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Nutritional Status and School Development in Children Aged 5 to 12

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Abstract--- *Nutritional problems affect children's health. Insufficient nutritional status in childhood increases the risk of death, inhibits el cognitive development and can affect lifelong health. This problem affects the poorest socioeconomic strata in society; in school age, this result in learning problems and high dropout rates. The objective of this research was to determine the nutritional status and its impact on the school development of children between 5 and 12 years of age. A descriptive and observational type study was conducted in a sample of 22 children who met the inclusion criteria. The Research tools applied were surveys, interviews, and observation. The Body Mass Index was calculated as a measure of children's nutrition status. The analysis found that nutritional status had a negative impact on children's school years. Overweight and obesity affect approximately 70% of children. This result was related to the excessive consumption of sweets and frying. Demotivation, poor academic performance and non-compliance with tasks are direct consequences of the negative feeding habits shown by students.*

Keywords--- *Body Mass Index, Cognitive Development, Nutritional Status, Obesity, Overweight*.

I. INTRODUCTION

The relationship of eating habits with health and disease has worried man since the origins of the first societies and cultures. Until the last century, most food-related illnesses were due to a deficiency of some nutrient. In recent years, interest has shifted towards chronic diseases (cardiovascular disease, diabetes, cancer), but also towards diseases related to excess fat, mainly obesity. There is a general lack of knowledge about the influence of diet during the first years of life and the carefreeness of the disease in the adult, which translates into a great interest in feeding at critical stages of development (infant and young child) (Moreno & Galiano, 2015; Corimaya, 2018; Suryasa *et al.*, 2020; Wiardani *et al.*, 2018; Yuliara 2019). However, similar attention has not been paid to the feeding of the child from 3 years onwards (Moreno & Galiano, 2015; Rodriguez *et al.*, 2020; Sidiartha & Pratiwi, 2018; Suiraoka *et al.*, 2017).

The crucial stage for the growth and development of the human being takes place between conception and early childhood. In this interval, the brain forms and develops at maximum speed. This is why, if the child does not have the necessary conditions, they will have lost the best opportunities to develop their maximum potential (Corimaya, 2018). A poor diet during physical development can lead to poor cognitive development in children, considering, in addition, the development of other diseases caused by poor or excessive food intake.

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The impact of malnutrition on school performance is explained, in part, by the influence it has on the central nervous system. No less important, however, is the action on immunity, which explains the high incidence of morbidity in children living in very depressed environments, which negatively affects food intake, learning ability and school attendance. Finally, there is a decrease in physical activity, as a mechanism to compensate for the energy deficit, thus limiting the possibility of interaction with the environment, a fundamental element in the learning process (Atalah& UNICEF, 1992).

In order to answer the question: What are the effects of malnutrition on psychomotor development?, 48 articles published in databases were used, the result of original research conducted in national and international contexts (Barreto & Quino, 2014). Thick motor development evaluates muscle control, body coordination and locomotion, fine motority refers to the development of control and coordination of body segments to perform more precise and complex tasks, integrates coordination perceptual and perceptual skills (Quino & Barreto, 2015).

When analyzing the relationship between malnutrition, psychomotor development and learning capacity, it is necessary to bear in mind that the observed effect is due, in part, to the nutritional deficit and to the social, affective and cultural depravity that, in a habitual way, accompanies malnutrition. Separating and quantifying the relative importance of each of these variables is a highly complex task, considering the great association that exists between poverty and malnutrition (Atalah & UNICEF, 1992).

Malnutrition is an international problem that reflects a great economic impact on public health. An estimated 840 million malnourished children exist in the world; in turn, an estimated 26.7% of school children in developing countries are underweight and 32.5% are not growing properly (Delcid *et al.*, 2017; Nyandra *et al.*, 2018; Pérez *et al.*, 2019; Puryana & Antarini, 2018).

Public health has been affected internationally, especially in vulnerable groups such as children under 5 years of age. Child malnutrition generates, in addition to physical damage, irreversible damage to cognitive ability. Weakness, understood as "developmental deterioration syndrome", includes growth disorders, motor and cognitive delays, as well as behavioral development, a capacity and an increase in morbidity and mortality (Barreto & Quino, 2014).

The World Health Organization (WHO) has considered malnutrition as one of the five main causes of infant mortality, being a public health and social welfare problem in all contexts and settings (Barreto & Quino, 2014). Nutritional alterations by default are contextualized in various social, cultural and economic variables, the same ones that are risk factors in child development, producing psychomotor-level injuries that cause low academic performance and a lower productive capacity of the adult (Mamani *et al.*, 2013).

In some regions of Nicaragua, Ecuador, Peru and Bolivia, malnutrition rates particularly affect children under the age of 12, who have been identified as nutritional statuses outside normal parameters, characterized by low size relative to age, increase or decrease in body mass volume and / or low haemoglobin; ills that impair health reaching to death (Kevany, 1965). In Latin America they become more evident in the exposure group, mainly referring to this age group and its problems, as it has been observed to be more vulnerable to nutrition deficiencies, both socially and psychologically; secondly, because this group represents a growing sector of the current population of developing

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areas; and finally, because two decades from now it will be the economically productive population (Kevany, 1965).

The fight against child malnutrition is one of the major work fronts of the United Nations Children's Fund (UNICEF) throughout the world, and for this reason, special emphasis is placed on this serious problem in the campaign against child malnutrition “Donate 1 Day”. The situation is very serious, but it has also been shown that there are many feasible, cost-effective and effective interventions to improve the lives of these and many millions of other children (Wisbaum, 2011; Farfán *et al.,* 2019; Giler *et al.,* 2019; Mataram *et al.,* 2020).

Brain development is the main condition of the psychomotor part; This occurs before the child turns three years old. Neurons proliferate making synapses, establishing new connections and allowing the proper development of the nervous system; which sets the guidelines for motor development throughout life. That is why the first years of the infant's life are the most important. Thus, one of the characteristics of the profile of the clinical psychologist is to prevent and promote the mental health of the human being (Sotomayor & Rubio, 2016).

Malnutrition has negative effects in different dimensions, among which are the impacts on health, education and the economy (costs and public and private cats, and lower productivity). In turn, these exacerbate problems of social insertion and increase or deepen the scourge of poverty and indigence in the population, reproducing the vicious circle by increasing vulnerability to malnutrition with them (Gutiérrez, 2013; Arnawa *et al.*, 2019; Dewi & Mustika, 2018).

In Ecuador, the most latent concerns of basic education teachers is the low school performance that students present at the end of each school year due to nutritional problems. In a study, the Ministry of Public Health (MSP) of this country reveals that one in four boys in Ecuador suffers from chronic malnutrition, a problem that is more evident in girls, according to the results of the National Survey of Health and Nutrition (López, 2014).

On the Ecuadorian coast there is an incidence of this problem of 47%, in the mountains it is 27%, and in the Amazon, it is 26%. In general, in Ecuador, 21 out of a hundred children suffer from malnutrition problems during the first five years of life and 405 minors die annually from this problem. In the Chimborazo province, malnutrition reaches the critical figure of 44%. A large number of indigenous people live in the province, representing the majority of the malnourished population (López, 2014). In rural areas, the lack of drinking water and environmental sanitation are factors that lead to malnutrition. Only 27% of families have drinking water and 24% have sewage (López, 2014).

The Ministry of Economic and Social Inclusion (MIES) revealed that in 2016 there were more than 3,000 minors in foster care and institutional programs due to problems in the homes. Most of these cases were registered in the provinces of Los Ríos, Manabí, El Oro, Esmeraldas, Loja and Cañar. A total of 1,096 minors received a legal measure to be part of the foster care (living with non-parental families) and 2,151 were part of the institutional foster care ("Children face problems inside and outside the home", 2019).

In the province of Manabí there are several cantons with high rates of food insecurity and child malnutrition: Jipijapa, Paján, Montecristi, Jaramijó, Pedernales, Santa Ana and Junín. According to chronic malnutrition measures, the canton with the highest percentage of malnourished children in Manabí is Jipijapa (58%), and the

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most affected parishes are América and El Anegado with approximately 72% and 68% of their children, respectively.

Manabi Hasan area of 18,900 km^2, 1,190,000 people and 22 cantons. It is the coastal province with the highest malnutrition rate (29.4%). Only 8 of the 22 cantons are below the national average in terms of malnutrition (Cedeño *et al.*, 2005).

The present investigation is developed in the field of public health, according to the strategic lines of UNICEF. The aim is to include nutrition in public policies, with alliances for capacity building, generation of knowledge, information and evidence, and support in the exchange of experiences with other countries, including communication for the development of these programs, supported by the generation, analysis, and dissemination of information on child nutrition, which is promoted through communication processes for the development of behavior, attitudes, and healthy practices. The objective is to determine the nutritional status and its impact on school development in children from 5 to 12 years old at the Paulina de los Ángeles School of Basic Education in the Jipijapa canton, Ecuador.

II. Materials and Methods

An observational descriptive study was carried out, with the objective of determining the nutritional status and its impact on school development in children from 5 to 12 years old at the Paulina de los Ángeles Basic Education School in the canton of Jipijapa, which has with 33 children enrolled. A sample of 22 children who met the inclusion criteria was selected. The information collection methods were surveys, interviews and observation. The information was processed using the IBM SPSS software, version 21.0 (IBM SPSS Statistics for Windows, 2012).

The surveys were applied to parents and children. The questions were multiple-choice and to obtain greater accuracy in the information collected, 15 minutes were given to answer. Anthropometric measurements were also taken in grades from first to sixth year, parallels A and B, applying the program established by the WHO related to growth patterns.

Three interviews of 5 open questions regarding nutritional status and school development were conducted. The first was carried out on Dr. Eliana Hormaza Bernal, nutritionist at the Luis F. Martínez General Hospital. The second was carried out on Dr. Johana Serpa Montalvo, Educational Psychologist at the Mariana de Jesús School. The third was carried out to Ing. María Sánchez Gorozabel, a teacher at the Paulina de los Ángeles School of Basic Education.

The parents of the children surveyed were previously informed in accordance with the ethical standards established by the MSP. Informed consent was obtained from the users selected for the research. Through the review of surveys and the home visit carried out, data such as personal information, habits and lifestyle were obtained. Nutritional assessment was carried out, which was subsequently evaluated by the respective specialists. The Body Mass Index (BMI) was calculated, using equation (1).

$$MC = \frac{mass}{height^2}\left[\frac{kg}{m^2}\right] \qquad (1)$$

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To obtain the data required by the BMI, the following instruments were used: height rod, calibrated foot scale and the WHO guidelines for assessment of nutritional status. The applied BMI ranges, as established by the WHO and the MSP of Ecuador were: low weight (less than 14.5 - 15.5 kg / m^2), normal (between 15.6 - 20 kg / m^2), overweight (between 20.1 - 23.2 kg / m^2), and obesity (greater than 23.3 kg / m^2).

To assess school performance, the following qualifications, established by the Ministry of Education (Annex # 4) were taken into account: very good (AD 18 - 20), good (A 14 - 17), fair (B 11 - 13), and bad (C 10 or less).

III. Analysis and Discussion of the Results

As shown in Table 1, of the total sample, 5 children (22.7%) are obese and 10 (45.5%) are overweight, that is, 68.2% of children are above normal weight. On the other hand, 7 (31.8%) children present deficiencies in their weight. These results coincide with the health diagnosis made in the community.

Table 1: Nutritional Status Established by BMI

Nutritional status	Frequency	Percent (%)	Cumulative percentage (%)
Obesity	5	22.7	22.7
Over weight	10	45.5	68.2
Under weight	7	31.8	100
Total	22	100	

The nutritional disorders irreversible metabolic disorders trigger when not corrected weather. Family members and teachers are responsible for taking pertinent actions to avoid this situation. This research showed that most of the children studied were overweight, a result that coincided with the health diagnosis made in the community and with another reviewed research related to the topic (Lacassie *et al.,* 1980).

Table 2 shows the types of food consumed by children at school. Fruit consumption is highlighted, with 10 children (45.5%). On the other hand, the consumption of less healthy foods such as sweets and frying reach 68.2% cumulatively. This result may relate to the percentage of students entering the overweight and obesity categories (68.2%), set out in Table 1.

Table 2: Types of Food Consumed by Children during Recess

Type of food	Frequency	Percentage	Cumulative percentage
Sweets	8	36.4	36.4
Frying	7	31.8	68.2
Fruits	10	45.5	100
Total	22	100	

Children have a high consumption of fried foods and sweets, unhealthy foods when eaten in excess, causing alterations in nutrition and other body systems. The child needs a varied diet that allows him to grow, develop his physical activity and be healthy. Carbohydrates, fats and sweets must be consumed in a balanced way, since they provide energy to the body to carry out its functions, but excessive consumption causes overweight in school children (Rodríguez, 2017). On this issue, the institution carries out exchanges with parents, coordinated with the MSP. Despite these efforts, a considerable percentage of user's state that they do not receive training.

With regard to parents, was taken into consideration the have received training on healthy eating and child nutrition. The results show that of 22 parents, 8 (36.4%) if they received such instruction, while the rest (63.6%)

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didn't get it. In terms of performing homework, 15 parents (68.2%) they claim that their children have difficulty performing homework. According to respondents' opinions, this may be related to the need to be distracted from children. Moreover, we were also mentioned deficiencies since school. Again, the percentage here obtained Guard close similarity with the number of children in overweight or above (Table 1).

The motivation of children to attend school was another important factor considered in this study. According to interviews, 12 of the children (54.5%) they don't feel motivated to go to class. A you complain people who us surround and they have special significate in our lives play a very important role in our cognitive development. A child learns of their parents, they are meaningful people for the child and through them learns a whole series of habits and guidelines conduct (Sobrino *et al.*, 2014). This is where the role of parents as a motivational parent for the child.

As seen in the Table 3, 72.7% of children have satisfactory school performance, with 27.3% being very good and 45.5% good. In contrast, the remaining 27.3% has an unsatisfactory (bad) return.

Table 3: Qualitative Assessment of Learning

Performance	Frequency	Percentage	Cumulative percentage
Very good	6	27.3	27.3
Good	10	45.5	72.8
Poor	6	27.3	100
Total	22	100	

The nutrition and school development of children in the early stages of life are two variables that are related. Research on determining the interrelationships between nutritional status, brain development, intelligence and school performance, especially in school age, have shown this (Unda, 2013), stating that nutritional problems affect especially to the poorest socio-economic strata in society, and have negative consequences for economic development. In school age, this results in high dropout rates and performance problems, coinciding with this research, where feeding problems for the children in the school under study were shown to be related to low student grades.

IV. CONCLUSION

It was determined that the nutritional status influenced the school development of the children included in the research. Nutritional alterations were related to overweight and obesity in a greater proportion, highlighting the intake of sweets and fried foods, foods that excessively affect nutritional status. Most of the children were not motivated to attend school, failing to do their homework, a situation that had a negative impact on the results of the grades, so their school performance was unsatisfactory. Not all parents receive educational talks on nutrition systematically, an unfavorable situation to solve existing problems with children, school and home.

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