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Clinical and epidemiological characteristics of malnourished children under five years of age

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SUMMARY

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Protein-energy malnutrition is aOne of the leading causes of morbidity and mortality in childhood worldwide. An epidemiological, descriptive, longitudinal, and prospective study was conducted in 189 malnourished children under five years of age in the area of the Jimmy Hirzel polyclinic, Bayamo municipality, Granma province, Cuba, during the period 2018-2023. The aim was to determine some clinical and epidemiological characteristics present in the child, their mother, and their family, which could be related to the disease. Theoretical, empirical, and statistical methods were used. Relevant results: 36% of children were born prematurely and 46% were underweight; 55.6% received mixed breastfeeding until 6 months, and 63.5% received inadequate complementary feeding; boys predominated (54.5%) and the infant and transitional group (67.2%); 27% presented comorbidity. Among mothers, the most common were those aged 20 to 34 (50.8%), those with pre-university education (36%), those who were working (40.2%), and those with pregnancy-related illnesses (71.4%). 32.8% had chronic illnesses. Among families, 59.8% lived in homes with average structural conditions, 70.4% earned average incomes, and 45.5% lived in overcrowded conditions. It was concluded that in most of the malnourished children under five years of age studied, personal and family conditions contributed to malnutrition.

Keywords: Malnutrition; Underweight; Complementary feeding; Breastfeeding.

SUMMARY

Protein-energy malnutrition is one of the leading causes of morbidity and mortality in childhood worldwide. An epidemiological, descriptive, longitudinal, and prospective study was conducted on 189 malnourished children under five years of age in the Jimmy Hirzel Polyclinic area, Bayamo municipality, Granma province, Cuba, during the period 2018–2023, with the objective of determining some clinical and epidemiological characteristics present in the child, the mother, and the family that could be related to the disease. Theoretical, empirical, and statistical methods were used. Among the relevant results, 36% of the children were born prematurely and 46% with low birth weight; 55.6 % received mixed breastfeeding up to 6

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months of age, and 63.5 % had inadequate complementary feeding; males (54.5%) and the infant and transitional age group (67.2%) predominated; 27% had comorbidities. Among the mothers, those aged 20–34 years (50.8%), with a pre-university level of education (36%), employed (40.2%), and with pregnancy-associated illnesses (71.4%) stood out; 32.8% had chronic diseases. In families, 59.8 % lived in homes with fair structural conditions, 70.4 % had a medium income level, and 45.5 % lived in overcrowded conditions. It was concluded that most of the malnourished children under five years of age studied lived in personal and family conditions that favored malnutrition.

Keywords: Malnutrition; Low birth weight; Complementary feeding; Breastfeeding.

SUMMARY

Energy-protein malnutrition is one of the main causes of childhood morbidity and mortality worldwide. An epidemiological, descriptive, longitudinal and prospective study was carried out with 189 malnourished children under five years of age, in the area of the Jimmy Hirzel Polyclinic, municipality of Bayamo, province of Granma, Cuba, during the period from 2018 to 2023, with the objective of determining some clinical and epidemiological characteristics present in the children, in the mother and in the family that They could be related to the job. Foram used theoretical, empirical and statistical methods. As relevant results, 36% of children were born prematurely and 46% were underweight; 55.6% received mixed food within 6 months and 63.5% received inadequate complementary food; Boys will predominate (54.5%) in the infant and transition group (67.2%); 27% present comorbidities. Among the others, we highlight the communities between 20 and 34 years old (50.8%), pre-university schooling (36%), workers (40.2%) and doenças associated with pregnancy (71.4%); 32.8% presented chronic illnesses. Of the families, 59.8% lived in residences with regular structural conditions, 70.4% had average income and 45.5% lived in superlot conditions. It is concluded that, in the majority of the malnourished children under five years of age studied, there are personal and family conditions that favor malnutrition.

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Keywords: Malnutrition; Low weight; Complementary nutrition; Maternal joy.

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Introduction

Malnutrition is the measurement that most clearly reflects the alterations in health and nutrition that a child experiences and accumulates, regardless of their causes and even the development of a country. (1)

Insufficient height for one's age is called stunting. It results from chronic or recurrent malnutrition, usually associated with poor socioeconomic conditions, poor maternal nutrition and health, recurrent illnesses, and/or inappropriate feeding and care of infants and young children. Stunting prevents children from developing their full physical and cognitive potential. Children who weigh less than their age are underweight and may also be stunted and/or wasted. (2)

Inadequate intakes of vitamins and minerals (micronutrients) pose a major threat to the health and development of populations worldwide, particularly for children and pregnant women in low-income countries.. (2)

The negative effect on the child's growth and development processes will depend on the time, severity, and duration of the nutritional deficiency. In general, children under one year of age are the most susceptible, due to their high growth rate and vulnerability to diarrheal, respiratory, and other infectious diseases. (3)

Among the factors that influence malnutrition are demographic, social, cultural, child's health status and eating habits. (4.5)

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In Latin America and the Caribbean, one in every 100 children under five years of age suffers from acute child malnutrition, a rate of 1.3%, very low compared to the global rate of 7.5%. Chronic malnutrition has also decreased, from 11.4% in 2012 to 9.6% in 2017. (6)

In Cuba, a series of measures are being adopted to prevent malnutrition. (7,8) Thanks to all this work, Cuba is among the countries with the lowest prevalence of undernourishment in the Americas. However, children on the island continue to be diagnosed with malnutrition. (8)

According to statistical data from the Provincial Health Department, Granma province's pattern is similar to that of the rest of the country, with some cases of mild and moderate malnutrition still occurring among children, especially children under five, affecting all municipalities.

In a study carried out in the area of the Jimmy Hirzel polyclinic, in the Bayamo municipality, in the three-year period 2014-2016, 80 children under two years of age with mild and moderate malnutrition were reported. (9) After that date, in the health area itself, children under five years of age have been diagnosed with protein-energy malnutrition, which motivates and justifies this research, with the aim of determining some epidemiological and clinical characteristics present in these children, during the period 2018-2023, which could be related to the disease.

Methods

An epidemiological, descriptive, longitudinal, and prospective study was conducted in malnourished children under five years of age, belonging to the Jimmy Hirzel Polyclinic, Bayamo municipality, Granma province, with the purpose of characterizing them clinically and epidemiologically. Variables were studied in the child (history of prematurity and low birth weight, age, sex, breastfeeding and complementary feeding, comorbidity), their mothers (age, education level, occupation, pregnancy-associated illnesses, chronic illnesses), and their families (structural conditions of the housing, overcrowding, economic income). The universe grouped 224 children under five years of age diagnosed as malnourished during the period 2018-2023.

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The sample was made up of those who met the selection criteria: 189 children with protein-energy malnutrition, whose mothers gave their consent to participate in the research and who remained in the health area while it was carried out.

Malnutrition was diagnosed through a nutritional assessment of each child using Cuban tables (weight/height, weight/age, and height/age). Weight was determined in kg and height in cm, and all children with a nutritional assessment below the third percentile were considered malnourished.

The children's and mothers' individual medical records, as well as family medical records, were reviewed to study each variable; homes were visited to determine family-related issues.

Operationalization of variables

Child:

- Prematurity: based on gestational age at birth (nominal dichotomous qualitative variable). It was categorized as present (children born before 37 weeks of gestational age) and absent (children born at 37 weeks of gestational age or later).
- Low birth weight (nominal dichotomous qualitative variable): categorized as present (weight less than 2,500 g) and absent (weight of 2,500 g or more).
- Age groups (nominal qualitative variable): categorized into infants and transitional infants (six months to 1 year, 11 months, and 29 days), and preschoolers (two years to four years, 11 months, and 29 days). Infants were selected from six months of age to assess feeding practices with exclusive breastfeeding and the initiation of complementary feeding.
- Sex (nominal dichotomous qualitative variable): it was divided into male and female, according to biological category.
- Breastfeeding (nominal polytomous qualitative variable): This variable was categorized as exclusive, if the child was fed only breast milk until six months of age; mixed, if the child was offered milk other than breast milk until the same age; and formula, if the child was never breastfed and was fed with another milk or formula.

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- Complementary feeding (nominal dichotomous qualitative variable): It was categorized as correct when the child was offered food according to the schedule prescribed by his or her attending physician in accordance with national protocols, and incorrect when the above was not met.

- Comorbidity (nominal dichotomous qualitative variable): it was categorized as present when the child presented one or more non-acute, non-infectious diseases, simultaneously with the malnourished condition, and absent when the above was not met.

Mother:

- Age (continuous quantitative variable): categorized into under 20 years, 20-34, 35 and over.

- Level of education (ordinal qualitative variable): categorized into primary, secondary, pre-university and university, depending on the last level completed.

- Occupation (nominal qualitative variable): categorized as student (if only studying), housewife (if working at home without pay), and worker.

- Diseases associated with pregnancy (nominal dichotomous qualitative variable): it was categorized as present if one or more acute diseases were present during pregnancy (urinary tract infection, vaginal discharge syndrome, anemia, gestational diabetes, hypertensive disease of pregnancy, etc.) or absent if the above was not met.

- Chronic diseases (nominal dichotomous qualitative variable): it was categorized as present if it presentedone or more non-acute diseases (high blood pressure, diabetes mellitus, bronchial asthma, epilepsy, heart disease, hypothyroidism, etc.) or absent if the above were not met.

Family:

- Structural conditions of the dwelling (ordinal qualitative variable): Good was categorized as having a roof in good condition (except those made of thatched roofs), with uncracked walls, a tile floor or other structure except earth, and a sanitary facility; fair, when it did not meet one of the previous conditions; thatched roofs, dirt floors, latrines in poor condition, or open defecation were not considered in this category; poor, if it did not meet two or more

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requirements that define the good category. This included dwellings with thatched roofs, dirt floors, latrines in poor condition, poorly located latrines, or open defecation.

- Overcrowding conditions (nominal qualitative variable): it was categorized as overcrowded, when more than two people lived with the child in the same room, and non-overcrowded, when up to two people lived with the child.

- Income (ordinal qualitative variable): Low income was categorized as families receiving up to 750 monetary units per month (in Cuban pesos); medium income was between 750 and 2,000; and high income was more than 2,000.

Methods used in the research

- Theoretical: historical-logical and analytical-synthetic.
- Empirical: review of clinical histories of the child, mother and family (interview with mothers), and observation.
- Statistics: Absolute and relative frequencies were used as summary measures of descriptive statistics.

Results

Table 1 presents the characterization of malnourished children. Thirty-six percent were premature, and 46% were low birth weight. The study group was predominantly infants and transitional infants (67.2%) and males (54.5%). Regarding feeding practices, the majority received mixed breastfeeding until 6 months (55.6%) and inadequate complementary feeding (63.5%). Twenty-seven percent presented comorbidities.

Table 1. Characteristics of malnourished children under five years of age.

Variable	# (n=189)	%

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Prematurity	Present	68	36.0
	Absent	121	64.0
Low birth weight	Present	87	46.0
	Absent	102	54.0
Age groups	Infants and transitionals	127	67.2
	Preschoolers	62	32.8
Sex	Male	103	54.5
	Female	86	45.5
Breastfeeding	Exclusive up to 6 months	63	33.3
	Mixed up to 6 months	105	55.6
	He didn't receive it	21	11.1
Complementary feeding	Incorrect	120	63.5
	Correct	69	36.5
Comorbidity	Present	51	27.0
	Absent	138	73.0

Source: medical records

Table 2 shows that there was a superiority of mothers aged 20 to 34 years (50.8%), who had reached the pre-university level of education (36%), workers (40.2%), with diseases associated with pregnancy (71.4%) and without chronic diseases (67.2%).

Table 2. Characteristics of mothers of malnourished children under five years of age.

Variable		# (n=189)	%
Age (years)	<20	68	36.0
	20-34	96	50.8
	35 and over	25	13.2
Schooling	Primary	10	5.3
	Secondary	51	27.0
	Pre-university	68	36.0
	University	60	31.7
Occupation	Student	62	32.8
	Worker	76	40.2

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	Housewife	51	27.0
Associated diseases to pregnancy	Presents	135	71.4
	Missing	54	28.6
Chronic diseases	Presents	62	32.8
	Missing	127	67.2

Source: medical records

Table 3 shows the characterization of the families, highlighting those who had homes with regular structural conditions (59.8%), received average economic income (70.4%), and were not overcrowded (54.5%).

Table 3. Characteristics of families of malnourished children under five years of age.

Variable		# (n=189)	%
Structural conditions of the housing	Regular	113	59.8
	Hello good	73	38.6
	Bad	3	1.6
Economic income	High	16	8.5
	Half	133	70.4
	Low	40	21.1
Overcrowded conditions	Missing	103	54.5
	Presents	86	45.5

Source: medical records

Discussion

When evaluating the characteristics of the children studied, it is noteworthy that more than one-third were premature and almost half were low birth weight. In the research conducted in the health area itself, to characterize malnourished children under two years of age during 2014-2016, the number of premature babies was similar, and more than 70% were low birth weight. (9)

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In 2021, a study entitled “Magnitude and trend of malnutrition and factors associated with short stature in children under five years of age in Mexico” found that 4.8% of children under 5 years of age were underweight, 14.2% were short, and 1.4% were wasted. (10)

Mamani-Urrutia V and collaborators, in their publication “Nutritional status of children under 6 months of age in a pediatric hospital in Peru: prevalence and associated factors,” they concluded,l multivariate analysis, there was an association between birth weight and malnutrition. (11)

Coinciding with this research, in those of Fernández-Martínez and collaborators,Hodgson MI and co-authors, and Juma Paspuel et al., there were more malnourished children under two years of age. (12-14) For their part, Deleón CA et al. (15) found a predominance of those over two years of age at 58.7%.

Of the children studied, only a third were exclusively breastfed until six months, and a small number were never breastfed. Regarding complementary feeding, only a small portion of the sample received it adequately.

In the article “Determining factors in child malnutrition in San Juan y Martínez, 2020”, (12) the authors identify as determining factors of child malnutrition the duration of exclusive breastfeeding less than three months and inadequate complementary feeding (51.6% and 65% of cases, respectively).

Reyes Montero and collaborators, (16) also found among the predisposing factors for malnutrition to occur, the exclusion of breastfeeding and the insufficiency in the complementary feeding process, which is related to what was obtained in the present study.

Regarding associated comorbidities, it is important to highlight that almost one-third of the children had this condition. A study on mortality in malnourished children admitted to intensive care showed an association between malnutrition, severe illness, and mortality. (17)

Risk factors and illnesses that occur in pregnant women influence the fetus and can affect its health from the beginning of intrauterine life: adolescent mothers, low educational attainment, lack of employment, acute or chronic illnesses during pregnancy.

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Most of the mothers of the children studied were between 20 and 34 years of age, the ideal age for conception, since women are physically and mentally prepared for motherhood after the age of 20. However, it should be noted that more than a third of the mothers were teenagers, a worrying result because there is an increase in teenage pregnancy in Cuba. (8) Studies conducted in the Bayamo municipality, where this research was conducted, obtained similar results. (9)

There were more mothers with pre-university education and employment, in line with the educational level and occupation predominant among most Cuban women.This result coincides with that of national publications, (9) and differs from what was found in a study in Peru, where the predominant schooling was primary and secondary. (18)

Pregnancy-related illnesses occurred in three-quarters of the mothers studied, and chronic illnesses in one-third. The negative impact of these illnesses on the unborn child is well known.

High blood pressure is a known risk factor for numerous diseases, including low birth weight and malnutrition in early life. Authors have linked this and other chronic and pregnancy-related diseases to low birth weight and malnutrition in early childhood. (19)

Gómez Mendoza C et al, (20) show in their study of mothers who had underweight children,Vaginal sepsis was present in 71.7%, followed by anemia at 32% and high blood pressure at 29.4%.

Childhood malnutrition is a multifactorial health problem, as it is related to biological, cultural, environmental, economic, and institutional factors. In this series, the majority of children came from middle-income families and from homes with average structural conditions.

Studies conducted in Latin America and developing countries agree that low purchasing power, limited educational level and poor food hygiene are related to high rates of malnutrition, in addition to the interaction between malnutrition and infections, which aggravate each other. The first five years of life are a crucial time for the development of an individual. It is considered a short but unique period, since the adequate interaction of the aforementioned factors will allow the individual to reach their maximum growth and development potential due to the

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particular biological characteristics of this stage and the presence of risk factors that affect their growth and development, as well as their future health when they reach adulthood. (14,15)

The results of this study demonstrate that childhood malnutrition is closely linked to multiple causes, many of which can be prevented with early interventions, even before conception, preparing the expectant mother (and her family) to begin pregnancy and reach term in the best health conditions.

Conclusions

It was concluded that in most of the malnourished children under five years of age investigated, personal and family conditions were conducive to malnutrition.

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Conflict of interest

The authors declare that there are no conflicts of interest for the publication of the article.

Authorship contribution

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I, Nora Almaguer Céspedes, on behalf of all the co-authors, declare the veracity of the content of the article.

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