

## Original Research Article

DOI: <https://dx.doi.org/10.18203/2349-3291.ijcp20214946>

# A cross sectional study on assessment of nutritional status and factors affecting anemia in children in tertiary care teaching hospital

Uma M. Posam<sup>1\*</sup>, Thanmai C. Chereddy<sup>1</sup>, Revanth S. Pirati<sup>1</sup>, N. V. Rama Rao<sup>1</sup>,  
Elizabeth Bandrapalli<sup>2</sup>, Sravani Yangalasetty<sup>1</sup>, Ramarao Nadendla<sup>1</sup>

<sup>1</sup>Department of Pharmacy Practice, Chalapathi Institute of Pharmaceutical Sciences, Guntur, Andhra Pradesh, India

<sup>2</sup>Department of Pediatrics, Government General Hospital, Guntur, Andhra Pradesh, India

**Received:** 17 November 2021

**Revised:** 07 December 2021

**Accepted:** 13 December 2021

**\*Correspondence:**

Dr. Uma M. Posam,

E-mail: umaposam8862@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Earlier many studies were conducted to assess the prevalence of anemia in adults, pregnant women, and children under 5 years of age. Despite all the reasons, there is an immense need to assess the nutrition status and prevalence of anemia in a pediatric population. Therefore, the purpose of the present study was to assess the nutritional status and prevalence of anemia in the pediatric population of age group 1-12 years.

**Methods:** The present study was a cross-sectional study with a sample size of 100 with age group 1-12 year, was conducted in Government general hospital, Guntur. The study was carried for a period of 6 months (October to March). Data were collected by using the NACS assessment guide tool for nutritional status and tallquist hemoglobin scale was used to measure hemoglobin.

**Results:** Age group of 1-6 years had 26% severe stunting whereas in the age group 10-12 years, 5% of the people had severe stunting. Age group of 1-6 yr and 7-12 years had 16% of severe wasting and 13% of severe wasting respectively. The prevalence of anemia in children had a significant impact with maternal education ( $p<0.05$ ), socioeconomic status of the family ( $p<0.05$ ), birth order of the child ( $p<0.05$ ) and doesn't have any significant impact with father education ( $p>0.05$ ), past medical history ( $p>0.05$ ).

**Conclusions:** From our study, we conclude that moderate anemia was more noticeable than mild and severe anemia in people of rural areas in and around Guntur. Severe stunting and moderate wasting was observed more in the age group of 1-6 years of children in both sexes.

**Keywords:** Anemia, Nutrition, Hemoglobin, Stunting, Wasting

## INTRODUCTION

In a developing country like India, all the resources are not reaching the children because of various reasons like illiteracy among parents, poverty, lack of awareness among health. India ranked 94th among 107 countries in the 2020 global hunger index “malnutrition is endemic in India”.<sup>1</sup>

**Nutrition:** The term nutrition can be defined as the process of taking in food and using it for growth, metabolism, and repair. Nutritional stages are ingestion, digestion, absorption, transport, assimilation, and excretion.<sup>2</sup> Because of the nutritional deficiency in children that may lead to malnourishment. **Malnutrition:** It has been used to describe a deficiency, excess, or imbalance of a wide range of nutrients, resulting in a measurable adverse effect on body composition, function,

and clinical outcome.<sup>3</sup> malnutrition is classified into 3 types: undernutrition, micro nutrient-related malnutrition, overweight and obesity. Anemia is a condition in which hemoglobin (Hb) concentration or red blood cell (RBC) numbers are lower than normal and insufficient to meet an individual physiological needs.<sup>4</sup> Specific physiologic needs vary with a person's age, gender, altitude, smoking behavior, and different stages of pregnancy.<sup>5</sup> Anemia may results based on blood loss, deficient erythropoiesis and RBC destruction. According to global nutritional report, states that 37.9% of children under 5 years are stunted and 20.8% are wasted, compared to the Asia average of 22.7% and 9.4% respectively stunting prevalence is 10.1% higher in rural areas compared to urban areas.<sup>6</sup>

Some individuals with anemia have no symptoms. Others with anemia may: weakness, fatigue, pale discoloration, palpitations (feeling of heart racing), shortness of breath. Additional anemia symptoms may include: hair loss, malaise (general sense of feeling unwell), worsening of heart problems. If anemia is longstanding (chronic anemia), the body may adjust to low oxygen levels and the individual may not feel different unless the anemia becomes severe. On the other hand, if the anemia occurs rapidly (acute anemia), the patient may experience significant symptoms relatively quickly and with relatively mild fluctuations of hemoglobin levels.<sup>7</sup> Treatment for anemia Intestinal iron absorption is limited. The maximum rate of absorption of 100 mg of oral iron is 20% to 25% and is reached only in the late stage of iron deficiency.<sup>8</sup> The range from 100 to 200 mg of elemental iron per day, successful repletion can be achieved with doses as low as 15 to 30 mg of elemental iron daily. Several formulations are available over the counter and are typically composed of ferrous iron salts (e.g., ferrous sulfate, ferrous gluconate, and ferrous fumarate).<sup>9</sup>

### Objectives

Objectives of current study were to assess the nutritional status of the pediatric population, to assess the prevalence of anemia among the pediatric population, to assess the impact of literacy of parents on anemia of children, to assess the influence of socioeconomic status on anemia among children, to assess the influence of birth order on

anemia among children and to assess the influence past medical history of child with anemia.

### METHODS

A cross-sectional study was conducted in Government general hospital from October 2020 to March 2021 for 6 months among 100 subjects. The study was conducted after obtaining approval from the Institutional ethics committee and informed consent from parents of the child. Validated inform consent form and data collection form were designed. The patients were screened based on inclusion and exclusion criteria. Patients who satisfy inclusion criteria were included in the study. After including the subjects into the study the data was collected in the designed data collection form.

#### Inclusion and exclusion criteria

Inclusion criteria were children of age between 1 -12 years of both sexes (as per WHO guidelines) and those with valid date of birth. Children with severe diarrhea, and using other drugs that affect hemoglobin levels and patients with hemolytic anemia and thalassemia, sickle cell anemia were excluded from study.

#### Procedure

For anemia hemoglobin level was measured by using tallquist method with was performed by the lab technician in the hospital. Nutritional status was accessed by measuring height and weight of the child in the ward. Data was compiled and analyzed using EPI INFO software. Analysis was done using appropriate statistical tools like percentages, Chi square test etc. and conclusions were drawn accordingly,  $p<0.05$  were considered statistical significant.

### RESULTS

A total of 100 members data was analysed. The prevalence of anemia in children had an significant impact with maternal education ( $p<0.05$ ), socioeconomic status of the family ( $p<0.05$ ), birth order of the child ( $p<0.05$ ) and doesn't have any significant impact with father education. ( $p>0.05$ ), past medical history ( $p>0.05$ ).

**Table 1: Nutritional status of the boys vs. girl were compared.**

Stunting	N	Girls	Boys	Wasting	N	Girls	Boys
Normal	54	29	25	Normal	22	15	07
Moderate	15	07	08	Moderate	49	09	40
Severe	31	16	15	Severe	39	10	19
Total	100	52	48	Total	100	34	66

### DISCUSSION

In the present study, a total of 100 children were enrolled of age group 1-12 years in a Government general hospital. For assessing the factors affecting the impact of

anemia in children, this study was carried for a period of 6 months. The major findings of this study are discussed here. In the present study from the (Table 1) it reveals that 16% of girls and 15% boys had severe stunting, 7%

of girls and 8% of boys had moderate stunting, 29% of girls and 25% of boys had no stunting.

**Table 2: Factors effecting anemia.**

Parameters	Anemia			P value
	Mild	Moderate	Severe	
<b>Age (years)</b>				
1-6	23	9	26	0.03
6-12	31	6	5	
<b>Gender</b>				
Male	29	7	16	0.057
Female	31	6	5	
<b>Education of mother</b>				
School	10	25	3	
Inter	1	6	0	
Degree	2	0	0	0.04
No	7	37	9	
<b>Education of father</b>				
School	11	27	6	
Inter	0	2	1	
Degree	3	3	0	0.07
No	6	36	5	
<b>Past medical history</b>				
Yes	5	5	0	
No	15	63	12	0.03
<b>Birth order</b>				
1	3	5	2	
2	8	31	4	
3	9	32	6	0.04
<b>Socioeconomic status</b>				
Upper lower class	8	35	3	
Lower middle class	0	4	3	0.02
Upper middle class	12	29	6	

By comparing stunting with age, people who were 1-6 years of age had 26% severe stunting, 9% had moderate stunting, 23% had no stunting whereas in the age group 6-12 years, 5% of the people had severe stunting, 6% had moderate stunting, 31% had no stunting. According to a study conducted by Sudhagandhi et al, the prevalence of anemia was reported. In the present study, we found that 67% were moderately anemic, 17% were mild anemia, 16% were severely anemia.<sup>10</sup> According to a study conducted by Dharmalingam et al the percentage of anaemic girls among literate mothers was 20.67% whereas in illiterate mothers it was 58.67%.<sup>11</sup> In the present study, from the (Table 2) suggested that mother who were uneducated had children 9% of severe, 37% moderate, 7% mild anemic. Mother who studied 5-10 class had children of 3% severe, 25% moderate, 10% mild anemic. Mother who studied Inter had children of 6% moderate, 1% mild. Mother who studied degree had children of 2% mild anemic. The results are statistically

significant ( $p<0.05$ ). So it was concluded that the prevalence of anemia has a significant impact of literacy of mother as education of mother increases the severity and frequency of anemia was decreased. Individuals who were illiterates had children with (N=47) 5% severe, 36% moderate, 6% Mild. Primary education had children with (N=44) 6% severe, 27% moderate, 11% mild. Inter education had children with (N=6). 3% moderate, 3% mild. Degree education (N=3) had 1% severe, 2% moderate. According to the study conducted by Mamulwar et al concluded that children with higher birth order (2nd and  $\geq 3$ rd) were more likely to be malnourished (underweight, stunted/wasted) as compared with first born child and the distribution was found to be statistically significant in stunting.<sup>12</sup> From the (Table 2) it was suggested that children with first birth order had 2% severe, 5% moderate, 3% mild. Children with second birth order had 4% severe, 31% moderate, 8% mild. Children with third birth order had 6% severe, 32% moderate, 9% mild anemia. According to a study conducted by Ghane et al concluded that socioeconomic status. 86 s (27.30%) children belonged to upper middle class, 143 (45.40%) to lower middle class, 85 (26.98%) to upper lower class, and 1 (0.32%) child to lower class.<sup>13</sup> In the present study upper lower class (N=46) had 3% severe, 35% moderate, 8% mild. Lower middle class (N=49) had 6% severe, 29% moderate, 12% mild. Upper middle class (N=7) had 3% severe, 4% moderate anemia. The results are statistically significant ( $p<0.05$ ). In this present study it was observed that children who had past medical history doesn't have any impact on the anemia. In this present study, from the table 2, 5% children with past medical history had mild anemia, 5% are moderately anemic. The results were statistically significant  $p=0.03$  ( $p<0.05$ ).

#### **Limitations**

Limitations of current study were; the study was limited to the small sample size because of COVID time. It was conducted in a Government hospital where most of the people came from rural regions only but urban people may also have malnutrition and anemia. The study was limited for 6 months duration only. This study can be extended by comparing anemia and malnutrition in the urban children and rural children. This study can also be extended to adults for comparing who are having severe anemia.

#### **CONCLUSION**

From our study, we conclude that moderate anemia was more noticeable than mild and severe anemia in people of rural areas in and around Guntur. Nowadays many health related programmes were launched by Govt. of Andhra Pradesh, despite all the efforts done by the Govt. of AP nevertheless, there is lacking awareness on the people concerning anemia. The prevalence of anemia has a significant impact of literacy of mother as education of mother increases the severity and frequency of anemia

was decreased. There is a significant association of Socioeconomic status and anemia i.e., children of upper lower class status are moderately anemic than the lower middle class. Birth order of child also has a part in anemia, an increase in the birth order has an increase in risk of anemia. Severe stunting and moderate wasting was observed more in the age group of 1-6 years of children. To control birth order family planning is the option so that children have more birth space and nutritional deficiencies can be minimized.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. William CS, Medical definition of nutrition. Available at: <https://www.medicinenet.com/nutrition/definition.html>. Accessed on 28 February 2021.
2. Nutritional status. Available at: <https://www.encyclopedia.com/education/dictionaries-thesauruses-pictures-and-press-releases/nutritional-status>. Accessed on 28 February 2021.
3. Elia M. Guidelines for detection and management of malnutrition. BAPEN. 2001;26(1):81-3.
4. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Available at: <http://www.who.int/vmnis/indicators/haemoglobin.pdf>. Accessed on 28 February 2021.
5. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Available at: <http://www.who.int/vmnis/indicators/haemoglobin>. Accessed on 28 February 2021.
6. Global nutrition report 2020. Available at: <https://www.drishtiias.com/daily-updates/daily-news-analysis/global-nutrition-report-2020>. Accessed on 28 February 2021.
7. Means RT. Hepcidin and anaemia. *Blood Rev.* 2004;18 (4):219-25.
8. Frede S, Fandrey J, Pagel H. Erythropoietin gene expression is suppressed after lipopolysaccharides or interleukin-1 beta injections in rats. *Am J Physiology.* 1997;273:1067-71.
9. Medicine. Anemia symptoms, causes, diet, diagnosis, treatment and prevention. Available at: <https://www.medicinenet.com/anemia/article.htm>. Accessed on 28 February 2021.
10. Sudhagandhi B, Sundaresan S, William WE. Prevalence of anaemia in the school children of Kattankulathur, Tamil Nadu, India. *Int J Nutr Pharmacology Neurol Dis.* 2011;1(2):184-8.
11. Dharmalingam A, Mena R, Raghupathy NS. Cross sectional study on nutritional status and prevalence of anaemia in rural adolescents. *Int J Contemp Pediatr.* 2017;4(3):951-5.
12. Mamulwar MS, Rathod HK, Jethani S. Nutritional status of under-five children in urban slums of Pune. *Int J Med. Public Health.* 2014;4(3):247-52.
13. Vaishali G, Kumar R. Nutritional status of under five children of Mumbai suburban region. *Int J Res Med Sci.* 2017;3:190-6.

**Cite this article as:** Posam UM, Chereddy TC, Pirati RS, Rao NVR, Bandrapalli E, Yangalasetty S, et al. A cross sectional study on assessment of nutritional status and factors affecting anemia in children in tertiary care teaching hospital. *Int J Contemp Pediatr* 2022;9:100-3.