Nutritional status and socioeconomic level of schoolchildren aged 7 to 9 from Ciudad Obregon, Sonora

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SUMMARY

Introduction: The socioeconomic level is a determining factor of the health and lifestyle of the individual. **Objective:** Identify the relationship between the nutritional status and the socioeconomic level of schoolchildren aged 7 to 9 from Ciudad Obregon, Sonora. **Methodology:** Applied, quantitative, cross-sectional and correlational study; non-probabilistic sampling were used for convenience**.** The 2017 Socio-Demographic Questionnaire for parents was used. To assess the socioeconomic status, the AMAI-NSE8X7 Rule (2011 version) was applied, and anthropometric measures were taken to assess the nutritional status, using 3-97 percentile chart of the World Health Organization and Body Mass Index by age. The informed consent of parents and schoolchildren was obtained prior to its application. **Results:** It was applied to 114 schoolchildren, of which 53.5% were females, with a distribution by age group between 7, 8, and 9 years old (33.33%, 36.84%, and 29.82%, respectively). 41.1% of the schoolchildren from high socioeconomic status were overweight; a similar result from middle socioeconomic level schoolchildren (47.06%). Additionally, in low socioeconomic level schoolchildren normal nutritional status (30.9%) and obesity (30.7%) were detected. **Conclusions:** Three nutritional status were evenly distributed across the three socioeconomic levels; however, there is an important prevalence of overweight and obesity. Therefore, the need for guidance and monitoring from the primary education level stands out, so as to prevent the early onset of chronic degenerative diseases during adolescence or young adulthood.

Keywords: Nutritional status; social class; children (DeCS; BIREME).

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INTRODUCTION

The nutritional status is the condition of the organism that results from the relationship between individual nutritional needs and the intake, absorption, and utilization of the nutrients contained in food by the organism, which becomes a reflection of the health status[1,-3]. The schoolchildren may be in a situation of normal nutrition or undernourished, both due to excess of nutrients which also includes overweight or obesity, and nutrient deficiency which includes undernourishment[4]. Currently, global children population presents a problem of a double burden of malnutrition that includes undernourishment, overweight, and obesity that, in any of its forms, presents considerable risks to human health[5,6]. Undernourishment causes about one third of children deaths, while overweight and obesity increasing rates are associated with an increase in chronic diseases such as cancer, cardiovascular disease, and diabetes[6].

In Mexico, the total population of children and adolescents is 39.2 million[7], occupying the first position at worldwide level in childhood obesity[8]; 15.4% of schoolchildren aged 5 to 11 are overweight and 18.3% within the same age range suffers from obesity[9]. Similarly, there are still high rates of malnutrition, where 32% of children population aged 0 to 11[10] suffers from malnutrition; this indicates unfairness in the country which often leads to changes in lifestyles and, hence, to both extremes in the nutritional status.

Malnutrition significantly affects the southern part of Mexico, while obesity predominates in the northern part. Nonetheless, the two extremes extend throughout the Mexican territory, highlighting the need to increase efforts to promote healthy and balanced diets, with an emphasis in pediatric ages[8].

The socioeconomic level is a hierarchical structure based on the accumulation of economic and social capital that symbolizes the wealth of material goods and the social dimension that represents the store of knowledge, contacts, and social networks. These characteristics are manifested with the ability to access a certain lifestyle, that is, it is an attempt to classify the population according to its possibilities of accessing goods and services in a society[11, 12].

Both in countries and regions and in families and individuals, the socioeconomic level is closely linked to the health status, nutrition, student achievement, and life expectancy[11]; it has been determined that the mortality rate of a country depends largely on its socioeconomic levels, placing this variable as one of the main elements for the analysis of the health status of the population[12]. Currently, Mexico is going through an epidemiological transition characterized by the persistence of old nutrition and health problems linked to poverty and new problems associated with wealth, so that the financial means of each family generate different eating habits, turning the socioeconomic level into a factor that determines the individual behavior with respect to the health of the population[13].

According to a research carried out in Spain by Miqueleiz[14], it was found that families with low socioeconomic status show unhealthy habits and behaviors in their eating habits, increasing the risk of childhood obesity[14]; therefore, the low socioeconomic level is not only linked to

The results for Sonora from the 2012 National Health and Nutrition Survey[15] indicate that children with obesity predominate; however, there have also been cases of malnutrition. Therefore, studying the nutritional status of schoolchildren from Ciudad Obregon, Sonora, gives us an overview of the nutritional status of children and what strategies have to be implemented and reinforced in terms of promotion and detection of these nutritional imbalances through the programs aimed at children health care pursuant to PROY-NOM-031-SSA2-2014 For children health care[16]. Based on the above, the need to know the variety of nutritional status that schoolchildren present can be seen. This study was aimed to identify the nutritional and socioeconomic status of school-age children from Ciudad Obregon, Sonora.

Table 1. Nutritional status by age of the schoolchildren, Ciudad Obregon, Sonora, 2017.

Age (years)	Nutritional Status					
	Normal		Overweight		Obesity	
	f	%	*f*	%	*f*	%
7	22	57.8	7	18.4	9	23.6
8	27	64.2	5	11.9	10	23.8
9	22	64.7	5	14.7	7	20.5
Total	71	62.3	17	14.9	26	22.8

Source: Cuestionario sociodemográfico y Percentiles OMS 3-97 ***n=*** *114*

Table 2. Nutritional status by gender of schoolchildren, Ciudad Obregon, Sonora, 2017.

Gender	Nutritional Status					
	Normal		Overweight		Obesity	
	f	%	*f*	%	*f*	%
Female	37	52.1	10	58.8	14	53.8
Male	34	47.9	7	41.2	12	46.2
Total	71	62.3	17	14.9	26	22.8

Source: Cuestionario sociodemográfico y Percentiles OMS 3-97 ***n*** = 114

Table 3. Socioeconomic level of schoolchildren, Ciudad Obregon, Sonora, 2017.

Socioeconomic Level	*f*	**%**
High Socioeconomic Level	38	33.3
Middle Socioeconomic Level	44	38.6
Low Socioeconomic Level	32	28.1

Source: Regla AMAI-NSE 8X7, 2011 ***n*** = 114

METHODOLOGY

The study was executed using a cross-sectional, correlational, and quantitative methodological design. Sampling was non- probabilistic by convenience using a sample of 114 schoolchildren, 7 to 9 years of age, enrolled in three elementary schools in Ciudad Obregon, Sonora, which were randomly chosen. For data collection regarding nutritional status, weight percentile charts for age and height/size from the World Health Organization found in the appendix of PROY-NOM-031-SSA2- 2014 For children's health care[16] were used; in addition, identification charts of Body Mass Index were used according to the data obtained through the somatometry of schoolchildren with the help of a Tanita HD 314 digital scale (with a maximum weight of 150 kg in 100 g increments) and a Seca 213 portable stadiometer (2.2 m long and 1 mm precision). The Regla del Índice de Nivel Socioeconómico de la Asociación Mexicana de Agencias de Investigación de Mercados y Opinión Pública (AMAI NSE) 8x7(17) (Socioeconomic Level Index Rule of the Mexican Association of Market Research and Public Opinion Agencies (AMAI NSE)) was used to measure the socioeconomic level, which consists of 8 items classified in 7 levels (A / B, C +, C, C-, D +, D, E).

Data capture and assessment were performed using the SPSS Version 20 statistical software. An analysis of frequencies and percentages for the sociodemographic variables, and contingency tables, in order to describe the relationship at percentage level of the study variables. Also, non-parametric statistics (X^2 test) were used to determine the relationship between the study variables.

The specifications of the Regulation of the General Health Act in the Area of Health Research[18] were taken into account to request the verbal and written consent (Articles 13, 14, 21, 22) to the legal representatives of the study subjects to ensure voluntary and free participation (Article 36). To keep individual privacy, each data collection instrument was identified with a code that included numbers and letters (Article 16). The study was classified as risk-free research (Article 17).

RESULTS

114 schoolchildren were studied, mostly females (53.5%), with an average age of 7.9 years. According to the results, 62.3% have a normal nutritional status, 14.9% are overweight, and 22.8% are obese. Regarding the nutritional status by age, it was found that 42.1% of 7 year-olds schoolchildren are overweight (42.1%) and 35.7% of 8 year-olds are obese, as indicated in Table 1.

As can be seen in Table 2, of the total number of schoolchildren with normal nutritional status (71), 52.1% are females; of the 17 schoolchildren with overweight, 58.8% are girls and finally, of the 16 schoolchildren who are obese, 53.8% are girls and 46.2% are boys.

Table 4. Nutritional status and socioeconomic level of schoolchildren, Ciudad Obregon, Sonora, 2017.

Nutritional Status	Socioeconomic Level							
	High		Middle		Low		Total	
	f	%	*f*	%	*f*	%	*f*	%
Normal	24	33.8	25	35.2	22	30.9	71	62.2
Overweight	7	41.1	8	47.06	2	11.7	17	14.9
Obesity	7	26.9	11	46.3	8	30.7	26	22.8
Total	38	33.3	44	38.6	32	28.1	114	100

Source: Regla AMAI-NSE 8X7 (2011) y Percentiles OMS 3-97 ***n*** = 114

Table 5. Chi-square test for socioeconomic level and nutritional status, Ciudad Obregon, Sonora, 2017

	Value	df	Bilateral Asymptotic Significance
Pearson's Chi-square	3.151	4	.533
Likelihood ratio	3.580	4	.466

p = <0.05 ***n*** = 114

Regarding the socioeconomic level, it was found that 33.3% of the study population has a high socioeconomic level, 38.6% has a middle socioeconomic level, and 28.1% has a low socioeconomic level (Table 3). 35% of the parents of schoolchildren surveyed said they were unemployed.

Regarding the nutritional status and socioeconomic level, it was found that 35.2% of schoolchildren with a normal nutritional status are from the middle socioeconomic level and 33.8% are from the high socioeconomic level. Of the overweight schoolchildren, 47.06% have a middle socioeconomic level followed by 41.1% with a high socioeconomic level. Finally, it was found that 46.3% of schoolchildren with obesity are from the middle socioeconomic level (Table 4).

As shown in Table 5, no statistically significant differences were detected between having a normal nutritional status, overweight or obesity and being from high, middle or low socioeconomic level (X^2 = 3.151, *df* = 4, *p* = 0.533).

DISCUSSION

The purpose of this study was to determine the relationship between nutritional status and socioeconomic level of schoolchildren between the ages of 7 and 9; as a percentage, it was found that schoolchildren with high and middle socioeconomic level are overweight. Although students of low socioeconomic level show normal nutritional status, they also show obesity. However, it was not statistically possible to determine the relationship between the variables socioeconomic level and nutritional status.

In a research performed in Havana, Cuba, with 276 adolescents between the ages of 10 and 14, overweight and obesity prevalence was found[19]; although the age of the subjects and the sample size differ from this study, there are similarities with the results described above. In Colombia, Vallejo informed the prevalence of malnutrition and obesity in indigenous and rural populations aged 0 to 5[20]. The nutritional status of the infant population is currently an issue, making clear the need there is for the design and implementation of programs for the reduction of overweight and obesity in this age group, problem that affects several countries in Latin America.

A study conducted in the state of Morelos, Mexico, indicated that the overall prevalence of low weight based on BMI is approximately 8%, while the joint prevalence of overweight and obesity is greater than 25% in children and adolescents[21]. Another study conducted in children (boys and girls) aged 7 to 26 months from rural and marginalized areas of Mexico found cases of chronic malnutrition evaluated as short stature. Chronic malnutrition has negative impacts on the development of motor skills and mental functions[22] of children such as intelligence, memory, and learning abilities [22].

Regarding geographical location, the "2016 Mid-Way Health and Nutrition Survey indicated that there is a slight increase in the distribution of the prevalence of overweight and obesity according to the type of location[10], compared to

the results of the 2012 survey. This survey was conducted in people of urban areas and schoolchildren with malnutrition were not detected; thus, this is considered as an area of opportunity for future studies, since the municipality where the data collection was carried out features a considerable number of rural communities. It is essential to conduct studies in rural areas, since higher percentages of food insecurity have been found in these areas compared to urban areas. Such food insecurity arises when the access of the population to nutritionally adequate food is limited and uncertain[23]. The acquisition of data from both areas will allow us to make concrete comparisons and facilitate the design of preventive and/or corrective actions; likewise, coordinated work with multidisciplinary teams will be required.

Overweight schoolchildren were from middle and high socioeconomic levels; schoolchildren with obesity were from middle and low socioeconomic levels. For subsequent studies, a methodological design capable of determining the type of relationship between a certain socioeconomic level and the nutritional status of the school population is suggested, including toddlers, since a delay in linear growth reflects the social and dietary marginalization at which a child has been exposed for a long period of time[22]. Likewise, some research has linked nutritional status during childhood with the development of chronic degenerative diseases in adulthood. A study in Chile found that the prevalence of high blood pressure showed a significant upward trend with increasing body mass index[24].

Moreover, one of the limitations in this study was the random identification of schools that allowed access to the school to collect data, which in turn assured the existence of families of different socioeconomic levels (according to the geographical location of the school) and a homogeneous school population.

The results of this study suggest the need to develop or strengthen programs aimed at preventing and controlling excess weight in children, not only in high and middle socioeconomic groups, but also giving importance to children of low socioeconomic level, since with improper eating all are vulnerable to overweight and obesity.

CONCLUSIONS

Most of the children between the ages of 7 and 9 from Obregon, Sonora, who participated in this study, have a normal nutritional status and the results with the highest percentages are distributed equally in the three socioeconomic levels (high, middle, and low). Nevertheless, a slight prevalence of obesity and overweight is concentrated in the middle socioeconomic level. Additionally, the study showed that there is no relationship between the socioeconomic level of the schoolchildren studied and their nutritional status.

Boys and girls have an equivalent proportion of obesity, but it is in girls that there is a higher prevalence of overweight compared to boys. Boys aged 7 show a higher prevalence of obesity and boys aged 8 show a higher prevalence of overweight.

The production or strengthening of programs aimed at preventing and controlling excess weight in children from all socioeconomic levels is suggested. Although schoolchildren evaluated were drawn from several walks of life, all were vulnerable to overweight and obesity. It is important to implement physical activities that appeal to the female gender. The purchasing power of the family does not determine the ideal food quality or amount that schoolchildren are receiving.

CONFLICT OF INTEREST

The authors declare they do not have any conflict of interest.

FINANCING

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