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Evaluation of the hematological profile of school-aged children in the municipality of Marshal Candido Rondon – PR

Assessment of the hematological profile of school-age children in the municipality of Marshal Candido Rondon, PR

Evaluation of the hematological profile of children in schools in the municipality of Marechal Cândido Rondon, PR

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Abstract: Introduction: Anemia represents a significant public health problem, especially in the child population, due to the impacts it can have on physical and cognitive development and school performance. While of multifactorial etiology, the most prevalent anemia in children is due to nutrient deficiency resulting from poor diet, leading to nutritional deficiencies. Objective: To analyze the occurrence of anemia in school-aged children, with emphasis on iron-deficiency anemia, considering its relevance as a major public health problem. Materials and methods: Data from complete blood counts and complementary tests such as iron and ferritin levels were collected and analyzed from children at the UNILAB laboratory in the municipality of Marechal Cândido Rondon in 2025.
Results: Analyzing the results, it was noted that of the 187 medical records analyzed, there was a prevalence of 45.5% of children between 5 and 6 years old (n=85), with females being the most prevalent at 54% (n=101). The prevalence of anemia among the participants was 1.07% (n=2), as they presented hemoglobin concentrations below 11.5 g/dL, while 98.93% (n=185) did not present anemia. Conclusion: The analysis highlighted iron deficiency as one of the main causes of anemia in this population, emphasizing the need for actions focused on prevention, diagnosis, and monitoring of cases. The study reinforces that knowledge about the prevalence of anemia and its associated factors is fundamental for the development of public health strategies, which has led to a reduction in the disease and improved health and child development.

Keywords: Anemias, Blood count, Child health, Iron deficiency.

Abstract: Introduction: Anemia represents a significant public health issue, particularly among children, due to the impacts it can have on their physical and cognitive development, as well as their academic performance. While it has a multifactorial etiology, the most prevalent form of anemia in children stems from a lack of nutrients—a result of poor diet leading to nutritional deficiency. Objective: To analyze the occurrence of anemia in school-aged children, with an emphasis on iron-deficiency anemia, given its importance as a major public health concern. Materials and Methods: Data were collected and analyzed from complete blood counts (CBCs) and supplementary tests—such as iron and ferritin levels—for children seen at the UNILAB laboratory in the municipality of Marechal Cândido Rondon during 2025. Results: An analysis of 187 medical records revealed that 45.5% (n=85) of the children were between 5 and 6 years old, with females accounting for 54% (n=101) of the total. The prevalence of anemia among the participants was 1.07% (n=2), as these individuals presented with hemoglobin concentrations below 11.5 g/dL, while 98.93% (n=185) did not have anemia. Conclusion: The analysis identified iron deficiency as a primary cause of anemia in this population, underscoring the need for initiatives focused on prevention, diagnosis, and the monitoring of cases. This

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study reinforces that understanding the prevalence of anemia and its associated factors is essential for developing public health strategies, which can lead to a reduction in the disease and improved health outcomes and development for children.

Keywords: Anemia, Complete blood count (CBC), Child health, Iron-deficiency.

Abstract: Introduction: Anemia represents an important public health problem, especially in children's populations, due to its possible effects on physical and cognitive development and school performance. Its etiology is multifactorial and the most common way in children is due to a lack of nutrients resulting from inadequate nutrition, which causes nutritional deficiencies. Objective: To analyze the appearance of anemia in children at school age, with emphasis on iron deficiency anemia, considering its relevance as an important public health problem. Materials and methods: Blood count data and complementary tests, such as blood and ferritin, were collected and analyzed from children attended at the UNILAB laboratory of Marechal Cândido Rondon in 2025. Results: Of the 187 records analyzed, 45.5% corresponded to children aged 5 to 6 years (n = 85), with a predominance of the female sex, which represented 54% (n = 101). The prevalence of anemia was 1.07% (n = 2), although hemoglobin concentrations were lower than 11.5 g/dL, while 98.93% (n = 185) had anemia.

Conclusion: The analysis allowed us to highlight iron deficiency as one of the main causes of anemia in this population, highlighting the need for prevention, diagnosis and follow-up actions. The study focuses on understanding the prevalence of anemia and its associated factors and is fundamental for developing public health strategies, with results in reducing illness and improving health conditions and child development.

Keywords: Anemia, Hemogram, Child health, Iron deficiency.

1. Introduction

Anemias have a multifactorial etiology and can result from deficiencies
Nutritional deficiencies, such as iron, vitamin B12, and folic acid, as well as chronic diseases and hemorrhages,
Renal insufficiency, hemoglobinopathies, and bone marrow aplasia. Laboratory tests reveal anemia is...
defined by the reduction of hemoglobin concentration in the blood below the values of
Reference for age, sex, and physiological conditions, this being the main laboratory criterion.
for diagnosis (Lorenzi, 2019).

Anemias can be classified according to morphological criteria, based on...
primarily in Mean Corpuscular Volume (MCV) and Hemoglobin Concentration
Mean Corpuscular Hemoglobin Concentration (MCHC), which are divided into macrocytic, microcytic, and normocytic cells.
Macrocytic carcinomas are frequently associated with vitamin B12 or folic acid deficiency.
while microcytic anemias are primarily associated with iron deficiency anemia.
Normocytic cells are observed in conditions such as chronic diseases, hemolytic anemias, and...
bone marrow aplasia (Lorenzi, 2019).

The laboratory diagnosis of anemias is mainly based on the analysis of
Complete blood count, with emphasis on hemoglobin concentration, hematocrit, and indices.

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Hematimetric parameters. MCV determines the average size of red blood cells, while MCH and MCHCs contribute to the assessment of the quantity and concentration of hemoglobin in Red blood cells. The Red Cell Distribution Width (RDW) assesses the variability of Red blood cell size. In iron deficiency anemia, a reduction in MCV, MCH, and MCHC is observed. accompanied by an increase in RDW (Moreira et al., 2025).

Anemia in childhood is a condition that requires special attention, since This phase is marked by intense physical growth and cognitive development. increasing the need for essential nutrients for proper functioning of Children are more susceptible to developing anemia. due to a combination of physiological, nutritional, and environmental factors. During this stage, the The organism undergoes constant developmental processes, which increases the demand for Micronutrients, especially iron, are essential for the production of hemoglobin. However, this need is not always adequately met, especially in Situations involving a diet with little variety and insufficient intake of iron-rich foods. (Word Health Organization, 2023).

Furthermore, exposure to intestinal infections and parasitic diseases can contribute to... development of anemia, whether by impairing nutrient absorption or causing losses blood loss or interfere with iron metabolism. In girls, blood loss Menstrual irregularities also represent an additional risk factor, as they increase the need for Iron absorbed by the body. (Moraes et al., 2019).

In Brazil, data from the National Demographic and Health Survey (PNDS), conducted in Studies from 2006 indicated that approximately 20.9% of children presented with anemia. Indicators highlight the importance of the condition as a public health problem. especially when associated with socioeconomic factors, food insecurity, conditions inadequate basic sanitation and difficulties in accessing health services (Brazil, 2006).

In this context, micronutrient deficiency is one of the main factors. related to the development and worsening of childhood anemia, since these These substances play essential roles in the production of blood cells and in... Maintaining physiological balance. Iron stands out as the main micronutrient. involved in this process, as it is the protein responsible for transporting oxygen through organism. Its deficiency can compromise the adequate production of red blood cells, leading to development of iron deficiency anemia. (Lima et al., 2025).

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However, other micronutrients also play an important role, such as Vitamin A, which contributes to the mobilization and utilization of iron by the body; vitamin Vitamin B12 and folic acid are essential for DNA synthesis and the maturation of blood cells; and vitamin C, which promotes intestinal absorption of iron, especially that which comes from of plant-based foods. Therefore, a deficiency in these nutrients can compromise hematopoiesis (Brazil, 2009).

Hematological monitoring becomes essential to investigate the origin of anemia, establishing the correct diagnosis and guiding treatment according to the needs of Each child. Through clinical evaluations and laboratory tests, such as a complete blood count. complete blood count, ferritin levels, and other markers of iron metabolism are possible. to identify changes in blood parameters, to differentiate between possible types of anemia and To monitor the response to treatment. This monitoring also allows for the evaluation of... recovery of hemoglobin levels and iron reserves, preventing recurrences and possible complications arising from the condition (Brazil, 2006).

Given this context, the present study aimed to evaluate the prevalence and to characterize the main types of anemia in school-aged children attending a private laboratory in the municipality of Marechal Cândido Rondon – PR, through analysis Retrospective analysis of laboratory tests performed in 2025. Aspects considered. related to age and sex, as well as hematological and biochemical parameters, including hemoglobin, hematocrit, red blood cell count, hematimetric indices, ferritin, iron serum and vitamin B12.

Screening is the most effective way to provide the child population with the assurance of a A future with healthy development is essential for reducing the prevalence. of childhood anemia and to prevent cognitive impairment and learning difficulties, promoting a better quality of life for children, and it is worth highlighting that iron deficiency anemia It is a condition that is often preventable and treatable. The earlier it is identified, The greater the opportunities to intervene and prevent consequences for health and the child development.

2. Theoretical Framework

Anemia is a major global public health problem, affecting approximately 30% of the global population. According to the World Health Organization (WHO, By 2024, approximately 40% of children between 6 and 59 months of age had anemia, being the

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Iron deficiency is the main nutritional cause associated with its occurrence. Its high prevalence is related to micronutrient deficiencies, food insecurity and unfavorable socioeconomic conditions (Alves-Santos et al., 2023; Pedraza et al., 2018; (Paixão et al., 2021). In Brazil, anemia remains a significant health problem. childhood anemia, with iron deficiency anemia being the most frequent form in childhood, associated to the impairment of growth, neurocognitive development, and performance. school (Vieira et al., 2022; Souza et al., 2024). Prevention depends on measures such as Appropriate complementary feeding, iron supplementation when indicated, and diagnosis. early intervention, constituting one of the priorities of public health policies (WHO, 2024; Souza et al., 2024).

Children's health is directly influenced by nutritional conditions, especially during childhood, a period characterized by intense growth and development, which requires high availability of essential nutrients. In this context, nutritional anemias They represent a significant cause of compromised children's health, since Iron, vitamin B12, and folic acid deficiencies can impair hemoglobin synthesis. formation of red blood cells and maintenance of erythropoiesis, interfering with physical growth, in neurological development and physiological functions (Wirth et al., 2024). The high increased iron demand resulting from rapid growth, coupled with insufficient iron intake. micronutrient deficiency favors the development of its deficiency, which is related not only to to the reduction in hemoglobin concentration, but also to impaired growth, of the immune response and school performance (Viana et al., 2022).

In addition to hematological effects, nutritional anemias can cause damage to... Neurocognitive and psychomotor development. Iron deficiency is associated with alterations in brain neuroplasticity, while vitamin B12 deficiency can compromising myelination and the conduction of nerve impulses, causing difficulties in learning, attention deficit and delay in motor development (Santos, 2024; Larson, 2019).

2.1 General classification of anemias

Anemias can be classified according to different criteria, the most common being... Morphological, pathophysiological, and etiological factors are used. From an etiological standpoint, the following stand out: This classification helps in understanding whether there are nutritional anemias or hemolytic anemias.

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of the mechanisms involved in the development of the disease and directs the investigation laboratory and clinical conduct (De Santis, 2019).

Nutritional anemias result from a deficiency of essential nutrients. normal production of red blood cells, mainly iron, vitamin B12 and folic acid (vitamin (B9) (Dutra, 2019). Folic acid and vitamin B12 deficiency impairs cell division, causing the development of megaloblastic anemia (Lima, 2022). Among the anemias Due to nutritional deficiencies, iron-deficiency anemia is the most frequent form worldwide, constituting a an important public health problem, especially among children (Viana et al., 2022). The diagnosis of nutritional anemias is based on a combination of clinical evaluation and tests. Laboratory tests. A complete blood count (CBC) is the primary test for the initial identification of anemia. allowing for the analysis of hemoglobin concentration, hematocrit, and red blood cell count. and hematological indices. However, confirmation of the etiology depends on performing... of specific biochemical tests (De Santis, 2019).

In the investigation of iron deficiency anemia, serum ferritin is the main marker. of the body's iron reserves, being considered the test of choice for confirmation of deficiency. Other parameters, such as serum iron, total iron-binding capacity (TIBC), Transferrin saturation index and soluble transferrin receptor may complement the evaluation. In cases of suspected megaloblastic anemia, serum measurement of Vitamin B12 and folic acid for diagnostic confirmation (Leão, 2018).

The combined interpretation of clinical findings, blood count, and tests. biochemical tests make it possible to establish a differential diagnosis between the main types of anemia, guiding treatment and allowing monitoring of the therapeutic response. (Lima, 2022).

On the other hand, hemolytic anemias constitute a group of diseases characterized by due to the reduced lifespan of red blood cells as a result of their premature destruction. They can These anemias can be classified as congenital or acquired (Moraes, 2025). Clinically, these anemias Symptoms may include pallor, jaundice, splenomegaly, and increased liver count. reticulocytes. Laboratory tests show elevated levels of indirect bilirubin and lactate. dehydrogenase (LDH), reduction in serum haptoglobin, and evidence of bone marrow response. compensatory (Moraes, 2025).

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2.2 Diagnostic criteria

The World Health Organization establishes diagnostic criteria for anemia with based on hemoglobin (Hb) concentration, whose reference values vary according to the range. age. In children and adolescents, anemia is considered when Hb is less than 11.0 g/dL. Between 6 and 59 months, 11.5 g/dL between 5 and 11 years, and 12.0 g/dL between 12 and 14 years. These criteria They are widely used in clinical practice and in epidemiological studies for diagnosis. and monitoring of anemia (WHO, 2024).

2.3 Pathophysiological mechanisms of nutritional deficiencies

Iron is an essential micronutrient for erythropoiesis, playing a role fundamental in the synthesis of hemoglobin, the protein responsible for transporting oxygen from The body transports iron from the lungs to the tissues. Approximately two-thirds of the body's iron is found in the lungs. incorporated into the hemoglobin of erythrocytes, while the remainder is stored primarily in the form of ferritin and hemosiderin (Moreira et al., 2025).

Reduced body reserves or insufficient iron intake compromises the hemoglobin synthesis, resulting in the formation of microcytic and hypochromic erythrocytes, characteristic of iron deficiency anemia. Vitamin B12 or folic acid deficiency, on the other hand, is a deficiency. It impairs DNA synthesis and the maturation of erythroid precursors, causing anemia. megaloblastic, characterized by the presence of macrocytic red blood cells (Moreira et al., 2025; Castellanos-Sinco et al., 2015).

An adequate supply of iron, vitamin B12, and folic acid is essential for... maintenance of erythropoiesis and normal red blood cell morphology. Changes in The availability of these micronutrients is reflected in hematological parameters, such as... hemoglobin concentration, hematocrit, red blood cell count, and hematimetric indices. important tools for the diagnosis of nutritional anemias (Lima et al., 2025).

Iron, vitamin B12, and folic acid deficiencies compromise erythropoiesis because distinct mechanisms. Iron deficiency begins with the depletion of bodily reserves, followed by a reduction in the availability of iron to the bone marrow and the synthesis of hemoglobin, resulting in the formation of microcytic and hypochromic red blood cells, characteristic of iron deficiency anemia (Lorenzi, 2019; Wirth et al., 2024).

Vitamin B12 deficiency impairs the synthesis of erythroid precursor DNA. promoting ineffective erythropoiesis and megaloblastic anemia, characterized by the presence of

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macrocytic red blood cells, which can also cause neurological manifestations. In a way
Similarly, folic acid deficiency impairs nucleotide synthesis and cell replication.
DNA and hematopoietic cell maturation are impaired, resulting in megaloblastic anemia.
often associated with insufficient folate intake or increased requirements
metabolic processes (Jajoo; Zamwar; Nagrale, 2024; Lima et al., 2022; Castellanos-Sinco et al., 2015).

These changes are reflected in the parameters of the erythrogram. In the deficiency of
Iron deficiency leads to a reduction in hemoglobin, MCV, MCH, and MCHC, associated with an increase
of RDW. In vitamin B12 and folic acid deficiencies, an increase in MCV is observed,
resulting from the formation of macrocytic red blood cells. Therefore, an integrated assessment of
Hematimetric indices are essential for the differential diagnosis of the main anemias.
nutritional (Lima et al., 2025; Lorenzi, 2019).

2.4 Risk factors for nutritional anemias in school-aged children

In the pediatric population, nutritional deficiency is one of the main factors.
associated with the development of nutritional anemias, especially iron-deficiency anemia.
Insufficient intake of iron, vitamin B12, and folic acid compromises normal production of
red blood cells (Castro et al., 2024). The occurrence of these anemias is also related to
Food and Nutritional Insecurity (FNI), which limits access to quality food and
intake of micronutrients essential for child growth and development (Dremiski et
al., 2025).

Socioeconomic conditions have a direct influence on the occurrence of
Nutritional anemias in childhood. Low family income, low educational level of caregivers,
limited access to health services and inadequate housing and sanitation conditions
They compromise nutrition and promote intestinal infections and parasites, increasing the risk of disease.
risk of iron deficiency (Paixão et al., 2021).

Enteroparasitoses constitute an important risk factor for childhood anemia, because
They can impair nutrient absorption and cause chronic blood loss. In
A systematic review conducted in Brazil observed an association between anemia and infections.
parasitic diseases, most notably Giardia lamblia, Ascaris lumbricoides, and Enterobius vermicularis.
Entamoeba coli and Endolimax nana, reinforcing the importance of prevention, diagnosis and treatment.
treatment of these infections (Moraes et al., 2019).

Nutritional anemias represent a significant cause of health impairment.
childhood, since childhood is a period characterized by intense growth and high levels of development.

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Nutritional requirements. Deficiencies in iron, vitamin B12, and folic acid compromise... erythropoiesis and can interfere with physical growth, neurological development, and physiological functions (Wirth et al., 2024).

In addition to hematological effects, these anemias can cause damage to... Neurocognitive and psychomotor development, and school performance. Iron deficiency is associated with changes in brain neuroplasticity, while vitamin deficiency B12 can impair myelination and nerve impulse conduction, causing learning difficulties, attention deficit and delayed motor development (Santos) 2024; Larson 2019).

Nutritional deficiencies can also compromise the immune response. increasing susceptibility to respiratory and gastrointestinal infections. Therefore, the Early diagnosis and preventive measures, such as proper nutrition and supplementation of Micronutrients, when indicated, and nutritional monitoring are essential to reduce... the impacts of nutritional anemias on growth, development, and quality of life children's lives (Hassan 2016; Lozoff 2018).

3. Materials and methods

Study design

This study is characterized as a retrospective, documentary research of The study employed a cross-sectional design and a quantitative approach. The research was submitted for approval to the Research Ethics Committee Involving Human Beings (CEPEH) of the University. Paranaense (UNIPAR), CAAE nº 00622226.3.0000.0109 under opinion Nº 8.704.828.com Request for exemption from the Free and Informed Consent Form (TCLE), due to using Secondary data from laboratory tests.

Population and data collection

Electronic laboratory reports from children aged 5 to [age missing] were retrospectively analyzed. 10 years old, of both sexes, treated at a private laboratory in Marechal Cândido Rondon. – PR, in the year 2025. Tests including a complete blood count were included, and when Available tests included iron and vitamin B12 profiles. Duplicate tests were excluded. medical records with incomplete information and tests lacking hematological parameters. necessary for the classification of anemias. The variables analyzed included age, sex,

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hemoglobin, hematocrit, red blood cell count, MCV, MCH, MCHC, RDW and, when
Available factors include serum iron, ferritin, and vitamin B12. The classification of anemias was based on...
hemoglobin values recommended by the World Health Organization and in the indices
Hematimetric data were obtained anonymously, ensuring confidentiality.
patients.

Statistical analysis

The data were organized into spreadsheets and analyzed using GraphPad Prism®.
Version 10.1. The normality of continuous variables was assessed using the Shapiro-Wilk test.
Data were presented as mean and standard deviation or median and interquartile range.
according to the distribution, while categorical variables were expressed as frequencies.
absolute and relative prevalence of anemia was calculated as a percentage, with distribution...
according to sex and age group. Comparisons were performed using Student's t-test and Mann-K ...
Whitney, ANOVA, or Kruskal-Wallis tests, as applicable. Associations between variables
Categorical correlations were evaluated using the Chi-square or Fisher's exact test, adopting a level...
significance level of 5% ($p < 0.05$).

4. Results and discussion

In the present study, 187 medical records were evaluated, and the prevalence of these was noted.
45.5% of children were between 5 and 6 years old (n=85), with a significant number of females.
with 54% (n= 101), the remaining data for the categorization of individuals are found in Table 1.

Table 1 – Distribution of participants according to age group and sex, Marechal Cândido Rondon – PR, 2025.

Variable	Category	N	%
Age range	5–6	85	45.5
	7–8	51	27.3
	9–10	51	27.3
Total		187	100.0
Sex	Feminine	101	54.0
	Masculine	86	46.0
Total		187	100.0

Source: The authors, 2026.

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Analysis of the erythrogram (Figure 1) revealed an average of 4.71 ± 0.31 × 10ÿ/µL for erythrocytes, 13.29 ± 0.81 g/dL for hemoglobin, 37.98 ± 2.23% for hematocrit and 34.97 ± 1.06 g/dL for MCHC. The prevalence of anemia among the participants (Table 2) was 1.07%. (n= 2), since they presented a hemoglobin concentration lower than 11.5 g/dL, while 98.93% (n= 185) did not present with anemia.

Figure 1 – Erythroid profile of the children evaluated, Marechal Cândido Rondon – PR, 2025.

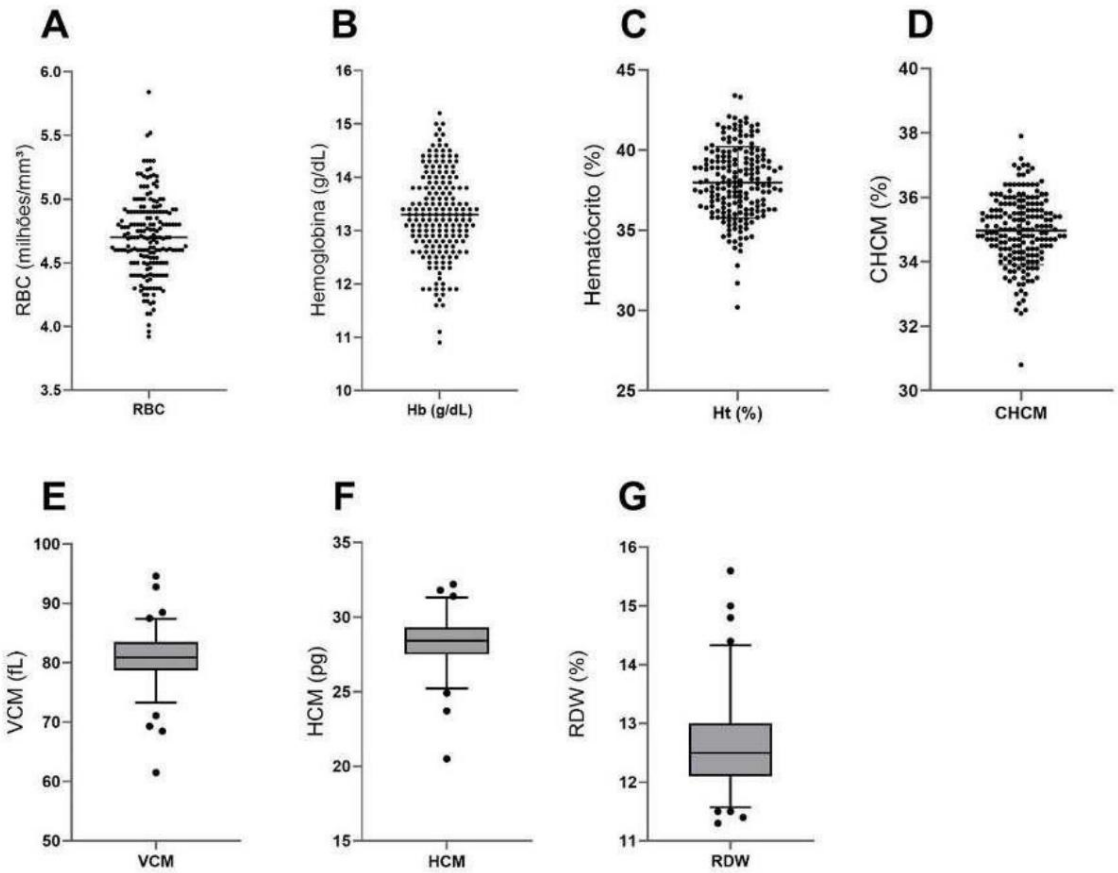

Figure 1 – Erythrocyte profile of study participants. (A) red blood cells (RBC); (B) hemoglobin (Hb); (C) hematocrit (Ht); (D) mean corpuscular hemoglobin concentration (MCHC); (E) mean corpuscular volume (MCV); (F) mean corpuscular hemoglobin (MCH); and (G) red blood cell distribution width (RDW). RBC, Hb, Ht, and MCHC are presented as mean ± standard deviation, while MCV, MCH, and RDW are presented as median and interquartile range (P25–P75). n = 187. For parameters that showed non-normal distribution, medians of 80.9 fL for MCV, 28.4 pg for MCH, and 12.5% for RDW were observed. According to the Shapiro-Wilk test, erythrocytes (p = 0.2527), hemoglobin (p = 0.4802), hematocrit (p = 0.3474), and MCHC (p = 0.1956) showed a normal distribution, while MCV, MCH, and RDW showed a non-normal distribution (p < 0.0001). Source: The authors, 2026.

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Table 2 – Distribution of participants according to hemoglobin classification and prevalence of anemia, Marechal Cândido Rondon – PR, 2025.

Classification according to Hb	N	%
Anemia (Hb < 11.5 g/dL)	2	1.07
No anemia (Hb ÿ 11.5 g/dL)	185	98.93
Total	187	100.00

Source: The authors, 2026.

In a study conducted in 2017 by Nobre, 228 children of the following age were evaluated. In school, reduced iron reserves and cases of iron-deficiency anemia occurred. respectively in 15.9% and 18.9% of the participants evaluated. In comparison with the current Research, also conducted with school-aged children, shows a lower occurrence. anemia. This result may be related to different factors, such as conditions food, socioeconomic factors and access to information (Castro et al., 2023).

In this context, the importance of raising awareness among parents and guardians is highlighted. regarding children's nutrition, as well as the partnership between the health and education sectors, by through food guides, guidance programs and actions to promote healthy eating. adequate and healthy.

This study identified only two cases of anemia among the 187 blood tests. The analyzed figures correspond to 1.07%, while Nobre's study identified 18.9% of cases. anemia (n=43) in a study conducted with 228 children. A study conducted in A study by Garcia et al. (2011) showed a prevalence of 29.17% of children with anemia. The analysis was performed on 754 blood tests.

A study conducted by Souza et al. (2001) showed results of 47.8% anemia. in a population of 557 children evaluated, whose determinants were: families with income Per capita income equal to or less than one minimum wage, the prevalence of anemia in the population The incidence studied is quite high, especially in children from lower socioeconomic backgrounds. Therefore, it can be taken into account that in the 20-year retrospective, measures were created aiming at... The fight against anemia has been effective, and raising awareness about prevention is also a factor. This is an issue that should be given greater visibility to families. (Souza et al., 2001).

Iron deficiency anemia is a major public health issue, mainly among children under five years old, being observed both nationally and international. The analysis of the literature, according to Castro et al., (2024), demonstrates that its

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This occurrence is related to various factors, such as insufficient consumption of food sources.
iron deficiency, socioeconomic vulnerability, and difficulties accessing health services.
(Castro et al., 2024)

Regarding sex, no cases of anemia were observed among the female participants.
female, while 2 cases were identified among male participants.
Fisher's exact test did not show a statistically significant association between sex and
anemia (p = 0.2102). It should be noted, however, that the presence of only two cases of anemia in
The sample size limits the statistical power of the analysis and requires caution in interpreting the results.
Regarding age range, the cases were distributed among the evaluated age groups, without
Statistical analysis was conducted due to the small number of events.

Considering nutritional deficiencies as an important factor associated with anemia
In infants, iron and ferritin levels were assessed when available.

Among the parameters related to iron metabolism, results were obtained for
Ferritin levels were measured in 182 participants and serum iron in 106. The average serum iron level was...
82.4 ± 29.5 µg/dL, while ferritin had a median of 37.0 ng/mL, with a distribution
not normal. By the Shapiro-Wilk test, serum iron showed a normal distribution (p =
0.6371), while ferritin showed a non-normal distribution (p < 0.0001). The distribution
The values for serum iron and ferritin are shown in Figure 2.

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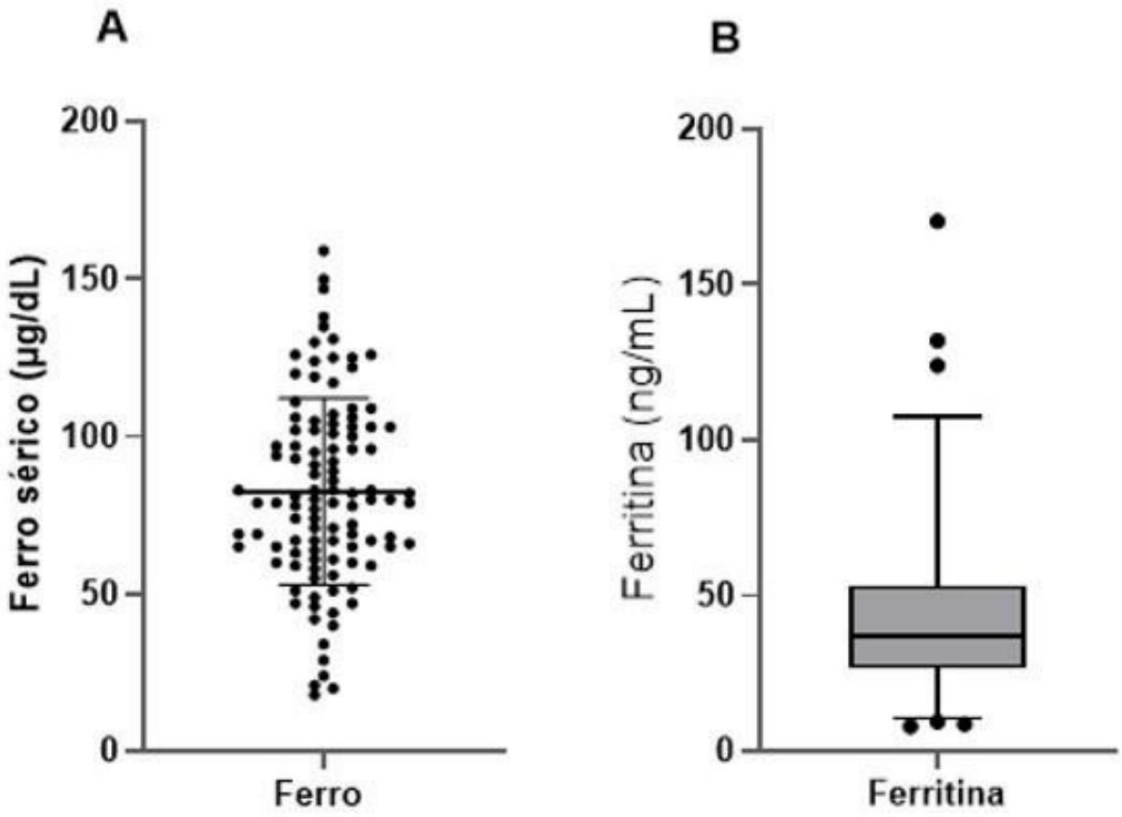
Figure 2 – Distribution of parameters related to iron metabolism.



Distribution of parameters related to iron metabolism. (A) Serum iron, presented as individual values with mean and standard deviation; (B) ferritin, presented in a boxplot, with median and interquartile range. Serum iron: n = 106; ferritin: n = 182. Source: The authors, 2026.

The low incidence of anemia observed in this study, with only two cases. identified, demonstrates that this condition was present in a small percentage of population evaluated. However, even with the reduced number of cases, childhood anemia This deserves attention, considering its potential impacts on growth and... child development. Theola and Andriastuti (2025) highlight, in their review systematic analysis suggests that iron deficiency during early childhood may be associated with impairments in neurocognitive, motor, and behavioral development, reinforcing the The importance of prevention, early identification, and nutritional monitoring in children. (Theola; Andriastuti, 2025).

Food and nutrition education initiatives have been driven by different factors. policies and strategies in the school environment. For example, Law 11.947/200912 valued the Food and nutrition education activities in schools, guiding their integration with the project.

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pedagogical. Different actors are identified for the development of practices with this.
thematic, such as the nutritionists of the National School Feeding Program (PNAE) and
health professionals from primary care teams. These actions bring to the parents
and responsible individuals raise awareness about children's nutrition, so that the lack of
Information should not be the primary cause of childhood anemia.

5. Final considerations

Analysis of the data revealed a low prevalence of anemia among the children.
evaluated, with only 2 cases identified out of a total of 187 patients. Despite the low
Given the observed occurrence, it is worth highlighting that childhood anemia remains an important issue.
public health, making the maintenance of preventive strategies and monitoring fundamental.
hematological assessment and attention to nutritional factors that may compromise development.
childhood. Thus, the findings contribute to the knowledge of the hematological profile of
The population of Marechal Cândido Rondon - Paraná, and they reinforce the importance of the investigation.
Laboratory testing as a tool for monitoring and promoting childhood health.

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