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Implications of family socioeconomic level on risk behaviors in child-youth obesity

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Abstract

Introduction: **Socioeconomical status may indirectly affect the obesity prevalence. This study gathers together dietary behaviour, physical activity and sedentary lifestyle in relation to the family socioeconomic status in a sample of Spanish children.**

Design: **Population-based cross-sectional study of 3-16 years children.**

Methods: **Questionnaires about dietary behaviors, physical activity and sedentary lifestyles, and direct anthropometric measures. Criteria of physical activity recommended was >5METs (metabolic equivalence) during 60 min/day, and sedentary lifestyle as 120 min/day of sedentary activities, using obesity criteria from the ENKID study. We derived a single "family socioeconomic level" indicator (FSEL) from the level of studies, professional category and work situation of both parents.**

Results: **1620 children were studied. 59.5% met the physical activity recommendations. Boys with the higher FSEL quartile tend to do more physical activity. In girls, physical activity increases with the age and degree of overweight. 57.7% of boys and 48.1% of girls were found to be sedentary, with a lower rate in families with higher FSEL. Higher FSEL quartile was related to healthy dietary habits such as having breakfast, 5 meals per day and less snacking. The FSEL was related also to the consumption of whole grains, dairy products and fruits, but not to vegetables, meat or fish. The greatest risk of excess weight was found in girls >6 years old, with a low FSEL, sedentary habits, that snack frequently and eat few proteins.**

Discussion: **Family socioeconomic status seems to determine the level of physical activity, sedentary lifestyle and dietary behavior. The elaboration of a simple socioeconomic indicator may be useful to study factors involved in child obesity.**

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Key words: *Adolescent. Child. Health behavior. Obesity. Overweight. Social class.*

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IMPLICACIONES DEL NIVEL SOCIOECONÓMICO FAMILIAR SOBRE LAS CONDUCTAS DE RIESGO EN LA OBESIDAD ISNFANTOJUVENIL

Resumen

Introducción: **La situación socioeconómica puede afectar indirectamente las cifras de obesidad. Este trabajo recoge hábitos alimenticios, actividad física y sedentarismo y su relación con el nivel socioeconómico familiar en población infantojuvenil española.**

Diseño: **Estudio transversal de base poblacional en escolares de 3-16 años.**

Métodos: **Encuesta de hábitos alimentarios, actividad física y sedentarismo con mediciones antropométricas directas. Se consideró actividad física adecuada si alcanzaba >5METs (equivalentes metabólicos) durante 60 min/día, y sedentarismo 120 min/día de actividades sedentarias. Utilizamos los criterios de obesidad del estudio ENKid. Se confeccionó un indicador del "nivel socioeconómico de la familia" (FSEL) con el nivel de estudios, categoría profesional y situación laboral de ambos padres.**

Resultados: **Se estudiaron 1.620 niños. El 59,5% cumplían las recomendaciones de actividad física. En los niños es mayor la actividad física en el cuartil superior de FSEL, aumentando en las niñas con la edad y el sobrepeso. El 57,7% de varones y el 48,1% de niñas eran sedentarios, disminuyendo en familias con mayores FSEL. El cuartil superior de FSEL se asoció con hábitos alimenticios saludables: desayunos, 5 comidas y menor picoteo. El FSEL se asoció al consumo de cereales, lácteos y frutas, pero no al de verduras, carne o pescado. Obtuvimos mayor riesgo de sobrepeso en niñas >6 años, FSEL bajos, sedentarismo, picoteos y menores ingestas proteicas.**

Discusión: **El nivel socioeconómico familiar parece condicionar actividad física, sedentarismo y alimentación infantil. La elaboración de un indicador simple del FSEL familiar puede ser útil para el estudio de factores que intervienen en la obesidad infantil.**

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Palabras clave: *Adolescente. Niños. Conductas saludables. Obesidad. Sobrepeso. Clase social.*

Introduction

The prevalence of childhood obesity and overweight has increased in developed countries, with important short and long-term health repercussions, affecting social adaptation and causing a predisposition for adult obesity[1,2].

In the USA, the prevalence of overweight children has increased[3,4], with higher levels in ethnic minorities that are frequently related with a disproportionate representation of groups with a low socioeconomic level[5].

In Europe, the most elevated rates of obesity are observed in countries with lower incomes; according to the International Obesity Taskforce criteria, obesity is high in Italy, Spain and Greece[6]. The Enkid Study[7] reports a prevalence of child-youth obesity in Spain of 14.9%, and 12.4% for overweight. The latest epidemiological studies reveal an alarming increase in the prevalence of childhood overweight and obesity in Spain, rendering levels of 26.1% of children overweight and 19.1 % of obesity[8]. The city of Cádiz is located within the Andalusian region, where values of overweight and obesity reach 20.4% and 8%, respectively[7].

Various authors relate overweight/obesity with family socioeconomic level (FSEL) that is measured by educational level, occupation and income[9]. Children with a low FSEL are confirmed to have 2.23 times the risk to be overweight[10]; its maintenance and increase depends on the time that a disadvantaged FSEL situation lasts[11]; thus obesity can be considered as an indicator of health inequality[12].

The influence of the family environment on overweight and obesity is greater during childhood, and it is reduced with age. Some authors even defend the need to study the FSEL of young adults in an independent manner from that of the parents during this transition period[13].

Of all the cultural and environmental factors that contribute to overweight and obesity risk-related behaviours, eating habits, physical activity and sedentary habits are those with the greatest relevance[7].

The relationship between active or sedentary behaviors and the nutritional well-being of a child with the educational and professional levels of both parents, which are factors that determine the FSEL, is increasingly important. In families with a low FSEL, the consumption of fats and the prevalence of obesity in the parents is greater. A family diet with a greater caloric intake could partially explain the greater tendencies of child obesity and the persistence of obesity in adults with a low FSEL (30-60%)[14]. A greater possibility of an optimal level of phyical activity has been observed when both parents are active and increases with educational levels[15].

When analyzing the influence of socioeconomic factors such as the educational level of parents, work activity, type of occupation, economic resources, home life, etc., on the prevalence of excess weight, finding associations to some of these variables taken independently is frequent[16]. There seems to be a consensus about the need to have a single FSEL indicator that would take into account relevant dimensions such as level of studies, work activity and type of occupation[17,18].

In this paper, we aimed to identify the primary risk behaviors leading to childhood overweight and obesity in an area of Spain with a relatively low socioeconomic level and a high prevalence of excess weight. We analyzed the physical activity, sedentary habits, and frequency of anomalous eating habits as relating to the family socioeconomic level, measured using a single indicator of the "family socioeconomic level of the child", obtained by calculating the level of studies, professional category and work situation of both parents.

Materials / Subjects and Methods

A cross-sectional, population-based study, conducted on the child-youth population between the ages of 3 and 16 years old in schools of the city of Cádiz, was selected age range that includes preschool and compulsory school age children.

According to data from the regional education authority, this population is formed by 14,332 subjects; the minimum sample size has been estimated to be 1,200 subjects (relative error 5%) . A two-step cluster sampling procedure was conducted, and 6 schools were included in the study. We included public schools, private and mixed in all boroughs. None of the schools selected to participate in the study refused. In each one of them, a number of "lines" of each of the courses were selected to obtain a representative sample, stratifying the selections of the last sample units (subjects) by gender and age. 1,620 individuals were included: 831 boys (51.3%) and 789 girls (48.7%).

The study was approved by the local University Reseach and Ethics Committee. Data was collected through the use of questionnaires that parents and children completed together, after obtaining the informed consent from parents.

In this questionnaire, the following information was collected:

- Socio-demographic data of the parents/guardians that include level of education, occupation, work situation and family size.
- Eating habits studied using a qualitative 24 hour recall and a semiquantitative food frequency questionnaire adaptation of the short questionnaire on frequency of dietary intake[19].
- Physical activity. The questions on physical activity were adapted from the physical activity questionnaire by the World Health Organization Countrywide Integrated Noncommunicable Disease Intervention program (CINDI)[20] and from the MARATHON questionnaire[21] on physical

activity during free time that includes playing sports (type and frequency) in academic and leisure settings. With these questionnaires, the energy spent is calculated associated with the physical activity in Metabolic Equivalents (MET). When MET>5 during ≥ 60 min/day, the subject was considered compliant with the recommended physical activity, according to Pate et al.[22]. The WHO recommends youth to spend at least 60 minutes daily doing moderate to vigorous physical activity[23].

– Sedentary habits: measured as time dedicated to passive recreational activities like watching television, playing videogames or surfing the Internet. Criteria for sedentary habits are considered as dedicating more than 120 minutes/day to sedentary activities.
– Individual measurements of body weight, height and triceps skinfold were obtained in each schools by healthcare professionals previously trained. Measurements were performed according to standardized procedures. The variables analyzed were: weight, height, BMI, tricipital skinfold (TS) and the Nutritional Index (NI) using the auxological tables from the Enkid Study, which contain the cut-off values most frequently used for Spain[7]. The BMI was used for weight typification, criteria to define overweight and obesity were BMI ≥ P85-97 and BMI ≥ P97 , TS ≥ P85-95 and TS ≥ P95, and NI ≥ 110-120 and NI ≥ 120

The classification system proposed by the Spanish Society of Epidemiology[24] was employed to evaluate *Level of Education,* and Professional Category (Occupation). Level of education were categorized in: illiterate, literate, primary education (6 years), secondary education/GED/high school (10-12 years), Associate's Degree, Bachelor's/Master's/Doctorate. A classification system proposed by the Spanish Society of Epidemiology[24] was used to evaluate *Professional Category* (Occupation), with the folloing categories: I = Public administration and business directors, professions associated with university degrees, technicians and assisting professionals, artists and athletes; II = Administrative and assisting professional staff for administrative and financial management, personal and security service workers, freelance workers, supervisors of manual labor; III = Qualified manual laborers; IV = Semi-qualified manual laborers; and V= Unqualified laborers.

The *Work Situation* was classified in six categories: Active, Disabled/temporary leave, Retired, Unemployed with benefits, Unemployed without benefits, students and housewives (no income). Currently, the combination of professional category and work situation provide a good indication of income level in Spain.

We calculated a Family Socioeconomic Level (FSEL) index to quantify the socioeconomic situation of the child's family. This index weighs the level of education, professional category, and work situation, adding up the values obtained by both parents/guardians to obtain a score for this variable between 0 and 135 (Anexe). Three important aspects of this index are worth mentioning: First, we gave a greater specific weight to the level of education of the parents as indicated in the literature[16]. Second, we included the professional category. Finnaly we considered, the work situation related to the professional category.

The distribution in quartiles of the *family socioeconomic situation* allows for the families to be distributed in four Family Socioeconomic Levels (FSEL). Families of level I would have the least favorable SE situation, versus families with level IV with the higher socioeconomic situation.

The tabulation of data has been carried out using the SPSS 15 software. The prevalence ratio and the confidence intervals have been calculated along with the central tendency and dispersion values in the statistical analysis using parametric as well as non-parametric tests: Chi-square, t-Student, ANOVA, Kolmogorov-Smirnov, Mann-Whitney, Kruskall-Wallis and Spearman's rank correlation test, where appropriate.

Anexe

Variables used to obtain the Family Socioeconomic Level (FSEL) Index

	Level of studies	*Professional category*	*Work situation*
SCORE - Category	0 - No studies 1.5 - Primary education 3 - Secondary education 6 - High school diploma 12 - Vocational Associate's Degree 15 - Bachelor's/Master's/Doctorate	0 - Passive classes 6 - (V)Non-qualified manual 12 - (III-IV) Tr. Manual 18 - (II) Intermediate 25 - (I) Management	0 - No income 0.20 - Unemployed with benefits 0.30 - Retired 0.40 - Disabled with benefits 0.50 - Active
FAMILY SOCIOECONOMIC SITUATION INDEX	2 * LEVEL OF STUDIES (FATHER + MOTHER)	+ PROFESSIONAL CATEGORY (FATHER + MOTHER)	+ WORK SITUATION * PROFESSIONAL CATEGORY (FATHER + MOTHER)
Maximum score	2 (15+15) = 60	25 + 25 = 50	(0,50*25) + (0,50*25) = 25

The association between different variables and the presence of excess weight in the population has been studied using logistic regression. The results are presented as OR with its IC95%; the measurement of the contribution of each one of the variables studied and the excess of weight has been obtained using logistical regression, considering the dependent variable (BMI) divided in the previously mentioned levels.

Results

Regarding the rates of prevalence of overweight, obesity and excess weight of the population studied, we have found a wide variability in values according to the parameter used to classify the children: Body Mass Index (BMI), Nutritional Index or Triceps Skinfold. In our study, we consider the BMI according to the criteria used in the Enkid study (Table I).

According to age groups and gender, females present higher rates of prevalence of overweight, obesity and excess-weight in all age groups. Although there are no statistically significant differences in the infant and primary school ages between both genders, there are statistically relevant differences for obesity and excess weight in the 13 to 16-year-old group.

The relationship that exists between family socioeconomic level (FSEL) and BMI of the children studied is shown in table I, where normal weight is seen to increase as the socioeconomic level increases, whereas overweight and obesity is greater in the lowest socioeconomic levels, decreasing as the aforementioned increases.

Three of the principal factors that are directly involved in the ethiology of child overweight and obesity are physical activity, sedentarism, and eating habits. When analyzing these factors, we find that 59.5% of children in the study comply with the physical activity recomendations, with marked differences between males and females; 71.8% of males carried out moderate or intense physical activity for at least 60 minutes per day, compared with only 47.8% of females. By age groups, physical activity stays constant for males while it increases for females with age (from 39.3% in the 3-5 year old group to 48.1% in the 13-16 year old group).

When studying physical activity in relation to FSEL, we find that the degree of compliance of the physical activity recommendations in the low FSEL is 55.9% compared to 63.1% in the high FSEL.

We have not obtained significant differences regarding the compliance of physical activity recommendations between boys and girls depending on the FSEL that they belong to. However, when studying them in each age group, the youngest girls (3-5 years old), are those that do not comply with the physical activity recommendations (58.1% for the FSEL I compared to 78.1% for FSEL IV). Such incompliance decreases considerably in girls from 13-16 years old (36.3 for girls in group I of FSEL, compared to 25% for group IV), likely due to their concerns with their body image. In males, the degree of compliance of the physical activity recommendations primarily decreases in the ages of 13-16 years old (Table II).

The levels of sedentary habits in our sample were around 52.8%, with differences by gender (57.7% in boys compared with 48.1 in girls). The levels of sedentary habits in boys is very similar for all ages, while sedentary habits increase with age for girls (from

Table I
Variables used to obtain the Family Socioeconomic Level (FSEL) Index

		FSEL QUARTILES				
		Q1	*Q2*	*Q3*	*Q4*	*Total*
3 TO 5 YEARS	<P25 (UNDERWEIGHT)	22,8%	29,4%	30,2%	17,6%	23,8%
	P25-P84 (NORMAL WEIGHT)	54,4%	55,9%	57,1%	74,1%	62,3%
	P85-P97 (OVERWEIGHT)	12,3%	5,9%	4,8%	5,9%	7,1%
	>=P97 (OBESITY)	10,5%	8,8%	7,9%	2,4%	6,7%
6 TO 12 YEARS	<P25 (UNDERWEIGHT)	17,7%	19,1%	16,4%	24,5%	19,6%
	P25-P84 (NORMAL WEIGHT)	44,1%	47,3%	48,2%	48,9%	47,3%
	P85-P97 (OVERWEIGHT)	21,5%	13,6%	21,2%	17,0%	18,9%
	>=P97 (OBESITY)	16,7%	20,0%	14,2%	9,6%	14,2%
13 TO 16 YEARS	<P25 (UNDERWEIGHT)	21,0%	24,1%	13,7%	18,5%	20,9%
	P25-P84 (NORMAL WEIGHT)	44,6%	50,0%	61,8%	56,8%	51,4%
	P85-P97 (OVERWEIGHT)	19,1%	14,9%	17,6%	17,3%	16,7%
	>=P97 (OBESITY)	15,3%	11,0%	6,9%	7,4%	10,9%
TOTAL POPULATION	<P25 (UNDERWEIGHT)	19,8%	23,2%	17,9%	21,8%	20,7%
	P25-P84 (NORMAL WEIGHT)	45,8%	49,8%	53,2%	55,9%	51,1%
	P85-P97 (OVERWEIGHT)	19,3%	13,8%	17,6%	14,7%	16,3%
	>=P97 (OBESITY)	15,3%	13,1%	11,3%	7,6%	11,8%

Table II
Degree of incompliance of the physical activity and sedentary habits recommendations by quartiles of family socioeconomic level

		FSEL QUARTILES				
Gender	*Age groups*	*Q1*	*Q2*	*Q3*	*Q4*	*Total*
INCOMPLIANCE OF THE PHYSICAL ACTIVITY RECOMMENDATIONS						
MALE	3 TO 5 YEARS	22,2%	40,0%	35,3%	26,1%	29,1%
	6 TO 12 YEARS	38,0%	27,3%	29,0%	23,3%	28,9%
	13 TO 16 YEARS	32,9%	15,0%	17,6%	30,4%	26,5%
	TOTAL	33,5%	25,4%	27,1%	25,5%	28,2%
FEMALE	3 TO 5 YEARS	58,1%	25,0%	63,3%	71,8%	60,7%
	6 TO 12 YEARS	63,9%	58,8%	61,3%	50,5%	58,6%
	13 TO 16 YEARS	36,3%	32,1%	42,3%	25,0%	35,2%
	TOTAL	53,0%	43.2%	56,7%	50,0%	52,2%
SEDENTARY HABITS						
MALE	3 TO 5 YEARS	59,3%	60,0%	64,7%	34,8%	51,3%
	6 TO 12 YEARS	73,4%	75,8%	60,7%	46,7%	60,2%
	13 TO 16 YEARS	59,5%	60,0%	60,8%	47,8%	57,1%
	TOTAL	65,4%	68,3%	61,5%	44,3%	57,7%
FEMALE	3 TO 5 YEARS	58,1%	41,7%	43,3%	15,4%	37,5%
	6 TO 12 YEARS	50,0%	44,1%	45,4%	38,5%	44,6%
	13 TO 16 YEARS	68,8%	42,9%	57,7%	61,1%	60,7%
	TOTAL	58,0%	43,2%	48,3%	38,0%	48,1%

37.5% in girls from 3-5 years old, 44.6% in girls from 6-12 years old, up to 60.7% in girls from 13-16 years old) (Table II).

Taking into account the FSEL, the decrease of sedentary habits is significantly noticeable as FSEL improves; the rate of sedentary habits is 61.4% in children from low FSEL compared to 41.4% in high FSEL. This fact is also confirmed analysing by gender: sedentary habits in males as well as females are less frequent in high FSEL, with 65% of males and 58% of females sedentary in FSEL-I, while we observe a prevelance of sedentary habits of 44% for males and 38% for females in FSEL-IV.

We found lower rates of sedentary habits in the higher FSEL for all age groups. The percentage of sedentary males between 3-5 years of age in FSEL-I is 59.3% compared to 34.8% for level IV, and in females from 58.1% in FSEL-I compared to 15.4% in level IV. In adolescents from 13-16 years old, 59.5% of boys from FSEL-I are sedentary compared to 48% for level IV, and for girls, 68.8% from FSEL I compared to 61.1% from FSEL IV (Table II).

Regarding healthy eating habits, we evaluated whether children have breakfast before leaving the home in the mornings or not, whether they have five meals daily, and the frequency of snacking between meals (Table III). We found daily breakfast frequencies of 80.6%, 52.2% have the five recommended meals daily, and a snacking frequency of 36.8%.

We observe a clear significant difference of having breakfast or not regarding the FSEL. The daily breakfast frequency is 73% in children that belong to FSEL-I and 90.2% for those belonging to level IV. This behavior remains constant when we conduct the analysis by gender, although boys have breakfast in a greater percentage than girls and this is more pronounced in the 13-16 year group (93.5% of males of the FSEL-IV compared to 69.4% in females from the same level).

The category of having five meals a day also shows a significant difference among different FSEL's, increasing from 44.8% for FSEL I to 66.2% for FSEL IV. The differences in the frequency of having five meals per day by FSEL are more pronounced in males (46.5% FSEL I *vs* 73.2% in FSEL IV). The rising tendency of having five meals per day as the FSEL increases is observed in every age group, with a higher gradient in the 6-12 year old age group. On the other hand, the 13-16 years-old girls group, have the poorest levels of compliance with this habit.

Snacking decreases significantly in both males and females as FSEL increases (from 43.2% in FSEL I males, to 25.5% in SEL IV, and in females from 44.3% in FSEL I to 32.6% in FSEL IV), however, the habit of snacking between meals increases, again, in females of older age group, in any FSEL category.

When analyzing the relationship between the consumption of different foods that make up the food

Table III
Frequence of breakfast, five meals and "snack between meals" according quartiles of family socioeconomic level

		FSEL QUARTILES				
Breakfast		*Q1*	*Q2*	*Q3*	*Q4*	*Total*
MALE	3 TO 5 YEARS	92,6%	70,0%	88,2%	97,8%	91,5%
	6 TO 12 YEARS	75,9%	87,9%	84,1%	95,0%	86,4%
	13 TO 16 YEARS	65,8%	90,0%	84,3%	93,5%	79,6%
	TOTAL	74.1%	85.7%	84.9%	92.3%	85.3%
FEMALE	3 TO 5 YEARS	83,9%	91,7%	90,0%	82,1%	85,7%
	6 TO 12 YEARS	73,1%	79,4%	77,3%	89,9%	80,0%
	13 TO 16 YEARS	66,3%	50,0%	61,5%	69,4%	63,3%
	TOTAL	72.1%	70.3%	75.1%	84.2%	76.1%
FIVE MEALS						
MALE	3 TO 5 YEARS	66,7%	20,0%	61,8%	93,5%	71,8%
	6 TO 12 YEARS	48,1%	42,4%	55,1%	73,3%	58,7%
	13 TO 16 YEARS	38,0%	55,0%	51,0%	52,2%	46,4%
	TOTAL	46,5%	42,9%	55,2%	73,1%	57,4
FEMALE	3 TO 5 YEARS	61,3%	75,0%	46,7%	61,5%	58,9%
	6 TO 12 YEARS	42,6%	58,8%	47,1%	62,4%	51,4%
	13 TO 16 YEARS	37,5%	14,3%	28,8%	41,7%	32,7%
	TOTAL	43,4%	44,6%	42,3%	58,2%	47,2%
SNACKS						
MALE	3 TO 5 YEARS	37,0%	50,0%	32,4%	21,7%	30,8%
	6 TO 12 YEARS	39,2%	42,4%	35,5%	25,8%	33,6%
	13 TO 16 YEARS	49,4%	55,0%	43,1%	28,3%	43,4%
	TOTAL	43,2%	47,6%	37,7%	25,5%	36,0%
FEMALE	3 TO 5 YEARS	45,2%	33,3%	23,3%	17,9%	28,6%
	6 TO 12 YEARS	40,7%	44,1%	35,3%	33,0%	37,0%
	13 TO 16 YEARS	48,8%	35,7%	38,5%	47,2%	43,9%
	TOTAL	44,3%	39,2%	34,3%	32,6%	37,6%

pyramid with FSEL, we found a greater consumption of whole grains as FSEL increases, especially among males.

Daily consumption of dairy products also varied with FSEL, ranging from a consumption of 3 or more dairy servings in 30.4% of FSEL I children versus 44.9% from children in FSEL IV families. Males were found to consume more dairy products at all ages, with a marked decrease in the older ones. Girls in the lower two FSELs consume significantly less dairy products every day, than those from the higher FSELs, especially FSEL IV (Table IV).

No significant differences were found in the consumption of vegetables in relation with FSEL, although there is a slight increasing trend in their consumption as the level rises, especially in females from 13 to 16 years old.

With regard to fresh fruit consumption, a similar trend was found; children from lower FSELs consume less fruits than children from higher FSELs. Again, the gropu of older girls is the one in which this difference is more pronounced (in girls from 13-16 years old, a 7.5% of those that belong to the FSEL I consume 2-3 pieces of fruit per day, while a 30.6% in FSEL IV).

We did not find any significant difference in meat and fish consumption in relation to FSEL. On the other hand, there was a significant difference in fast food or prepackaged meals consumption, with a generally lower rate of consumption in females (6.8% in females belonging to FSEL I and 0.5% in those from FSEL IV).

Finally, we found a relationship between sugar consumption and FSEL in our sample. This association was found both, in males and females, with a noticeably smaller consumption of sugar in females from the FSEL IV at older ages (13-16 years).

Other factors that have been evaluated in relation with the socioeconomic level and that could be linked to the increase of overweight and obesity in children, include mother's weight gain during pregnancy, and the lack of breastfeeding. Regarding the first of these factors, we have observed that women of lower socioeconomic levels gained more weight during pregnancy, more than 12 Kg, in 43.7% compared to 37.6% of the women belonging to FSEL IV. Likewise, a direct rela-

Table IV
Consumption of food groups by Family Socioeconomic Levels

			FSEL QUARTILES				
Food groups			*1*	*2*	*3*	*4*	*Total*
WHOLE GRAINS	MALE	Less than 3	89,7%	95,2%	89,1%	89,2%	89,9%
		3-5,99	10,3%	4,8%	10,9%	10,8%	10,1%
WHOLE GRAINS	FEMALE	Less than 3	96,8%	94,6%	91,5%	92,4%	93,8%
		3-5,99	3,2%	5,4%	8,5%	7,6%	6,2%
DAIRY PRODUCTS	MALE	Less than 2	26,5%	27,0%	19,3%	12,7%	19,9%
		From 2-2.99	37,8%	34,9%	35,4%	39,2%	37,3%
		3 or more	35,7%	38,1%	45,3%	48,1%	42,8%
DAIRY PRODUCTS	FEMALE	Less than 2	34,7%	39,2%	30,8%	23,4%	31,0%
		From 2-2.99	39,3%	36,5%	39,3%	35,3%	37,9%
		3 or more	26,0%	24,3%	29,9%	41,3%	31,1%
FRUIT	MALE	Less than 2	83,2%	79,4%	76,6%	77,4%	79,0%
		From 2-2.99	11,9%	17,5%	17,7%	19,8%	16,7%
		3 or more	4,9%	3,2%	5,7%	2,8%	4,3%
FRUIT	FEMALE	Less than 2	83,6%	87,8%	80,6%	72,8%	80,2%
		From 2-2.99	14,6%	9,5%	17,9%	23,4%	17,4%
		3 or more	1,8%	2,7%	1,5%	3,8%	2,4%
VEGETABLES	MALE	From 0-1.99	98,4%	96,8%	97,9%	99,1%	98,3%
		2 or more servings	1,6%	3,2%	2,1%	,9%	1,7%
VEGETABLES	FEMALE	From 0-1.99	99,1%	100,0%	98,5%	96,2%	98,2%
		2 or more servings	,9%	—	1,5%	3,8%	1,8%
MEAT-FISH	MALE	From 0-1.99	58,4%	49,2%	62,5%	56,6%	58,1%
		2 or more servings	41,6%	50,8%	37,5%	43,4%	41,9%
MEAT-FISH	FEMALE	From 0-1.99	59,4%	59,5%	56,2%	57,1%	57,8%
		2 or more servings	40,6%	40,5%	43,8%	42,9%	42,2%
SWEETS	MALE	Up to 1S	25,9%	30,2%	31,8%	41,5%	33,1%
		More than 1 S/D	74,1%	69,8%	68,2%	58,5%	66,9%
SWEETS	FEMALE	Up to 1S	29,2%	20,3%	29,4%	42,9%	32,0%
		More than 1 S/D	70,8%	79,7%	70,6%	57,1%	68,0%
PREPACKAGED	MALE	Less than 0.5	91,9%	90,5%	95,3%	98,1%	94,8%
		0.5 or more	8,1%	9,5%	4,7%	1,9%	5,2%
PREPACKAGED	FEMALE	Less than 0.5	93,2%	94,6%	96,0%	99,5%	95,9%
		0.5 or more	6,8%	5,4%	4,0%	,5%	4,1%

tionship was found among children that had been breastfed for longer in relation with a higher FSEL, with a more significant rate in males of all age groups.

The logistical regression to evaluate the primary factors causing overweight and obesity in our sample regarding socioeconomic level, revealed a greater risk in girls 6 years old or older with a low FSEL, sedentary habits including hours of watching television, and eating habits that include frequent snacking between meals and a low-protein diet. (Table V).

Discussion

As there are no studies that confirm a consensuated socioeconomic indicator and that take into account educational characteristics, professional level and work situation of both parents (parameters considered in this study). Such indicator would help us to compare situations that take place in different populations, and between different populations. We have evaluated these characteristics individually.

Table V
Multivariant analysis of variables associated with excess weight

							CI 95% for EXP (B)	
	L	*ET*	*Wald*	*gl*	*Sig.*	*Exp (B)*	*Inferior*	*Superior*
SOCIOECONOMIC LEVEL			7,611	3	,055			
FSEL - QUARTILE 2)	-,560	,219	0,605	1	,799	0,946	,616	1,452
FSEL - QUARTILE 3	-,257	,160	2,574	1	,109	0,773	,564	1,059
FSEL - QUARTILE 4	-,448	,172	6,828	1	,009	0,639	,456	,894
FEMALE	**,404**	**,132**	**9,443**	**1**	**,002**	**1,498**	**1,158**	**1,939**
AGE GROUP			24,463	2	,000			
6-12 YEARS	,997	,221	20,394	1	,000	2,710	1,758	4,177
13-16 YEARS	,615	,259	5,633	1	,018	1,851	1,113	3,076
SNACKS	,268	,135	3,978	1	,046	1,308	1,006	1,702
FIVE MEALS	-,575	,131	19,143	1	,000	,563	,435	,728
BREAKFAST	-,210	,137	2,356	1	,124	,811	,620	1,060
COMPLIANCE OF PHISICAL ACTIVITY RECOMMENDATIONS	,059	,135	,191	1	,662	1,061	,815	1,381
HOURS VIDEO GAMES	,126	,060	4,485	1	,034	1,135	1,009	1,275
HOURS OF SLEEP	-,134	,073	3,350	1	,067	,875	,758	1,010
< 2 SERVING VEGETABLES	-,731	,458	2,549	1	,110	,482	,196	1,181
< 1 SERVING MEAT	,294	,130	5,102	1	,024	1,342	1,040	1,731
Constant	,285	,910	,098	1	,754	1,330		

a. Variable(s) introduced in step 1: Vegetables, Meat.

This way, when analyzing the possible relationship between the *nutritional state of the child and the educational level of the parents,* we find significantly lower rates of excess weight (EW) when the fathers and/or mothers possess university studies when compared to the group of parents without any studies or only basic education. In the Enkid Study[7], similar rates of the prevalence of EW were described when the parent's education level was elevated (22.5% and 24.8%, respectively), while the EW reached 29.1% when both parents had a low level of studies.

The work level of both parents seems to have a similar effect, with lower prevalences of excess weight in children of parents that work at a director level compared to the values obtained in parents that work as manual laborers. Once again, we find similar results in national studies such as the Enkid and Avena, where rates of excess weight when the socioeconomic level of the family was elevated were of 24.5%, while they rose to 28.1% when the socioeconomic level of the family was low. Said pattern in childhood excess weight is also observed in national studies with adults between the ages of 25 and 60 years old, where greater rates of obesity are found in men and women with lower educational and economic levels[7].

In Central Europe, adolescent girls with greater prevalences of obesity belong to the lowest social classes as they do in the United States, where the situation is similar to that of Spain. In Australia, differences in the prevalences of excess weight according to socioeconomic level were not found. Curiously, in South America, in countries that are developed but have been suffering a severe socioeconomic crisis for the last several decades, such as Argentina and Chile, the greatest percentages of child-adolescent obesity come from the socially-favored classes, with high levels of malnutrition in the low socioeconomic levels. At the same time, these low social classes are starting to show high prevalences of overweight, in co-existence with nutritional problems from excess as well as deficiency[25-28].

While trying to establish a relationship between the *compliance of daily physical activity recommendations of school children and the educational level of parents,* we found significantly higher rates of physical activity in children of parents with university studies compared to the children of parents with only basic education. In the national Enkid study, the data was the inverse of our data, with a greater percentage of compliance of physical activity recommendations when the level of studies of the mother was low: 57.6%, decreasing to percentages of 54.4% when the level of studies was high. When we analyzed the *work level of both parents,* we observed a greater physical activity in the children of parents that work at a director level compared with the children of parents that work as manual laborers, which concurrs with the national results of greater physical activity in children from families of high socioeconomic levels (59.1%) when compared with families of low economic levels (51.1%)[7].

If we establish a relationship between the *sedentary habits in school children and the educational level of the parents,* we find significantly higher rates of sedentary habits in the children of parents with only basic

education compared to the children of parents with university studies, similar to that found in the Enkid study (basic education: 59.7% and high level of studies: 40%). When we analyze the *work level of both parents,* we observe more sedentary habits in the children of parents who work as manual laborers, compared to the children of parents that work at a director level. These data are in accordance with the results of the Enkid study where a low family socioeconomic level is associated to children with greater sedentary habits (55.8%), while an elevated socioeconomic level presents lower rates (42.1%). Similar to other national studies, sedentary habits are more common in children of parents with a low educational and socioeconomic level.

In our study, we have observed that according to the compliance of *physical activity and sedentary activity recommendations for school-aged children,* both life styles can co-exist in one individual.

When trying to establish a relationship between the *dietary habits during the scholastic years and the educational-work level of parents/guardians,* we find a greater compliance of the dietary recommendations: five meals per day, snacking and having breakfast or not, in the children of parents with higher education and/or work situations compared with children of parents with basic education and/or working as manual laborers, as found in international studies[29]. We have also observed a greater consumption of dairy products and fruit in children whose *parents/guardians* had a *high work and education level,* while in this same group of subjects, the consumption of sugars and prepackaged food was significantly lower than in the most disadvantaged social classes. A similar pattern of behavior has been found in national studies, where the elevated family socioeconomic level is associated in the child-adolescent population to a greater consumption of dairy products (yogurt, cheese), fruits-vegetables, fish-meat, and a lower consumption of cold meats, pastries and alcoholic beverages[7].

The association of socioeconomical level with obesity was stronger than the association with overweight; this finding is similar to that observed in studies than have evaluated the relation between socioeconomical status of the area of residence[30] or the family[31] with adiposity in childhood. Other studies[32] even suggest that family socioeconomic disadvantage during childhood may be linked with greater adiposity or obesity in adolescence.

Our findings show that obesity is related with socioeconomic level, but only in top family socioeconomical position explained differences in the healthy diet or physical activity of the children.

In conclusion, our findings suggest that life style that children learn and acquire from their families will be implanted as future life styles for the child themselves, later on. A great number of these can be considered as risk behaviors for childhood overweight and obesity, such as living a sedentary life, poor eating habits, or an inadequate consumption of food. These behaviors are intimately related with the different aspects that are included in the family socioeconomic characteristics[33] (educational, work and professional level).

Therefore, the existence of an indicator that includes all of these variables is necessary, that allows for us to make comparisons between different populations in a simple manner, as well as to monitor the evolution of these processes. This would facilitate interventions in populations that present a greater susceptibility to overweight and obesity.

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