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Fatalistic beliefs, self-care, and HbA1c in Mexican men with type 2 diabetes mellitus
A cross-sectional study

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Abstract

The aim of this study is to examine the relationship between fatalistic beliefs, self-care, and glycemic control among Mexican men with type 2 diabetes mellitus. This is a cross-sectional study in men diagnosed with type 2 diabetes mellitus from 18 to 59 years of age from the Northeast of Mexico. Fatalistic beliefs, self-care, medication adherence, and HbA1C were evaluated. Patients were divided into glycemic control (<7% HbA1c) and without glycemic control (>7% HbA1c). Tests were performed to compare 2 independent groups, Student's t and U Mann Whitney. Correlation tests and multiple linear regression models were also performed. For statistical analysis, the SPSS v27 program was used. Forty-nine percent of the men had glycemic control (<7% HbA1c). Fatalistic beliefs were negatively correlated with self-care and medication adherence, but not with HbA1c. In multiple linear regression models, fatalistic beliefs were a negative predictor of self-care and medication adherence. In the model for HbA1c, the pessimism subdimension and self-care were the predictors. Fatalistic beliefs negatively affect self-care compliance and medication adherence, while the pessimism subdimension was related to the increase in HbA1c.

Abbreviations: HbA1c = glycosylated hemoglobin, T2DM = type 2 diabetes mellitus.

Keywords: adult, glycated hemoglobin, hispanic, men, self care, type 2 diabetes

1. Introduction

Type 2 diabetes mellitus (T2DM) is a public health problem with the highest prevalence and growth in low- and middle-income countries.[1] Additionally, the American continent holds the second place in mortality rate and the third place in years lost due to disability.[2] In Mexico, the prevalence of T2DM is 10.3%, 61% of the patient present uncontrolled glycemic (HbA1c > 7%) and mortality is higher in men than in women of reproductive age (25 to 64)[3–5] Nuevo Leon is the fourth state in the country with the highest prevalence of T2DM (12.6%), higher than the national prevalence.[3]

The American Diabetes Association recommends that individuals with T2DM prioritize self-care actions and medication intake as essential elements for maintaining glycemic control levels (<7.0% HbA1c).[6] Studies have reported that men are less likely to prioritize self-care in health and adhere to recommended self-care actions in managing T2DM.[7,8] Within the social construction of masculinity, men are expected to demonstrate strength, aggression, invulnerability, and an ideal state of health. Conversely, engaging in health care actions during an illness can make them feel less masculine because health care is perceived as a feminine characteristic. This leads to an inequality in self-care among men with T2DM.[9]

A cultural belief, considered a key social determinant of health, is an important factor in shaping health behaviors.[10,11] In recent years, fatalistic beliefs have gained increasing relevance in T2DM.[12] Fatalistic beliefs, characterized by the notion of a greater and external force (which can be in the form of luck, destiny, or divine will) that controls the lives of people[13,14] and are often associated with pessimistic attitudes towards the future, are prevalent in Hispanic/Latin American populations.[15] This belief system may impact the health behaviors and attitudes towards T2DM management among Mexican men.

Previous studies on the relationship between fatalistic beliefs and T2DM have produced contradictory results. While some studies reported that fatalistic beliefs can lead to decreased medication adherence,[16] lower self-care compliance,[17,18] and higher HbA1c levels in patients,[19,20] other studies indicated that there was no significant relationship between fatalistic beliefs and those factors.[21]

The aim of this study is to examine the relationship between fatalistic beliefs, self-care, and glycemic control among Mexican men with T2DM.

2. Methods

2.1. Study design and participants

We conducted a cross-sectional study on adult men aged between 18 and 59 with a previous recorded diagnosis of T2DM[6] in Monterrey, Nuevo León. For this research, convenience sampling was used. Patients with Alzheimer's, dementia, psychiatric problems, and illiteracy were excluded. The final sample comprised of 121 participants. We calculated the sample size using the software G*power 3.1 with an effect size of.30 and a reliability of.05 for a multiple linear regression model with 11 predictor variables, which gave a power of.98.

2.2. Data collection

The researchers identified potential participants through their monthly appointments scheduled for the T2DM consultation and approached them in the waiting room. The principal investigator introduced himself and informed him of the study's purpose. The investigator verified the inclusion and exclusion criteria. Eligible patients were invited to participate in the research. Once they agreed to participate, the researcher read the consent form to the interested individual then asked them to sign before giving them a copy of the document. After consent was obtained, data collection began.

2.3. Surveys

We evaluated fatalistic beliefs using the Multidimensional Fatalism Scale,[13] which consists of 30 statements that assess beliefs regarding divine control, luck, hopelessness, internality, and fatalism. Participants responded on a 5-point Likert-type scale. The total score of the scale ranges from 30 to 150 points, with the higher scores indicating higher levels of fatalistic beliefs. In this study, the Cronbach's alpha for the scale was.81.

We evaluated self-care using the summary questionnaire of self-care activities in T2DM,[22] which contains 10 items that assess compliance in the last 7 days (0–7) related to diet, exercise, glucose self-monitoring and foot check. The total score ranges from 0 to 70 points, where the highest values indicate greater self-care. The questionnaire reported a Cronbach's alpha of 0.72.

We evaluated was medication adherence using the Adherence to Refills and Medications Scale for Diabetes (ARMS-D).[23] It consists of 11 questions focusing on how often participants forgot to take their medications in the past month. Participants responded on a Likert-type scale from 1 (never) to 4 (always). The total score ranges from 11 to 44 points. For this study, we inverted the answers to questions 1 to 10 to indicate that higher scores reflect greater medication adherence. The Cronbach's Alpha reported in this study was 0.95.

Additionally, the study evaluated various covariates including age, marital status, years of schooling, waist circumference, body mass index, alcohol use, tobacco use, work, and number of years diagnosed with T2DM.

2.4. HbA1c

To assess glycemic control, we measured the percentage of glycosylated hemoglobin (HbA1c) using the High-Pressure Liquid Chromatography (HPLC) method. Glycemic control was considered HbA1c < 7%.

2.5. Statistical analysis

The statistical program SPSS V. 27 was used to capture and analyze the data. In the descriptive analysis, means and standard deviation were used in continuous variables, and for categorical variables, frequencies and percentages. Student t test and the Mann–Whitney U test were employed to compare the glycemic control (<7%) and no glycemic control (>7%) groups. For the inferential analysis, the Pearson correlation coefficient and a multiple linear regression model for self-care, medication adherence, and HbA1c were used.

The study protocol was approved by the institutional review board of Research Ethics Committee of the Nursing School of the Autonomous University of Nuevo León (No. FAEND1198). Informed consent was confirmed by the IRB. This research followed the principles outlined in the Declaration of Helsinki.

3. Results

3.1. Demographics data

The sample consisted of 121 participants, the majority of whom were between 40 to 59 years, having completed secondary school, with a diagnosis time of T2DM of less than 5 years. The men were characterized as overweight/obese, consumers alcohol, tobacco, and working more than 40 hours a week (Table 1).

3.2. Difference between good glycemic control and without glycemic control

Upon comparing individuals with glycemic control and those without glycemic control, it was found that the latter group had lower education levels, longer working hours, lower self-care compliance, lower adherence to medication intake, and higher levels of fatalistic beliefs (Table 2).

Table 1

Description of the characteristics of the participants.

Variable	%	5
Age		
20–39 yr	15.7	19
40–59 yr	84.3	102
Scholarship		
Elementary school	25.6	31
Secondary school	46.3	56
High school	14.9	18
Bachelor's degree	3.3	4
Postgraduate	9.9	12
Diagnosed with T2DM		
1–5 yr	46.3	56
6–10 yr	31.4	38
> 10 yr	22.3	27
Waist circumference		
<90 cm	14.0	17
>90 cm	85.0	104
BMI		
Normal weight	18.2	22
Overweight	39.7	48
Obesity	42.1	51
Hour's work/wk		
<40 h	18.2	22
>40 h	81.8	99
Alcohol		
No	53.7	65
Yes	46.3	56
Smoking		
No	71.9	87
Yes	28.1	34

n = 121 participants with T2DM.

BMI = body mass index, T2DM = type 2 diabetes mellitus.

3.3. Correlation analysis

During bivariate analysis, negative correlations were observed between fatalistic beliefs and self-care ($r = -0.239$, $P = .008$) and medication adherence ($r = -0.212$, $P = .020$), although no significant correlation was found with HbA1c.

3.4. Multivariable analysis

Subsequently, a multiple regression model was carried out with self-care as the dependent variable, and T2DM diagnosis time, work hours and fatalistic beliefs were identified as the only predictors of self-care, explaining 19.1% of the variance of diabetes self-care ($F = 5.039$, $P = .000$) (Table 3). Table 4 presents a multiple linear regression model for medication adherence, where diagnosis time, work hours and fatalistic beliefs explain 9.7% of the variance of medication adherence ($F = 2.839$, $P = .009$).

Table 5 displays a multiple linear regression model for the HbA1c variable, which includes the subdimensions of fatalism individually. Both the first model ($R^2 = 0.296$; $F = 8.215$, $P = .000$) and the adjusted model (age, education, years of T2DM diagnosis and body mass index, hours of work) revealed that the

subdimension of pessimism and self-care were the only predictors of HbA1c ($R^2 = 0.302$; $F = 5.711$, $P = .000$).

4. Discussion

This study observed participants with type 2 diabetes mellitus, who exhibited habits of alcohol and tobacco consumption, long working hours, low levels of education, overweight/obesity and poor self-care. Notably, men with this condition visit health services less frequently and participate less in health programs.[8] One possible explanation is that individuals with longer work hours worked have less time to go to health services during available hours, or skip it due to long waiting hours, which means that their health needs are not met and do not make the necessary lifestyle changes.[24]

On the other hand, within the construction of masculinity, men are inclined to avoid going to the doctor as a way to demonstrate masculine behaviors. It should also be considered that men have to take time off from work to visit the doctor, resulting in them earning less money. This can potentially undermine their role as an economic provider within their family, as work is prioritized within the norms of masculinity for men.[25]

Fatalistic beliefs were found to be a common trend among participants, as indicated by the mean questionnaire score. They are prevalent among patients who do not present serious or severe symptoms of T2DM.[26] Some researchers consider these beliefs to be a coping mechanism.[18,26] For some, fatalistic beliefs have a religious connotation, believing that their condition is a test from God. While this can lead to resilience and acceptance of their diagnosis of T2DM,[18] it may also result in patients seeking alternative forms of treatment outside of traditional healthcare settings. As a consequence, fatalistic beliefs could deter patients of DMT2 from seeking medical attention

Table 2

Comparison between men with glycemic control and whitout glycemic control in T2DM.

Variables	HbA1c		
	<7% M (SD)	>7% M (SD)	P
Age*	49.1 (7.0)	48.5 (8.0)	.739
Years of education*	10.3 (4.6)	8.6(3.1)	.010
Diagnosed with T2DM*	8.3 (6.5)	6.9 (5.9)	.209
BMI†	28.8 (4.5)	29.5 (4.8)	.400
Waist circumference†	103.4 (11.5)	106.1 (12.0)	.214
Work hours/week*	51.1 (18.0)	63.4 (19.2)	.000
Self-care*	3.5 (1.3)	1.9 (1.0)	.000
Diet*	4.7 (1.7)	2.6 (1.5)	.000
Exercise*	2.8 (2.4)	1.3 (2.1)	.000
Self-monitoring*	0.7 (1.2)	0.4 (1.0)	.008
Feet*	4.7 (2.6)	2.5 (2.3)	.000
Medication adherence*	41.3 (6.8)	33.5 (11.5)	.000
Fatalistic beliefs†	75.6 (20.1)	83.0 (19.2)	.041
Pessimism*	14.0 (5.9)	15.1 (6.0)	.255
Internal*	11.0 (3.1)	10.6 (3.6)	.366
Lucky†	14.3 (5.8)	15.1 (5.6)	.468
Divine control*	18.6 (6.7)	21.9 (6.7)	.010
Fatalism†	17.5 (5.7)	20.2 (5.5)	.012

n = 121 participants with T2DM.
BMI = body mass index, M = mean, SD = standard deviation, T2DM = type 2 diabetes mellitus.
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†t de student.

Table 3

Linear regression model for self-care in T2DM.

Variables	B	t	P
Age	−0.001	−0.015	.988
Years of education	0.091	1.029	.306
Diagnosed with T2DM	0.202	2.267	.025
BMI	0.193	0.933	.353
Waist circumference	−0.308	−.1.467	.145
Work hours/week	−0.315	−3.639	.000
Alcohol	−0.116	−1.343	.182
Smoking	−0.064	−0.712	.478
Fatalistic beliefs	−0.183	−0.2094	.039

n = 121 participants with T2DM.
BMI = body mass index, T2DM = type 2 diabetes mellitus.

Table 4

Linear regression model for medication adherence in T2DM.

Variables	B	t	P
Age	0.030	0.325	.746
Years of education	0.077	0.826	.410
Diagnosed with T2DM	0.214	2.277	.025
BMI	0.137	0.628	.653
Waist circumference	−0.162	−0.730	.467
Work hours/week	−0.211	2.311	.023
Alcohol	−0.079	−0.861	.391
Smoking	−0.125	−1.319	.190
Fatalistic beliefs	−0.184	−1.995	.048

n = 121 participants with T2DM.
BMI = body mass index, T2DM = type 2 diabetes mellitus.

Table 5

Linear regression model for HbA1c in T2DM.

Variables	Model 1 B†	Model 2 B‡
Fatalism	0.130	0.122
Pessimism	0.273*	0.340*
Internal	−0.005	−0.004
Luck	0.063	0.052
Divine control	0.039	0.022
Medication adherence	0.139	0.165
Self-care	−0.477**	0.468**

n = 121 participants with T2DM.
BMI = body mass index, HbA1c = glycosylated hemoglobin, T2DM = type 2 diabetes mellitus.
*$P < .05$.
**$P < .01$.
†Unadjusted analysis.
‡Adjusted (age, education, years of T2DM diagnosis and BMI, hours of work).

that is not aligned with their beliefs (such as healers, traditional medicine).[27]

According to several previous studies, individuals with higher fatalistic beliefs tend to exhibit lower compliance with self-care and medication adherence.[16–18] People with fatalistic beliefs view complications in T2DM and death as inevitable events, which may minimize the importance of compliance with self-care.[28] This may explain why male patients are reluctant to make changes in their lifestyle and adhere to the recommendations of health professionals.

The linear regression model of HbA1c revealed that fatalism was related to an increase in HbA1c, which is consistent with previous studies.[19,20] However, only the pessimism subdimension was the only predictor for this study. Pessimism is a series of negative outlook on the future, often characterized by the belief in predetermined and unchangeable events in life.[29] Pessimistic individuals with T2DM may exhibit resignation and negative coping strategies with their disease.[30] Previous studies have found that pessimism is related to greater physical and mental health problems including stress, anxiety and depression,[30–32] as well as an higher rates of premature mortality.[33]

The study has some limitations that should be acknowledged. Firstly, as a cross-sectional study, it is not possible to establish a cause-and-effect relationship between the study variables. Secondly, convenience sampling was used. However, it is recommended that future research use a probabilistic sampling to guarantee the extrapolation of the results. Lastly, this study focused only on males who attended primary care centers for disease control. Future research could examine individuals who did not attend health services to broaden the scope of the investigation.

5. Conclusions

Fatalistic beliefs were related to lower compliance with self-care and medication adherence. Pessimism subdimension was linked to higher HbA1c levels. Therefore, it is important that health professionals address fatalistic beliefs during interventions to improve self-care and glycemic control in Mexican men with T2DM.

Author contributions

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