



# Relationship between vitamin A, E and D with markers of obesity, chronic inflammation and insulin resistance in Mexican school-aged children.

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## INTRODUCTION

- Epidemiological studies have reported associations between micronutrient levels with obesity and chronic low-grade inflammation and insulin resistance markers (1).
- Vitamin E has been inversely associated with BMI and HOMA-IR (2,3). In some studies, vitamin A is directly associated with adiposity measurements (2,3) while others show inverse associations (4).
- Obesity has also been shown to increase the risk of vitamin D deficiency (5); additionally, low vitamin D levels are associated with insulin resistance and higher CRP concentrations (6).

## OBJECTIVE

The aim of this study was to determine the relationship between levels of vitamin A, E and D with markers of obesity, insulin resistance and inflammation in school-aged children.

## METHODS

- 287 children (8.42±1.53 years) from a rural area in Mexico participated in a cross-sectional study.
- Measurements:**

### Anthropometric & body composition

- Waist circumference, Height, Weight
- Body fat (DXA)

### Biochemical

- Glucose, Insulin, Cholesterol, Triglycerides
- Vitamin A, E and D
- IL6, TNF $\alpha$ , IL10, CRP

- Statistical analysis:** Linear regression and logistic regression models were used to analyze associations between variables. All the analysis were performed with SPSS version 20.0.

## CONCLUSIONS

- Vitamin A was positively associated and vitamin E:lipid ratio was negatively associated with markers of obesity and inflammation in school-aged children living in rural Mexico.
- No association was found between vitamin D and the variables studied.

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## RESULTS

- The combined prevalence of overweight/obesity was 28.9%.
- 18% of the children had insulin resistance.
- 2.7% of the children had high LDL, 30% presented hypertriglyceridemia and 17% showed low HDL levels.

**Table 1. Relationship between anthropometric and body composition variables with vitamins concentrations (N=287).**

	WC		BMI (Z-Score)		Body fat (%)	
	$\beta$	IC 95%	$\beta$	IC 95%	$\beta$	IC 95%
<b>Vitamin A (<math>\mu\text{g/dL}</math>)</b>	.287*	.152;.421	.052*	.031;.074	.301	.193;.409
<b>Vitamin E: lipid ratio (mg/g)</b>	-3.83*	-5.14; -2.52	-.532*	-.744; -.319	-2.52*	-3.62; -1.42
<b>Vitamin D (nmol/L)</b>	.018	-.074;.111	.004	-.011;.019	.048	-.027;.124

\*p <0.05. Model adjusted by sex, age of the children and mother's schooling.

**Table 2. Relationship between vitamins concentrations with risk of having insulin resistance and high levels of cytokines (N=287).**

	HOMA IR		Leptin		IL6		TNF $\alpha$		IL10		CRP	
	OR	IC 95%	OR	IC 95%	OR	IC 95%	OR	IC 95%	OR	IC 95%	OR	IC 95%
<b>Vitamin A (<math>\mu\text{g/dL}</math>)</b>	1.02	0.97; 1.07	1.13*	1.07; 1.19	0.99	0.95; 1.03	0.99	0.95; 1.04	1.01	0.97; 1.05	0.89*	0.84; 0.95
<b>Vitamin E: lipid ratio (mg/g)</b>	0.53*	0.32; 0.87	0.55*	0.36; 0.84	0.44*	0.32; 0.73	0.82	0.55; 1.21	0.83	0.56; 1.23	0.55*	0.33; 0.92
<b>Vitamin D (nmol/L)</b>	1.0	0.98; 1.05	0.99	0.97; 1.02	0.98	0.96; 1.01	0.99	0.96; 1.02	0.98	0.96; 1.01	1.00	0.95; 1.03

\*p <0.05. Model adjusted by sex, age of the children, mother's schooling and body fat percentage.