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Original Research Article

Awareness and preventive practices for anaemia among urban school going adolescent girls

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ABSTRACT

Background: Anaemia is a significant public health concern in India, particularly among adolescent girls. The objective was to assess awareness and dietary practices related to anaemia among urban adolescent school-going girls and indirectly evaluate the effectiveness of the weekly iron and folic acid supplementation WIFS Program.
Methods: A prospective questionnaire-based survey was conducted among urban adolescent school-going girls in India. The data so obtained was analysed.
Results: High awareness levels regarding anaemia were observed (98.9%). Additionally, 96.7% of the respondents were aware that anaemia was a health problem, 71.3% of respondents could satisfactorily talk about anaemia, and 28.7% had insufficient knowledge. Awareness about anaemia symptoms was lower, with only 56.2% giving satisfactory responses. Most girls adopted good practices to prevent anaemia. 85.7% took iron supplements, which the government provides under the WIFAS scheme, and 78.7% consumed green leafy vegetables. The hygiene practices are well maintained, with 98.9% washing hands before meals and 100% washing hands after defecation. 85.6% had taken deworming tablets, which helped in preventing anaemia caused by parasitic infections 60.3% reported experiencing stress or worry, which may indirectly affect anaemia management, as stress can impact nutritional intake and overall health.
Conclusion: Targeted educational initiatives are necessary to enhance knowledge about anaemia symptoms and promote consistent dietary habits. Continuous monitoring and supportive health interventions are crucial to ensure better anaemia prevention and management.

Keywords: Anaemia, Adolescent girls, Awareness, Dietary practices, WIFS program, India

INTRODUCTION

Anaemia is one of the most important nutritional deficiencies affecting various social and socioeconomic strata. It is more common in developing countries, with children and adolescents being at a significantly higher risk for the condition.[1] Iron deficiency anaemia (IDA) remains among the five leading causes of years lived with disability worldwide, and it is the top cause of disability in women.[2] It has been traditionally regarded as a public health concern primarily affecting growing children, premenopausal women, and pregnant women; its impact extends far beyond these populations.[2]

A scheme, weekly iron folic acid supplement (WIFS) is a government scheme was launched by the government of India in 2013 with the objective of WIFS to reduce the prevalence and severity of anaemia in the adolescent population (10-19 years). Still, anaemia is prevalent in our country. Iron deficiency anaemia is a significant public health concern in India, particularly among adolescent girls. According to recent estimates, approximately 65.7% of adolescent girls in India suffer from anaemia. This translates to around 64 million girls at any given time. The prevalence of anaemia varies across different regions in India. For instance, Madhya Pradesh has a prevalence rate of 52.5%, while Gujarat has a relatively lower rate of 37%.

Other states like Uttar Pradesh, Andhra Pradesh, and Maharashtra have higher prevalence rates, ranging from 56.3% to 85.4%. Interestingly, Shimla has a significantly lower prevalence rate of 21.5%, whereas Karnataka's rate stands at 41.5%. These numbers highlight the need for targeted interventions to address anaemia among adolescent girls in India.[3]

Indian studies have observed low levels of IDA awareness among adolescents, inadequate iron-folic acid (IFA) consumption, and limited community awareness regarding anaemia, particularly in vulnerable urban communities.[4,5] Hence, there seems to be a knowledge gap regarding anaemia awareness and experiences with anaemia prevention services from the perspective of adolescent girls and their associated individuals. Thus, the present study aimed to assess the awareness and dietary practices related to anaemia among urban school-going adolescent girls, indirectly reflecting the effectiveness of the WIFS program. The study's objectives were to explore the knowledge, awareness, and preventive practices for anaemia.

METHODS

The present study employed a cross-sectional study design, and a questionnaire-based survey was conducted to assess the awareness of anaemia among urban school-going adolescent girls. The approval for conduct was obtained from the Institutional Ethics Committee (IEC Code 2025/18 dated 28/3/2025) The study was conducted over the period of 01 April to 31 July 2025.

The sample size consisted of adolescent girls who fulfilled the inclusion criteria, provided ascent for participation, and obtained consent from their school authority, parents or guardians.

Inclusion criteria

The inclusion criteria specified that participants were to be between 12 to 16 years old, have permission from their parents or guardians, and obtain consent (as ascent) to participate in the study.

Exclusion criteria

Conversely, the exclusion criteria were participants who did not get permission from their parents or guardians, did not provide consent (as ascent), or were outside the specified age range.

Data collection was facilitated through the administration of a questionnaire, both in English and Hindi, to urban school-going adolescent girls. The questionnaire was designed to assess the awareness of anaemia among the participants, and the researchers asked questions to gather information on this topic. By employing this methodology, the study aimed to provide valuable insights into the awareness of anaemia among adolescent girls, which can inform the development of targeted interventions to address this critical health issue.

RESULTS

A total of 400 adolescent girls who met the inclusion criteria were given a questionnaire. Five schools of the nearby locality were identified. Prior permissions from the school authorities and parents/guardians of participants were obtained. The adolescent girls between 12 and 16-years of age from standard sixth to tenth were approached for participation.

Awareness and knowledge about anaemia

Our study revealed that a significant majority of the participants (98.9%) were aware of anaemia, indicating high awareness levels (Figure 1). Additionally, 96.7% of the respondents were aware that anaemia was a health problem. This suggests that most of the girls surveyed were aware of anaemia and understood its potential health implications. However, the small percentage (3.3%) who did not consider it a health issue highlights a need for further education on the risks of anaemia and associated problems. 71.3% of respondents could satisfactorily describe anaemia, and 28.7% had insufficient knowledge (Figure 2).

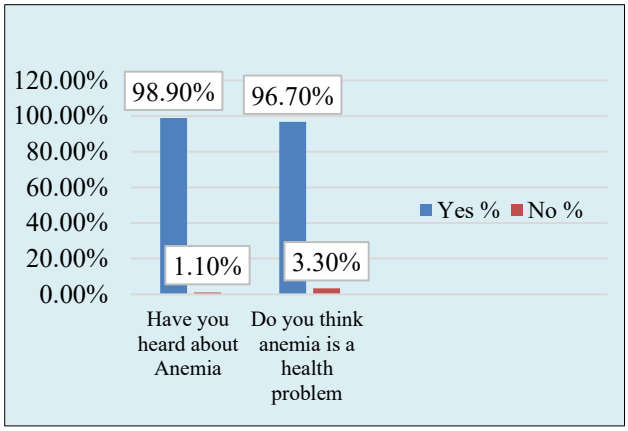

Figure 1: Awareness among urban school-going adolescent girls for anaemia as a health problem.

Awareness about anaemia symptoms was lower, with only 56.2% giving satisfactory responses. Furthermore, 69.7% of the girls knew that it is preventable, and 70% understood its treatment. These findings indicate that while most girls had basic knowledge about anaemia, still gaps, particularly regarding its symptoms. Strengthening educational initiatives can help bridge these knowledge gaps and improve understanding.

Preventive practice towards anaemia

Regarding preventive practices towards anaemia, the result showed that most of the girls adopted good practices to prevent anaemia. 85.7% took the iron supplements,

which the government provides under the scheme of WIFS, and 78.7% consume green leafy vegetables, both of which are critical for preventing iron deficiency. Additionally, hygiene practices are well maintained, with 98.9% washing hands before meals and 100% washing hands after defecation. However, only 67.2% reported having breakfast regularly, which could be an area for improvement, as skipping meals can contribute to poor nutrition and increased anaemia risk (Table 1).

Health-seeking behaviour towards anaemia

The survey results indicated that a large proportion of girls were actively engaged in health-seeking behaviours to address anaemia. About 73.3% had checked their haemoglobin levels, and 83.3% had taken iron folic acid tablets weekly in the past year. Moreover, 85.6% had taken deworming tablets, which further helped in preventing anaemia caused by parasitic infections (Table 2).

However, 60.3% reported experiencing stress or worry, which may indirectly affect anaemia management, as stress can impact nutritional intake and overall health. These findings highlight the need for continuous monitoring and supportive health interventions to ensure better anaemia prevention and management. Overall, the awareness and practices related to anaemia are relatively high among the surveyed girls; still, there is a need for targeted educational efforts to improve knowledge about symptoms and ensure more consistent dietary habits.

Table 1: Assessment of practices to prevent anaemia.

Question	Yes (%)	No (%)
Do you have breakfast regularly?	67.2	32.8
Are you taking any sort of iron supplement or weekly iron tablets?	85.7	14.3
Do you wash your hands with soap before consuming food?	98.9	0.1
Do you wash your hands with soap after defecation?	100	0
Do you have consumption of green leafy vegetables?	78.7	21.3

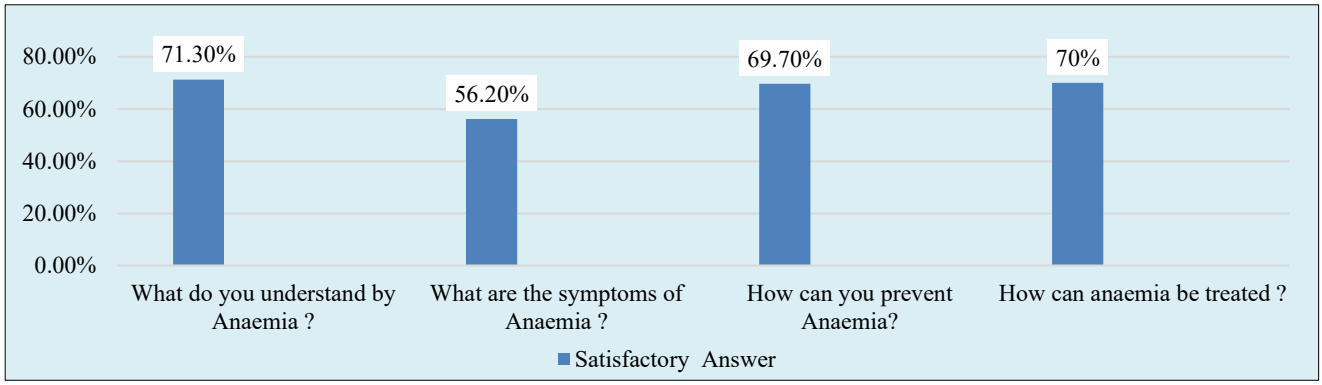

Figure 2: Satisfactory answers by participants about knowledge of anemia.

Table 2: Assessment of health-seeking behaviour towards anaemia.

Question	Yes (%)	No (%)
Have you checked your haemoglobin level	73.3	26.7
Have you taken iron tablets in the last 1 year	83.3	16.7
Do you have any chronic illnesses?	85.4	14.6
You have taken deworming tablets in the last 6 months	85.6	14.4
Are you suffering from any stress or worry?	60.3	39.7
Do you have regular menstruation?	95.3	4.7
Do you have heavy menstrual bleeding?	9.1	89.9

DISCUSSION

The present study found that high awareness levels regarding anaemia among the surveyed girls, with 98.9% aware of anaemia and 96.7% recognising it as a health problem. This suggests that anaemia awareness campaigns have been effective in reaching these adolescent girls. However, the small percentage (3.3%) who do not consider anaemia a health issue highlights the need for further education on the risks associated with anaemia. Despite the high awareness levels, gaps exist in the girls' knowledge about anaemia, particularly concerning symptoms. Only 56.2% provided satisfactory responses regarding anaemia symptoms, indicating a need for targeted educational initiatives to improve knowledge in this area. Strengthening educational programs can help bridge these knowledge gaps and enhance understanding of anaemia.

A concomitant study by Gillespie et al, conducted in South India found that despite the existence of dedicated government programs, we found that awareness about the possibility of adolescent anaemia and knowledge about prevention were very limited.[6] Our results are further in concordance with Patnaik et al, Ajgaonkar et al, and Sethi et al reported that low- and middle-income countries (LMICs) suggest that gaps in awareness about anaemia and nutrition status among adolescents and their communities hinder progress in anaemia prevention.[4,5,7]

De Andrade Cairo et al revealed a prevalence of iron deficiency anaemia of around 20% in adolescents and described the harmful effects of anaemia in this age group.[1] A literature analysis by Leung et al reported that iron deficiency anaemia commonly affects children aged 9 months to 3 years and adolescents.[8] It can result from increased iron demand, inadequate intake, or decreased absorption. Symptoms may include pallor, poor appetite, fatigue, and irritability. Severe cases can lead to neurodevelopmental and cognitive deficits. Early diagnosis and oral iron therapy can effectively treat the condition. In the present study, the adoption of good practices to prevent anaemia, such as taking iron supplements (85.7%) and consuming green leafy vegetables (78.7%), is encouraging. However, the finding that only 67.2% reported having breakfast regularly highlights an area for improvement, as skipping meals can contribute to poor nutrition and increased anaemia risk. The high engagement in health-seeking behaviours to address anaemia, with 73.3% checking their haemoglobin levels and 83.3% taking iron tablets in the past year, is a positive trend. However, the reported stress or worry experienced by 60.3% of the girls may indirectly affect anaemia management, emphasising the need for continuous monitoring and supportive health interventions to ensure better anaemia prevention and management.

A study by Anand et al, conducted in India, highlighted that socioeconomic disadvantage significantly increases the risk of iron deficiency anaemia (IDA) due to limited access to a diverse diet.[9] Another study by Kapil et al found that poor environmental sanitation and unsafe drinking water increase the risk of iron deficiency anaemia.[10] A study by Gupta et al reported that vulnerable populations, including pregnant women, children, and individuals living in poverty, are more susceptible to additional risk factors such as repeated hookworm infestations and multiple micronutrient deficiencies.[11] Studies conducted by Gupta et al, Kapil et al, and Jeyakumar et al emphasised the challenges faced by adolescent-oriented anaemia prevention programs, particularly in ensuring access, coverage, and sustainability.[10-12] Patnaik et al reported that discriminant function loadings revealed age (0.79), mother's education (0.43) and occupation (0.59), father's occupation (0.59), number of female siblings (0.36) and BMI (0.78) to be key determinants of IDA awareness and the low scores on IDA awareness and the high proportion of underweight participants highlight the need for targeted health education and nutrition interventions.[4]

The prevalence patterns observed in this study are consistent with previous reports from India. Toteja et al documented a 90.1% prevalence of anaemia among adolescent girls across 16 districts, with 7.1% of cases being severe.[13] In contrast, none of the participants in the present study had severe anaemia. The significant association of anaemia with socio-economic status observed in our cohort may be attributed to differences in dietary intake and accessibility to nutrient-rich foods among different socio-economic groups. Moreover, the association with parental educational status reflects both improved awareness among literate mothers and better overall living conditions. Similar findings were reported by Chaudhary et al who also found socio-economic and parental literacy to be important determinants of anaemia prevalence.[14]

Bulliyy et al reported a 96.5% prevalence of anaemia among non-school-going adolescent girls in Orissa, with 45.2%, 46.9%, and 4.4% presenting with mild, moderate, and severe anaemia, respectively.[15] They also demonstrated significant correlations between haemoglobin levels, parental education, family income, and body mass index. Comparable associations were noted in our study, wherein the mean height and weight of anaemic participants were significantly lower than those without anaemia, suggesting that anaemia negatively impacts overall adolescent growth and development. Khanduri et al reported peak incidences of megaloblastic anaemia in the 10–30 year age group (48%), with a higher prevalence among females (71%), further highlighting the vulnerability of this population.[16] Similarly, Verma et al reported that girls aged 11 to 14 (p=0.042) and those with lower socioeconomic status (p=0.022) were more likely to have anaemia than those of older age and higher socioeconomic status.[17]

A study done by Verma et al, at Rajasthan, in their study results, anaemia was found in 56.32% (n=352) of the recruited population, with a mean of 9.92 (SD=1.40). Girls aged 11 to 14 (AOR=3.63, 95% CI:1.76-6.38, p value=0.042) and those with lower socio-economic status (AOR=4.37, 95% CI:1.39-8.25, p value=0.022) were more likely to have anaemia.[18] In a study done by Kumar et al, was found that the prevalence of stunting, anaemia and thinness among adolescents was 27.2, 28.5 and 24.1%, respectively.[19]

Rathi et al reported that more than half of the sample had anaemia (16.7% mild anaemia, 33.3% moderate anaemia, 2.8% severe anaemia) in their study.[20] And in their study, they also identified- poor understanding of the term anaemia, minimal discussion about anaemia in classroom, limited knowledge about symptoms of anaemia, limited awareness about prevention and cure of anaemia, perception of iron folic acid and deworming tablets among students, lack of contribution of health workers in the

prevention of anaemia and no knowledge of 'Anemia free India' programme.

The study by Bhandari et al involved 380 adolescent girls, who were selected using a convenience sampling technique.[21] Anthropometric measurements, social demography and blood for haemoglobin estimation were taken. A point estimate at a 95% confidence Interval was performed, and it was found that 230 (60.5%) individuals within the 95% confidence interval (55.56-65.41) were anaemic, with a mean haemoglobin level of 11.138±1.954 gm/dl. The mean age was 14.57±2.107 years.

Overall, the findings of this study reinforce the high burden of anaemia among adolescent girls and its multifactorial associations with socio-economic and educational determinants. Importantly, they emphasise the need for strengthening nutritional programs and educational initiatives to bridge knowledge gaps, improve dietary practices, and enhance the health and growth outcomes of this vulnerable group.

CONCLUSION

In conclusion, the survey highlights that adolescent girls in India demonstrate high awareness levels regarding anaemia, with 98.9% having heard about the condition and 96.7% recognising it as a health problem. However, gaps exist in their knowledge, particularly concerning symptoms, with only 56.2% providing satisfactory responses.

The survey also reveals that most girls adopt good practices to prevent anaemia, such as taking iron supplements (85.7%) and consuming green leafy vegetables (78.7%). Nevertheless, areas for improvement remain, including increasing regular breakfast consumption and addressing stress and worry, which may impact anaemia management. To effectively address anaemia, targeted educational initiatives are necessary to enhance knowledge about symptoms and promote consistent dietary habits. Additionally, continuous monitoring and supportive health interventions are crucial to ensure better anaemia prevention and management.

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