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# Evaluation of anemia in school children of the age group of 3 to 6 years: An observational study

**Ravi Kumar Vavilapalli**
Assistant Professor, Department of Paediatrics, Great Eastern Medical School and Hospital, Ragolu, Srikakulam, Andhra Pradesh

**Noolu Ramalingeswara**
Assistant Professor, Department of Paediatrics, Great Eastern Medical School and Hospital, Ragolu, Srikakulam, Andhra Pradesh

**Havilah Twinkle Reddipogu***
Associate Professor, Department of Physiology, Great Eastern Medical School and Hospital, Ragolu, Srikakulam, Andhra Pradesh
*Corresponding author

**Pradeep Kumar Vegi**
Assistant Professor,Department of Biochemistry, Coordinator - Research and Development, Great Eastern Medical School and Hospital, Ragolu, Srikakulam, Andhra Pradesh

***Abstract*---**Background: There exist different types of anemia and the most common of all is nutrition deficient anemia in children. This can be treated by administering an adequate amount of nutrition to the children. Hence, the early diagnosis of the anemia is highly essential to start the management at the earliest. Objective: The present study was undertaken to evaluate anemia in school children of the age group of 3 to 6 years. Materials and methods: A total number of 100 cases of Anemia were included in the study. The age group of participants is 3-6 years (preschool children). They were recruited from the pediatric out patient department of Great eastern medical school and hospital, Srikakulam, and were admitted for evaluation of Anemia. The study was conducted from January 2019 to June 2019. The participants with a hemoglobin value of less than 11 percent were selected for the study. Permission was obtained from the parents and also school authorities to conduct the study. The children with severe complications were excluded from the study. Results: Out of the 100 children, 52 were males and 48 were females. 42 participants were having severe anemia, 38 were having moderate anemia, 20 were

having mild anemia Majority of cases were severe in both males and females. In the etiology it was clear that majority of the children were suffering with the nutritional deficient anemia. Majority of patients have microcytic hypochromic anemia. Majority of males have microcytic hypochromic anemia and females have dimorphic anemia. Conclusion: The study results highlight the importance of early evaluation of anemia in children to offer effective treatment strategies. The study also suggests detailed further studies for better understanding of the relationship between the parameters so that better treatment protocols can be planned.

***Keywords*---**anemia, diagnosis, children.

## Introduction

A decrease in the count of the red blood cells or a decrease in the hemoglobin percentage accounts for anemia. In India, the most common anemia is iron-deficiency anemia which affects mainly children due to undernutrition [1]. Anemia can occur with different causes; hence adequate diagnosis is required for the management of anemia. As anemia does not present any signs, it must be diagnosed by a systematic approach [2]. The age group of 3 to 6 years was more prone to develop anemia. The systematic approach includes not only physical examination but also laboratory tests. It was reported that about sixty percent of the children in the age group of 1-3 years were anemic. Anemia can be mild, moderate, and severe [3]. There will be a decrease in the oxygen-carrying capacity in anemic patients and ultimately it affects the metabolism. There exist different types of anemia and the most common of all is nutrition deficient anemia in children [4-6]. This can be treated by administering an adequate amount of nutrition to the children. Hence, the early diagnosis of the anemia is highly essential to start the management at the earliest. The present study was undertaken to evaluate anemia in school children of the age group of 3 to 6 years.

## Materials and Methods

Study design: Observational study
Study setting: The present study was conducted at the pediatric outpatient department of Great eastern medical school and hospital, Srikakulam, Andhra Pradesh, India.

## Study participants

A total number of 100 cases of Anemia were included in the study. The age group of participants is 3-6 years (preschool children). The study was conducted from January 2019 to June 2019. The participants with a hemoglobin value of less than 11 percent were selected for the study. Permission was obtained from the parents and school authorities to conduct the study. The children with severe complications were excluded from the study.

**Methods**

After the recruitment, patients underwent a thorough physical examination. Then the demographic data was obtained followed by detailed data collection. An automated blood cell counter was used to assess routine hematological assessments. Peripheral blood smear, reticulocyte count, and osmatic fragility were observed by standard methods [7].

**Ethical considerations**

The study was approved by the institutional ethical committee. Voluntary informed consent was obtained from all parents of the participants.

**Statistical analysis**

Data was analyzed using SPSS 20.0. Student t-test was administered to observe the significance of the difference between the groups.

**Results**

Out of the 100 children, 52 were males and 48 were females. 42 participants were having severe anemia, 38 were having moderate anemia, 20 were having mild anemia. Table 1 presents the degree of anemia in male and female participants. Majority of cases were severe in both males and females. Table 2 presents the etiology of anemia in the participants. Table 3 presents the etiology of anemia in male and female participants. In the etiology it was clear that majority of the children were suffering with the nutritional deficient anemia. Table 4 presents the peripheral smear evaluation of participants. Majority of patients have microcytic hypochromic anemia. Table 5 presents the peripheral smear evaluation of male and female participants. Majority of males have microcytic hypochromic anemia and females have dimorphic anemia.

Table 1: Degree of anemia in male and female participants

| Degree of anemia | Male | Female | Total |
|---|---|---|---|
| Mild (10-10.9 gm%) | 11 | 9 | 20 |
| Moderate (7-9.9 gm%) | 21 | 17 | 38 |
| Severe (< 7 gm %) | 20 | 22 | 42 |
| Total | 52 | 48 | 100 |

Data was presented as frequency.

Table 2: Etiology of anemia in the participants

| Etiology | Frequency | Percentage (%) |
|---|---|---|
| Nutritional(Iron)Deficiency Anemia | 83 | 83 |
| Acute Lymphoblastic leukemia | 8 | 8 |
| Thalassemia | 6 | 6 |
| Refractory Anemia (Myelodysplastic syndrome) | 2 | 2 |

| | | |
|---|---|---|
| Non Hodgkin's Lymphoma | 1 | 1 |

Data were presented as frequency and percentage.

Table 3: Etiology of anemia in male and female participants

| Etiology | Male | Female |
|---|---|---|
| Nutritional(Iron)Deficiency Anemia | 40 | 43 |
| Acute Lymphoblastic leukemia | 5 | 3 |
| Thalassemia | 5 | 1 |
| Refractory Anemia (Myelodysplastic syndrome) | 1 | 1 |
| Non Hodgkin's Lymphoma | 1 | 0 |

Data were presented as frequency.

Table 4: Peripheral smear evaluation of participants

| Type of Anemia | Frequency | Percentage (%) |
|---|---|---|
| Microcytic, hypochromic | 44 | 44 |
| Dimorphic | 40 | 40 |
| Normocytic, Normochromic | 15 | 15 |
| Macrocytic | 1 | 1 |
| Total | 100 | 100 |

Data were presented as frequency and percentage.

Table 5: Peripheral smear evaluation of male and female participants

| Type of Anemia | Male | Female |
|---|---|---|
| Microcytic, hypochromic | 30 | 14 |
| Dimorphic | 13 | 27 |
| Normocytic, Normochromic | 8 | 7 |
| Macrocytic | 1 | 1 |
| Total | 52 | 48 |

Data were presented as frequency.

**Discussion**

There exist different types of anemia and the most common of all is nutrition deficient anemia in children. This can be treated by administering an adequate amount of nutrition to the children. Hence, the early diagnosis of the anemia is highly essential to start the management at the earliest. The present study was undertaken to the evaluation of anemia in school children of the age group of 3 to 6 years. Out of the 100 children, 52 were males and 48 were females. 42 participants were having severe anemia, 38 were having moderate anemia, 20 were having mild anemia Majority of cases were severe in both males and females. In the etiology it was clear that majority of the children were suffering with the nutritional deficient anemia. Majority of patients have microcytic hypochromic anemia. Majority of males have microcytic hypochromic anemia and females have dimorphic anemia. The study results support the results of earlier studies as there were higher cases of nutritional deficient anemia [8-12]. The study

highlights the importance of diagnosis of anemia in early stages of childhood to offer better treatment. As the cause is nutritional deficient, proper diet supplementation can be able to restore the children health.

**Conclusion**

The study results highlight the importance of early evaluation of anemia in children to offer effective treatment strategies. The study also suggests detailed furthers studies for better understanding of the relationship between the parameters so that better treatment protocols can be planned.

**Conflicts of interest:** None declared
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