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A Review on Prevalence of Anemia among Urban Adolescent Girls

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ABSTRACT: As defined by the WHO, adolescence is the period between the ages of 10 and 19. Girls constitute 240 million of India's adolescents. Many fundamental physicals, psychological and behavioral changes occur throughout the teen years. Anemia is a condition in which the overall mass of RBCs decreases abnormally, resulting in a drop in the concentration of hemoglobin. It may lead to developmental and cognitive function impairment, decreased productivity, and an increased risk of infection. Weakness, weariness, dizziness, syncope, chest discomfort, and palpitations are frequent signs of the disease. Anemia can be cured by consuming foods rich in iron, copper, zinc, folic acid, vitamin B-12, and protein. It is possible to promote children's health, growth, and intellectual development via school-based nutrition education. Education is especially important for women and girls since they will have children in the future. Healthy moms are essential to the well-being of every country. There are no healthy citizens until there are healthy moms. In this review, we focused on the prevalence of anemia in urban adolescent girls and its consequences.

KEYWORDS: Adolescent girls, anemia, iron, nutrition education, healthy mother

I. INTRODUCTION

The World Health Organization has defined adolescence as the time of life between the age of 10 and 19 years. Adolescence is a time of rapid development for the body, mind, and spirit [1]. About 22% of Indians are members of this group [2]. The term "adolescence" refers to a stage of life that includes physical, psychological, chronological, and cultural changes. One of the most important periods in one's life is the time between puberty and the beginning of adulthood. Protein-energy malnutrition and iron deficiency in adolescent females are serious health issues. Deficiencies of micronutrients such as folate, and vitamin B12, hereditary disorders such as thalassemia, and environmental contaminants such as lead are among the most prevalent causes of anemia [3]. For menstruation and growth and development, adolescent females require more iron. The cognitive and behavioral development of children with iron deficiency anemia is hampered, and therefore, their school performance is compromised. It is also possible that iron deficiency in infancy might cause delayed menarche and an impaired immunological response. Anemic women during pregnancy are more likely to have low birth weight kids and have higher rates of maternal death and perinatal mortality [4].

Anemia is the 2nd most common cause of death in India, after AIDS [5]. National Nutritional Anemia socio-demographic variables among school-going adolescents Prophylaxis (NNAPP) was launched in 1970 under the fourth 5-year plan to reduce anemia prevalence to 25% [6]. RBC mass decreases and the concentration of Hb in the blood drops. If an individual's hemoglobin concentration falls below a two-standard deviation below-average level, they are considered anemic. Teenage anemia is most often caused by recurrent dietary problems, fast development and physical changes, high iron needs, high infection and worm infestation rates, and early marriage and adolescent pregnancies.

Anemia

It is defined as a decrease in the number of RBCs or the concentration of hemoglobin that falls below the usual range of values that would be expected to be seen in a healthy population considering age and gender [7]. Alternately, it is described as a state in which the number of RBCs and O₂-carrying capacity is inadequate to fulfill physiologic demands [8].

It is also defined as a decreased absolute number of RBCs that are circulating in the blood. It is a medical disorder in which the concentration of Hb and the number of red blood cells (RBCs) are both lower than normal [9]. Because of a deficiency in iron, which is required to synthesize hemoglobin, anemia is not a disease but rather a condition in which the Hb concentration in the blood is lower than normal. An abnormal decrease in the total blood RBC mass, which



results in a drop in the concentration of hemoglobin in the blood on red blood cell mass, is the defining feature of anemia regardless of the underlying cause.

A decreased amount of hemoglobin and an inadequate number of red blood cells, both of which are caused by a shortage of iron, diminish the oxygen-carrying capacity to different tissues, hinder brain development, and make it difficult to do physical labor and regulate body temperature [10]. A patient is considered to have this condition when their Hb level is below two standard deviations of the mean for their age and gender. The molecule of hemoglobin requires the presence of iron to function properly [11]. Depending on a person's age, gender, altitude, smoking habits, and the various phases of pregnancy, these requirements may vary.

Table 1. Minimum Hb and hematocrit used to define anemia in people

Age or Sex group	Hemoglobin (g/dL)	Hematocrit (%)
Children 6 months to 6 years	11.0	33
Children 5-11 years	11.5	34
Children 12-13 years	12.0	36
Non-pregnant women	12.0	36
Pregnant women	11.0	33
Men	13.0	39

1.1 Different types of anemia –

➤ **Folate deficiency anemia –**

Anemia induced by folic acid deficiency is known as folate-deficiency anemia. Folic acid is a B9 vitamin. O₂ is transported throughout the body by red blood cells. Megaloblastic anemia may be brought on by a deficiency in folic acid. Red blood cells are abnormally big in this case. They are also oval, as opposed to round.

Pale skin, decreased appetite, irritability, exhaustion, and a smooth and delicate tongue are all possible symptoms. Vitamin and mineral supplements, dietary changes, and medication are all options for treatment. Folic acid is naturally found in leafy greens, whole grains, legumes, and citrus fruits. Fetal neural tube defects may be caused by folate-deficiency anemia during pregnancy. Neurodevelopmental disorders occur when a child's brain or spinal cord does not mature correctly. It may be fatal before or shortly after delivery. It might also result in limb paralysis.

➤ **Vitamin B12 deficiency anemia**

Vitamin B12 deficiency anemia is a disorder in which the body does not produce enough RBCs because lack of vitamin B12. This vitamin produces RBCs, which distribute O₂ throughout the body. Tissues and organs don't get enough oxygen person needs if a person doesn't have enough RBCs in their body. The body cannot operate correctly if lacks sufficient O₂ is present. Vitamin B12 deficiency may cause anemia known as pernicious anemia. Lack of intrinsic factors is one of the most common causes of vitamin B12 deficient anemia. - Internal factor is a protein that is produced in the gastrointestinal tract. To absorb vitamin B12, Pernicious anemia is the medical term for this kind of B12 deficient anemia. Vitamin B12 is absorbed in this region of the small intestine.

➤ **Iron Deficiency anemia**

Anemia due to iron deficiency occurs when the body does not have enough iron to support normal blood functions. Red blood cells cannot transport adequate oxygen if the body's iron requirements aren't met. A person may feel exhausted and breathless because of iron deficiency anemia. In teens and women before menopause, heavy menstruation, gastrointestinal bleeding, or excessive blood donation may all play a role in the development of this illness. Deficit anemia may occur during pregnancy or with rapid development in children [12]. Very heavy menstrual cycles, inability to absorb iron gastrointestinal bleeding, iron deficiency or restriction in food, medicine (aspirin, ibuprofen, naproxen, and diclofenac), vitamin deficiencies (folic acid, vitamin B12), renal bleeding, diseases of the blood and bone marrow caused by hookworms, fatigue, lethargy, dizziness, and a headache are all possible symptoms [13].

1.2 Risk factors

During this era of physical development, reproductive maturation, and cognitive changes, adolescents are at greater risk of anemia because of the increased demand for macro and micronutrients, including iron.

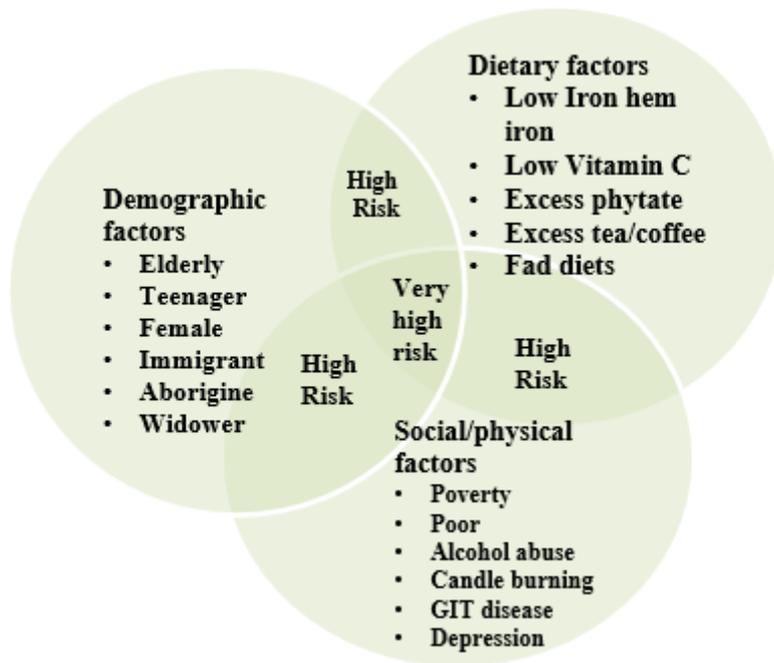


Figure 1. High -Low-risk factors of anemia

1. Prevalence of anemia- Indian Scenario

In India, the prevalence of anemia is greater than in other developing nations. About half of the population in India is anemic, according to the WHO. As more women are afflicted, the situation gets increasingly serious. Anemia is a factor in 20% to 40% of all maternal fatalities in India, and one in every two Indian mothers (56%) is anemic. A Hb level of less than 12 g/dl in females is considered anemic by the National Consultation on Control of Nutritional Anemia in India. A hemoglobin level of 10-11.9 g/dl is considered mild anemia, 7-9.9 g/dl is moderate, and less than 7 g/dl is considered severe anemia in females. Surveys conducted by theICMRin 2004, as well as the District Level Household Survey (DLHS) in 2006, as well as the National Nutrition Monitoring Bureau (NNMB) in 2002, demonstrate that anemia is common among young children, pregnant women, and teenage females [14]. Anemia is more prevalent in newborns, children, and women of reproductive age. Adolescent females, who make up a large percentage of India's population, are at increased risk of illness and death. In this phase of life, a person undergoes the most significant physical, psychological, and behavioral transformations. Nutritional anemia may occur at this time in a person's life. Adolescent females are at risk for iron deficiency anemia owing to the increased need for iron for hemoglobin and myoglobin, as well as to make up for the iron loss associated with menstruation and poor eating habits.

Table 2. Stages of anemia

Age groups	Cut off (No Anemic g/dl)	Mild Anemia g/dl	Moderate Anemia g/dl	Severe Anemia g/dl
6-59 months of age	≥11	10-10.9	7-9.9	<7
5-11 yrs of age	≥11	11-11.9	8-10.9	<8
12-14 yrs of age	≥12	11-11.9	8-10.9	<8
Non-pregnant women (15 yrs of age and above)	≥12	11-11.9	8-10.9	<8
Pregnant women	≥11	10-10.9	7-9.9	<7
Men	≥13	11-12.9	9.8-10.9	<8

According to the NFHS-III, which was conducted in 2005-2006, India has one of the highest rates of anemia in the world. There are a variety of factors contributing to this, including the high expense of healthcare, subpar diet, and the low social position of women. According to the results of the poll, 72 percent of married women in Assam are anemic,

followed by 69.7 percent in Haryana and 69.5 percent in Jharkhand. Even among families with college degrees and affluent incomes, moderate and severe anemia is common. Pregnant women with Hb levels of less than 8 g/dl are at high risk. Severe anemia occurred in 9.2% of pregnant women, and 7.3% of lactating women in Madhya Pradesh; in Assam, it was 14.4%; and in Haryana, it was 8.5 and 13.4%. A total of 84% of pregnant and 92% of lactating women were anemic. In the same areas, ICMR data showed that 90.1% of teenage females were anemic (7.3 percent had severe anemia). According to the ICMR district nutrition study (1999-2000), anemia affects 84.2% of pregnant women, with 13.1% suffering from severe anemia. So, these data indicate that anemia persists in women throughout their lives.

Teenage girls in the field practice areas of a medical college in Gautam Buddha Nagar district, India (2022), were studied for the incidence of iron deficiency anemia as well as the risk factors related to iron deficiency anemia among adolescent females. 236 people took part in the survey. Participation in the study was open to all female students at RHTC and UHTC. During our three-month research period, we surveyed 684 teenage girls (251 from RHTC and 433 from UHTC). Anemia was identified in 42 percent of the population overall, in 54.5 percent of rural adolescents, and 35.5 percent of urban adolescents at the time of the research. The beginning of menarche at a young age, prior use of albendazole, living in a joint household, and a lower socioeconomic position were all determined to be significant risk factors for teenage anemia. There was a significant frequency among females aged 16 and older, as well as those from lower socioeconomic categories and rural areas. Adolescent females should have access to regular supplies of iron and folic acid pills, and adherence to medication and dietary recommendations should be improved [15].

2. School-age children and adolescent girls

In rural regions, anemia affects 46% of men and 50% of girls between the ages of 5 and 14 according to a study conducted in 1962/64 [16]. Surveys conducted in 1975/76 and 1981/82 found almost 75% overall prevalence [17,18]. Rural regions had an 80.4 percent response rate, while urban areas had a 70.5 percent response rate, according to the 1995/96 survey. Furthermore, 81% of the female population was affected compared to 75% of the male population. Almost 40 percent of rural 6- to 11-year-olds and nearly half a million teenage females were anemic at the time of a national vitamin A study performed in 1997/98 [19]. Notably, only 2.1 percent and 1.0 percent of school-aged children and adolescents had hemoglobin levels below 90 g l^{-1} , indicating severe anemia. Anemia was found in 51.5 percent of the 400 children aged 7–10 attending rural schools in the Savar subdistrict in 1996 [20].

More than half of the 49 males and 61 percent of the remaining 69 girls were anemic in a 1996 study of rural youngsters aged 11 to 19 by Hyder and colleagues [21]. More than one in three Bangladeshi children between the ages of three and five suffer from anemia, according to a 1998 research [22]. The anemia rates in urban populations were as high as 20% for 5–12-year-olds (research period: 1990) and 22% for 12–15-year-old females (study period: 1993) [23,24]. There was a frequency of anemia of 27% in a survey of 548 schoolgirls aged 11-16 in the peri-urban region of the Dhaka district in 1996, however, none of them had severe anemia [25]. The frequency of anemia (44–49 percent) among female manufacturing workers in Dhaka city, Bangladesh, has also been documented [26,27]. This has resulted in substantial public health concerns, even if school-age and teenage anemia has decreased over time. Compared to men, women seem to be in a worse condition. In addition, young female manufacturing employees in metropolitan areas are particularly vulnerable to this issue.

Adolescents are the most susceptible age group in the human lifespan to anemia. Afar's pastoral community has a dearth of medical research due to inadequate healthcare facilities in the area. Anemia and its related determinants will be examined among teenage females in the Aysaita area, an Ethiopian pastoral community. Cross-sectional research in the Aysaita area included 522 randomly chosen teenage females. Use of a structured questionnaire and systematic random selection utilizing school registration rosters were utilized to obtain data. To determine the amount of hemoglobin in the venous blood sample, researchers used a complete blood count machine. Adolescents' nutritional status was assessed using anthropometric measures. Researchers performed descriptive logistic regression analysis to describe their findings and pinpoint the causes of anemia. Schoolgirls aged 12 to 17 years old were found to be 21.7 percent anemic in this research, with a 95% confidence interval of 18.1% to 25.3%. Girls in remote areas who attend high school (adjusted odds ratio (AOR) = 3.42, 95 percent) [28].

III. CONCLUSION

A high frequency of anemia among urban teenage females is worrying, given the long-term effects of anemia. Girls in metropolitan areas should be given extra nutritional assistance, including iron and folic acid supplements, to avoid anemia. There is a lack of awareness about anemia and iron-rich foods. To reduce anemia's prevalence in the

community, certain information education and communication (IEC) programs might be implemented. Adolescents should begin taking steps to enhance their health as soon as possible so that they have appropriate iron reserves in their bodies even before they get married and have a family. Interventional programs, such as dietary supplementation and prophylaxis with iron-folic acid pills to avoid anemia, are urgently needed in these urban regions. Adolescent girls should get regular nutritional education workshops to raise their knowledge of anemia.

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