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PREVALENCE OF ANEMIA IN ADOLESCENT BOYS AND GIRLS IN TAMIL NADU - AN INTERIM ANALYSIS (JUNE 2023 - OCTOBER 2023)

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Abstract

INTRODUCTION : Anemia is a significant global public health concern, particularly in low- and middle-income countries, affecting adolescents' well-being and development. This study aims to assess the prevalence and severity of anemia among adolescents in Tamil Nadu, India, with a focus on identifying regional disparities and aligning the findings with existing national and state-level data.

OBJECTIVES : The study seeks to determine the prevalence and severity of anemia among adolescent boys and girls in Tamil Nadu, analyze the distribution of anemia across demographic and socio-economic variables, and make recommendations for targeted interventions.

MATERIALS AND METHODS : This secondary data study involves ongoing anemia detection camps conducted in Tamil Nadu from May 2023 to April 2024. Data was collected from 2127 Primary Health Centers (PHCs) and local schools and colleges. Blood samples were analyzed using cell counters to categorize anemia severity, and data was recorded in Excel spreadsheets for analysis.

RESULTS : The study reveals that 56% of adolescent girls and 41% of adolescent boys in Tamil Nadu have been identified with anemia, reflecting significant regional variations. Interim analysis shows that 10,290 girls and 2,316 boys have been identified with severe anemia, and efforts are underway to address their conditions. Comparisons with national and state-level data indicate alignment with existing prevalence rates.

CONCLUSION : The study underscores the persistent challenge of anemia among adolescents in Tamil Nadu. Targeted interventions, improved healthcare access, nutritional education, public awareness campaigns, and interdisciplinary collaboration are recommended to address this public health concern effectively. Collaborative efforts among healthcare professionals, educators, and policymakers are vital to enhance adolescent well-being.

KEYWORDS : Anemia, Adolescents, Prevalence, Severity, Tamil Nadu, India, Public Health, Targeted Interventions, Healthcare, Nutrition, Public Awareness

INTRODUCTION

Anemia is acknowledged as a global public health concern, especially in low- and middle-income countries.[1,2] Anemia is defined based on low concentrations of hemoglobin or a decrease in the number of red blood cells.[2,3] In clinical practice, it is categorized as mild, moderate or severe based on hemoglobin levels, with the cutoffs being based on age, sex and physiological state.

The word adolescence is derived from the Latin word, 'adolescere'; meaning "to grow, to mature".[4] The WHO has defined adolescence as the age period between 10 to 19 years of age for both the sexes (married and unmarried). There are about 1.2 billion adolescents in the world, which is equal to 1/5th of the world's population and their numbers are increasing. Out of these, 5 million adolescents are living in developing countries. India's population has reached the 1 billion mark, out of which 21% are adolescents.[5]

WHO estimates that 40% of children 6–59 months of age, 37% of pregnant women, and 30% of women 15–49 years of age worldwide are anaemic. The WHO has defined adolescence as the age period between 10 to 19 years of age for both the sexes (married and unmarried). There are more adolescents in the world than ever before, 1.2 billion, totalling one sixth of the global population. This number is expected to rise through 2050, particularly in low- and middle-income countries where close to 90% of 10- to 19-year-olds live.[5]

India has the largest adolescent population in the world, 253 million, and every fifth person is between 10 to 19 years. According to NFHS 5 data (2019-2021), the prevalence of anaemia among adolescent girls were 59% and adolescent boys was 31%. Similarly in Tamil Nadu the prevalence of anaemia among adolescent girls was 52.9% and boys was 24.6%.[6]

Anaemia in boys and girls limits their development, learning ability, reduces concentration in daily tasks, increases their vulnerability to infection, increases school dropout rates, reduces physical fitness and work productivity.[7] Adolescent girls are at a high risk for anaemia and malnutrition.

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Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life and beyond.[8] Very often, in India, girls get married and pregnant even before the growth period is over, thus doubling the risk for anaemia.[9] The nutritional anaemia in adolescent girls attributes to the high maternal mortality rate, the high incidence of low birth weight babies, high perinatal mortality and the consequent high fertility rates. This phase of life is also important due to the ever increasing evidence that the control of anaemia in pregnant women can be more easily achieved if a satisfactory iron status can be ensured during adolescence.[10]

As compared to the vast amount of work which has been done in pregnant mothers and young children, there are relatively few published studies on the prevalence of anaemia among adolescents. The data on the prevalence of anaemia among the rural adolescents is scarce, particularly in a rural community setup. Meaningful programmes cannot be implemented without sufficient data.

Therefore, the present study was undertaken to assess the prevalence of anaemia among adolescents in Tamil Nadu.

OBJECTIVES

1. To determine the prevalence of anemia among adolescent boys and girls in Tamil Nadu.
2. To assess the severity of anemia and classify it based on established criteria.

METHODOLOGY

This secondary data study was done to determine the prevalence of anemia among adolescent boys and girls aged 10 to 19 years in both urban and rural areas of Tamil Nadu, India.

Anaemia detection among adolescents took pace in a camp mode over the course of a year, commencing in May 2023 and concluding in April 2024 and was organized by the 2127 Primary Health Centers (PHCs) in Tamil Nadu, with health check-up camps held in nearby schools and colleges. At least one camp per month per PHC was conducted. All adolescent boys and girls in the Government schools who willingly consented for venepuncture, were included.

A brief clinical examination was also conducted, evaluating physical appearance and clinical indicators, encompassing the measurement of blood pressure and heart rate and visual observation for physical appearance indicators like pallor and fatigue. To assess anemia, blood samples were collected at the camp site, employing an aseptic venipuncture kit that included needles, syringes, and collection tubes, with EDTA vacutainers used for blood collection. The collected blood samples were analyzed utilizing mobilized cell counters as these counters demonstrated a high level of accuracy in determining cell values. Following the analysis, results were provided to the adolescents, who were subsequently categorized into mild, moderate, or severe anemia based on the analysis report. In addition, it also included the formulation and implementation of Standard Operating Procedures (SOPs) for the treatment of anemic adolescents based on the severity of their condition.

Data collection was conducted on a daily basis across districts, with the collected data recorded in Excel spreadsheets. Subsequently, these Excel datasets were compiled and subjected to thorough analysis.

The study is currently ongoing, with seven more months remaining in the anemia detection camps. However, interim analyses have been conducted to monitor the progress and trends in the data collection. Interim analyses are essential to assess the quality of data, ensure the camps are meeting their monthly targets, and make necessary adjustments if deviations or issues are identified. These interim analyses help in identifying any potential concerns early in the study, allowing for timely corrective actions.

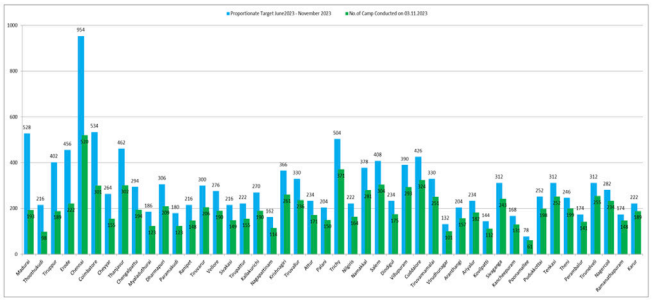

Figure 1 : Anemia Detection Camp Progress in HUDs (June - October 2023)"

Overall camp completion percentage is 69%. The completion of camps ranges from 37% to 85% across the districts, reflecting how well each district has met its goals during this time frame. Districts like "Kancheepuram" and "Poonamallee" have a proportionate target completion of 78%, indicating that they did not fully achieve their targets for the given period. In contrast, districts such as "Ramanathapuram" and "Karur" have a higher proportionate target completion, each at 85%, suggesting that they have performed relatively better in meeting their targets during the period.

The identified anaemia among adolescent female so far is 56% spanning from as low as 18% in Nilgiris to as high as 85% in Trichy, underscores significant regional variations in anemia prevalence. Trichy particularly stands out with a notably high percentage of identified anemia, while districts

like Nilgiris, Tiruvallur, and Nagercoil exhibit relatively lower percentages.

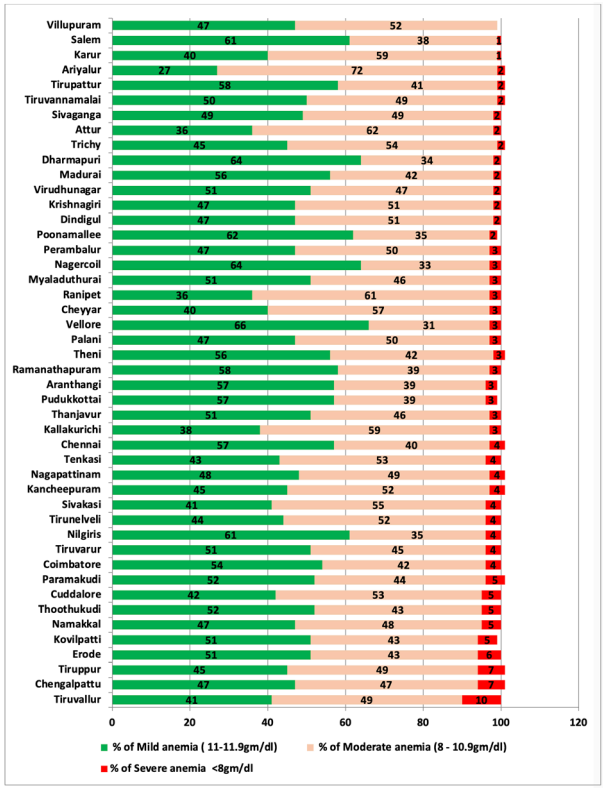

Figure 2 : Anemia Screening and Severity Distribution of adolescent female by HUD in Tamil Nadu (June - October 2023)

Examining the distribution of anemia severity, the percentage of mild anemia varies between districts, ranging from 27% to 64%, with Villupuram recording the highest percentage and Tiruvallur the lowest. Likewise, the percentages of moderate anemia span from 32% to 62%, with Villupuram again having the highest and Tiruvallur the lowest. On the other hand, the percentage of severe anemia falls within a range of 1% to 7%, encompassing the majority of districts. The percentage of identified anemia varies across districtsis 41%, ranging from 7% to 63%. Districts like Thoothukudi and Poonamallee have relatively higher percentages of identified anemia. The percentage of mild anemia ranges from 34% to 79%, with Poonamallee having the highest percentage and Tiruppur the lowest. Moderate anemia percentages range from 14% to 54%, with Poonamallee having the highest and Tiruppur the lowest. The percentage of severe anemia varies from 0% to 4%, with most districts falling within the lower range.

The total count of girls with severe anemia across all districts is notably high, reaching 10,290. Chengalpattu and Chennai emerge as the districts with the highest numbers of girls identified with severe anemia, reporting 596 and 580 cases, respectively.

A total of 4,711 (46%) girls have transitioned from severe anemia to moderate anemia, which suggests that healthcare efforts have had a positive impact. Erode, with 331 cases, leads in the number of girls who have made this positive shift. The total number of boys identified with severe anemia across all districts is 2,316, which underscores the considerable health challenge posed by anemia among boys in the region. Specifically, 876 (38%) boys have successfully transitioned from a state of severe anemia to moderate anemia. Trichy has successfully converted 104 boys from a state of severe anemia to moderate anemia, followed by Ariyalur .

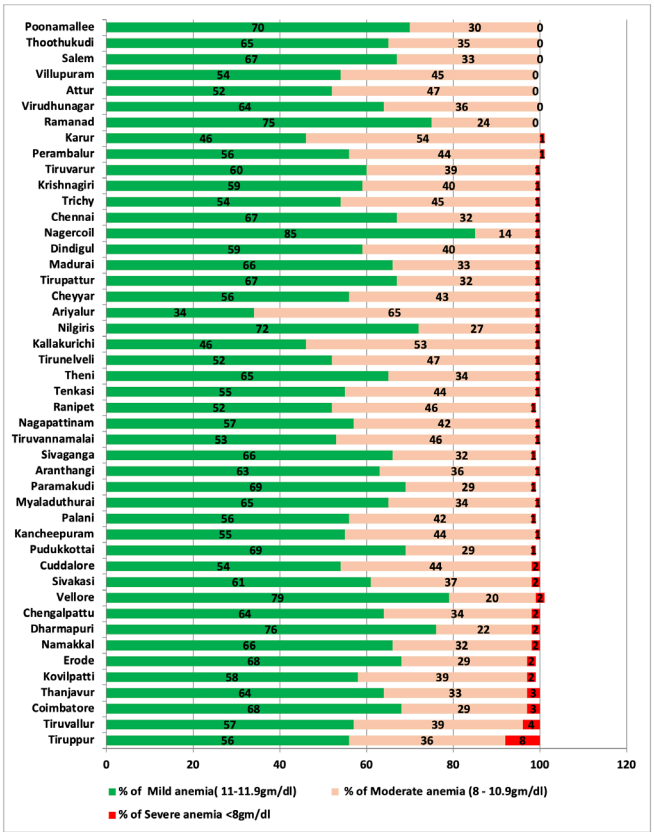

Figure 3 : Anemia Screening and Severity Distribution for adolescent male by HUD in Tamil Nadu (June - October 2023)

DISCUSSION

Comparing our study's findings with the NFHS 5 data and the specific data for Tamil Nadu reveals valuable insights into the prevalence of anemia among adolescents in the region.

Prevalence of Anemia	Present Study	NFHS 5 National Data	NFHS 5 Tamil Nadu-Specific Data
Female Adolescents	56%	59%	52.90%
Male Adolescents	41%	31%	24.60%

These comparisons underscore the persistent challenge of anemia among adolescents in Tamil Nadu, reflected in our study's findings that are in line with existing data trends. It highlights the continued need for research and interventions to effectively address this public health concern and improve the overall well-being of adolescents in the region.

RECOMMENDATIONS

1. Ensure improved access to healthcare facilities, especially in districts where a high proportion of adolescents are identified with severe anemia. This includes providing timely medical care, nutritional support, and regular follow-ups.
2. Implement nutrition education programs that aim to improve dietary habits and promote the intake of iron-rich foods among adolescents, which can contribute to a reduction in anemia prevalence.
3. Launch public awareness campaigns to educate parents, caregivers, and adolescents about the importance of regular health check-ups and early intervention in cases of anemia.
4. Interdisciplinary Collaboration: Promote collaboration between healthcare professionals, educators, and community organizations to address anemia comprehensively and holistically

LIMITATIONS

1. Our data is upto October, 2023, and may not reflect the most current situation. The situation can change over time, and it's important to consider this in policy and program planning.
2. Our study does not account for the underlying causes of anemia or socioeconomic factors that may contribute to the prevalence. A more in-depth analysis is required to understand the root causes better.
3. Our data is specific to Tamil Nadu, and the findings may not be generalizable to other regions or countries.

CONCLUSION

Our study sheds light on the challenges of addressing severe anemia among adolescents in various districts of Tamil Nadu. While we have made progress in identifying and following up on severe cases, it is clear that a more comprehensive approach is needed to combat anemia effectively. We recommend a focus on healthcare interventions, nutritional education, community awareness, and routine surveillance to reduce anemia's impact on adolescents. Collaboration among healthcare professionals, educators, and policymakers is essential to ensure the well-being of adolescents in the region.

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