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INCIDENCE OF ANAEMIA IN THE SCHOOL-GOING CHILDREN IN DR. B. R. AMBEDKAR KONASEEMA DISTRICT

Paediatrics

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ABSTRACT

Background: Anaemia remains one of the most prevalent and preventable public health challenges among school-aged children in India, with significant implications for physical growth, cognitive development, and academic performance. This study was undertaken to estimate the prevalence of anaemia and identify its associated socio-demographic and nutritional risk factors among school-going children. **Methods:** A cross-sectional study was conducted among 400 children aged 6–16 years from five selected schools (2 government, 3 private) using multistage stratified random sampling. Data were collected using a semi-structured questionnaire and hemoglobin levels were measured using portable hemoglobinometers. Anaemia was classified as per WHO guidelines. Statistical analysis was performed using Epi-info. **Results:** The overall prevalence of anaemia was 41.5%. Anaemia was more common among girls (47.4%) than boys (36.2%) and among children aged 13–16 years (48.1%) compared to younger age groups (35.8%). Government school students had a higher burden (53.2%) than private school peers (34.8%). Significant risk factors included infrequent deworming, low parental literacy, low socioeconomic status, poor hygiene, frequent junk food intake, skipping breakfast, recent infections, underweight status, and lack of iron/folic acid supplementation ($p < 0.05$). **Conclusion:** Anaemia among school children in Konaseema is alarmingly high and associated with multiple modifiable factors. Regular deworming, school-based supplementation, nutrition education, and targeted interventions are essential. Localized strategies based on these findings can help improve children's health outcomes and educational performance.

KEYWORDS

Anaemia, School Children, Iron Deficiency, Pediatrics, Retrospective Study, Nutritional Status, Public Health

INTRODUCTION

Education and health are two critical pillars that determine the future of children. Healthy children are more likely to attend school regularly, concentrate better, and perform well academically. However, when faced with health issues such as anaemia, especially iron deficiency anaemia their physical growth, cognitive development, and overall well-being can be significantly compromised. Anaemia is one of the most common and preventable nutritional disorders affecting children, and it remains a major public health challenge in India [1].

In growing children, iron is essential for brain development, oxygen transport, and immune function. Iron deficiency leads to reduced hemoglobin levels, causing fatigue, poor concentration, frequent infections, and in severe cases, developmental delays [2,3]. Globally, the World Health Organization (WHO) estimates that nearly 43% of children aged 5–14 years are anaemic [4]. In India, national surveys and regional studies reveal that anaemia continues to persist despite several government interventions such as Mid-Day Meal programs and Iron-Folic Acid supplementation schemes [5,6]. Yet, rural areas like Dr. B.R. Ambedkar Konaseema district lack detailed, localized data to support targeted intervention.

This district, while rich in agricultural produce and located in the resource-abundant delta region of Andhra Pradesh, continues to face hidden nutritional deficiencies. Preliminary observations by health workers and clinicians suggest a high prevalence of anaemia among school-aged children in the region, but systematic studies remain sparse. Additionally, poor sanitation, irregular deworming, low socioeconomic status, limited dietary diversity, and insufficient parental awareness contribute to the problem [7–9]. These factors not only increase the risk of anaemia but also compound its effects, making affected children more vulnerable to infections, growth faltering, and reduced academic performance.

Furthermore, global evidence—including studies from Africa, China, and Southeast Asia—points toward a strong correlation between anaemia and other modifiable factors such as parasitic infections, skipping meals, lack of iron-rich foods, and poor personal hygiene [10–13]. Yet, such multidimensional risk factor analysis is rarely conducted in small rural districts. This gap calls for comprehensive, localized data that captures the true burden of the problem along with its associated causes.

The need for this study arises from the growing concern that, despite available health and nutrition programs, many children continue to fall through the cracks. Current anemia control strategies rely heavily on national averages, which may not reflect micro-level realities. Without district-specific data, local healthcare providers and policymakers cannot plan focused interventions or allocate resources efficiently. This study seeks to bridge that gap by providing evidence on the prevalence of anaemia among school-going children and examining the associated risk factors such as diet, hygiene, socioeconomic conditions, and health practices. By identifying high-risk groups and modifiable factors, this research aims to contribute meaningfully to the reduction of childhood anaemia and support the development of a healthier, more productive generation.

Objectives:

1. To assess the prevalence of anaemia using routine hematological parameters.
2. To identify socio-demographic, nutritional, and health-related factors associated with anaemia.

Methodology:

A cross-sectional study was conducted school-going children in Dr. B. R. Ambedkar Konaseema District, Andhra Pradesh. The research was carried out in five high schools, comprising two government and three private institutions, selected to ensure representation from both public and private educational environments. The schools were chosen purposively from different areas of the district to reflect demographic and socioeconomic diversity. The study was conducted over a period of 6 months [July 2024 to December 2025]. The target population included school children aged 6 to 16 years who were enrolled in the selected high schools. A total of 400 children were included in the study with estimated prevalence of 40% and 5% precision.

Students were selected using a multistage stratified sampling method. In the first stage, stratification was done based on the type of school (government vs. private). In the second stage, individual schools were selected purposively. Finally, from each school, students were chosen using simple random sampling from their class attendance registers. Children were eligible to participate if they were aged between 6 and 16 years, currently enrolled and attending one of the selected schools, and were present on the day of the survey. Informed consent was obtained from their parents or guardians prior to participation.

Children with previously diagnosed hematological disorders such as thalassemia or sickle cell disease, and those with chronic renal or hepatic conditions, were excluded from the study to avoid confounding factors.

Data were collected using a semi-structured questionnaire, which was administered to gather information on the child's age, gender, dietary habits, family income, parental education levels, deworming history, and other relevant socio-demographic factors. In addition, hemoglobin levels were measured using portable hemoglobinometers following standard protocols. Anaemia was classified as per WHO guidelines based on age and sex-specific hemoglobin cutoffs. All necessary ethical considerations were taken into account during the study. Permission was obtained from the institutional authorities and school management. Written informed consent was secured from parents or legal guardians of each child. Data confidentiality and anonymity were strictly maintained throughout the research process.

The collected data were entered into Microsoft Excel and analysed using Epi-info. The Chi-square test was used to examine associations between anaemia and risk factors with a p-value of less than 0.05 was considered statistically significant.

RESULTS

The overall prevalence of anaemia among the participants was found to be 41.5%. Anaemia was more prevalent in students from government schools (53.2%) compared to private schools (34.8%). The gender-wise distribution showed that females had a higher prevalence (47.6%) than males (36.2%). Children aged 13–16 years had a higher proportion of anaemia (48.1%) than younger children aged 6–12 years (35.6%).

Table 1: Distribution Of Anaemia By Demographic Variables (n = 400)

Variable	Category	Total (n)	Anaemic (%)	Non-Anaemic (%)
Gender	Male	210	76 (36.2%)	134 (63.8%)
	Female	190	90 (47.4%)	100 (52.6%)
Age Group	6–12 years	240	86 (35.8%)	154 (64.2%)
	13–16 years	160	77 (48.1%)	83 (51.9%)
School Type	Government	160	85 (53.2%)	75 (46.8%)
	Private	240	84 (34.8%)	156 (65.2%)

Table 2: Association Between Various Risk Factors And Anaemia

Risk Factor	Anaemic (n = 166)	Non-Anaemic (n = 234)	p-value
No recent deworming (past 6 months)	28 (16.9%)	14 (6.0%)	<0.01
Low parental literacy	24 (14.5%)	16 (6.8%)	0.02
Low socioeconomic status (BG prasad class 4 or 5)	27 (16.3%)	12 (5.1%)	<0.01
Poor personal hygiene (e.g., dirty nails)	21 (12.7%)	15 (6.4%)	0.03
Frequent junk food consumption (>3x/week)	25 (15.1%)	20 (8.5%)	0.04
Skipping breakfast regularly (≥3 times/week)	19 (11.4%)	12 (5.1%)	0.04
History of recent infections (past 3 months)	18 (10.8%)	10 (4.3%)	0.03
Underweight (BMI-for-age < 5th percentile)	22 (13.3%)	11 (4.7%)	<0.01
Lack of iron/folic acid supplementation	26 (15.7%)	13 (5.6%)	<0.01

No recent deworming (16.9% vs. 6.0%), low parental literacy (14.5% vs. 6.8%), and low socioeconomic status (16.3% vs. 5.1%), all showing p-values < 0.01, indicating strong statistical significance. Other significant contributors were poor hygiene, frequent junk food intake, skipping breakfast, recent infections, being underweight, and lack of iron/folic acid supplementation, all of which showed higher prevalence among anaemic children compared to their non-anaemic counterparts ($p < 0.05$). These findings highlight the multifactorial nature of anaemia and underscore the need for comprehensive, community-based interventions addressing nutrition, hygiene, and education.

DISCUSSION

The study among 400 school-going children found a 41.5% prevalence of anaemia, which is comparable to findings in other Indian studies. For instance, a study conducted by Dubey et al. in rural areas near Indore reported anaemia prevalence of 47% among school children, highlighting a similar burden in central India [14]. Likewise, a study by Nair and Doibale in rural Maharashtra observed a prevalence of 40.5% among adolescent girls, supporting the general trend of moderate to high anaemia burden in school-age populations [15].

Infrequent deworming (past 6 months) was another major risk factor in our study (16.9% vs. 6.0%, $p < 0.01$). This aligns with Reddy & Pavithran findings, where the lack of deworming and poor sanitation were associated with higher anaemia rates among adolescent girls [8,16]. Deworming interventions are thus critical in controlling iron deficiency anaemia caused by helminthic infections. Socioeconomic status and parental literacy were also significantly associated with anaemia. Low-income families (BG Prasad class 4 or 5) and illiterate parents were more likely to have anaemic children, similar to findings from Rahman et al. in Bangladesh and Sonawane et al. in Maharashtra, who identified low income and maternal education as critical social determinants [17,18].

Behavioural risk factors such as frequent junk food consumption and skipping breakfast were found to contribute to anaemia in our sample. This trend was also observed by Apriningsih et al. in rural Indonesia, emphasizing that dietary transitions towards processed foods may exacerbate nutritional deficiencies [19]. The study also highlighted the association between poor hygiene, recent infections, and underweight status with anaemia. Underweight children (BMI-for-age < 5th percentile) were significantly more anaemic (13.3% vs. 4.7%, $p < 0.01$), similar to findings from Gemechu et al. in Ethiopia, and supports the idea that malnutrition and anaemia frequently coexist [12].

Lastly, the absence of iron and folic acid supplementation showed a strong association with anaemia (15.7% vs. 5.6%, $p < 0.01$), which mirrors the findings by Kimaro et al. and Reddy et al., who recommended strengthening school-based weekly iron-folic acid supplementation programs [7,8].

Overall, our findings reinforce the multifactorial nature of anaemia and emphasize the importance of multi-pronged public health interventions including nutrition, deworming, education, and hygiene promotion. What makes our study particularly relevant is the local context—a district like Konaseema with rich agricultural resources yet suffering from nutritional deficiencies among its younger population. This paradox indicates that access alone is insufficient without targeted education and systemic healthcare outreach.

CONCLSUION:

This study reveals a high prevalence of anaemia among school-going children, linked to multiple modifiable risk factors like poor diet, lack of deworming, low parental education, and undernutrition. School-based interventions—such as regular screening, nutrition education, iron/folic acid supplementation, and hygiene promotion—are essential. Community involvement and targeted health programs can significantly improve children's well-being and support national health goals. Further research with broader samples is recommended to evaluate long-term outcomes.

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