



Nutritional Status And Its Relationship With Socioeconomic Level In Schoolchildren Of The Uunt Wichim Community, Seville Don Bosco Parish. Morona Santiago, 2023

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ABSTRACT

Background: Malnutrition is a worldwide health problem that is associated with various factors, among them, the socioeconomic level of the family nucleus.

Objective: To determine the nutritional status and its relationship with socioeconomic level in schoolchildren of the Uunt Wichim community, Sevilla Don Bosco, Morona Santiago-Ecuador, in the period April-June 2023.

Methodology: A cross-sectional observational study was carried out between March and May 2023, with schoolchildren of both genders and ages between 5-12 years, from a community located in Morona Santiago-Ecuador. The height and weight of the schoolchildren were taken, to evaluate the socioeconomic level, the parents or legal guardians filled out the Graffar-Méndez Castellano scale.

Results: A total of 68 schoolchildren participated in the study, with a median and an interquartile range of 10.0 (7.0 - 12.0) years, and 40 (58.8%) were female. Of the schoolchildren, 23.5% were undernourished, 8.8% were overweight and 1.5% were obese. In relation to the socioeconomic level, 7.4% belonged to stratum III, 69.1% to stratum IV and 23.5% to stratum V. Schoolchildren belonging to stratum III and V presented differences in BMI ($p = 0.011$), likewise, there were differences in BMI between schoolchildren belonging to stratum IV and V ($p < 0.001$).

Conclusions and relevance: The schoolchildren presented a double burden of malnutrition. The results show that the nutritional status of schoolchildren is related to the socioeconomic level of the family nucleus. It is necessary to develop strategic interventions to eradicate malnutrition.

Keywords: *Malnutrition; Obesity; Socioeconomic Level; Undernutrition*

INTRODUCTION

Malnutrition is defined as unbalanced nutrition due to insufficient or excessive diet (1). Among the main forms of malnutrition are undernutrition and obesity, which represent a

serious health problem worldwide, especially affecting both low- and middle-income countries. The World Health Organization (WHO) determined that, in 2016, 45% of deaths in children under 5 years of age were caused or related to malnutrition. In addition,

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approximately 52 million children under 5 years of age globally were wasting (underweight for height) and 17 million were severely wasted. On the other hand, according to data reported by the WHO for the same year 2016 around 41 million children under 5 years of age and 340 million children and adolescents between 5 and 19 years were overweight or obese (2,3). In Latin America, around 2.3 million children between 0 and 4 years of age have both moderate and severe malnutrition, and in Ecuador, chronic child malnutrition affects 23% of children under 5 years of age, a scenario that is aggravated in rural areas. On the other hand, 13% of Ecuadorian children aged 0 to 5 years and 35% of children between the ages of 5 and 11 are overweight and obese, being more prevalent in urban areas (4–6).

Malnutrition is defined by the Food and Agriculture Organization of the United Nations (FAO) as the pathological state resulting from insufficient consumption of nutrients or inadequate assimilation of ingested food. (7), that is, there is an alteration in the balance between needs and nutrient intake, causing protein, micronutrient or energy deficits, a situation that negatively affects child development and growth. (8). In Latin America, child malnutrition is a major public health problem due to its high morbidity and mortality rates. (4). This health problem can start from the womb, so it is essential an adequate diet and the consumption of supplements (folic acid, iron, calcium) of future mothers to avoid complications in the short and long term (9). There are several causes that can be directly or indirectly associated with child malnutrition. Among the direct causes are: 1) the consumption of unhealthy diets and 2) the presence of conditions and diseases that generate abnormal loss of nutrients, decreased food intake or alterations in the absorption and utilization of nutrients. On the other hand, among the main indirect causes are: 1) socioeconomic factors, which intervene in the accessibility of food, 2) political factors, 3) environmental factors, 4) unfavorable behaviors of the family nucleus and 5) availability of food in quality and quantity (4,8). Several studies have associated malnutrition at an early age with a reduction in the number of neurons, synapses, dendritic arborizations and myelination, causing delay in the growth of the cranial perimeter, brain development and consequently delays in global function, motor function and memory. (8).

The WHO defines obesity and overweight as an excessive or abnormal accumulation of energy in the form of adipose tissue (in age, sex and height), and that can be harmful to health and affect the quality of life of children and adults with this condition. (3,10). Obesity originates when there is an imbalance between calories consumed and calories expended. (11). Among the main causes of obesity and overweight are poor dietary practices and reduced physical activity (12). In addition, there are several factors that favor the development of overweight and obesity, among the most important are the lifestyle of the individual, socioeconomic level, environmental factors, the obesogenic environment, endocrine alterations and genetic factors (13). Over the years, there have been several studies that have shown the relationship between the condition of obesity or overweight with the increased risk of developing chronic non-communicable diseases (14). Overweight and obesity can cause alterations in health and decrease the quality of life both in childhood and in adulthood. Existing literature indicates that children who are overweight and obese are more susceptible to cardiovascular disease, respiratory distress and diabetes, psychological disorders such as anxiety, depression, social stigma and bullying, and premature death. (15,16).

The increasing prevalence of child malnutrition (undernutrition, overweight and obesity) is related to several factors, including socioeconomic status. Several studies have shown that children with parents of low socioeconomic status are more likely to have inadequate nutritional status, either due to an excess or a deficit of nutrients. (17). For this reason, the present study aims to determine the nutritional status and sociodemographic and socioeconomic characteristics of schoolchildren from the Uunt Wichim community in the parish of Sevilla Don Bosco, province of Morona Santiago-Ecuador during the period April-June 2023 and determine if there are significant differences between the nutritional status and socioeconomic level of schoolchildren.

METHODOLOGY

Study design

An observational, analytical and cross-sectional study was conducted on the relationship between nutritional status and socioeconomic level in

schoolchildren from the Uunt Wichim community belonging to the parish of Sevilla Don Bosco, located in the Ecuadorian Amazon in the province of Morona Santiago. Recruitment and data collection were conducted between April and June 2023.

Participants

The participants who were part of the study were selected according to the following inclusion criteria: 1) be between 5 and 12 years old, 2) be enrolled and attend the "Carlos Zabala Rivadeneira" Basic Education School of the Uunt Wichim community, in the province of Morona Santiago-Ecuador, 3) have the written informed consent of the parents or legal representatives of the student and 4) have the informed consent of schoolchildren, signed or fingerprinted. We excluded schoolchildren who 1) had a medical condition that affects their nutritional status or required a special diet, 2) have received medical or nutritional treatment for eating disorders or malnutrition in the last 6 months, 3) presented intellectual, physical or multiple disabilities, 4) did not have the informed consent of the parents or legal representatives of the school, and (5) did not have the informed assent of schoolchildren. Due to the low population density of the parish and being the only school in the region, the present study was conducted with the universe of students who met all the inclusion criteria.

Ethical aspects

This study has the approval of the bioethics committee (CEISH) of the Catholic University of Cuenca. In addition, permission was obtained from the authorities of the GAD Parroquial Sevilla Don Bosco and the President of the Uunt Wichim community to carry out the study. Prior to the delivery of informed consents and informed assents, parents, legal representatives and students were explained in detail what the research consisted of, its objectives, methods and the confidentiality of the data obtained.

The parents or legal representatives who participated in the present study gave their written informed consent. Similarly, schoolchildren who were part of the study gave their informed assent. To ensure confidentiality, the minors' data was anonymized by a code assigned to each schoolchild. All procedures

were performed in the presence of one of your parents or guardians.

Data logging sheet

Data referring to age, sex, anthropometric and socioeconomic variables were recorded in a form prepared by the researcher.

Anthropometric measurements

The techniques for measuring weight and height were based on a manual of the Ministry of Public Health on Anthropometry Procedures and Determination of Blood Pressure (18). The weight measurement was carried out using a K&I scale, model KI1699, JL22I10 series with a capacity from 0 to 175 kg, and for the height measurement a Seca brand tallimeter, model 200 cm, series 22089 with measuring range from 0 to 200 cm was used. The instruments in question were calibrated.

The procedure for measuring weight and height was carried out in conjunction with two collaborators. For weight measurement, the participant was asked to remove stockings and shoes, and then participants were placed on the scale in an upright position with their feet together. Once the weight was recorded, the size was recorded, asking the participants to stand in a straight position, with their shoulders straight in a resting position and their eyes straight ahead, with their head and buttocks attached to the tallimeter.

Body Mass Index (BMI) was used to determine nutritional status. BMI was calculated using tables according to age range and sex, in which specific values were obtained for ages between 5 and 18 years of age for boys and girls (19).

Socioeconomic status

The socioeconomic status of parents and legal representatives was determined using the Graffar-Méndez Castellano scale, an instrument that has been widely used to classify the socioeconomic stratum of families. This instrument considers the following variables: 1) profession of the head of household, 2) level of education of the mother, 3) main source of income of the family and 4) housing conditions. Each variable is assigned a score, depending on the participant's response, then the points are added to establish which stratum the family

belongs to, according to a scale that varies between 4 and 20 points (Table No. 1) (20,21).

TABLE 1: Interpretation of the Graffar-Méndez Castellano score

Score	Stratum
4 – 6	I
7 – 9	II
10 – 12	III
13 – 16	IV
17 – 20	In

Fountain: Graffar-Mendez Castellano (20).

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Statistical analysis

Numerical variables are presented as mean and standard deviation or median and interquartile range, depending on the distribution of the data. Categorical variables are presented as absolute and relative frequencies. To determine the relationship between nutritional status and

socioeconomic status, the Kruskal-Wallis test was used because the data did not follow a normal distribution. A significant p was considered to be <0.05. All statistical analyses were performed using RStudio version 1.4.1106.

RESULTS

TABLE 2: Description of the study population

Variable	Absolute frequency (n=68)	Relative frequency (%=100)
Sex		
Man	28	41.2
Woman	40	58.8
Nutritional status		
Malnutrition	16	23.5
Normal	45	66.2
Overweight	6	8.8
Obesity	1	1.5
Socioeconomic status		
I	0	0
II	0	0
III	5	7.4
IV	47	69.1
In	16	23.5

Source: Research database.

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Analysis

the total study population was 68 schoolchildren with inclusion criteria to participate in the research. All schoolchildren completed the study. The population consisted of 58.8% (40) girls. Regarding nutritional status based on BMI,

23.5% of schoolchildren were malnourished, 8.8% were overweight and 1.5% were obese. Most of the families (69.1%) of the schoolchildren presented a socioeconomic level belonging to stratum IV.

TABLE 3: Descriptive statistics of age and anthropometric variables

Variable	Value
Age (years)	10.0 (7.0 – 12.0)
Weight (kg)	26.5 (21.0 – 35.25)
Size (cm)	130.9 ± 13.8
BMI (kg/m ²)	15.25 (13.8 – 18.5)

Source: Research database.

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Analysis

In the study population, the height variable presents a normal distribution and is presented as

mean ± standard deviation, while variables with a non-normal distribution (age, weight, BMI) are presented as median (interquartile range).

TABLE 4: Post-hoc analysis between BMI and socioeconomic status

	Stratum III	Stratum IV
Stratum IV	0.686	-
Stratum V	0.011	< 0.001

Source: Research database.

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Analysis

When comparing the BMI of schoolchildren between socioeconomic levels, statistically significant differences ($p < 0.001$) were found between at least two groups. When applying the specific post-hoc test for Kruskal-Wallis, it was determined that there are differences in BMI between stratum III and V ($p = 0.011$), and between stratum IV and V ($p < 0.001$).

socioeconomic differences condition both food and nutritional inequalities, since diets with better nutritional quality tend to be more expensive, and therefore, access to these foods is complicated for populations with a low socioeconomic level, which implies a lower consumption of healthy foods such as vegetables, fruits, dairy, fish, and increased consumption of ultra-processed foods and beverages (25).

DISCUSSION

The findings of the present study have shown that there are statistically significant differences between socioeconomic status and BMI-based nutritional status of the schoolchildren who participated in the research. Similar results were previously reported in several studies. (22–24), in which a significant relationship was found between BMI and the socioeconomic level to which the study subjects belonged.

In this context, the development of individuals in school stage is subject to the influence of the socioeconomic context in which they develop, which is evidenced through the findings obtained in a similar research (26), the results of which indicate that children from families with limited economic resources were more likely to be stunted. It is important to mention that stunting during childhood occurs more frequently in low- and middle-income countries. (27). In addition, several investigations have determined that presenting malnutrition is related to a lower learning capacity and therefore with lower cognitive and academic performance during childhood, which in turn compromises productivity in the future. (28). Therefore, the socioeconomic factor is widely associated with malnutrition problems, recent studies indicate that the lower the socioeconomic situation of the

The results obtained in the present study indicate that the main socioeconomic strata of the population of schoolchildren under study belong to stratum IV (69.1%) and V (23.5%), which indicate a low socioeconomic level. In the same way, the presence of malnutrition, overweight and obesity in schoolchildren was evidenced. These findings can be explained because

family, the greater the risk of chronic malnutrition in children (29).

In contrast, it has been suggested that high socioeconomic income and therefore a favourable socio-economic environment play an important role in the physical and mental development of children. (24), since a favourable socioeconomic status in the family nucleus allows parents to provide a healthy diet for their children, both in quality and quantity, which is essential to prevent malnutrition during early childhood. (30). Additionally, there are several studies that mention that parents or guardians who have greater economic resources have a broader understanding of dietary guidelines for adequate nutrition, compared to those families with a lower socioeconomic level whose knowledge on this subject is limited. (31).

It is evident that a high socioeconomic level leads to a better allocation of resources towards children, which in turn is reflected in the adoption of healthy eating habits and consequently better health conditions with a lower risk of diseases. (32). However, it is also important to consider that a high socioeconomic status often means that parents have less time at home due to long working hours, which means a limited ability of parents to adequately supervise the preparation and feeding of their children, which can negatively affect their diet, nutrition, nutrition, as well as their physical and cognitive development (33). Interestingly, other findings have reported that those children whose mothers are unemployed have a better diet compared to those whose mothers are employed. (32).

However, despite the significant progress made in the fight against malnutrition, there has been a worrying increase in the prevalence of childhood obesity. This phenomenon is attributed to the nutritional transition, which many countries are suffering, towards the adoption of diets characterized by the intake of foods with high energy content but of low nutritional value, as well as the adoption of a sedentary lifestyle with the consequent lack of activity. (34). All the factors described above refer to the existence of the complex phenomenon of the double burden of malnutrition, where malnutrition, overweight and obesity coexist in the same population, family and even in the same person. (3,35). The double burden of malnutrition is attributed to a combination of socio-economic factors, changes

in dietary patterns and food availability, as well as lack of access to balanced diets and essential nutrients. To effectively address the double burden of malnutrition, it is crucial to implement comprehensive interventions that promote food security, nutrition education and the adoption of healthy lifestyles, while addressing underlying social and economic inequalities. (36).

These findings highlight how socioeconomic inequalities are an important predictor of serious public health problems, such as stunting in children's growth and increased risk factors for the development of chronic noncommunicable diseases such as overweight and obesity, which provides a notable contribution to the health area of the area in which the study was conducted. and the country in general, since there is a lack of updated information regarding similar studies carried out in communities in eastern Ecuador.

One of the main limitations of the present study is that since the "Carlos Zabala Rivadeneira" Basic Education School is the only school in the Uunt Wichim community, the results obtained cannot be extrapolated to other populations. In addition, it was not possible to establish differences between BMI and socioeconomic strata I and II (high socioeconomic level), because none of the schoolchildren who were part of the study were within these strata. However, the present study also has strengths, among them, the use of widely used measurement instruments such as the Graffar-Méndez Castellano scale. Future studies may assess the socioeconomic status and other factors causing malnutrition among schoolchildren in several communities in the province of Morona Santiago, Ecuador.

CONCLUSIONS

The population of schoolchildren in the Uunt Wichim community presents a double burden of malnutrition, a situation that reaffirms the process of nutritional transition that several Latin American countries are suffering, including Ecuador, evidencing the coexistence of malnutrition, overweight and obesity. The nutritional status of schoolchildren in the Uunt Wichim community is influenced by several factors, including the socioeconomic status of the parents.

The results of this study can serve as a basis for decision makers to develop strategic interventions to eradicate all types of malnutrition, by improving economic opportunities, promoting education in the area of health and access in both quantity and quality to healthy foods, which allow in the short and long term to improve the nutritional situation of children.

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