

Risk of Developing Diabetes Mellitus Type 2: San Matías, Francisco Morazan, Honduras

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Abstract

Background: Diabetes mellitus represents a public health problem worldwide; in 2014, 422 million people were reported with this disease.

Objective: Assess the risk to develop type 2 diabetes mellitus through the Finnish Diabetes Risk Score (FINDRISK) in people from ages from 20 to 35 years old.

Methods: We conducted a quantitative, descriptive, and transversal study with a sample of 59 patients, randomly selected with a non-probabilistic sampling by convenience. We provided a consent form, followed by the FINDRISK, assessing age, body mass index, abdominal perimeter, daily exercise, fruit and vegetable ingestion, hypertension treatment, the background of hyperglycaemia and family history of T2DM. We categorized them as low risk, slightly elevated risk, moderate risk, high risk and extremely high risk according to the test score.

Results: The prevalent risk factors were sedentarism 64% (38), unhealthy diet 51% (30) and obesity according to their BMI of 20% (12). 40% (24) of the patients were classified as low risk, 46% (27) slightly elevated risk, 12% (7) moderate risk, 2% (1) high risk and 0% (0) extremely high risk.

Conclusion: The use of the FINDRISK test in Primary Health Care is a useful tool for the early detection of patients with high risk to develop diabetes mellitus type 2 and intervene promoting healthy lifestyles.

Keywords: Diabetes mellitus type 2; Risk factors; Screening

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Introduction

Diabetes mellitus worldwide has represented a public health problem; by 2014, 422 million people had diabetes, with an increase in the prevalence of the disease of approximately 95% [1]. In recent decades, the Americas have had a notable rise in Chronic Non-communicable Diseases (NCDs) associated with unhealthy lifestyles. The most related condition is Type 2 Diabetes Mellitus (DM 2), which has an important role and has become a pandemic that constitutes a public health problem in the world, with an increasing incidence, which reaches all strata of the population. In Honduras, we face an increase in the incidence of DM2 daily. In this country, concerning diabetes, according to PAHO/WHO, around 7.3% of the Honduran population suffers from diabetes (700 to 900 thousand patients), 50% of the population is not diagnosed. Currently, patients in Honduras have a national reference centre such as the National Diabetic Institute (INADI), where 300 to 350 patients are treated daily [2].

One of the main reasons for the increase in this disease is the low level of education,[3] according to the National Institute of Statistics (INE) for June 2016, 11.0% of people in Honduras could not read or write [4]. On the other hand, the National Diabetic Institute studied a total of 382 clinical records of patients who have a diagnosis of type 2 diabetes mellitus and who attended a medical consultation in the period established by the study; the degree of education that predominated was primary 43.98% (168) followed by illiteracy with 27.75% (106) [5]. People with a lower educational level have more than double the prevalence of this disease and have more limited access to its treatment and control. According to the National Demographic and Health Survey 2011-2012, people with more than 12 years of schooling have 29.5% obesity, while those with less than eight years of schooling reach 46.6% [6].

Another determinant related to eating habits is the socioeconomic condition of the people [7]. In rural areas, despite having more significant physical activity due to the long distances travelled because of the lack of economic resources to pay for transportation, a high degree of a sedentary lifestyle and poor nutrition based on high fat and carbohydrate content is observed [8].

The diagnosis of DM2 is based mainly on the evaluation of the high glycaemic levels in this disease and associated symptoms. However, prevention measurements are important tool important tool to avoid and control of this disease [9-12].

We considered the main risk factors for developing type II diabetes mellitus and its complications' burden for health systems; this study was developed to assess the risk of developing DM2 in the next ten years using the Finnish Diabetes Risk Test Score (FINDRISK) in patients aged 20 to 35 years. It is a survey that is composed of 8 questions whose answers add a specific score; in the end, the sum generates a value that indicates a risk of developing diabetes mellitus; low risk (less than 7), slightly high (7 to 11), moderately high (12 to 14), high (15 to 20) and very high (over 20), according to the corresponding category. The variables included in this questionnaire are age, abdominal perimeter (normal ranges for men is >102 cm and normal ranges for women >86 cm), intake of antihypertensive drugs, family history of diabetes, physical activity, fruit consumption, BMI and previously altered blood glucose [13].

Participants and Methods

A descriptive, cross-sectional quantitative research was carried out in San Matías, Francisco Morazán, in June to July of 2019. During the study, we followed the good practices in health research and ethical principles of the declaration of Helsinki. The research protocol was not submitted to any ethics committee. We presented the protocol, and the Health Sector Chief of the Secretary of Health of Amaratéca was used as an institutional endorsement to revise and approve the research protocol. A sample of 59 people, 53 women and 6 men, were selected by a non-probability sampling for convenience [14-18].

Inclusion criteria

Male and female persons between the ages of 20 and 35 who resided in San Matías, Francisco Morazán and who agreed with informed consent to perform the necessary physical examination and complete the FINDRISK test during June and July 2019.

Exclusion criteria

People with special abilities who cannot provide informed consent, pregnant women and people diagnosed with diabetes mellitus.

The study began by requesting the health centre in charge of the area and providing information on the procedures and content of the test, the procedures necessary for calculating the abdominal circumference and Body Mass Index (BMI). Then, the execution of the instrument was continued, which consisted in the collection of general data: name, age, sex, telephone number

and FINDRISK test, which is made up of 8 questions: age, BMI, abdominal circumference, physical activity, vegetable intake and daily fruits, previous medication with hypertensive patients, a record of hyperglycaemia tests and family history of DM2, which have a value already established by the test [19-23].

The research team carried out data collection to take the abdominal perimeter using a millimetre tape. The patient was standing up, relaxed, without forced inspiration, and measuring at the level of the umbilical scar. For calculating the BMI, the height and weight were obtained with a scale that included a height rod, then the formula $BMI = \text{Weight in KG} / \text{height in m}^2$ was used.

To evaluate physical activity according to the FINDRISK test, it was considered positive in people who did some exercise outdoors or work during the day for 30 minutes or more. We considered a positive vegetable or fruit intake if the participants ate at least one fruit or vegetable daily during the last month. For the use of hypertensive drugs, we asked about previous diagnoses of hypertension and drugs prescribed to maintain adequate blood pressure [24,25].

We considered the hyperglycaemic history according to appointments, consultations or examinations that affirm a high glycemic index and the family history if they had close relatives (uncles, cousins, grandparents, mother, father or siblings) diagnosed with DM2.

At the end of the FINDRISK test, we made the addition of the points, 25 being the highest score (highest risk) and 0 the lowest score (lowest risk); the classification provided by the FINDRISK test consists of: <7 low risks (1% will likely develop DM2 in 10 years); 7-11 slightly moderate risk (4% could develop diabetes in 10 years); 12-14 moderate risk (17% could develop diabetes in 10 years); 15-20 high risk (33% could develop diabetes in 10 years), >20 very high risk (50% could develop diabetes in 10 years).

We constructed a database and performed analysis using 7.2.2.6 Epiinfo version, including descriptive bivariate and application of measures of central tendency to frequency average and standard deviation where needed. During the application of the instrument, we provided information with the consent to the participants about the advantages, disadvantages, benefits, risks of the research.

Results and Discussion

Regarding sex and age, 90% (53) of the participants were women, and 10% (6) were men. The average age was 26 years (Standard Deviation 2.72 variance 7.4), with 8% (5) being under 30 years of age. According to the FINDRISK test, 43% (25) of the population was overweight, and 20% had obesity, with a similar proportion in men (8%) and women (12%). We found that 24% (14) of the participants had an abdominal circumference above the normal range for men and women (94 cm-102 men; 80-88 cm Women), with a higher proportion in women (21%) than men (3%) (**Table 1**). 64% (38) of the participants proved to be sedentary, and 51% (30) maintain a diet based on carbohydrates and fats.

Table 1 Distribution of FINDRISK test results according to sex in the community of San Matías, Francisco Morazán, Honduras. N=59.

Categories Test Findrisk	Population		Male		Feminine	
	No.	%	No.	%	No.	%
BMI						
<25 Kg/m ²	22	37%	1	2%	21	35%
25-30 Kg/m ²	25	43%	0	0	25	43%
>30 Kg/m ²	12	20%	5	8%	7	12%
Abdominal Circumference						
<94 cm man; <80 Women	22	37%	2	3%	20	3.4%
94 cm-102 man; 80-88 cm Women	2.3	39%	2	3%	21	36%
>102 cm men; >88 cm women	14	24%	2	3%	12	21%
Physical Activity >30 min daily						
Yes	21	36%	2	3%	19	33%
No	38	64%	4	7%	3.4	57%
Daily Intake of Fruits and/or Vegetables						
Yes	29	49%	3	5%	26	44%
No	30	51%	3	5%	27	46%
Use of Antihypertensive						
Yes	0	0%	0	0%	0	0%
No	59	100%	6	10%	53	90%
High Glucose Levels Previously Detected						
Yes	0	0%	0	0%	0	0%
No	59	100%	6	10%	53	90%
Diagnosis of DM in family						
No	25	42%	1	2%	24	40%
Yes (grandparents, uncles or cousins)	21	36%	4	7%	17	30%
Yes (parents, siblings or children)	13	22%	1	2%	12	20%

Table 2 FINDRISK test. Distribution of the risk of developing type 2 Diabetes Mellitus in the next ten years according to sex in the community of San Matías. N=59.

Classification	BR ^a		RLM ^b		RM ^c		RA ^d		RMA ^e		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Sex												
Male	2	3%	1	2%	2	3%	1	2%	0	0%	6	10%
Feminine	22	37%	26	44%	5	9%	0	0%	0	0%	53	90%
Total	24	40%	27	46%	7	12%	1	2%	0	0%	59	100%

^a Low risk; ^b Slightly moderate risk; ^c Moderate risk; ^d High risk; ^e Very high risk

Regarding the risk of developing Type 2 Diabetes in the coming years, according to the score obtained in the FINDRISK test (**Table 2**), it was found that 40% (24) of people are within the low-risk classification, 46% (27) at slightly moderate risk, 12% (7) at moderate risk, 2% (1) at high risk, and 0% (0) at very high risk. According to gender, a moderate risk was higher in female participants (9%) than in men (3%).

During the study, we found no participants with a history of hypertension or high blood glucose levels. However, 58% (34) of them had a family history of type 2 diabetes mellitus.

Conclusion

Diabetes mellitus is a public health problem increasing worldwide, both in developed and underdeveloped countries. The FINDRISK test is an instrument that benefits to detect diabetes early and thus be able to prevent it. One of the factors that affect this disease is the low educational level of the population, especially in rural areas, where most of the sample were female, because most of

the women oversee their homes in this region, while the men are engaged in fieldwork. In our study, 89.8% of the participants were women, similar data was found in a study carried out in Barranquilla, Colombia, with the participation of 322 people, 214 were under 45 years of age, 79.5% of the participants were women, showing greater participation of women in studies of this type as happened in our study.

Our study found that 40% of people were classified as low-risk of developing Type 2 Diabetes in the next ten years; similar to that found in Barranquilla, Colombia (45%) and Argentina (43%), where uses the FINDRISK test. In contrast, in Manizales, Colombia, 93% were found to be at low risk. During the study, we found that 12% were at moderate risk, lower than Barranquilla (37.8%) but higher than Manizales (7%). On the other hand, we did not find participants within the high-risk classification compared to Manizales (3.4%) and Spain (19.5%).

Our study determined that 43% of the participants were overweight, similar to Manizales (42.7%), representing a

significant risk factor. About other risk factors found in the study participants, it was observed that a sedentary lifestyle (51%) is the main modifiable risk factor, followed by a poor diet (50%) where inadequate or insufficient consumption of fruits and vegetables was evaluated, these factors can modify the greater abdominal circumference factor (63%), directly related to overweight (43%) and obesity (20%) which are modifiable in the same way. The results are similar to those obtained in the study carried out in Barranquilla, Colombia, where it turned out that 74.85% did not perform physical activities, 56% did not consume daily fruits and vegetables, and 40% had a body mass index greater than 25 Kg/m².

One of the study's limitations was the small number of similar studies in the region and none in the country. On the other hand, it is essential to highlight that the FINDRISK test has been adapted to Latin American populations with good results but requires more studies at the local level. Similarly, the low participation of male patients in the study, the data is more representative of women, although the studies found showed similar results.

The study population is from the rural area, where, unfortunately, the educational levels are lower than in the urban area. Therefore, they are more likely not to understand the importance of hereditary factors and manage it in the nearest health centre or have check-ups of continuous glycemic levels. Furthermore, fewer economic resources leave a population at greater risk of

developing chronic non-communicable diseases such as diabetes mellitus due to poor diet and sedentary lifestyles. These are the most relevant factors in developing this disease, as observed in the previous research data.

In conclusion, the FINDRISK test can be used to assess the level of risk of developing diabetes mellitus, and it could be a handy tool to use in primary health care in the detection of type 2 diabetes mellitus and in the reduction of risk factors for patients more likely to develop it once the patient's risk has been recognized, the creation of education programs that promote a balanced diet and physical activity.

Contributions

Solano Velasquez, JZ designed the study; Alvarez, A, Valenzuela, A, Laitano, I. contributed to data collection, analysis, and interpretation. All authors contributed to the article's writing, reviewed its intellectual content, and approval of the final version of the article to be published.

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