

## The Prevalence of Anaemia Among Adolescent Girls in Karnataka: A Literature Review

Miss. Jyothi<sup>1\*</sup>, Dr. Sujatha Vijaykumar<sup>2</sup>

### ABSTRACT

Anaemia, a critical public health issue, affects over 1.6 billion people worldwide, with adolescent girls particularly vulnerable due to increased physiological demands during puberty and menstruation. In India, and specifically Karnataka, adolescent girls face disproportionately high rates of anaemia, with the National Family Health Survey (NFHS-5) reporting 58.4% prevalence among girls aged 15-19. This article examines the causes, risk factors, and determinants of anaemia among adolescent girls in Karnataka, including poor dietary intake, socio-economic conditions, cultural practices, and the impact of parasitic infections. Government initiatives like the National Iron Plus Initiative (NIPI) and Weekly Iron and Folic Acid Supplementation (WIFS) have aimed to reduce anaemia, yet challenges such as inadequate program implementation, logistical barriers, and lack of education persist. Recommendations include strengthening public health programs, increasing community engagement, and promoting dietary diversification. Addressing these factors through a multi-sectoral approach can help reduce anaemia prevalence and improve the health outcomes of adolescent girls in Karnataka.

**Keywords:** *Anaemia, adolescent girls, Karnataka, iron deficiency, socio-economic factors, dietary practices, public health, National Iron Plus Initiative, Weekly Iron and Folic Acid Supplementation, India*

**A**naemia is a significant global public health issue affecting populations worldwide, with over 1.6 billion people estimated to be anaemic. The condition, characterized by low levels of hemoglobin in the blood, leads to reduced oxygen-carrying capacity, which can impair physical and cognitive development, particularly in vulnerable groups such as women and children. Among these, adolescent girls are particularly at risk due to their increased physiological demands during puberty and menstruation, combined with often inadequate nutritional intake. In India, anaemia remains a pressing concern, with adolescent girls facing disproportionately high rates of the condition, which can impact their growth, future maternal health, and overall well-being.

Focusing on adolescent girls is crucial because they represent a critical window of opportunity for intervention. Anaemia during adolescence can have long-term consequences,

<sup>1</sup>Nursing Scholar, Department of Nursing, Himalayan University, Itanagar, Arunachal Pradesh, India.

<sup>2</sup>Professor, Department of Nursing, Himalayan University, Itanagar, Arunachal Pradesh India.

\*Corresponding Author

Received: September 20, 2024; Revision Received: December 06, 2024; Accepted: December 10, 2024

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including poor academic performance, reduced physical capacity, and complications during pregnancy if left untreated. In India, where socio-economic factors, dietary habits, and cultural practices further aggravate the risk, addressing anaemia among this group is essential for improving public health outcomes.

Karnataka, a southern state of India, mirrors the national trends of high anaemia prevalence among adolescent girls. With diverse socio-economic and geographical factors, the state provides a valuable case for studying the extent and causes of anaemia. By examining the prevalence and contributing factors of anaemia in this region, tailored strategies can be developed to address the specific challenges faced by adolescent girls in Karnataka, ensuring their health and development are prioritized in public health policies.

### *Anaemia in Adolescent Girls: Causes and Risk Factors*

- Iron Deficiency Anaemia (IDA) is the most common, caused by poor diet, absorption issues, and blood loss.

### **Key Risk Factors:**

- Physiological demands during adolescence (growth, menstruation).
- Poor dietary intake of iron, vitamin C, and folic acid.
- Socio-economic factors like poverty, lack of healthcare, and cultural practices restricting access to iron-rich foods.
- Infections like hookworm and malaria exacerbate anaemia due to blood loss and red blood cell destruction.

### *Prevalence of Anaemia in Karnataka*

Anaemia continues to be a major public health issue in Karnataka, particularly among adolescent girls. According to the National Family Health Survey (NFHS-5), the prevalence of anaemia among adolescent girls in the state is alarmingly high, with more than half of this population affected. NFHS-5 data reveals that approximately 58.4% of girls aged 15-19 years in Karnataka are anaemic, reflecting both mild and severe cases. This mirrors the national trend, where adolescent girls consistently show a higher susceptibility to anaemia due to their specific nutritional and physiological needs<sup>1</sup>

A comparison of anaemia prevalence between urban and rural areas in Karnataka shows significant disparities. In urban regions, the prevalence of anaemia among adolescent girls is slightly lower, though still high, hovering around 50%. Urban girls often have better access to healthcare, education, and nutritional resources, contributing to this marginally lower rate. However, in rural areas, the prevalence is significantly higher, with estimates ranging between 55% and 65%. Factors such as poor access to healthcare services, lower awareness of nutritional requirements, and socio-economic barriers exacerbate the condition in rural communities<sup>2</sup>

The prevalence of anaemia is particularly severe in Karnataka's tribal communities, where rates often exceed 70%. Tribal populations face unique challenges, including geographical isolation, inadequate healthcare infrastructure, and deep-rooted socio-cultural practices that limit access to nutritional support and education. Adolescent girls in these communities are especially vulnerable due to limited resources, poor dietary diversity, and the impact of early marriage and adolescent pregnancy, which heighten their risk of iron deficiency.

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There are also regional variations in the prevalence of anaemia within Karnataka. Certain districts, particularly those with higher levels of poverty or malnutrition, report significantly higher anaemia rates. For instance, northern districts like Kalaburagi and Yadgir show higher prevalence compared to more developed regions such as Bangalore. These regional disparities underscore the need for localized interventions that account for the diverse socio-economic, cultural, and healthcare challenges faced by adolescent girls across the state<sup>3</sup>

### ***Determinants of Anaemia Among Adolescent Girls in Karnataka***

Several determinants contribute to the high prevalence of anaemia among adolescent girls in Karnataka, encompassing dietary patterns, cultural practices, access to healthcare, socio-economic factors, and the impact of infections and parasitic diseases.

#### **Dietary Patterns and Iron Consumption**

Dietary patterns play a crucial role in determining the iron status of adolescent girls. In Karnataka, many girls consume diets that are low in iron-rich foods such as meat, legumes, and dark leafy greens. Cereal-based diets, common in both rural and urban areas, often lack sufficient iron, and the absence of iron-rich supplements exacerbates the problem. Furthermore, inadequate intake of vitamin C, which enhances iron absorption, compounds the issue. Dietary deficiencies are prevalent in low-income families where access to a variety of nutritious foods is limited.

#### **Cultural Practices and Taboos Affecting Diet**

Cultural practices and dietary taboos significantly influence the nutritional intake of adolescent girls. In some communities, traditional beliefs and practices restrict the consumption of certain iron-rich foods, particularly during menstruation. Such restrictions can lead to reduced intake of essential nutrients needed to prevent and manage anaemia. For example, taboos around consuming meat or specific fruits during menstruation can limit dietary diversity and iron intake, contributing to higher rates of anaemia.

#### **Access to Healthcare and Educational Resources**

Access to healthcare services and educational resources is a critical determinant of anaemia. In Karnataka, disparities in healthcare access between urban and rural areas impact the ability to diagnose and treat anaemia effectively. Rural areas often face shortages of healthcare facilities and professionals, which can delay diagnosis and treatment. Educational resources also play a role; lack of awareness about the importance of nutrition and regular health check-ups can lead to inadequate preventive measures. Inadequate health education and outreach exacerbate the prevalence of anaemia among adolescent girls, particularly in underserved regions.

#### **Impact of Early Marriage and Adolescent Pregnancy**

Early marriage and adolescent pregnancy are significant socio-cultural factors contributing to anaemia. In Karnataka's rural and tribal communities, early marriage is common and can lead to early pregnancies, increasing the nutritional demands on young girls. The additional iron needs during pregnancy, combined with insufficient dietary intake and prenatal care, often result in severe anaemia. The cycle of early pregnancy and subsequent nutritional depletion reinforces the prevalence of anaemia among this vulnerable group.

#### **Role of Infections and Parasitic Diseases**

Infections and parasitic diseases are important contributors to anaemia. Parasitic infections, such as hookworm, lead to chronic blood loss and iron deficiency. Malaria, prevalent in

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certain regions of Karnataka, also exacerbates anaemia by destroying red blood cells and increasing the body's demand for iron. These infections are particularly prevalent in impoverished areas with poor sanitation and limited access to healthcare, further complicating efforts to manage and prevent anaemia.

Addressing these determinants requires a comprehensive approach, including improving dietary practices, addressing cultural barriers, enhancing healthcare access, and controlling infections. Targeted interventions and community-based education can help mitigate the factors contributing to anaemia and improve the health outcomes for adolescent girls in Karnataka.

### *Government Initiatives to Combat Anaemia*

- **Overview of National Iron Plus Initiative (NIPI):** The National Iron Plus Initiative (NIPI) is a key government program aimed at addressing iron deficiency anaemia across India, including Karnataka. Launched in 2013, NIPI focuses on providing iron and folic acid supplements to vulnerable populations, particularly children, adolescent girls, and pregnant women. The initiative integrates various strategies, including the distribution of supplements through schools and anganwadis (community childcare centers), health education campaigns, and regular health check-ups to monitor and manage anaemia. The program is designed to improve the iron status of target groups through a combination of supplementation and dietary guidance.<sup>4</sup>
- **Weekly Iron and Folic Acid Supplementation (WIFS) Program:** The Weekly Iron and Folic Acid Supplementation (WIFS) program, introduced in 2013, is another critical intervention aimed at reducing anaemia among adolescents. The program provides iron and folic acid tablets to school-going adolescents on a weekly basis. It is implemented through schools, where teachers distribute the supplements and monitor adherence. WIFS also includes educational components to raise awareness about the importance of iron and folic acid in preventing anaemia. The program aims to reduce the prevalence of anaemia by ensuring regular intake of these essential nutrients.<sup>5</sup>
- **Impact and Challenges in Implementation:** While both NIPI and WIFS have made significant strides in addressing anaemia, their implementation faces several challenges. NIPI has had a positive impact on increasing awareness and supplement distribution, but issues such as irregular supply of supplements, inadequate monitoring, and inconsistent coverage in remote areas have limited its effectiveness. Similarly, the WIFS program has contributed to improved iron status among adolescents, but challenges such as inconsistent tablet distribution, low adherence rates, and lack of coordination between schools and health services hinder its overall success.<sup>6</sup>
- **Limitations of Current Programs:** Current programs face several limitations, including logistical challenges in supplement distribution and monitoring, inadequate coverage in rural and tribal areas, and insufficient integration with other health and nutrition programs. The focus on supplementation alone without addressing underlying dietary deficiencies and socio-economic factors limits the overall impact. Additionally, both programs often struggle with sustainability and require continuous support and funding to maintain their effectiveness.<sup>8</sup>

### *Challenges and Gaps in Addressing Anaemia*

- **Program Implementation and Community Outreach Issues:** Effective implementation of anaemia control programs is often hindered by inadequate community outreach and program management. In many areas, particularly in rural and tribal regions, there is a lack of awareness and engagement with the target populations. Program outreach efforts are frequently insufficient, leading to low participation rates and poor adherence to supplementation schedules. Furthermore, coordination between different stakeholders, including health departments, educational institutions, and community organizations, is often inadequate, affecting the overall effectiveness of the programs.<sup>5,6</sup>
- **Barriers to Accessing Healthcare and Nutritional Supplements:** Barriers to accessing healthcare and nutritional supplements include logistical challenges, such as difficulties in reaching remote areas and ensuring a consistent supply of supplements. Additionally, socio-economic factors such as poverty, lack of transportation, and inadequate infrastructure contribute to limited access. In some cases, the high cost of healthcare services and supplements can be prohibitive for low-income families, further exacerbating the prevalence of anaemia.<sup>5,6</sup>
- **Lack of Awareness and Education Among Adolescent Girls and Their Families:** A significant gap in addressing anaemia is the lack of awareness and education among adolescent girls and their families. Many individuals are not fully informed about the importance of iron-rich diets, the symptoms of anaemia, and the benefits of regular supplementation. This lack of knowledge can lead to poor dietary choices and low participation in supplementation programs. Educational efforts need to be strengthened to ensure that both girls and their families understand the critical role of nutrition and health practices in preventing and managing anaemia.<sup>5,6</sup>

### *Recommendations for Reducing Anaemia Prevalence*

- Strengthening public health programs with better monitoring
- Increasing community engagement and education
- Promoting dietary diversification and iron-rich foods
- Addressing socio-economic and cultural barriers
- Collaborating with schools, NGOs, and local healthcare providers

## **CONCLUSION**

The prevalence of anaemia among adolescent girls in Karnataka is a pressing public health issue, with more than half of the population affected according to recent data. Studies indicate that anaemia is particularly prevalent in rural and tribal areas, where socio-economic challenges, dietary deficiencies, and limited access to healthcare services contribute to the high rates of the condition. Key determinants include inadequate iron intake, cultural dietary restrictions, and the impact of infections and parasitic diseases. A comprehensive strategy should include improving dietary practices, increasing awareness about the importance of nutrition, and ensuring better access to healthcare and supplements. Collaboration between government agencies, healthcare providers, and community organizations is crucial for developing and sustaining effective interventions. Continued research is necessary to better understand the specific needs of different populations within Karnataka and to refine existing programs. Improved policy implementation, coupled with robust community engagement and education, will be key to reducing the prevalence of anaemia and ensuring the health and well-being of adolescent girls in the state.

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### **Acknowledgement**

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

### **Conflict of Interest**

The author(s) declared no conflict of interest.

**How to cite this article:** Jyothi & Sujatha, V. (2024). The Prevalence of Anaemia Among Adolescent Girls in Karnataka: A Literature Review. *International Journal of Indian Psychology*, 12(4), 1834-1839. DIP:18.01.174.20241204, DOI:10.25215/1204.174