Prevalence of overweight and obesity in school-age children

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Abstract

Introduction: Childhood obesity is a public health challenge. Between 1999 and 2012, the prevalence in Mexico of overweight and obesity in schoolchildren went from 25.5 to 32 %. **Objective:** To report current prevalence of overweight and obesity in schoolchildren from the municipality of Durango, Mexico. **Method:** Cross-sectional survey conducted between January 2017 and December 2018. A total of 24,600 children aged between six and 11 years from 138 schools of the municipality of Durango were included. The body mass index reference values established by the World Health Organization were used to determine the presence of overweight and obesity. **Results:** The prevalence of overweight was 19.7 %, of obesity, 16 %, and of overweight and obesity combined, 35.7 %. In the six-year-old group, a prevalence of overweight-obesity of 25.4 % was found, and in the 11-year-old group, 41.1 %. **Conclusions:** The prevalence of overweight-obesity in children aged from 6 to 11 years in the municipality of Durango is higher than those reported in the national survey by states in 2012 and in the 2016 national survey; a trend towards an increase with age was observed.

KEY WORDS: Obesity. Overweight. School-age children.

Prevalencia de sobrepeso y obesidad en niños escolares

Resumen

Introducción: La obesidad infantil es un reto de salud pública. Entre 1999 y 2012, en México la prevalencia de sobrepeso y obesidad (SO) en niños escolares pasó de 25.5 a 32 %. **Objetivo:** Reportar la prevalencia actual de SO en niños escolares del municipio de Durango, México. **Método:** Encuesta transversal realizada entre enero de 2017 y diciembre de 2018. Se incluyeron 24 600 niños de seis a 11 años, de 138 escuelas del municipio de Durango. Se utilizaron los valores de referencia del índice de masa corporal establecidos por la Organización Mundial de la Salud para determinar la presencia de SO. **Resultados:** La prevalencia de sobrepeso fue de 19.7 %, la de obesidad de 16 % y la de SO de 35.7 %. En el grupo de seis años se encontró una prevalencia de SO de 25.4 % y en el de 11 años, de 41.1 %. **Conclusiones:** La prevalencia de SO en niños de seis a 11 años del municipio de Durango es más elevada que la reportada en la encuesta nacional por entidad federativa en 2012 y la nacional en 2016; se observó tendencia al incremento en la prevalencia conforme aumenta la edad.

PALABRAS CLAVE: Obesidad. Sobrepeso. Escolares.

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Introduction

Although the prevalence of overweight and obesity in children has increased over the past 50 years, both in developing and developed countries, the childhood obesity increase rate is up to 30 % higher in countries with low or moderate income than in those with a high income.¹ This has made for childhood obesity to be considered as an emerging global public health problem, with not-yet-determined social and economic consequences.

Children with overweight and obesity generally continue to be obese throughout their lives and are more likely to develop non-communicable diseases such as diabetes, cardiovascular disorders, dyslipidemia, and orthopedic, neurological, lung and liver problems.^{2,3}

In Mexico, the prevalence of overweight and obesity in school-age children showed a significant increase between 1999 and 2012: it went from 25.5 to 32 %.⁴

The results of the 2012 National Health and Nutrition Survey (ENSANUT – *Encuesta Nacional de Salud y Nutrición*)⁵ showed that, in the state of Durango, the prevalence of overweight and obesity in children aged from five to 11 years was 33.8 %, and it was higher in boys (37.5 %) than in girls (29.8 %). “Half-Way” ENSANUT in 2016⁶ reported a national prevalence of overweight-obesity of 32.8 % in girls and 33.7 % in boys; in northern Mexico, the prevalence of overweight-obesity in children aged from 5 to 11 years was 29.5 %.

The purpose of this study was to determine the prevalence of overweight-obesity in children who attend primary schools in the municipality of Durango.

Method

After approval of the study by the Research Ethics Committee of the Mexican Institute of Social Security (2016-785-103), and after informed consent was granted by the parents of all participants, a descriptive, cross-sectional study was carried out in collaboration with the National System for Comprehensive Development of the Family of Durango, through the Comprehensive Health program that the state government has implemented in primary schools, which among its actions includes nutritional assessment of the children enrolled in primary schools of the public system.

Between January 2017 and December 2018, all children aged between six and 11 years included in the Comprehensive Health program for that period and

who were enrolled in 138 (68.3 %) schools out of a total of 202 located in the municipality of Durango were included.

Previously trained nutrition professionals determined weight and height using scales (Beurer, model MS 50) and portable stadiometers (Seca, model 213).

The overweight-obesity diagnosis was established according to the body mass index (BMI) based on the World Health Organization reference tables (BMI Z-values-for-age from five to 19 years).⁷ According to the number of inhabitants, the localities were classified as urban (more than 2,500 inhabitants) and rural (less than 2,500 inhabitants).

The information was collected in Excel spreadsheets and analyzed with the SPSS statistical program, version 15.

Results

A total of 24,600 children were included in the study, out of which 77.1 % came from urban localities and 22.9 % from rural localities. The prevalence of overweight-obesity was 35.7 % (19.7 % overweight and 16.0 % obesity); in urban schools, the prevalence was 36.7 %, while in rural schools it was 31.7 %.

In urban localities, the prevalence of overweight was higher in girls (21.2 %) than in boys (19.1 %), while the prevalence of obesity was higher in boys (19.2 %) than in girls (14.3 %). A similar pattern was observed in rural areas, with more overweight in girls (18.9 %) than in boys (17.7 %) and higher prevalence of obesity in males (15.0 %) than in females (11.7 %) (Table 1).

When the results were analyzed by age, the prevalence of overweight-obesity was 25.4 % in six-year-old children and 41.1 % in those aged 11 years (Table 2).

Discussion

The prevalence of overweight-obesity in children aged from 6 to 11 years in the municipality of Durango was 35.7 %, which is 1.9 % higher (1.2 % overweight and 0.7 % obesity) than that reported in ENSANUT 2012⁵ (Table 3).

According to Half-Way ENSANUT 2016 data, the national prevalence of overweight-obesity was 33.2%.⁶ Given that the survey did not provide results by state, the prevalences recorded in our study were compared with those reported in ENSANUT 2012.⁵ By gender, the prevalence of overweight-obesity had an increase of 4.5 % in girls, while in boys it decreased by 0.5 %.

Table 1. Prevalence of overweight and obesity by type of locality and gender

Locality	Girls						Boys					
	Normal weight		Overweight		Obesity		Total		Overweight + obesity		Obesity	
	n	%	n	%	n	%	n	%	n	%	n	%
Urban	6147	64.6	2014	21.2	1358	14.3	3372	35.4	9519	61.7	1803	19.1
									5829		1813	19.2
Rural	1977	69.4	537	18.9	334	11.7	871	30.6	2848	67.3	493	17.7
									1876		419	15
Total	8124	65.7	2551	20.6	1692	13.7	4243	34.3	12367	63	2296	18.8
									7705		2232	18.2
											4528	37
												12233

Table 2. Prevalence of overweight and obesity by age

Age (years)	Girls						Boys											
	Normal weight		Overweight		Obesity		Overweight + obesity		Total	Normal weight		Overweight		Obesity		Overweight + obesity		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	
6	1640	76.1	334	15.5	180	8.4	514	23.9	2154	1606	73.1	353	16.1	237	10.8	590	26.9	2196
7	1417	69.0	372	18.1	266	12.9	638	31.0	2055	1437	66.7	376	17.4	344	15.9	720	33.3	2157
8	1349	62.6	475	22.1	330	15.3	805	37.4	2154	1258	63.6	346	17.5	374	18.9	720	36.4	1978
9	1338	63.9	468	22.3	290	13.8	758	36.1	2096	1194	59.4	379	18.9	435	21.7	814	40.6	2008
10	1270	61.8	463	22.5	323	15.7	786	38.2	2056	1153	55.9	444	21.5	467	22.6	911	44.1	2064
11	1110	59.9	439	23.7	303	16.4	742	40.1	1852	1057	57.8	398	21.7	375	20.5	773	42.2	1830

Table 3. Prevalence of overweight and obesity in Durango according to ENSANUT 2012 and to the present study

	Girls			Boys		
	Overweight	Obesity	Overweight + obesity	Overweight	Obesity	Overweight + obesity
2012*	15.9 (10.2-23.9)	13.9 (9.2-20.3)	29.8 (21.9-39.0)	20.8 (15.7-27.0)	16.7 (11.0-24.4)	37.5 (30.2-45.4)
2018**	20.6 (19.8-21.3)	13.7 (13.0-14.3)	34.3 (33.4-35.1)	18.8 (18.1-19.4)	18.2 (17.5-18.8)	37.0 (36.1-37.8)

The values represent the prevalence and 95 % confidence intervals.

*ENSANUT 2012 data⁵; **Data from this study.

The increase in the prevalence of overweight-obesity in girls was determined by the significant increase in the prevalence of overweight, which went from 15.9 % to 20.6 % in six years. In boys, overweight decreased by 2 %: from 20.8 %, it went to 18.8 %. The prevalence of obesity in girls decreased by 0.2 %, while in boys, it increased by 1.5 %.

Regarding the type of locality, the prevalence of overweight-obesity increased by 1.2 % (0.6 % overweight and 0.6 % obesity) in urban localities, while in rural areas the increase was 1.7 % (1.9 % overweight and 0.2 % obesity).

When the data were analyzed by age, the prevalence of overweight-obesity was lower at six than at 11 years of age (25.4 and 41.1 %). When the information was broken down by gender, the same trend was observed. This result suggests that, at the time of admission to primary school, one fourth part of the children have overweight or obesity problems, probably related to lifestyle in the family environment and genetic factors (genome and gut microbiome) and to the fact that in schools there are adverse environments that favor the development of overweight and obesity.

In comparison with ENSANUT 2006,⁸ which, like our study, provided results by age groups, the fact that the prevalence of overweight-obesity in 11-year-old children (32.5 %) was higher than in those aged five (17.7 %) stood out. Similarly, the prevalence of overweight-obesity in 11-year-old girls was higher (29.5 %) than that of five-year-old girls (21.2 %).

In comparison with ENSANUT 2012,⁵ ENSANUT 2006⁷ reported a slight decrease in the prevalence of overweight in girls (16.5 % versus 15.9 %), and thus the prevalence of 20.6 % documented in the present study is the highest observed in the last 12 years in the state.

The increase in the prevalence of overweight in girls should be considered as a warning, since the risk of developing obesity and the comorbidities associated with it increase if this condition continues until adolescence, a stage in which there are changes in the body

composition associated with puberty (characterized by a decrease in insulin sensitivity, which promotes an increase in body fat), together with a decrease in regular physical activity and increased intake of foods with higher caloric content.⁹

Even when the problem represented by the high prevalence of overweight-obesity is well documented in schoolchildren, and various nutritional education interventions and physical activity recommendations have been established, these have not been effective for stopping it, which suggests that public policies in this area require substantial modifications.^{10,11}

Access to the entire sample conferred robustness and reliability to the results, as demonstrated by the reduced confidence intervals, which are considerably lower than those obtained in ENSANUT 2006 and 2012.^{7,5} One weakness of our study is that the recorded prevalence might not represent that of other rural populations of the state, due to their proximity to the city of Durango.

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Conflict of interests

None

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Ethical disclosures

The authors declare that no experiments were performed on humans or animals for this investigation.

Confidentiality of data. The authors declare that they followed the protocols of their workplace regarding the publication of third-party data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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