OVERWEIGHT AND OBESITY: MOTHERS AND ADOLESCENTS IN CHIAPAS, MEXICO

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CONTEXT

- Increase in prevalence of overweight/obesity (ow/ob) during the 21st century (Rtveladze et al., 2014)
  - Relationship to diabetes and cardiovascular disease, burden for health system
  - Risks during pregnancy
- Chiapas, the double burden of malnutrition, and the nutritional transition (Popkin, 1994; Ruiz García et al., 2018)
- Necesity for more investigations into the increase in ow/ob and factors related to marginalization in the south/southeast of Mexico

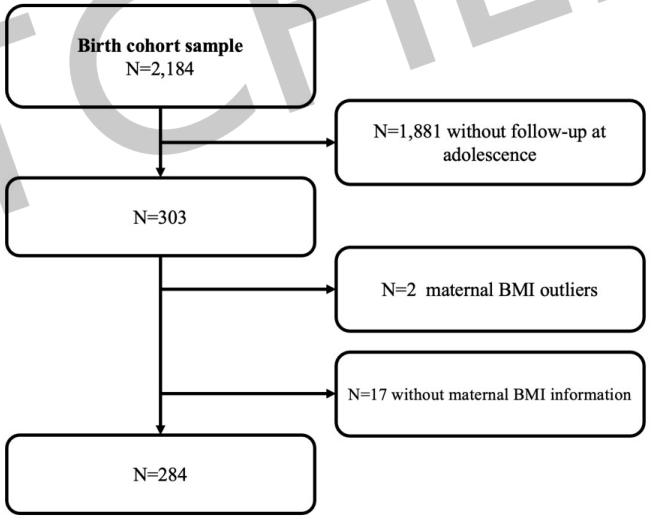
OBJECTIVES

- **What is the influence of maternal risk factors on adolescents' overweight/obesity status?**
- **To analyze the relationship between maternal risk factors and adolescent overweight/obesity in Chiapas through a case-control design**
  - **To analyze how maternal physical factors (waist circumference, ow/ob) are related to the probability that an adolescent is ow/ob**
  - **To analyze how maternal socioeconomic and demographic factors (age, language, schooling) are related to the probability that an adolescent is ow/ob**
  - **To further understand how maternal health and characteristics are related to intergenerational health**

METHODS

- Study population
  - 2003: "Randomised equivalency trial comparing 2.5% povidone-iodine eye drops and ophthalmic chloramphenicol for preventing neonatal conjunctivitis in a trachoma endemic area in southern Mexico" (Ramirez-Ortiz et al., 2007)
  - 2017: "Intrauterine growth restriction and overweight, obesity, and stunting in adolescents of indigenous communities of Chiapas, Mexico" (Flores-Guillén et al., 2020).
- Study design
  - 284 adolescents and their mothers (Cases: 83; Controls: 201)
  - Exposures (maternal factors): indigenous language, schooling (2003 and 2017), ow/ob, high waist circumference (88.9 cm)
- Data analysis
  - Crude OR
  - Adjusted OR, logistic regression

Figure 1. Flow chart showing participant selection. (n=284)



Note. Adapted from (Castro-Quezada et al., 2019).

RESULTS: DESCRIPTIVE STATISTICS

- Adolescents
  - Average age 2017: 14.1
  - 53.5% male, 46.5% female
- Urban
- Altos 70.1%,
- Household ítems

- Mothers
  - Average age 2003: 24.8
  - Median schooling: 6 años
  - Ow/ob 86.0%
  - High waist circumference 66.2%

- Differences between cases and controles
  - Sex: more males in case group
  - Stratum: more urban residents in the case group
  - IUGR: more common in control group
  - Maternal BMI: higher in case group
  - Waist circumference: higher in case group

Table 1. Descriptive statistics of case-control population. (n=284)

	Cases	Controls	Total	p-Value*
	n=83	n=201	n=284	
Age•	14.1, 0.2, [13.6-14.7]	14.1, 0.2, [13.7-14.8]	14.1, 0.2, [13.6-14.7]	0.117
Sex (%)				0.028
Male	36 (43.4)	116 (57.7)	152 (53.5)	
Female	47 (56.6)	85 (42.3)	132 (46.5)	
Region of residence (%)				0.274
Altos	62 (74.7)	137 (68.2)	199 (70.1)	
Selva	21 (25.3)	64 (31.8)	85 (29.9)	
Stratum (%)				0.020
Urban	70 (84.3)	143 (71.1)	213 (75.0)	
Rural	13 (15.7)	58 (28.9)	71 (25.0)	
IUGR (%)†				0.006
Restriction	14 (17.1)	67 (33.3)	81 (28.6)	
Normal	68 (82.9)	134 (66.7)	202 (71.4)	
LBW (%)				0.098
Low	5 (6.02)	26 (12.94)	31 (10.9)	
Normal	78 (94.0)	175 (87.1)	253 (89)	
Household items - Yes (%)				
Electric lights	83 (100)	200 (99.5)	283 (99.7)	0.520
Gas stove	83 (100)	135 (67.2)	195 (66.7)	0.061
Cell phone (head of household)	83 (100)	152 (75.6)	219 (77.1)	0.352
Piped water	81 (97.6)	190 (94.5)	271 (95.4)	0.261
Refrigerator	56 (67.5)	122 (60.70)	178 (62.7)	0.283
Distribution of maternal characteristics				
Adolescent mother				0.490
19 and under	20 (24.1)	41 (20.4)	61 (21.5)	
>19	63 (75.9)	160 (79.6)	223 (78.5)	
Mother's language (%)†				0.794
Indigenous	37 (44.6)	92 (45.8)	129 (45.4)	
Spanish	46 (55.4)	108 (53.7)	154 (54.2)	
Years of schooling 2003	7.08, 4.2, [0-16]	6.0, 3.9, [0-16]	6.3, 4.0, [0-16]	0.028
Median schooling 2003 (%)				0.027
Median schooling & below	42 (49.4)	130 (64.7)	172 (60.6)	
Above median schooling	41 (50.6)	71 (35.3)	112 (39.4)	
Years of schooling 2017†	7.3, 4.8, [0-17]	6.2, 4.4, [0-17]	6.5, 4.5, [0-17]	0.038
Median schooling 2017 (%) †				0.024
Median schooling & below	40 (48.2)	126 (62.7)	166 (58.5)	
Above median schooling	43 (51.8)	75 (37.3)	118 (41.6)	
Maternal BMI	30.7, 4.0, [21.5-39.5]	29.3, 4.5, [17.8-44.7]	29.7, 4.4, [17.8-44.7]	0.015
Maternal ow/ob (%)				0.024
Ow/ob	78 (94.0)	169 (84.1)	247 (87.0)	
Maternal waist circumference (%)				0.026
Above 88.9 cm	63 (75.9)	125 (62.2)	188 (66.2)	
Below 88.9 cm	20 (24.1)	76 (37.8)	96 (33.8)	

Mean (normal distributions) *or* median (non-normal distribution), SD, [Range]
*Differences across categories were analyzed using a two-tail t-test for normally distributed continuous variables, Mann-Whitney U test for continuous variables not normally distributed, and Chi-square analysis or Fisher's exact test (when five or fewer observations)
•Non-normal distribution
†Missing data point, median used for continuous variables

RESULTS: CASE-CONTROL
MATERNAL FACTORS

Median schooling & below 2003

- Crude 0.56, 0.027, [0.32-0.97]
- Adjusted 0.49, 0.011, [0.28-0.85]
- Confounding: Ado. sex, intrauterine growth, mother's BMI

Median schooling & below 2017

- Crude 0.55, 0.024, [0.31-0.96]
- Adjusted 0.51, 0.015, [0.29-0.88]
- Confounding: Ado. sex, intrauterine growth, mother's BMI

Indigenous language

- Crude 0.93, 0.795, [0.54-1.61]
- Adjusted 1.59, 0.148, [0.85-3.00]
- Confounding: Ado. sex, intrauterine growth, mother's BMI, mother's schooling 2003, stratum

Adolescent mother 2003

- Crude 1.24, 0.490, [0.64-2.36]
- Adjusted 1.51, 0.220, [0.78-2.90]
- Confounding: Ado. sex, intrauterine growth, mother's BMI , mother's schooling 2003

Overweight/obese

- Crude 2.95, 0.024, [1.21-7.87]
- Adjusted 2.70, 0.050, [1.001-7.31]
- Confounding: Ado. sex, intrauterine growth

High waist circumference

- Crude 1.92, 0.028, [1.07-3.41]
- Adjusted 1.77, 0.059, [0.98-3.19]
- Confounding: Ado. sex, intrauterine growth

OR, p-Value, [95% CI]

DISCUSSION

- Risk when parent is ow/ob (Brambila-Paz y Hernández-Ángeles 2022)
- Education and risk of obesity (Sparks y Sparks, 2020)
- Limitations
  - Temporal: mothers' BMI, one generation of adolescents
- Future investigations
  - Height: the intergenerational burden of stunted growth
    - "When women are the result of the vicious cycle of nutrition and do not reach a height of150 cm, one can speak of the intergenerational cycle of lack of growth" (García Parra, 2015)
- Influence of maternal adolescence, sociocultural analysis of gender roles and value placed on motherhood (Núñez-Medina & María Jiménez-Acevedo, 2018)
- In total, contributes to an aspect of the neccesity for more information about the development of ow/ob in Chiapas, Mexico

CONCLUSION

- Establishes a relationship between
  - Ow/ob present in mothers and ow/ob in adolescents
  - The level of schooling of mothers and ow/ob of adolescents
- No conclusions about language, maternal adolescence, nor high waist circumference
- Importance when diets are becoming more commercialized and the prevalence of ow/ob is rising

THANK YOU FOR YOUR ATTENTION!

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