ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24SEP604

A Review on Analysis of the Several Forms of Anaemia Common in Children and Adolescent in India between Ages of 1 to 19

[1]Kaviya P; [2]Dhanushya P
[1]Student; [2]Guest Lecturer
II M.Sc Foods and Nutrition , Department of Home Science
Mother Teresa Women's University, Kodaikanal- 624101

Abstract:- Anaemia poses a significant public health challenge in India, particularly affecting vulnerable populations such as women of reproductive age and children. Defined by low hemoglobin levels, anaemia's prevalence is notably higher in rural areas compared to urban centers, reflecting disparities in healthcare access and nutritional intake. Iron deficiency is the predominant cause, accounting for a substantial proportion of cases, alongside deficiencies in vitamin B12, folate, and other micronutrients. The condition's multifactorial etiology includes dietary factors, genetic predispositions, and socio-economic determinants.Efforts to address anaemia include national supplementation programs, health education initiatives, and improvements in maternal and child healthcare services. Despite these measures, anaemia rates remain stubbornly high, impacting physical development, cognitive function, and overall productivity. Diagnostic strategies involve hematological tests to assess hemoglobin levels and nutrient status, enabling targeted interventions.Future research directions emphasize understanding regional variations, exploring novel interventions, and addressing underlying socio-economic factors to achieve sustained reductions in anaemia prevalence.

Keywords:- *Anaemia, Prevalence, Iron Deficiency, Vitamin B12, Folate, Public Health Interventions.*

I. INTRODUCTION

Anaemia, according to the World Health Organization, is the state in which a person's blood hemoglobin content is low, specifically <130, <120, and <110 g/L for men, non-pregnant women (Givens*et al*., 2024). The human body develops anaemia through three primary mechanisms: (a) inadequate erythropoiesis, which occurs when the body produces insufficient red blood cells; (b) hemolysis, which occurs when red blood cells are destroyed; and (c) blood loss (Das*et al*., 2024). In poor nations like India, women of reproductive age (WRA) have a disproportionately high frequency of anaemia (Let *et al*., 2024). Anaemia's high prevalence poses a serious threat to public health in many low- and middle-income nations, including India (Rathi*et al*., 2024). Older adolescents (15–19 years old) had a greater prevalence of anaemia (F: 48%; M: 18%) (Rathi *et al*., 2024). Iron deficiency is the main cause of anaemia with over 60% of cases worldwide being attributed to it (Singh *et a*l., 2024). By investigating the relationships and interactions between genetic, environmental, infectious, and dietary predictors of Heamoglobin concentration in women and children living in rural and urban parts of Uttar Pradesh state, India, the current investigation aims to further clarify the aetiology of anaemia (Larson*et al*., 2024). While a lack of nutrition is one of the primary causes of the illness, there may be a connection between chronic exposure to air pollution and a higher risk of anaemia development (Khan *et al*., 2024). The main focus of policy is on the diet as the primary cause of anaemia, especially in lower socioeconomic classes. This is because a large portion of the population follows a vegetarian diet that is augmented with small amounts of milk, and the diet is monotonous and has low erythropoietic nutrient density (Kurpad *et al*., 2024). Iron deficiency anaemia, which is brought on by inadequate iron consumption, is one type of anaemia. Vitamin B12, vitamin A, and folate deficiencies are possible additional causes (Minakshi *et al*., 2023).

II. ANAEMIA

From a functional point of view, anaemia is defined as a reduction in the bulk of red blood cells that is necessary to provide sufficient amounts of oxygen to peripheral tissues (Sachdev *et al*., 2021). Conventionally, anaemia is defined as a blood haemoglobin concentration that is below a threshold or cutoff that is particular to age and sex (Sachdev *et al*., 2021). It is a part of the hemoproteins myoglobin and haemoglobin in red blood cells, which carry and store oxygen in the body's muscles and other tissues, respectively (Givens *et al*., 2024). Many variables, such as deficits in micronutrients including iron, folic acid, vitamin B12, vitamin A, copper, zinc, worm infestations, genetic blood diseases, inflammation, and other physiological situations like pregnancy, are thought to be the cause of anaemia (Rathi *et al*., 2024). Adolescents with anemia may be less resistant to infections, have slower physical and mental development, be less physically active, and be less able to work (Rathi *et al*., 2024).

- *Prevalence of Anaemia in India:*

In India, anaemia is a major public health concern (Sarna *et al*., 2020). According to the Global Burden of Disease Study, 59·7% of Indian children under the age of five had anaemia in 2017 (Sarna *et al*., 2020). In India, anaemia

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24SEP604

has impacted 67.1% of children (ages 06–59 months), 57.0% of all women (15–49 years), 52.2% of pregnant women (15–49 years), and 25.0% of men (15–49 years), according to the most recent National Family and Health Survey (NFHS–5) (2019–2021) (Das *et al ., 2024).* Furthermore, as comparison to the NFHS-4 survey, which was conducted in 2015–2016, the NFHS-5 (2019–21) shows a noteworthy increase in the prevalence of anaemia in all categories (NFHS, 2019–2021*)* (Das *et al* . ,2024). Since iron deficiency accounts for about 50% of anaemia cases, it is commonly believed to be the primary cause of anaemia. Six but other micronutrients, mainly folate and vitamin B12, are also essential for erythropoiesis and it's unclear how much of these deficits lead to anaemia in India (Sarna *et al*., 2020). Children living in rural areas were more likely than those living in urban areas to suffer from anaemia, which is mostly associated with moms who have little to no education and low-income households (Givens *et al*., 2024). The two main risk factors for adolescent anemia in this population are inadequate nutritional status and adolescent pregnancy (Givens *et al*., 2024).

An Analysis of the several forms of anaemia that are common in children and adolescent in india between the ages of 1 to 19 **(**Givens *et al*., 2024).

Table 1 Anaemia

Types of Anaemia					
Age group	**Anaemia prevalence (%)**	**Iron deficiency**	**Folate or vitamin B12**	**Inflamation**	**Other causes**
1 -4 years	40.5	18.9	18.9	6.5	24.5
5-9 years	23.4	15.6	24.6	5.4	43.6
Adolescent	21.3	21.3	25.6	3.4	31.4

III. MEASURES

➢ *Anaemia and RBC*

Based on the size of red blood cells, there are three forms of anaemia.

- Microcytic anaemia, which occurs when the volume of red blood cells is smaller than normal. The main cause of it is iron deficiency.
- Normocytic anaemia, red blood cells in have normal sizes. However, their presence is quite minimal.
- Macrocytic anaemia, which is characterised by red blood cells that are larger than average in volume (Bhadra *et al*., 2020)

➢ *Variations in Nutritional Anaemia Types:*

- Deficiency of iron
- Deficiency of vitamin B12
- Deficiency of folate
- Others vitamins deficiency (Bhadra *et al*., 2020)

➢ *Cause of Anaemia*

- Bloodloss (haemorrhoids, ulcers, and menstrual bleeding).
- Reduced or inaccurate RBC synthesis.
- RBC destruction, improper growth, and improper RBC maturation.
- Low blood iron levels
- Vitamin deficiencies (B12 and folate are necessary for the formation of red blood cells) Unhealthy eating habits and Blood cells with a crescent shape. (Bhadra *et al*., 2020).

➢ *General Symptoms of Anaemia:*

- Pale skin, shortness of breath
- Headache, dizziness, and easy weariness
- Loss of energy
- Arm and leg stiffness and clumsiness. Sensation of pins and needles in the feet and hands,
- Fast or erratic heartbeat, chest discomfort(Bhadra *et al*., 2020).

➢ *Diagnosis*

Anaemia can be diagnosed using the following methods:

- A complete blood count (CBC) testa) determining the number ofred blood cell volume and hemoglobin content b) blood iron and serum ferritin levels
- Vitamin B12 and folate levels
- Urine testing to measure bilirubin, reticulocyte count, and the time at which red blood cells develop
- A physical examination and assessment of the patient's medical background(Bhadra *et al*., 2020).

IV. CONCLUSION

Anaemia remains a significant public health concern in India, particularly among women of reproductive age and adolescents. The high prevalence of anaemia in these populations is attributed to a combination of factors, including iron deficiency, inadequate nutrition, and chronic exposure to air pollution. Understanding the complex interplay between genetic, environmental, infectious, and dietary predictors of haemoglobin concentration is crucial for developing effective interventions. While dietary modifications and iron supplementation are essential strategies, addressing the broader socioeconomic determinants of anaemia, such as education and poverty, is equally important. Further research is needed to elucidate the relationships between anaemia and other micronutrient deficiencies, as well as the impact of anaemia on physical and mental development in adolescents. By prioritizing anemia prevention and control, we can improve the health and well-being of vulnerable populations in India and reduce the burden of this debilitating condition.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24SEP604

REFERENCES

[1]. Bellizzi, S., Pichierri, G., Napodano, C. M. P., Salaris, P., Fiamma, M., Fozza, C., &Cegolon, L. (2021). Iron deficiency anaemia and low BMI among adolescent girls in India: The transition from 2005 to 2015. Public Health Nutrition, 24(7), 1577-1582.

[2]. Bhadra, P., & Deb, A. (2020). A review on nutritional anemia. Indian Journal of Natural Sciences, 10(59), 18466-18474.

[3]. Chauhan, S., Kumar, P., Marbaniang, S. P., Srivastava, S., & Patel, R. (2022). Prevalence and predictors of anaemia among adolescents in Bihar and Uttar Pradesh, India. Scientific Reports, 12(1), 8197.

[4]. Das, B., Adhikary, M., Singha, S. R., & Parmar, D. (2024). Who is Anaemic in India? Intersections of class, caste, and gender. Journal of Biosocial Science, 1-23.

[5]. Givens, D. I., Anitha, S., &Giromini, C. (2024). Anaemia in India and Its Prevalence and Multifactorial Aetiology: A Narrative Review. *Nutrients*, *16*(11), 1673

[6]. Khan, Y., & Banerjee, R. (2024). Exposure to air pollution as a risk factor for anaemia: a global scoping review. International Journal of Environmental Health Research, 1-13.

[7]. Kurpad, A., Laxmaiah, A., Chandak, G., Meshram, I., Raman, R., Sengupta, S., … & Ghosh, S. (2024). Anaemia and iron deficiency in India: a venous blood-based survey of adolescents, adults, and the elderly in eight states.

[8]. Larson, L. M., Thomas, T., Kurpad, A. V., Martorell, R., Hoddinott, J., Adebiyi, V. O., … & Neufeld, L. M. (2024). Predictors of anaemia in mothers and children in Uttar Pradesh, India. Public Health Nutrition, 27(1), e30.

[9]. Let, S., Tiwari, S., Singh, A., & Chakrabarty, M. (2024). Prevalence and determinants of anaemia among women of reproductive age in Aspirational Districts of India: an analysis of NFHS 4 and NFHS 5 data. BMC Public Health, 24(1), 437.

[10]. Minakshi, A. K., Mohan, C., Kumar, K., Dakua, S., Kumar, S., & Rani, D. (2023). Prevalence Of Anaemia In India: A Review. Korean Journal of Physiology and Pharmacology, 27(3), 481-486.

[11]. Rathi, N., Kansal, S., Raj, A., Pedapanga, N., Joshua, I., & Worsley, A. (2024). Indian adolescents' perceptions of anaemia and its preventive measures: Aqualitative study. Journal of Nutritional Science, 13, e9.

[12]. Sachdev, H. S., Porwal, A., Acharya, R., Ashraf, S., Ramesh, S., Khan, N., … & Sarna, A. (2021). Haemoglobin thresholds to define anaemia in a national sample of healthy children and adolescents aged 1–19 years in India: a population-based study. The Lancet Global Health, 9(6), e822-e831.

[13]. Sarna, A., Porwal, A., Ramesh, S., Agrawal, P. K., Acharya, R., Johnston, R., … & Saxena, R. (2020). Characterisation of the types of anaemia prevalent among children and adolescents aged 1–19 years in India: a population-based study. The Lancet Child & Adolescent Health, 4(7), 515-525.

[14]. Singh, A., Ram, S., Chandra, R., Tanti, A., Singh, S., & Kundu, A. (2024). A district-level geospatial analysis of anaemia prevalence among rural men in India, 2019-21. International Journal for Equsity in Health, 23(1), 9.