be a factor that underestimates knowledge of risk factors and perceived risk of T2DM. Therefore, the aim of this research was to assess the relationship between fatalistic beliefs, knowledge regarding the risk factors of diabetes, and the perception of T2DM in Mexican adults during the COVID-19 pandemic.

Methods
Ethics and consent
The study followed the guidelines of declaration of Helsinki and the General Health Law on health research in Mexico, and it was approved by the Ethics and Research Committee of the University of Guanajuato, Mexico with permit number DCSI-CI 20190308-3. Written informed consent was obtained from participants before their data was collected. Ethics approval was granted in 2019.

Design and participants
The study design was cross-sectional and correlational. We had included adult men and women aged 30 to 70 years, residents of San Miguel Eménguaro, Salvatierra, Guanajuato, Mexico. We had excluded persons with a diagnosis of type 1, type 2, and gestational diabetes. The sample was estimated using the statistical program G*power 3.1.4, with 95% reliability, 90% power and effect size of.08, which gave a sample of 218 people.

Data collection
Participants were invited through online social networks (Facebook, WhatsApp and Instagram). The access link for the survey (hosted on Google Forms) was electronically shared through social networks. The invitation stated the objective of the survey, the declaration of respect for the confidentiality and anonymity of information, as well as that the survey was aimed at residents of San Miguel Eménguaro, Salvatierra, Guanajuato. When the link was opened, the informed consent form with the option to agree to participate in the study was displayed first. Subsequently, information on sociodemographic data was requested and ended with the completion of the questionnaires. We restricted to survey to only allow one entry per person. Data collection was carried out from August to November 2020. The study followed the guidelines of declaration of Helsinki and the General Health Law on health research in Mexico.

Study variables
Independent variables: fatalism and knowledge.

Dependent variable: Perceived risk of Type 2 Diabetes Mellitus.
**Questionnaires**

A sociodemographic data card was used to collect information such as age, sex, marital status, schooling, and occupation.

To evaluate fatalism, the Multidimensional Fatalism Scale in Spanish[^15] was used, with 30 statements grouped into five factors: fatalism, pessimism/hopelessness, internal locus, luck, and divine control with a response from 1 to 5, where 1 means frequently disagree and 5 means frequently agree, with a maximum score of 150 points and a minimum of 30 points. The higher the score, the greater the fatalism. Cronbach’s alpha in this study was .88.

In addition, we used the Risk Perception Survey for Developing Diabetes (RPS-DD), which contains 43 items that measure beliefs about one’s risk for developing diabetes. This scale has six subscales: personal control (4 items), worry (2 items), optimistic bias (2 items), personal disease risk (15 items), comparative environment risk (9 items), and knowledge of diabetes risk factors (11 items). The higher the score the higher the perceived risk of T2DM.[^22][^23]

To evaluate knowledge of risk factors, a subscale of the same instrument with 11 questions was used. Each question has 4 answers (increases the risk, has no effect on risk, decreases the risk and don’t know). The items are dichotomously scored, correct/incorrect and the total sum of the subscale is from 0 to 11, the higher the score, the greater the knowledge.[^23] Cronbach’s alpha in this study was .76.

**Statistical analysis**

SPSS version 25 was used to capture and assess data. Descriptive statistics were used for the characteristics of the participants, frequencies and percentages for categorical variables and measures of central tendency and dispersion for continuous variables. The variables of fatalistic beliefs (low 30 to 90; high 91 to 150), knowledge (low 0 to 4; high 5 to 9) and perceived risk of T2DM (low 8 to 20; high 21 to 32) were categorized according to the mean of the total score of the questionnaires. For the correlation analysis, Spearman’s coefficient and multiple linear regression were used to explain the perceived risk of T2DM.

**Results**

**Sociodemographic characteristics**

In total 222 people participated in the survey, and 218 participants provided complete data. The average age was 29.2 years (SD=10.5), the sample was characterized by being mostly women (55%), single (52.3%), having a university education (36.2%) and having a job (53.7%), see Table 1.

**Table 1. Sociodemographic characteristics.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>120 (55)</td>
</tr>
<tr>
<td>Male</td>
<td>98 (45)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>114 (52.3)</td>
</tr>
<tr>
<td>Married</td>
<td>59 (27.1)</td>
</tr>
<tr>
<td>Common law marriage</td>
<td>30 (13.8)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (6.9)</td>
</tr>
<tr>
<td>Schooling</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>21 (9.6)</td>
</tr>
<tr>
<td>Junior High</td>
<td>51 (23.4)</td>
</tr>
<tr>
<td>High School</td>
<td>64 (29.4)</td>
</tr>
<tr>
<td>University</td>
<td>82 (37.6)</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
</tr>
<tr>
<td>Works</td>
<td>117 (53.7)</td>
</tr>
<tr>
<td>Studies</td>
<td>36 (16.5)</td>
</tr>
<tr>
<td>Works and studies</td>
<td>44 (20.2)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>21 (9.6)</td>
</tr>
</tbody>
</table>

Note: n=218; f=frequency; %=percentage.
Regarding fatalism, 27.5% report high fatalistic belief scores, 83.5% have high knowledge about T2DM risk factors and 66.1% have high perceived risk of developing T2DM; the measures of central tendency and dispersion of the variables are seen in Table 2.

Correlation analysis
According to the correlation analysis, the perceived risk of T2DM was inversely related to fatalism and its dimensions - see Table 3. The level of knowledge was positively correlated with perceived risk of T2DM (r=.178, p<.01). Subsequently, multiple linear regression was performed for perceived risk of T2DM, with fatalism dimensions and knowledge as predictor variables, but only pessimism (β=-.194, p<.01) and divine control (β=-.164, p<.05) were the only predictors, they explained 7.6% of the variance.

Discussion
The purpose of this research was to analyze the relationship between fatalistic beliefs, knowledge of T2DM risk factors, and the perceived risk of T2DM in Mexican adults during the COVID-19 pandemic. In Mexico there is a large percentage of the adult population at risk of developing T2DM; according to the results of the 2018 National Health and Nutrition Survey most adults aged 20 years or older have a high prevalence of overweight/obesity, as well as being involved in risky behaviors such as alcohol consumption, smoking, sedentary lifestyle, and food insecurity.24

In this study, it was identified that the perceived risk of T2DM was high in comparison with other studies in the Asian population.25 This may be since the most vulnerable population to complications, hospitalization and death from SARS-CoV-2 was people with chronic diseases.25,26 This situation may have generated concern in the population about feeling at risk of developing T2DM and therefore, also feeling vulnerable to the COVID-19 virus. Likewise, even though people with a higher perceived risk of T2DM can make lifestyle changes, it has been reported that during the pandemic, people report an increase in the consumption of alcohol, tobacco and processed foods, emotional problems, and less physical activity.27,28

Our results identified that a quarter of the respondents had above-average scores on fatalistic beliefs. Cultural beliefs are a key element in health care seeking and chronic disease prevention.29 In several studies it has been reported that people who believe that illness is a result of a supernatural phenomenon do not seek allopathic medical care, but instead seek help from healers or shamans who can help alleviate bad luck, witchcraft or perform prayers.30,31 This is due firstly because of the distrust they have about the negative beliefs held about treatments such as insulin or peritoneal dialysis, and secondly, because they think that allopathic medicine cannot cure or alleviate diseases that are caused by superhuman forces.
The level of knowledge was related to a greater perceived risk of T2DM. These results are consistent with previous studies, in which it has been reported that people who have information on the main risk factors and who have family members with a history of T2DM perceive a greater probability of becoming ill. In these studies, differences have been found between men and women with the level of knowledge and perceived risk of T2DM. Men have lower level of knowledge about risk factors and lower risk perception but have higher risk of developing T2DM compared to women. Health literacy has been considered as a relevant factor to face health problems and to know that chronic diseases are preventable, but studies in Latin America have indicated that although people have knowledge about T2DM risk factors, they consider that the disease cannot be prevented, that it is the responsibility of the health professional to prevent it and not of oneself.

Finally, we found that people who have high fatalistic beliefs have low perceived risk of developing T2DM. One of the dimensions of fatalistic beliefs that was related to low-risk perception was pessimism. Pessimism has been considered as a negative view, attitude, or idea regarding life events. People with pessimistic ideas have fewer coping strategies, lower self-efficacy, and are carefree considering that positive changes in health cannot be achieved. Thus, people with a pessimistic view have greater problems in making a healthy lifestyle change when they develop chronic diseases. Some authors report that these ideas are since they consider disease as something fatal and that death is inevitable, so that any action they take cannot change it. Another important factor in the perceived risk of T2DM is the belief in divine control. From a religious point of view, beliefs about God are a key element that influences people’s behaviors. On the one hand, people with fatalistic religious beliefs allow them to cope better with health problems. But, on the other hand, they may consider that diseases are tests or punishments from God, and that only God can cure the disease. This set of beliefs influences people to consider that it does not matter if they make changes in their way of living, because illness cannot be prevented if God does not want it. Also, people may self-perceive themselves to be at lower risk of developing T2DM by self-evaluating themselves without conflict with God.

The weaknesses of the study include data collection conducted through electronic means and social media on the internet, which resulted in a majority of young adult participants. It is necessary for future studies to collect data through face-to-face interactions in order to include participants from older age groups. The research design was cross-sectional; therefore a cause-and-effect relationship cannot be established. As a result, the findings should be interpreted with caution and extrapolated to similar populations to those in this study.

On the other hand, the strengths of the study include being one of the first investigations to link fatalistic beliefs with knowledge and perceived risk of T2DM. Additionally, it is a study conducted on a population of young adults from a rural community in Mexico, which highlights the relevance of these beliefs and their implications in identifying knowledge and health risks.

Conclusions
In young adults, knowledge increases the perceived risk of T2DM. But fatalistic beliefs decrease knowledge and perceived risk of T2DM. Fatalistic beliefs should be considered a variable that has to be dealt with by health professionals. It is necessary that health professionals consider fatalistic beliefs for the prevention of chronic diseases and improve through educational programs health literacy about the risk factors of T2DM and the benefit of lifestyle, mainly in young adult populations. It is important to provide more education in those who have low knowledge about T2DM risk factors, so that people become more aware of their risk.

Data availability
Underlying data

This project contains the raw questionnaire responses.

Extended data

This project contains the demographics questionnaire.

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).


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