Research Paper

Assessing the Knowledge, Attitudes, and Practices of Key Stakeholders in Anaemia Management among Adolescent Girls in Social Welfare Schools

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Abstract

Introduction: Anaemia is a major public health challenge among adolescent girls in India, despite various government initiatives. This study assessed the knowledge, attitudes, and practices (KAP) of key stakeholders—health supervisors, school principals, and teachers—in managing anaemia in Telangana Social Welfare Residential Schools. Methodology: A cross-sectional survey was conducted among 456 stakeholders using a structured, self-administered questionnaire. The survey captured demographic details and stakeholders' KAP regarding anaemia management. Statistical analysis was performed to evaluate differences in KAP scores across stakeholder groups. Results: Health supervisors exhibited higher awareness, with 81% correctly identifying normal haemoglobin levels compared to 83% of principals and 72% of teachers. Screening practices varied, with 31% of health supervisors conducting quarterly screenings versus 68% of teachers reporting volunteer-driven screenings only. Disparities in Albendazole administration were also observed, with 50% of health supervisors adhering to biannual dosing, compared to 34% of teachers. Discussion: The study highlights significant gaps in stakeholder practices, including inconsistencies in screening and treatment. Targeted training and standardized protocols are needed to improve stakeholder coordination and ensure effective anaemia management. Conclusion: A unified protocol, regular training, and enhanced collaboration among stakeholders are essential to reducing anaemia prevalence and improving adolescent health outcomes.

Introduction

According to Koshkakaryan et al. 2015[1], micronutrient deficiencies are widespread and are typically made worse by population hunger and poverty as well as a lack of knowledge about healthy eating practices. Anaemia is one of the major public health issues. The World Health Organization (WHO) defines anemia as a condition in which shortage of one or more basic nutrients, such as iron, folic acid, zinc, vitamin B12, and proteins, results in hemoglobin levels below normal for the age, gender, and physiological conditions. According to a review by Roche et al. 2018[2], iron deficiency anemia is thought to be the leading cause of illness and mortality among teenage females worldwide. Reduced academic potential, decreased wellbeing and productivity at home or in the community, and increased maternal and infant morbidity and mortality for adolescents who become pregnant are all consequences of physiological conditions like menstruation and recurrent pregnancies brought on by childbirth with little time for the body to recover.

According to estimates, anemia accounts for 20% of maternal fatalities. Low iron storage, poor physical and cognitive development, and compromised immune systems are all more common in children whose moms are iron deficient. Individual and national human potential is significantly impacted by early life iron status [3]. India has the highest burden of anemia even though it has had a program in place to control it for 50 years. Given India's phenomenal economic expansion over the past 20 years, the lack of anemia reduction in the nation is startling. It is anticipated that anemia rates will decrease around 25% as quickly as income rises [4]. West Bengal and Gujarat have the highest rates of anemia among teenage girls, according to NFHS-5. In Ladakh, nearly 97% of teenage girls aged 15 to 19 had anemia, up from 81.6% during the National Family Health Survey (NFHS-4). West Bengal had the highest incidence among the big states (70.8%, up from 62.2% during NFHS-4), followed by Gujarat (69%). Approximately 64.7% of Telangana's teenage females suffer from anemia, according to NFHS 5. It may surprise you to learn that in some areas of Telangana, up to 79% of teenage females suffer from anemia.
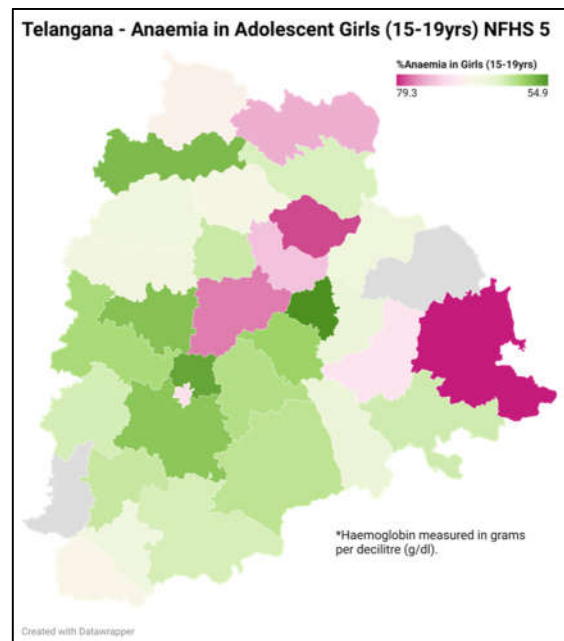
Anaemia is the most common condition, according to the statistics, and the Indian government has created a number of programs to reduce it in collaboration with numerous national nutritional institutes. In an effort to reduce the prevalence of anemia, India's National Nutritional Anemia Prophylaxis Program (NNAPP) was introduced in 1972 as part of the country's fourth five-year plan. In a number of industrialized and developing nations, notably those in Southeast Asia, weekly iron and folic acid (WIFS) supplementation has been shown

to be successful in managing and preventing IDA in adolescents. While it may be simpler to reach adolescents who are enrolled in school, adolescents who are not could be reached through an adolescent-to-adolescent method, in which a school-going adolescent contacts an out-of-school adolescent in the community [5]. Other programs run by the Ministry of Women and Child Development, such as the "Rajiv Gandhi Scheme for Empowerment of Adolescent Girls" (SABLA), give teenage girls extra nutrition in the form of hot cooked meals or take-home rations. A minimum of 600 calories, 18–20 grams of protein, and the necessary daily intake of micronutrients will be provided to each adolescent girl under SABLA for 300 days in a year at a cost of Rs 5 per beneficiary. Adolescent girls (10–19 years old) will receive weekly supplements under the National Iron+ Initiative, which was developed by the Ministry of Health and Family Welfare.

According to NFHS data, despite the fact that iron and folic acid (IFA) supplementation has been a component of Government of India programs for more than thirty years, IFA levels are still low. Therefore, a situational analysis is necessary to comprehend the difficulties and gaps. A situation analysis is an initial evaluation of a certain circumstance that is related to a project that will be carried out in a specific location. Stated otherwise, it is a scoping and analysis process that aids the project team in creating a common knowledge of the context of their project, which encompasses two elements to examine and critically evaluate: the external element, or environment, and the internal element, or program [6]. In many nations, adolescent health has not been prioritized as a public health concern, and the interventions that are now in place are frequently scattered and fragmented. The lack of knowledge about adolescent health problems and the elements that influence them, including risk factors, associated behaviors, laws, policies, and programmatic solutions, is one of the biggest obstacles. According to the WHO, the primary obstacles to the implementation of adolescent health programs are a lack of data collecting and analytic tools and a lack of information.

In his research, JL Beard (2000) found that the issue of anemia affects a larger population than the ones who are typically thought of as pregnant and breastfeeding women and toddlers [7]. The prevalence and severity of anemia in teenage females increase further with the advent of menstruation and the blood loss that goes along with it. Adolescent girls need constant iron replenishment during menstruation, according to research by Brabin and Brabin (1992) [8]. In India, girls who marry young and become mothers have a "vicious cycle of anemia" because of their low iron levels. One of the most significant contributing factors to iron deficiency anemia, which affects 12.1% of Nigerian rural teenagers, is heavy monthly bleeding, according to a 1998 study by Barr et al. on Reducing Iron Deficiency Anaemia Due to Heavy monthly Blood Loss [9]. In a cross-sectional investigation on the prevalence of anemia and iron deficiency, Leenstra et al. (2004) found that the two primary risk factors for anemia in young adolescent girls were schistosomiasis and malaria [10].

Any program would be impacted by the direct or indirect activities of stakeholders, such as subject matter experts and regulatory monitoring, according to a study conducted by Andrea in 2016 [11]. Since a stakeholder analysis is a tried-and-true technique for finding gaps, growth opportunities, and important individuals who can have an impact on policy, it was chosen as

the strategy. According to WHO (Medium Strategic Plan, 2007), several stakeholders may benefit from effective training [12]. We observe improved effect, a healthier community, and a shift in work performance and efficiency. It serves as the cornerstone for human resource development. Ineffective training is a waste of money. Evaluation is dependent on how training affects workplace behavior changes that result in better organizational performance.

Therefore, the study is designed such that the stakeholders in charge of the anemic girl child's wellbeing will be thoroughly interviewed, either individually or in groups, in order to identify any gaps or weaknesses in the program's implementation. To learn more about their abilities to manage anemic female students in Telangana state's social welfare dormitories, an analysis of their knowledge, attitudes, and behaviors will be conducted.
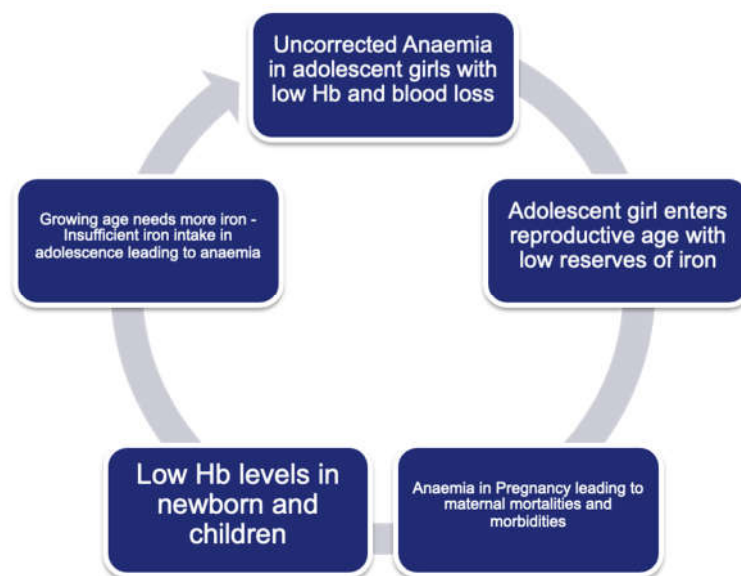

Figure 1: The necessity of treating anemia in adolescents

A KAP (Knowledge, Attitude, and Practices) study was conducted among health supervisors, teachers, and school principals to gather insights into their demographics, responsibilities, and their knowledge, attitudes, and practices regarding anaemia management. The primary objective of this study was to identify and address gaps in anaemia management by incorporating diverse perspectives.

Methodology
Study Design
The study adopted a cross-sectional quantitative KAP (Knowledge, Attitude, and Practice) survey design to assess the roles, responsibilities, and awareness levels of school principals, teachers, and health supervisors in managing anaemia among adolescent girl students in Telangana Social Welfare Residential Schools. This approach enabled to gather data on the existing roles and responsibilities, knowledge, attitudes, and practices of key stakeholders responsible for the well-being of students.
Study Population

The study population comprised principals, teachers, and health supervisors. Principals were included in the study due to their role in overall school management, including health and welfare programs. Teachers were selected because of their direct involvement in the daily activities and academic support of the students. Health supervisors, who are responsible for health monitoring and medical interventions, were also key participants in the study. These three cadres were deemed critical in understanding the management of anaemia in residential schools.

Data Collection

A structured, self-administered questionnaire was developed to collect data from the participants. The questionnaire was carefully designed to cover various aspects relevant to the study, including background information, knowledge, attitude, and practices related to anaemia management. The background section gathered demographic details such as age, gender, professional experience, and the number of students under their supervision. The knowledge section included questions related to the causes, symptoms, and prevention of anaemia. The attitude section consisted of Likert-scale questions aimed at assessing the participants' perceptions and attitudes toward anaemia management and their responsibilities. The practice section explored the current practices followed by the participants in identifying and managing anaemia among students.

Data collection was conducted using an online survey tool created through Google Forms. All participants were invited to an online session facilitated via the Zoom platform, where they were briefed about the study's objectives and methodology. During the session, informed consent was obtained digitally, and participants were guided to complete the questionnaire in real-time. This method ensured that all participants had an opportunity to clarify any doubts regarding the survey and provided an efficient way to gather data from a geographically dispersed population.

Inclusion and Exclusion Criteria

In terms of inclusion criteria, the study targeted principals, teachers, and health supervisors working in girls schools of Telangana Social Welfare Residential Schools who consented to participate and completed the questionnaire in full.

Ethical Approval

Ethical clearance for the study was obtained from the Institutional Ethical Committee (IEC) of JSS College of Pharmacy, Mysore. The protocol was reviewed, discussed, and approved on 26.03.2022, following a formal presentation on 25.03.2022. This ensured that the study adhered to ethical research practices involving human participants and safeguarded the rights and welfare of all participants.

Data Analysis Methods

The collected data were cleaned and analyzed using appropriate statistical methods. Descriptive statistics were used to summarize continuous variables such as age, experience, and KAP scores, while categorical variables were presented as frequencies and percentages. To compare the KAP scores across the three cadres—principals, teachers, and health supervisors—appropriate statistical tests were employed. One-way ANOVA was used for normally distributed data, while the Kruskal-Wallis test was applied for non-normally distributed data. All analyses were performed using statistical software such as SPSS or Microsoft Excel to ensure accuracy and reliability.

Results and Discussion

Comparison of Health Supervisors, Principals and Science Teachers:

The table presents data on the response rates of employees across three different groups—high school (HS) staff, principals, and teachers—at distinct points in time. Each group had a total of 289 employees. The HS staff, surveyed in March 2022, had a response rate of 63%, with 182 responses received, of which 165 (57%) were eligible. Principals, surveyed in April 2022, had a 50% response rate, receiving 146 responses, with 119 (41%) eligible. Teachers, surveyed in March 2024, had the highest response rate of 68%, with 198 responses, and 172 (59%) of those being eligible. This data highlights varying engagement levels among the groups, with teachers showing the highest participation and eligibility rates.

Table 1. Details of the participants

Total Number of Eligible Responses	HS	Principals	Teachers
Total number of Employees	289	289	289
Total number of responses received	182 (63%)	146 (50%)	198 (68%)
Total number of Eligible responses	165 (57%)	119 (41%)	172 (59%)

The pie charts depict the gender distribution among eligible respondents within three groups: high school (HS) staff, principals, and teachers. For HS staff (n=165), 77% are female and 23% are male. Among principals (n=119), the proportion of females is higher, with 89% female and 11% male. The gender distribution is most skewed among teachers (n=172), with 91% female and only 9% male. These charts highlight a significant gender disparity across all groups, with females comprising the majority of respondents, especially among principals and teachers. This imbalance suggests a higher representation of women in educational roles, particularly in teaching and leadership positions. (Fig. 1).
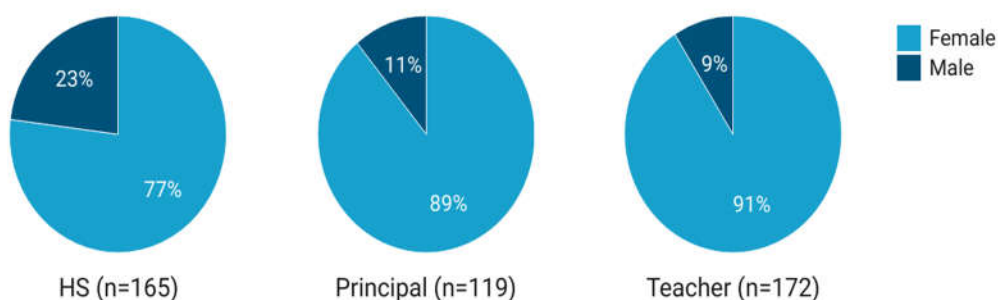

Figure 1. Distribution of male/female participants

The age distribution among the participants in the study varied significantly across headmasters (HS), principals, and teachers. In the 20-25 years age group, headmasters constituted 10.3%, while there were no principals or teachers in this category. Among those aged 26-30 years, 15.8% were headmasters, with principals again not represented, and 18.6% were teachers. The 31-35 years age group showed a higher representation of principals at 35.3%, compared to 15.8% of headmasters and 24.4% of teachers. Participants aged 36-40 years included 8.5% headmasters, 22.7% principals, and 26.7% teachers. In the 41-45 years age group, 2.4% were headmasters, 10.9% were principals, and 16.3% were teachers. For those aged 46-50 years, the

distribution was 3.0% headmasters, 14.3% principals, and 8.1% teachers. Participants aged 51-55 years included 4.2% headmasters, 15.1% principals, and 2.9% teachers. Lastly, those above 55 years comprised 0.6% headmasters, 1.7% principals, and 1.2% teachers. This data indicates a higher concentration of younger headmasters and teachers compared to principals, who are more represented in the middle age brackets, particularly between 31-55 years.
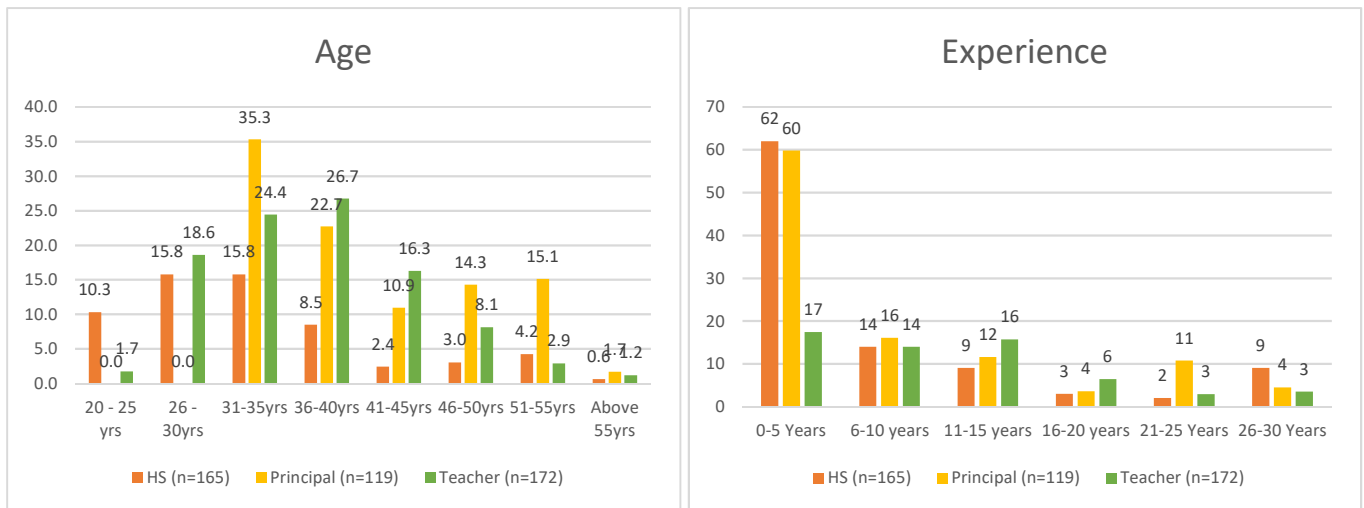

Figure 2. Age and Experience distribution of the participants

The experience distribution among headmasters (HS), principals, and teachers, when analyzed in percentages, reveals interesting trends. A significant portion of headmasters (37.6%) and principals (50.4%) have 0-5 years of experience, compared to only 9.9% of teachers. In the 6-10 years category, the percentages are relatively balanced: 8.5% of headmasters, 13.4% of principals, and 8.1% of teachers. For those with 11-15 years of experience, 5.5% are headmasters, 10.1% are principals, and 9.3% are teachers. The representation decreases further for the 16-20 years group, with 1.8% headmasters, 3.4% principals, and 3.5% teachers. Interestingly, a notable 9.2% of principals have 21-25 years of experience, compared to just 1.2% of headmasters and 1.7% of teachers. Lastly, for those with 26-30 years of experience, 5.5% are headmasters, 3.4% are principals, and 1.7% are teachers. This analysis indicates that headmasters and principals tend to be newer to their roles, while teachers have a more evenly distributed range of experience. Principals, in particular, show a significant presence in the mid-experience categories, especially 21-25 years, suggesting a longer period in the profession before advancing to principal roles.

The qualifications of health supervisors (HS), principals, and teachers reveal notable differences in their educational backgrounds. Among health supervisors, the largest group holds a General Nursing and Midwifery (GNM) qualification, representing 53%. This is followed by those with an Auxiliary Nurse Midwifery (ANM) qualification at 21%, various other qualifications at 17%, a Doctorate in Alternative Medicine at 7%, and a small proportion with Registered Medical Practitioner (RMP) qualifications at 2%.

For principals, the educational distribution is diverse. The largest group holds a Master of Science (MSc) degree, comprising 31.9%. This is followed by those with a Master of Commerce (M.Com) at 26.1%, Master of Arts and Master of Education (MA, MEd) at 9.2%,

Master of Science and Master of Education (MSc, MEd) at 12.6%, Master of Arts (MA) at 8.4%, and a small percentage with a Doctorate (PhD) at 4.2%.

Teachers predominantly hold a Master of Science and Master of Education (MSc, MEd) qualification, making up a significant 78% of the group. Other qualifications among teachers include 6% with a Master of Arts and Master of Education (MA, MEd), 2% with a Master of Commerce and Master of Education (MCom, MEd), and 14% with other qualifications.

This analysis indicates that health supervisors primarily have nursing-related qualifications, reflecting their roles in healthcare supervision. Principals, on the other hand, possess a wider range of advanced degrees, particularly in science and commerce, which suggests a diverse academic background suitable for administrative roles. Teachers predominantly have dual degrees in science and education, emphasizing their strong academic qualifications and focus on educational expertise.

Table 2. Percentage of anaemia students in the schools as per the Stakeholders

		Mild Anaemia	Moderate	Severe	Very Severe
<20%	HS (n=165)	68	61	87	89
	Principal (n=119)	49	48	79	88
	Teacher (n=172)	45	45	72	88
20-30%	HS (n=165)	15	16	6	6
	Principal (n=119)	27	21	14	7
	Teacher (n=172)	27	19	21	8
30-40%	HS (n=165)	4	9	6	4
	Principal (n=119)	4	9	6	3
	Teacher (n=172)	6	20	5	2
50-60%	HS (n=165)	6	10	1	1
	Principal (n=119)	12	16	1	1
	Teacher (n=172)	13	11	2	1
60-70%	HS (n=165)	4	4	0	0
	Principal (n=119)	3	3	0	0
	Teacher (n=172)	3	2	0	0
70% & Above	HS (n=165)	2	1	1	1
	Principal (n=119)	5	3	0	0
	Teacher (n=172)	4	2	0	0

The data illustrates varying percentages of anaemic students as identified by health supervisors (HS), principals, and teachers across different severity categories. Across all severity levels, HS consistently identified higher percentages of anaemic students compared to principals and teachers. Specifically, in the <20% anaemia category, HS identified 68%, 61%, 87%, and 89% of students with mild, moderate, severe, and very severe anaemia respectively, demonstrating a more acute awareness in anaemia detection. Principals and teachers showed lower percentages across these categories, indicating a potential need for improved training in anaemia management and identification among these groups. The disparities highlight the importance of targeted training initiatives for all cadres involved in student health monitoring to enhance overall health management practices and ensure timely intervention for anaemic students.
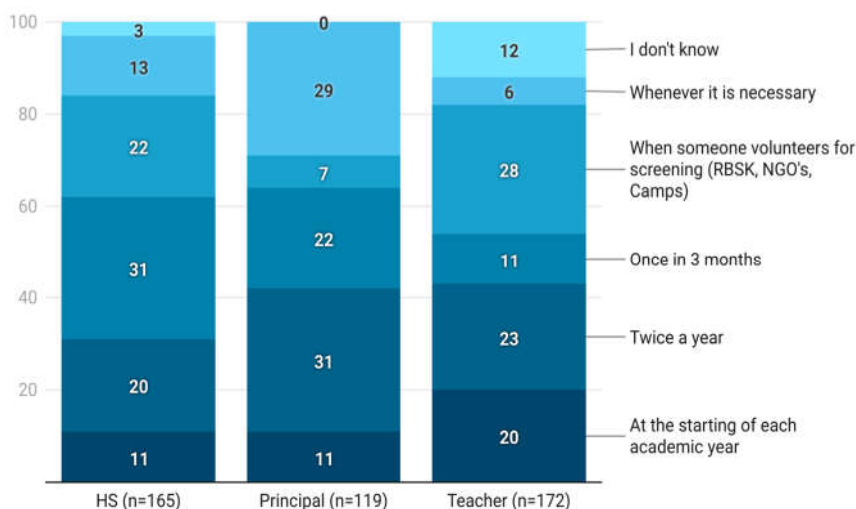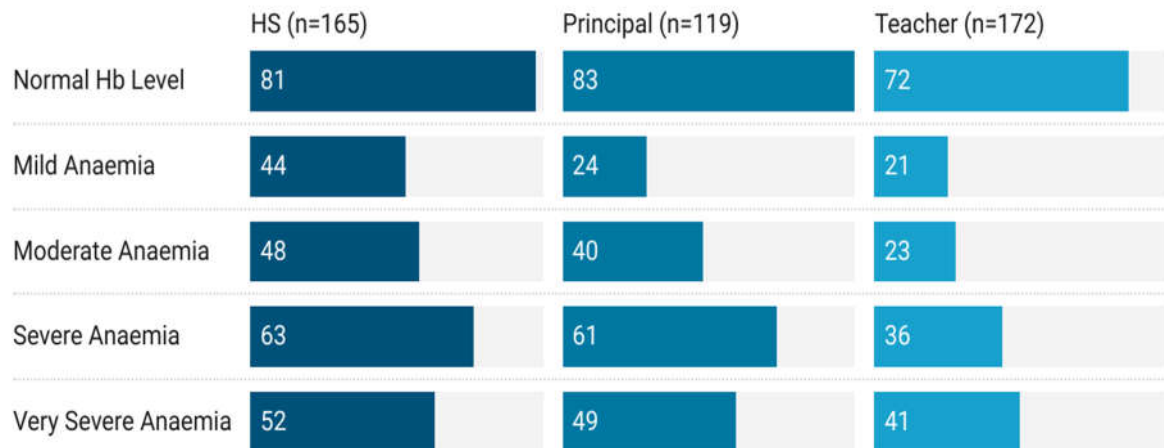

Figure 3. Frequency of Screening for Anaemia

The data on the frequency of anaemia screening among health supervisors (HS), principals, and teachers in Telangana Social Welfare Residential Schools highlights significant discrepancies in practices, indicating a lack of standardized protocols.

Among health supervisors (n=165), the most common answer was screening once every three months (31%). This was followed by screenings conducted when volunteers from organizations like RBSK, NGOs, or camps were available (22%), and twice a year (20%). Only 11% of health supervisors said they screened at the beginning of each academic year, 13% said whenever it was necessary, and 3% did not know the frequency of screenings. Principals (n=119) mentioned different tendencies, with the majority (31%) said screenings twice a year and 29% whenever necessary. Only 22% said once every three months, while 11% did say at the start of the academic year. A smaller percentage (7%) waited for volunteer screenings, and none were unsure about the screening frequency. Teachers (n=172) also presented a varied understanding, with 28% said volunteer screenings, 23% screening twice a year, and 20% doing so at the start of each academic year. Only 11% said they conducted screenings once every three months, 6% whenever necessary, and a notable 12% were unsure of the screening frequency.

The comparison among these stakeholders reveals inconsistencies in screening practices within the schools. Health supervisors, principals, and teachers all have different answers, leading to potential gaps in the early identification and management of anaemia among students. These differing opinions and practices underscore the urgent need for standardized screening protocols across all stakeholders in the schools. Implementing consistent guidelines would ensure regular and systematic screenings, improving the early detection and management of anaemia.

	HS (n=165)	Principal (n=119)	Teacher (n=172)
Normal Hb Level	81	83	72
Mild Anaemia	44	24	21
Moderate Anaemia	48	40	23
Severe Anaemia	63	61	36
Very Severe Anaemia	52	49	41

Created with Datawrapper

Figure 4. Identification of Anaemia based on classification by HS, Principals and Teachers
The data presented shows the percentages of correctly identified hemoglobin (Hb) levels by health supervisors (HS), principals, and teachers across different severity categories. In identifying normal Hb levels, principals demonstrated the highest accuracy at 83%, followed closely by HS at 81%, and teachers at 72%. For mild anaemia, HS had the highest correct identification rate at 44%, while principals and teachers identified 24% and 21% respectively. In cases of moderate anaemia, HS again led with 48% accuracy, followed by principals at 40%, and teachers at 23%. The trend continued with severe anaemia, where HS identified 63% correctly, compared to 61% for principals and 36% for teachers. Similarly, in identifying very severe anaemia, HS had the highest rate at 52%, followed by principals at 49%, and teachers at 41%. This suggests that while HS generally exhibit higher accuracy across all anaemia severity levels, there is room for improvement across all cadres, particularly for principals and teachers, indicating a potential need for enhanced training in anaemia recognition and management to ensure better student health outcomes.
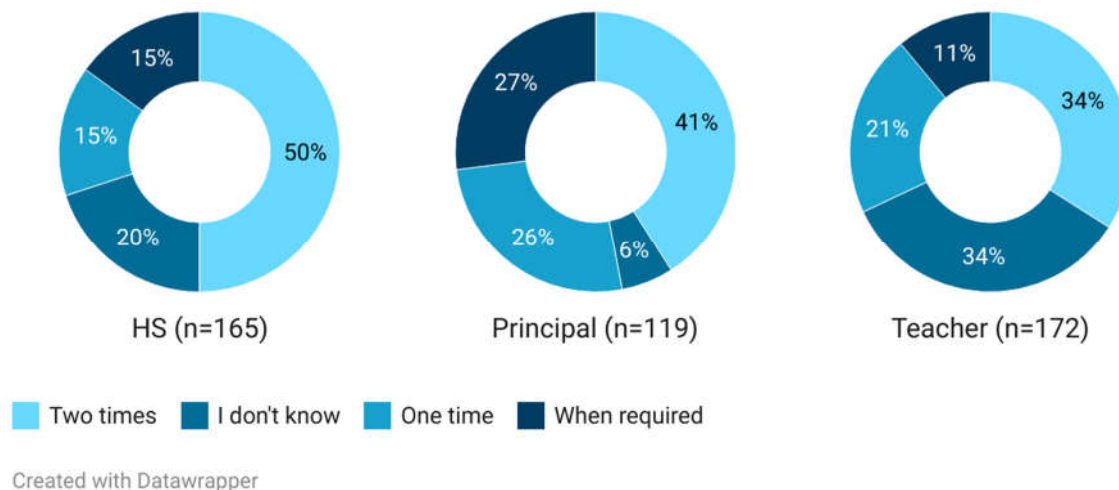
Figure 5. Frequency of Albendazole doses at School as described by the participants

The plot depicts the frequency of Albendazole doses administered at schools according to health supervisors, principals, and teachers. Among health supervisors (HS), 50% reported the doses are given two times, 20% said one time, 15% indicated it is done when required, and another 15% did not know. Principals had different responses: 41% reported the doses are given when required, 27% said two times, 26% one time, and 6% did not know. Among teachers, 34% reported two times, 34% said one time, 21% indicated it is done when required, and 11% did not know. This variation in responses reflects different levels of awareness or practices regarding Albendazole administration among these groups.

Table 3. Roles and responsibilities of the stake holders in the management of anaemia

Whose Responsibility it is		HS (n=165)	Principal (n=119)	Teacher (n=172)
To Identify	HS	72	88	89
	Principal	16	7	5
	Teacher	12	5	6
To Manage (Treatment and Diet)	HS	80	55	92
	Principal	16	43	7
	Teacher	4	2	1
To Counsel	HS	75	86	89
	Principal	13	12	4
	Teacher	12	2	7
To Follow Up	HS	74	68	82

	Principal	12	13	2
	Teacher	14	19	16

The table presents the perceived roles and responsibilities of health supervisors (HS), principals, and teachers in managing anemia at the school level. In identifying anemia cases, a significant majority of principals (88%) and teachers (89%) view it as their responsibility, compared to 72% of health supervisors. For managing treatment and diet, health supervisors (80%) and teachers (92%) are seen as primary responsible parties, while fewer principals (55%) share this view. Counseling duties are perceived strongly by teachers (89%) and principals (86%), with 75% of health supervisors also acknowledging this role. Follow-up responsibilities are similarly acknowledged by teachers (82%), health supervisors (74%), and principals (68%). These responses suggest that while health supervisors, principals, and teachers recognize their roles in anemia management, the specific responsibilities vary, with teachers frequently seen as key players in identification, management, and counseling, and health supervisors as essential for treatment and follow-up.

Conclusion

The study on the prevalence and awareness of anaemia among adolescent girls in Telangana has provided significant insights into the current state of anaemia management within social welfare residential schools. Despite various government initiatives aimed at mitigating this health issue, the findings reveal persistent challenges and highlight the need for targeted interventions. The analysis of stakeholder roles, including state-level policymakers, health command centre staff, regional health officers, school principals, teachers, health supervisors, and assistant caretakers, has underscored several strengths and weaknesses in the existing programs. While initiatives like special diets, Buddy Pairs, and daily yoga sessions show promise, there are critical gaps in uniform procedures, food quality, and the timely identification and management of anaemia, particularly among students with heavy menstrual bleeding.

The study's comprehensive approach, involving in-depth interviews and focus group discussions, revealed that health supervisors possess a higher accuracy in identifying anaemia compared to principals and teachers. However, all groups showed significant variation in screening frequencies and Albendazole administration, indicating a lack of standardized protocols.

The need for enhanced training and awareness programs is evident, particularly for health supervisors and teachers who play crucial roles in the early identification and management of anaemia. The data suggests that while teachers are seen as key players in identification, management, and counseling, health supervisors are essential for treatment and follow-up.

In conclusion, the study emphasizes the necessity for a unified and comprehensive protocol for anaemia management that involves all stakeholders. Regular screenings, consistent dietary management, and targeted training programs are crucial to improving the health outcomes of adolescent girls in these schools. Addressing these issues with a coordinated effort can

significantly reduce the prevalence of anaemia and enhance the overall well-being and academic performance of the students.

Future Work

The proposed study aims to identify significant gaps in the current practices of treating students suffering from anaemia and to develop a comprehensive protocol in collaboration with major stakeholders. The future study will focus on the following key areas:

1. Protocol Development and Implementation: *Early Identification:* Establishing methods for the early detection of anaemia in students through regular screening and monitoring. *Timely Referral:* Creating a streamlined process for the referral of identified cases to appropriate healthcare facilities. *Long-Term Management:* Ensuring consistent and effective long-term management of anaemia, tailored to the specific duties and responsibilities of each stakeholder.
2. Trend Analysis of Anaemia Cases: Conducting a thorough trend analysis of anaemia cases in schools to identify patterns, prevalence, and potential risk factors. This analysis will help in understanding the scope of the issue and in designing targeted interventions.
3. Stakeholder Training and Evaluation: Developing and implementing a comprehensive training program for all stakeholders involved in the protocol. This training will cover the identification, referral, and management of anaemia. Evaluating the effectiveness of the training program through pre- and post-training assessments to ensure that stakeholders are well-equipped to execute the protocol effectively.

The outcome of this study will provide valuable insights into the current treatment gaps and offer a robust framework for improving anaemia management in school settings. The findings and protocol will contribute to the overall health and well-being of students, ensuring better academic performance and quality of life.

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