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RESEARCH

Prevalence of overweight and obesity in adults with type 2 diabetes in Sinaloa, Mexico

Prevalencia de sobrepeso y obesidad en adultos con diabetes tipo 2 de Sinaloa, México

Prevalência de sobrepeso e obesidade em adultos com diabetes tipo 2 em Sinaloa, México

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Resumen

Introducción: El sobrepeso, la obesidad y diabetes en el mundo y en México posicionan a estos fenómenos como un problema de salud pública prioritario, la combinación de estas condiciones aumenta el riesgo de complicaciones micro y macrovasculares. **Objetivo:** Establecer la prevalencia de sobrepeso y obesidad al comparar por sexo y características sociodemográficas en adultos con diabetes tipo 2 en el periodo de agosto a diciembre de 2019 en clínicas de salud del norte de Sinaloa, México. **Metodología:** Estudio descriptivo transversal en 4 centros de salud del municipio de Ahome, El Fuerte y Guasave, Sinaloa, México,

muestra no probabilística de 556 adultos de mayores a 20 años, hombres y mujeres con un año o más de diagnóstico de diabetes tipo 2, todos firmaron consentimiento informado, se excluyeron a embarazadas. Se utilizó cédula de datos sociodemográficos, mediciones de peso, talla y circunferencia de cintura. **Resultados:** El 57 % fueron mujeres, la media de edad fue 50.4, diagnóstico de diabetes promedio 7.1 años. La prevalencia combinada de sobrepeso y obesidad fue 82 %. Hubo diferencia entre pacientes que vivían en zona rural y urbana p= .01, quienes tenían pareja presentaron prevalencia de sobrepeso y obesidad mayor en comparación con los solteros 23.9 % vs. 57.8. El 85.4 % presentó obesidad abdominal. **Conclusiones:** La prevalencia de sobrepeso y obesidad fue superior a lo reportado a nivel nacional, se requieren estrategias para seguimiento y control de peso en pacientes con diabetes tipo 2 que asisten a unidades de salud de primer nivel de atención.

Palabras clave: Sobrepeso; Obesidad; Diabetes Tipo 2; Prevalencia; Enfermería (DeCS).

Abstract

Introduction: Worldwide, and including Mexico, overweight, obesity, and diabetes are priority public health problems, since the combination of these conditions increases the risk of microvascular and macrovascular complications. **Objective:** To establish the prevalence of overweight and obesity when comparing sex and sociodemographic characteristics in adults with type 2 diabetes in the period from August to December 2019 in health hospitals in northern Sinaloa, Mexico. **Methodology:** Cross-sectional descriptive study in 4 health centers in the municipality of Ahome, El Fuerte, and Guasave, Sinaloa, Mexico non-probabilistic sample of 556 adults aged 20 years and older, men and women with a year or more of diagnosis of type 2 diabetes, all signed informed consent, however, pregnant women were excluded. A sociodemographic data questionnaire, weight, height and waist circumference measurements were used. **Results:** 57 % were women, mean age was 50.4, average diagnosis of diabetes was 7.1 years. The combined prevalence of overweight and obesity was 82 %. There was a difference between patients living in rural and urban areas p= .01, those who had a partner had a higher prevalence of overweight and obesity compared to single patients 23.9 % vs. 57.8. 85.4 % showed abdominal obesity. **Conclusion:** The prevalence of overweight and obesity was higher than reported nationally; strategies are required for follow-up and weight control in patients with type 2 diabetes who receive health care in first level health care units.

Key words: Overweight; Obesity; Type 2 diabetes; Prevalence; Nursing (DeCS).

Abstrato

Introdução: Em todo o mundo, inclusive no México, o sobrepeso, a obesidade e o diabetes são problemas prioritários de saúde pública, pois a combinação dessas condições aumenta o risco de complicações microvasculares e macrovasculares. **Objetivo:** Estabelecer a prevalência de sobrepeso e obesidade ao comparar sexo e características sociodemográficas em adultos com diabetes tipo 2 no período de agosto a dezembro de 2019 em hospitais de saúde no norte de Sinaloa, México. **Metodologia**: Estudo descritivo transversal em 4 centros de saúde no município de Ahome, El Fuerte e Guasave, Sinaloa, México, amostra

não probabilística de 556 adultos com 20 anos ou mais, homens e mulheres com um ano ou mais de diagnóstico de diabetes tipo 2, todos com consentimento informado assinado, mulheres grávidas foram excluídas. Foi utilizado um questionário de dados sociodemográficos, medições de peso, altura e circunferência da cintura. **Resultados:** 57% eram mulheres, a idade média era de 50,4 anos, o diagnóstico médio de diabetes era de 7,1 anos. A prevalência combinada de excesso de peso e obesidade foi de 82 %. Houve uma diferença entre os pacientes que viviam em zonas rurais e urbanas p= .01, os que tinham um parceiro tinham uma prevalência mais elevada de excesso de peso e obesidade em comparação com os únicos 23,9 % vs. 57,8. 85,4 % tinham obesidade abdominal. **Conclusões:** A prevalência de sobrepeso e obesidade foi maior do que a relatada nacionalmente; são necessárias estratégias para acompanhamento e controle de peso em pacientes com diabetes tipo 2 que recebem cuidados de saúde em unidades de saúde de primeiro nível.

Palavras-chave: Excesso de peso; Obesidade; Diabetes tipo 2; Prevalência; Enfermagem (DeCS).

Introduction

Overweight (OW) and Obesity (OB) are defined as an abnormal or excessive accumulation of fat that can be detrimental to health. These diseases are considered of multifactorial etiology, in which genetic, environmental, and lifestyle aspects are involved [(1)]. According to data from the World Health Organization (WHO) [(2)], since 1975 OB has almost tripled worldwide, in 2016 it was estimated that 39 % (1900 million) of adult people (over 18 years of age) had OW, of which 13 % (650 million) were living with OB.

In Mexico, in adults aged 20 years and older, the prevalence of OW and OB was estimated at 39.5% and 35.3%, respectively [(3)]. The epidemic of OW and OB in the world and Mexico places these conditions as a priority public health problem that requires attention and immediate cross-sectional actions for prevention, timely diagnosis, and control in the entire population. Despite the efforts of health organizations, the trend of these conditions seems to continue to increase. OW and OB are modifiable risk factors of great importance for the prevention of chronic diseases, among which diabetes stands out [(4-6)].

Worldwide, the International Diabetes Federation [(7)] estimated that 537 million people aged 20 to 79 years suffer from diabetes. The highest prevalence is found in low- and middle-income countries, including Mexico, which ranks sixth among countries with the highest prevalence of diabetes. The American Diabetes Association [(8)] classified diabetes into four categories: type 1 diabetes, type 2 diabetes (T2DM), gestational

diabetes and other types of diabetes due to other causes, of which, the WHO [9] globally identified T2DM as the most prevalent, accounting for more than 90-95% of cases.

In 2018, it was estimated that 13 % of the population in Mexico had DT2, a figure higher than that reported by the same survey in 2012. Researchers reported [10,11] that 68 % of patients did not have glycemic control, of which only 85.5 % received pharmacological treatment for DT2, they highlighted that only 26.8 % of patients acknowledged having modified their diet as part of the treatment; the percentage was lower for exercise (10.3 %). Lack of control of the disease increases the risk of microvascular and macrovascular complications, and they are more frequent in patients with OW and OB.

The American Diabetes Association [12] and the International Diabetes Federation [13] classified the treatment of DT2 as pharmacological (oral antidiabetics and insulin) and non-pharmacological (balanced diet and sufficient physical activity), which helps patients to improve their weight and reduce the risk of cardiovascular diseases, which are also the main causes of death. It has been evidenced that OW and OB are important risk factors for non-communicable diseases, causes of death in Mexican adults, disorders of the musculoskeletal system and some types of cancer (endometrial, breast, ovarian, prostate, liver, gall bladder, kidneys and colon), the risk of contracting these diseases increases with the increase in Body Mass Index (BMI), which refers to a simple indicator of the relationship between weight and height that is frequently used to classify OW and OB in adults.

There is strong and consistent evidence that OB control can delay progression from prediabetes to DT2 and is a protective factor for glycemic control. In DT2 adults with OW or OB, moderate and sustained weight loss has been shown to improve glycemic control and reduce the need for medications by improving glucose levels. In addition, it has been shown that in patients with DT2 and OB, extreme dietary energy restriction with very low-calorie diets can reduce glycosylated hemoglobin levels to <6.5 (48 mmol/mol) and fasting glucose to <126 mg/dL (7.0 mmol /L) in the absence of drug therapy [14,15].

In Mexican adults, prevalences of OW of 39.1 %, OB of 36.1 % and abdominal adiposity of 81.6 % have been reported (16-18). However, there is insufficient data available regarding the prevalence of OW and OB in the TD2 population. In this context, the nursing professional in his practice has been demonstrating the fundamental role he plays in the lives of people with DT2. Therefore, they have a decisive role in the identification of the prevalence of OW and OB, which allows to know the current situation and develop innovative practices for the control of DT2, which seek to improve health outcomes related to OWP and OB, reduce complications, overload on caregivers and the health system, in the state of Sinaloa no similar studies have been performed and according to the aforementioned is considered a need for scrutiny in this population that allows to have prevalence of OW and OB in the state. It is therefore important to know the prevalence of OW and OB in adults with type 2 diabetes. Therefore, it was proposed to conduct a study with the aim of establishing the prevalence of overweight and obesity by comparing them by sex and sociodemographic characteristics in adults with type 2 diabetes in the period from August to December 2019, in health clinics in northern Sinaloa, Mexico.

Methodology

Cross-sectional descriptive study [19], conducted in 556 adults with DT2 who visited four health centers in the municipalities of Ahome, El Fuerte, and Guasave, Sinaloa, Mexico, for control, in the period from July to December 2019. The sampling was non-probabilistic and included adults over 20 years of age, with more than one year of previous medical diagnosis of DT2, with the ability to stand on a scale and answer a questionnaire. Pregnant or breastfeeding women, adults with any disease that could alter their weight (hypothyroidism, anorexia, bulimia, etc.) were excluded.

For data collection, a sociodemographic data form was used, which included age, sex, schooling, occupation, marital status, years of diagnosis of TD2, urban or rural origin, and anthropometric measurements (weight, height and waist circumference). In anthropometric measurements, weight was expressed in kilograms and grams, it was measured with a scale, height was expressed in meters using a portable stadiometer; BMI was

calculated by clearing the following formula; weight (kg)/height^2 (mts), the result was classified according to NOM-08-SSA-2010 criteria as follows: underweight (<18.5), normal weight (>18.5 to 24.9), OW (>25 to 29.9) or OB (>30). Abdominal circumference was obtained with a flexible tape measure, expressed in centimeters, and the classification was determined as specified in NOM-008-SSA3-2010 [20] for the integral treatment of OW and OB: women < 80 cm and men < 94 cm. It should be noted that the measuring instruments used have good sensitivity and specificity, although it is recognized that there is no perfect measurement; there may be errors in both direct and indirect measurement [19]. The study was approved by the Ethics and Research Committee of the Faculty of Nursing with registration CIE-000-29 and authorization from the directors of the health institutions. Participants were approached in the waiting room for consultation and invited to participate in the study; those who met the criteria and confirmed their desire to participate, signed the informed consent, and at all times confidentiality and dignified treatment of the participants was ensured. The study followed the guidelines of the regulations of the General Health Law on health research [21].

Data were processed in the Statistical Package for Social Sciences (SPSS) version 25 for Windows in Spanish; the quantitative variables were presented in measures of central tendency and dispersion; the categorical variables were expressed in frequencies and percentages. Cross tables were used to calculate prevalences by category, and the Chi-square test was used to identify differences between groups.

Results

Fifty-seven percent of the participants were women, whose mean age was 50.4 years (SD=12.3) and they reported having 7.1 (SD=5.7) years of diagnosis of DT2. Regarding the schooling of the participants, 40.1 % had secondary education, 31.3 % had elementary school education, 15.3 % had high school education, 7.7 % had a professional career and 5.6 % had no studies. Seventy percent of the participants reported having a partner, 53.1% reported living in rural areas. The participants reported being housewives (41.2 %), employees (36.2 %), and day laborers (11.0 %). Table 1 shows that women showed higher prevalences of

OW and OB compared to men (47.5 % vs. 34.5 %), patients residing in rural areas presented higher prevalence of OW and OB (42.1 % vs. 39.9 %, x2= 8.5, p=.01) compared to those living in urban areas. In occupation, it was identified that employed people presented higher prevalences of OW and OB than those unemployed (43.2 vs. 38.8 %, x2= 8.5, p=.01). In the prevalence of OW and OB by schooling, it was found that patients with elementary education (OW=13.1 % and OB=11.7 %) and secondary education (OW=20.7 % and OB=14.6 %) showed the highest prevalences compared to those with high school and professional education (x2=16.2, p=.01).

In relation to the BMI and waist measurement (CC due to its acronym in Spanish) means due to sociodemographic characteristics, it was highlighted that, in all the categories related to the participants, means higher than the cut-off points of the NOM-008-SSA3-2010 were shown; when adjusting the BMI means by age groups, it was identified that these were higher in women aged 40 to 49 years (M=30.1, IC95 % 28.6-31.6) and 50-59 years (M=30.2, IC95 % 28.8-31.6). People living in rural areas (M=29.2, 95%CI 28.6-29.8) had slightly higher BMI mean compared to those living in urban areas (28.7, 95%CI 28.1-29.3). Unmarried participants showed the highest mean of all groups (M= 29.5, CI95 % 28.4-30.7). Moreover, those with secondary education (M= 29.3, CI95 % 28.6-30.0) and high school education (M= 29.7, CI95 % 28.3-31.0) showed higher means, (Table 2).

Table 1. Prevalences of body mass index according to sociodemographic characteristics in adults with type 2 diabetes. 2019, (n=556)

	Body Mass Index										
	Normal weight		Overweight		Obesity		Total		x^2	gl	p
	%	IC95 %	%	IC9 5%	%	IC95 %	%	IC95 %			
Sex											
Man	8.5	(6.4-11.0)	20.3	(17.1-23.8)	14.2	(11.5-17.3)	43.0	(38.9-47.1)	1.4	2	.47
Woman	9.5	(7.3-12.2)	26.1	(22.6-29.8)	21.4	(18.1-25.0)	57.0	(52.9-61.1)			
Age (years)											
20-29	0.7	(0.2-1.7)	2.3	(1.3-3.9)	1.6	(0.8-2.9)	4.6	(3.2-6.7)			
30-39	2.5	(1.5-4.1)	9.4	(7.1-12.0)	5.8	(4.0-7.9)	17.7	(14.6-21.0)			
40-49	4.1	(2.7-6.0)	9.7	(7.5-12.4)	9.4	(7.1-12.0)	23.2	(19.8-26.8)	7.3	8	.50
50-59	4.1	(2.7-6.0)	13.1	(10.5-16.1)	9.5	(7.3-12.2)	26.7	(23.2-30.6)			
≥60	6.5	(4.7-8.7)	11.9	(9.4-14.8)	9.4	(7.1-12.0)	27.8	(24.1-31.5)			
Origin											
Rural zone	11.0	(8.6 13.8)	21.6	(18.3-25.1)	20.5	(17.3-24.0)	53.1	(48.9-57.2)	8.6	2	*.01
Zone	7.0	(5.1-9.4)	24.8	(21.4-28.5)	15.1	(12.3-18.3)	46.9	(42.8-51.1)			
Marital status											
Without partner	6.1	(4.3-8.3)	12.6	(10.0-15.5)	11.3	(8.9-14.2)	30.0	(26.3-33.9)	2.1	2	.35
With partner	11.9	(9.4-14.8)	33.8	(30.0-37.8)	24.3	(20.9-28.0)	70.0	(66.1-73.7)			
Job											
Yes	9.7	(7.5-12.4)	27.2	(23.6-31.0)	16.0	(13.1-19.2)	52.9	(48.7-57.0)	8.4	2	*.01
No	8.3	(6.2-10.8)	19.2	(16.1-22.7)	19.6	(16.5-23.1)	47.1	(43.0-51.3)			
Schooling											
No studies	1.6	(0.8-2.9)	2.3	(1.3-3.9)	1.6	(0.8-2.9)	5.5	(3.9-7.7)			
Elementary	6.5	(4.7-8.7)	13.1	(10.5-16.1)	11.7	(9.2-14.6)	31.3	(27.5 -35.2)			
Secondary	4.9	(3.3-6.9)	20.7	(17.5-24.2)	14.6	(11.8-17.7)	40.2	(36.1-44.2)	18.3	8	*.01
High school	2.7	(1.6-4.3)	6.3	(4.5-8.5)	6.3	(4.5-8.5)	15.3	(12.5-18.5)			
Professional	2.3	(1.3-3.9)	4.0	(2.6-5.8)	1.4	(0.7-2.7)	7.7	(5.7-10.2)			
CC. (cm)											
Obesity	14.2	(2.4-5.6)	37.9	(6.4-11.0)	33.3	(1.3-3.9)	85.4	(11.8-17.7)	16.2	2	*.00
Normal	3.8	(11.5-17.3)	8.5	(34.0-42.0)	2.3	(29.5-37.3)	2.3	(82.3-88.2)			
Years of Dx.											
≤ five years	6.1	(4.3-8.3)	20.0	(16.8-23.4)	13.7	(11.0-16.7)	39.7	(35.7-43.9)	2.68	2	.26
≥ five years	11.9	(9.4-14.8)	26.4	(22.9-30.2)	21.9	(18.7-25.5)	60.3	(56.1-64.3)			

Source: Self-development

CC = Waist circumference, Dx = DT2 diagnosis, χ2 = Pearson's Chi square, % = percentage, *p< .05.

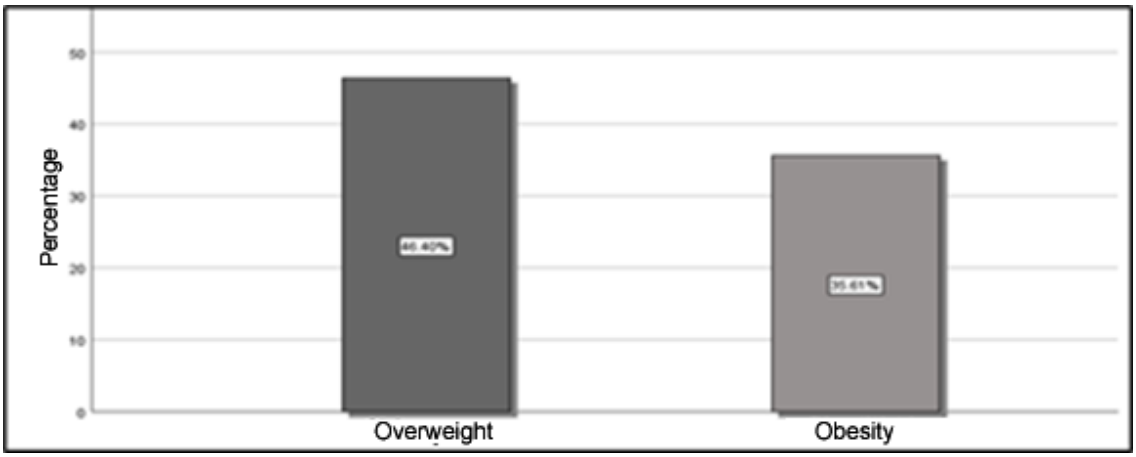
Table 2. Mean body mass index and waist circumference in adults with type 2 diabetes by sex and sociodemographic characteristics. 2019, (n= 565)

	IMC (Kg/m^2)						Waist circumference (cm)					
	Men (n= 238)		Women (n=317)		Total (n=556)		Men (n= 238)		Women (n=317)		Total (n=556)	
	Mean	IC95 %	Mean	IC95 %	Mean	IC95 %	Mean	IC95 %	Mean	IC95 %	Mean	IC95 %
Age												
20-29	27.2	(24.9-29.5)	29.1	(26.9-31.3)	28.4	(26.9-30.0)	101.4	(94.1-108.7)	96.6	(91.9-101.3)	98.3	(94.5-102.0)
30-39	28.3	(27.5-29.2)	28.6	(27.4-29.8)	28.5	(27.8-29.2)	98.7	(95.0-102.3)	100.2	(97.3-103.0)	99.4	(97.2-101.7)
40-49	28.4	(27.3-29.5)	30.1	(28.6-31.6)	29.3	(28.4-30.3)	99.0	(96.2-101.9)	98.8	(96.8-100.8)	98.9	(97.3-100.6)
50-59	28.1	(27.3-29.0)	30.2	(28.8-31.6)	29.2	(28.4-30.1)	101.8	(99.2-104.4)	102.4	(100.1-104.5)	102.1	(100.4-103.7)
≥60	29.5	(27.6-31.4)	28.3	(27.3-29.3)	28.8	(27.8-29.7)	101.3	(98.0-104.7)	102.0	(99.8-104.1)	101.7	(99.9-103.5)
Origin												
Rural zone	28.0	(27.2-28.7)	29.9	(29.0-30.7)	29.2	(28.6-29.8)	102.0	(99.9-104.1)	102.3	(101.0-103.7)	102.2	(101.1-103.3)
Urban zone	29.0	(28.1-29.9)	28.4	(27.5-29.2)	28.7	(28.1-29.3)	99.2	(97.2-101.2)	98.4	(96.6-100.1)	98.8	(97.5-100.1)
Marital status												
Widow	29.8	(25.4-34.2)	26.8	(25.6-28.0)	27.8	(26.2-29.4)	97.1	(87.0-107.3)	99.6	(94.4-104.8)	98.8	(94.3-103.3)
Divorced	29.0	(26.8-31.2)	27.4	(25.6-29.2)	27.9	(26.5-29.2)	101.1	(87.3-114.9)	101.0	(96.4-105.5)	101.0	(96.5-105.5)
Married	28.6	(27.8-29.4)	29.3	(28.5-30.1)	29.0	(28.4-29.5)	100.0	(98.2-101.8)	100.9	(99.5-102.3)	100.5	(99.4-101.6)
Common	27.2	(25.8-28.7)	30.0	(28.0-31.9)	28.9	(27.6-30.2)	100.5	(96.2-104.9)	102.0	(97.8-106.2)	101.4	(98.4-104.4)
Single	28.6	(27.2-30.1)	30.2	(28.5-31.8)	29.5	(28.4-30.7)	102.3	(98.8-105.9)	100.0	(97.7-102.4)	101.0	(99.0-103.0)
Schooling												
No studies	27.5	(25.3-29.7)	27.8	(25.5-30.0)	27.7	(25.9-29.5)	99.8	(91.9-107.7)	103.8	(99.9-107.7)	102.9	(99.5-106.2)
Elementary	28.3	(27.1-29.5)	29.4	(28.3-30.4)	28.9	(28.2-29.7)	103.5	(100.6-106.4)	102.9	(101.0-104.8)	103.2	(101.5-104.8)
Secondary	29.1	(28.2-30.1)	29.4	(28.5-30.4)	29.3	(28.6-30.0)	103.2	(100.8-105.5)	100.4	(98.6-102.1)	101.5	(100.1-103.0)
High school	28.7	(27.2-30.3)	30.8	(28.5-33.1)	29.7	(28.3-31.0)	94.1	(91.7-96.4)	97.28	(94.3-100.2)	95.6	(93.7-97.4)
Professional	26.8	(25.3-28.4)	26.5	(25.3-27.8)	26.7	(25.7-27.7)	92.8	(89.5-96.1)	95.16	(93.0-97.2)	93.8	(91.8-95.8)

Source: Self-development

Figure 1 shows that more than 80% of the participants presented OW or OB according to the cut-off points suggested in NOM-08-SSA-2010 for the comprehensive treatment of OW and OB.

Figure 1. Prevalence of Overweight and Obesity in Adults with Type 2 Diabetes. 2019, (n= 565)



Source: Self-development

Discussion

The present study aimed to establish the prevalence of OW and OB in adults with DT2 who attended DT2 control at four health centers in northern Sinaloa, Mexico, and to compare by sex and sociodemographic characteristics. The results of the prevalence of OW and OB obtained are higher than those reported by the ENSANUT 2018-19 for general population [10] i.e. three quarters of the population. This situation represents a major challenge for health institutions, especially those operating disease prevention and control programs, the family and social network of the community and patients with TD2. These conditions are modifiable factors that affect the control of T2D, making it difficult to achieve optimal glycemic control, increasing cardiovascular risk, compromising adherence to treatment, worsening the cardiovascular risk profile and limiting the benefits of treatment [22].

According to the sociodemographic and economic indicators [23], the sex and schooling of the participants were similar to those reported at the national level, which suggests that the study population is similar to

the general population. These two indicators are of great relevance in the population with diabetes, because it is suggested [24] that the level of education is a fundamental determinant of mortality due to TD2 in both sexes, with greater relevance in women. However, in terms of marriage, the study population considerably exceeds the general population, which could suggest a protective factor, which is supported by the fact that widowed or separated women have higher mortality rates [25]. Occupation is above the national average, which could suggest that the study participants are economically more active and have higher incomes. With regard to geographic area, the highest percentage is in rural areas, which differs from national sources [26] that indicate that the number of inhabitants of urban areas has been increasing and, in contrast, that of rural areas has been decreasing.

In this study, people living in rural areas presented slightly higher prevalences of OW and OB than those living in urban areas, although the rural context has been a protective factor for TD2 [27], the transition of communities from a traditional diet to one considered modern, characterized by high consumption of ultra-processed and low-cost foods, probably represents a risk for the patient with TD2 by increasing BMI and thus leading to OW and OB. In addition, the increase in job opportunities in the manufacturing industry demands less physical activity, which increases the risk of OW and OB [28].

Another important finding of this study was that the population with less schooling presented higher prevalences of OW and OB, this is consistent with what has been reported previously, because it has been shown that higher schooling is related to higher health literacy, which favors the understanding of information for the self-management of TD2, thus. Improving adherence to treatment decreases BMI and improves glycemic control [29].

Regarding BMI and CC according to sociodemographic and economic indicators, the results of the present study coincide with scientific evidence [25] that indicates that older women have a higher prevalence of abdominal OW and OB compared to men. In addition, it is suggested that they have an inverse relationship with educational level. The aforementioned points to the need to implement interventions that favor adult

women with low educational level. Weight reduction can be achieved through different weight loss strategies. These include lifestyle intervention (diet and exercise), pharmacotherapy or bariatric surgery. However, not all of these strategies are suitable for all patients and the patient's comorbidities, psychological, social and cultural context should be considered when planning programs and public policies. Therefore, therapeutic weight control strategies that can be easily adapted for the management of obese patients with TD2 are warranted [30-32].

Policies to increase healthy food consumption and physical activity are essential to improve the control of TD2, decrease its incidence and improve the BMI profile. A patient-centered treatment plan should be implemented, empowering patients, involving the family and timely diagnosis of complications. This requires a cross-sectional effort and a comprehensive approach that includes strengthening preventive and educational services, defining goals and individualized control, and coordinated implementation [33]. In addition, systemic, structural, and socioeconomic factors that may affect dietary patterns and food choices, such as food insecurity and hunger and access to healthy food options should be assessed as well as health cultural circumstances and social determinants [34].

The main strength of this study was to identify factors such as OW and OB in patients with a chronic disease that could increase the risk of showing early complications and the development of cardiovascular disease. In addition, the use of reliable anthropometric measurements that allow us to determine the nutritional status of the patient with DT2.

Conclusions

The prevalence of OW and OB was high. People living in rural areas had slightly higher prevalence of OW and OB than those living in urban areas; the population with less schooling had higher prevalence of OW and OB. For future studies, we suggest the identification of factors associated with OW and OB to create cross-sectional programs and public policies that consider psychological, social and cultural aspects for the

prevention, follow-up and weight control of people with TD2 who receive health care from primary health care units.

Conflicts of Interest

The authors stated that they do not have any conflict of interest in relation to the article.

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