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To Assess the Knowledge About Anaemia and Its Related Dietary Factors Among Adolescent Girls Attending Anganwadi Centres in the Slum Areas of Sagar City

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ABSTRACT

Background: Anaemia remains one of the most common nutritional disorders affecting adolescents worldwide and continues to be a major public health concern in India. Adolescent girls are particularly vulnerable because of increased nutritional requirements associated with rapid growth, menstruation, and inadequate dietary intake. Knowledge regarding anaemia and its related dietary factors plays a crucial role in its prevention and control. However, information on awareness levels among adolescent girls living in urban slums remains limited.

Objectives: To assess the knowledge regarding anaemia and its related dietary factors among adolescent girls attending Anganwadi Centres in the slum areas of Sagar City, Madhya Pradesh.

Materials and Methods: A community-based cross-sectional study was conducted among 300 adolescent girls aged 10–19 years who were registered at selected Anganwadi Centres in the urban slum areas of Sagar City. Participants were selected using a multistage simple random sampling technique. Data were collected using a pretested semi-structured questionnaire in Hindi language. Information on socio-demographic characteristics and knowledge of symptoms, treatment, prevention, effects of anaemia, and dietary factors was obtained. Data were entered into Microsoft Excel and analysed using IBM SPSS version 26. Descriptive statistics were expressed as frequencies and percentages, and the Chi-square test was applied to assess associations. A p-value <0.05 was considered statistically significant.

Results: Among the study participants, 45% belonged to the 17–19 years age group and 49.3% belonged to the lower-middle socioeconomic class. Knowledge regarding symptoms, treatment, effects, and prevention of anaemia was reported by 66%, 72.7%, 69%, and 60.7% of participants, respectively. Most respondents correctly identified iron-rich foods, vitamin C, and folic acid as important dietary measures for preventing anaemia. Educational status was significantly associated with knowledge regarding the effects of anaemia ($\chi^2 = 36.157$, $p = 0.002$).

Conclusion: The study demonstrated a satisfactory level of knowledge regarding anaemia and its related dietary factors among adolescent girls attending Anganwadi Centres. However, gaps in specific dietary knowledge and misconceptions about anaemia persisted. Strengthening nutrition education and awareness programmes through Anganwadi Centres may further improve preventive practices and help reduce the burden of anaemia among adolescent girls.

Keywords*: Anaemia; Adolescent girls; Dietary factors; Knowledge; Anganwadi Centres; Urban slums.*

INTRODUCTION

Anaemia is one of the most common nutritional disorders worldwide and continues to be a major public health problem, particularly in low- and middle-income countries. It is characterised by a reduction in the haemoglobin concentration of blood, resulting in decreased oxygen-carrying capacity and impaired tissue oxygenation. Iron deficiency remains the leading cause of anaemia globally, although deficiencies of folate, vitamin B12, and other micronutrients, as well as infections and chronic inflammatory conditions, also contribute significantly to its occurrence.[1,2]

Adolescence represents a period of rapid physical growth, sexual maturation, and increased nutritional requirements. During this stage, adolescent girls are particularly vulnerable to anaemia because of accelerated growth velocity, the onset of menstruation, and inadequate dietary intake of iron and other essential nutrients.[3] Anaemia during adolescence can adversely affect physical growth, cognitive development, educational performance, immunity, and future reproductive health. Persistent iron deficiency during this period may also reduce work capacity and quality of life.[2,4]

Globally, anaemia remains a significant contributor to morbidity and disability. Balarajan et al. reported that anaemia disproportionately affects populations living in resource-constrained settings and is closely associated with poverty, malnutrition, and limited access to healthcare services.[4] Iron deficiency alone accounts for a substantial proportion of anaemia cases worldwide and remains a major nutritional concern among adolescents and women.[5]

India bears a considerable share of the global burden of anaemia. A recent systematic review and meta-analysis by Daniel et al. demonstrated a persistently high prevalence of anaemia among Indian adolescent girls, highlighting the magnitude of the problem across different regions of the country.[6] Similarly, Scott et al. reported that anaemia remains highly prevalent among Indian adolescents aged 10–19 years and is influenced by multiple socioeconomic, dietary, and demographic factors.[3] Recent analyses of national survey data have further shown an increasing trend in anaemia prevalence among Indian adolescent females despite ongoing nutritional interventions.[7]

Knowledge regarding anaemia and its dietary determinants plays a crucial role in prevention and control. Awareness of iron-rich foods, dietary enhancers of iron absorption such as vitamin C, and healthy nutritional practices can significantly reduce the risk of anaemia. However, studies of adolescent girls have identified important gaps in knowledge, attitudes, and practices regarding anaemia prevention and dietary management.[8]

Anganwadi centres serve as important platforms for nutrition education, health promotion, and the implementation of adolescent health programmes. Assessing adolescent girls' knowledge of anaemia and its dietary factors is essential for identifying gaps and developing targeted educational interventions. Therefore, the present study was undertaken to assess the knowledge about anaemia and its related dietary factors among adolescent girls attending Anganwadi centres in the slum areas of Sagar City, Madhya Pradesh.

MATERIALS AND METHODS

A community-based cross-sectional study was conducted among adolescent girls registered at Anganwadi Centres located in the urban slum areas of Sagar City, Madhya Pradesh. The study was carried out over 18 months, comprising 12 months for data collection and 6 months for data analysis and interpretation, following approval from the Institutional Ethics Committee.

Ethical clearance for the study was obtained from the Institutional Ethics Committee of Government Bundelkhand Medical College, Sagar, Madhya Pradesh (Registration No. EC/NEW/INST/2023/3174; Approval No. IECBMC/DHR/2024/64 dated 21 March 2024). The study was conducted in accordance with the National Ethical Guidelines for Biomedical and Health Research involving Human Participants.

The study population comprised adolescent girls aged 10–19 years who were registered at the selected Anganwadi Centres and residing in the slum areas of Sagar City. A total of 300 adolescent girls participated in the study. Participants were selected using a multistage simple random sampling technique. Initially, a list of Anganwadi Centres situated in the urban slum areas of Sagar City was obtained from the concerned authorities. Thirteen Anganwadi Centres were identified and shortlisted through simple random sampling. Subsequently, six Anganwadi Centres were selected using the same sampling method. These included Anganwadi Centre 25 (Tilli Sanjay Nagar), Anganwadi Centre 95 (Ambedkar Ward), Anganwadi Centre 96 (Kaka Ganj), Anganwadi Centre 79 (Rajiv Nagar), Anganwadi Centre 43 (Bhagat Singh Ward), and Anganwadi Centre 82 (Vivekanand Ward). From each selected Anganwadi Centre, 50 adolescent girls were recruited through simple random sampling, yielding a final sample size of 300 participants.

Adolescent girls aged 10–19 years who were registered at the selected Anganwadi Centres, were present at the time of data collection, and provided informed consent/assent were included in the study. Participants who were below 10 years

or above 19 years of age, were not registered at the selected Anganwadi Centres, were absent during data collection, or were unwilling to participate were excluded from the study.

Data were collected using a pretested, semi-structured questionnaire prepared in Hindi. The questionnaire consisted of two sections. The first section included socio-demographic information such as age, religion, educational status, and socioeconomic status. The second section assessed knowledge of anaemia and its related dietary factors, including symptoms, treatment, prevention, and effects, as well as awareness of iron-rich foods and nutrients important for anaemia prevention.

Prior to data collection, written informed consent was obtained from the parents or guardians of the selected participants, and assent was obtained from the adolescent girls. The objectives and procedures of the study were explained to all participants, and confidentiality of the information provided was ensured. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any stage without any consequences.

The collected data were coded, entered into Microsoft Excel, and subsequently analysed using IBM Statistical Package for the Social Sciences (SPSS) version 26 (Trial Version). Descriptive statistics were expressed as frequencies and percentages. The association between categorical variables was assessed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 300 adolescent girls aged 10–19 years registered at selected Anganwadi Centres in the urban slum areas of Sagar City were included in the study. The results are presented by socio-demographic characteristics, knowledge of anaemia and related dietary factors, and the association between educational status and knowledge of anaemia's effects.

Table 1. Socio-demographic characteristics of study participants

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	10–13	63	21.0
	14–16	102	34.0
	17–19	135	45.0
Educational status	Illiterate	1	0.3
	Primary school	15	5.0
	Middle school	113	37.7
	High school	111	37.0
	Higher secondary	42	14.0
	Graduate and above	18	6.0
Religion	Hindu	290	96.7
	Muslim	10	3.3
Socioeconomic status	Class III (Middle)	30	10.0
	Class IV (Lower middle)	148	49.3
	Class V (Lower)	122	40.7

The majority of participants belonged to the 17–19 years age group (45%), followed by 14–16 years (34%) and 10–13 years (21%). Most participants had attained a middle school education (37.7%) or a high school education (37.0%), while only one participant was illiterate. The study population predominantly belonged to the Hindu religion (96.7%). Nearly half of the participants (49.3%) belonged to the lower-middle socioeconomic class, whereas 40.7% belonged to the lower socioeconomic class.

Table 2. Knowledge regarding anaemia and its related dietary factors among study participants

Variable	Response	Frequency (n)	Percentage (%)	χ^2 Value	p-value
Knowledge of symptoms of anaemia	All correct symptoms	198	66.0	28.941	0.016*
	Fatigue and weakness only	52	17.3		
	Paleness of skin only	21	7.0		
	Increased heartbeat only	15	5.0		
	Breathlessness only	14	4.7		
Knowledge of the treatment of anaemia	Iron/vitamin supplements, blood transfusion and deworming	218	72.7	24.387	0.059
	Blood transfusion only	40	13.3		

	Iron/vitamin supplements only	36	12.0		
	Deworming only	6	2.0		
Knowledge of effects of anaemia	Both growth impairment and reduced cognitive/muscle function	207	69.0	36.157	0.002*
	Decreased growth and development only	61	20.3		
	Reduced muscle strength, memory and cognition only	20	6.7		
	Kidney failure	12	4.0		
Knowledge of prevention of anaemia	Iron-rich foods + Vitamin C/Folic acid foods	182	60.7	31.824	0.007*
	Iron-rich foods only	55	18.3		
	Vitamin C/Folic acid foods only	24	8.0		
	Consumption of caffeine	39	13.0		

*= Significant

The majority of participants demonstrated adequate knowledge regarding anaemia and its dietary determinants. About 66.0% correctly identified all major symptoms of anaemia, while 72.7% were aware of the major treatment modalities, including iron supplementation, blood transfusion, and deworming. Knowledge regarding the effects of anaemia was satisfactory, with 69.0% correctly identifying both impaired growth and reduced cognitive and muscular performance as important consequences. Similarly, 60.7% of participants recognised the combined role of iron-rich foods and foods rich in vitamin C and folic acid in preventing anaemia.

Educational status showed a statistically significant association with knowledge regarding symptoms ($\chi^2 = 28.941$, $p = 0.016$), effects ($\chi^2 = 36.157$, $p = 0.002$), and prevention ($\chi^2 = 31.824$, $p = 0.007$) of anaemia. However, the association between educational status and knowledge regarding the treatment of anaemia was not statistically significant ($\chi^2 = 24.387$, $p = 0.059$). These findings indicate that higher educational attainment was associated with better awareness regarding the symptoms, consequences, and preventive dietary measures related to anaemia.

The findings of the study indicate that adolescent girls attending Anganwadi Centres in the urban slum areas of Sagar City possessed a reasonably good level of knowledge regarding anaemia and its related dietary factors. More than 60% of participants demonstrated correct knowledge regarding symptoms, prevention, treatment, and effects of anaemia. Knowledge of treatment was the highest (72.7%), followed by knowledge of the effects (69.0%) and symptoms (66.0%) of anaemia. However, notable gaps persisted in specific dietary knowledge and misconceptions regarding prevention and consequences of anaemia. Educational status emerged as a significant determinant of knowledge, suggesting that improved educational attainment may contribute to better awareness regarding anaemia and its prevention.

DISCUSSION

The present study assessed knowledge regarding anaemia and its related dietary factors among adolescent girls attending Anganwadi Centres in the urban slum areas of Sagar City. Anaemia remains a major public health problem among adolescent girls, particularly in socioeconomically disadvantaged populations, where inadequate dietary intake and limited health awareness contribute significantly to its burden.[9] In the present study, the majority of participants belonged to the 17–19 years age group (45%). Similar findings were reported by Dibyanshu et al., who observed greater representation of middle and late adolescents in community-based studies on anaemia.[10] The educational profile of the participants revealed that most had attained middle school or high school education, indicating a reasonable level of literacy that may have contributed to better awareness regarding health and nutrition. Similar observations were reported by Latha et al., who found that school-going adolescent girls demonstrated better knowledge regarding anaemia than those with lower educational attainment.[11]

Knowledge regarding symptoms of anaemia was satisfactory, with 66% of participants correctly identifying the major symptoms. Angadi and Ranjitha reported comparatively lower awareness among adolescent girls residing in urban slums, where only a limited proportion could correctly identify symptoms and causes of anaemia.[12] The higher level of awareness observed in the present study may be attributed to ongoing health education activities through schools and Anganwadi Centres.

The majority of participants (72.7%) correctly identified iron supplementation, blood transfusion, and deworming as treatment modalities for anaemia. Similar findings were reported among adolescent girls in Delhi, where awareness

regarding iron-folic acid supplementation was relatively high.[13] Increased visibility of national programmes such as Weekly Iron and Folic Acid Supplementation (WIFS) may have contributed to this improved awareness.[14] Knowledge regarding the effects of anaemia was also encouraging, with 69% of participants recognizing its impact on growth, physical capacity, memory, and cognitive performance. Educational status showed a statistically significant association with knowledge regarding the effects of anaemia (p=0.002), suggesting that formal education plays an important role in improving health literacy. Similar associations have been reported in studies assessing anaemia awareness among adolescents.[15]

Regarding preventive measures, 60.7% of participants correctly identified both iron-rich foods and foods rich in vitamin C and folic acid as important for prevention. Previous studies have similarly reported better awareness of iron-rich foods than of factors influencing iron absorption.[11,16] Knowledge of dietary practices is particularly important because poor dietary diversity and inadequate micronutrient intake remain major contributors to anaemia among Indian adolescents.[17]

Overall, the findings indicate that adolescent girls attending Anganwadi Centres possessed reasonably good knowledge regarding anaemia and its dietary determinants. However, persisting misconceptions and gaps in dietary awareness highlight the need for sustained nutrition education and behaviour change communication activities through Anganwadi Centres and adolescent health programmes.[18]

CONCLUSION

The present study revealed that adolescent girls attending Anganwadi Centres in the urban slum areas of Sagar City had a satisfactory level of knowledge regarding anaemia and its related dietary factors. Knowledge of the symptoms, treatment, prevention, and effects of anaemia was generally adequate among most participants. Educational status was significantly associated with awareness regarding the effects of anaemia, indicating the importance of formal education in improving health literacy. However, certain misconceptions and gaps in dietary knowledge persisted. Strengthening nutrition education and awareness programmes through Anganwadi Centres may help improve preventive practices and reduce the burden of anaemia among adolescent girls.

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