International Journal of Community Medicine and Public Health
Sur SS et al. Int J Community Med Public Health. 2026 Jan;13(1):288-295
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20254439

Original Research Article

Study to assess the knowledge, attitude and practice regarding prevention of anemia among adolescent girls in a view to develop an information booklet

Sangeet Sarita Sur*, Jasline M.

Teerthanker Mahaveer College of Nursing, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

Received: 25 October 2025
Revised: 01 December 2025
Accepted: 03 December 2025

***Correspondence:**
Sangeet Sarita Sur,
E-mail: sangeet.scholar@tmu.ac.in

ABSTRACT

Background: Anemia especially more common in the developing countries for having numerous socio-cultural problems, lack of knowledge, poor attitude and practice to prevent from the beginning. National Family Health Survey, 2019-21 reported that 59.1% of adolescent girls (15-19 years old) are anemic and this count is higher in rural areas (~58.5%) compared to urban areas (~53.8%). To check the early onset of anemia in women, it needs to be addressed properly during adolescent being regarded as the transitional stage of transformation.
Methods: This study was conducted with 170 adolescent girls among the age group of 14 to 19 comprising of five classes from IX to under graduate 1st year. The inferential statistics, χ^2 at α=0.05 and $p<0.05$ was tested with demographic variables for knowledge assessment. Attitude was rated with Bloom's cut off scale along with practice assessment. A spearman correlation was given for overall assessment of the knowledge, attitude and practice.
Results: The inferential statistics, χ^2 at α=0.05 and $p<0.05$ shows the significant association of knowledge with the demographic variables like age, class and family size. Spearman correlation (ρ) justifies the moderate correlation between knowledge, attitude and practice score of the sample. Surface plot justifies the improvement of attitude and practice due to knowledge at par class and age.
Conclusions: Mean knowledge score at poor level might be a factor for developing average attitude which in turn directly influenced the practice not to a good level for adolescent girls needs to be addressed further through developing the self-structured teaching programme and information booklet.

Keywords: Adolescent, Anemia, IDA, IFA

INTRODUCTION

Anemia is a world-wide health concern among public, especially prone to the adolescent girls, women in the age group of 15 to 49 years, pregnant women and the family bearing children in low- and middle-income countries.[1] It has come from the Greek word 'anemia' meaning lack of blood. It is considered as the most common blood disorder and the major cause of affecting one-third of the global population.[2-4] Anemia being explained as the declining counts or size of red blood cells and constituent hemoglobin concentration in the human body. As a consequence, this results in the reduced capacity of transporting oxygen to different parts of the human body.[5] As per the computation of WHO during 2019, 30% (~571 million) of women aged 15 to 49 years, 37% (~32 million) of pregnant women, and 40% (~269 million) of children 6 to 59 months of age were affected by anemia, with a severity onset in African region and south-east Asia region. It is especially more common in the developing countries for having numerous socio-cultural problems like shortage of essential nutrients, vitamins, iron folate, poverty, poor dietary habits, lack of knowledge, parasitic infestation, human

immunodeficiency virus, tuberculosis, acute or chronic blood loss, malaria, high parity, short inter-pregnancy interval, practices and cultural beliefs regarding nutrition and late registration of pregnant women at antenatal care (ANC) units.[6] It is also regarded as a public health concern among adolescent girl from the age 10-19 years of age. The National Family Health Survey (NFHS-5; 2019-21) data indicates a high prevalence of anemia among adolescent girls in India. Specifically, NFHS-5 reported that 59.1% of adolescent girls (15-19 years old) are anemic and this count is higher in rural areas (~58.5%) compared to urban areas (~53.8%) (http://www.pib.gov.in).

Among all types of anemia, iron deficiency anemia (IDA) is the most common and it takes up about 50% of anemia cases. It occurs due to inadequate intake of iron rich food, poor absorption of iron due to faulty techniques of dietary habits or intestinal issues and periodic blood loss. The risk of anemia increases during adolescent years with onset of menstruation and pregnancy. Loosing of Iron during the menstruation must be countered by further high iron intake for adolescent girls.[7] In adolescents, anemia has been linked to affecting physical disorders, growth and mental retardation, and also increases reproductive morbidities among adolescent girls while in-verge of womanhood.[8] IDA may reduce infection resistance, impaired physical growth and mental development and reduced physical fitness, work capacity, and school performance.[9] IDA finds its place as an indicator of both poor nutrition as well as poor health. It symbolizes to be problematic on its own, but serves as a threat on global public health such as stunting and wasting, overweight in childhood leads to obesity due to lack of energy to physical exercise. Poor record of school performance among children and compromised work efficiency in adults owing to anemia have their consequences in social and economic impacts for the concerned human being and family.[10] Onset of anemia in adolescent if not addressed properly it leads to a prevailing condition for women of reproductive age regarded as the threat to the society.

Ahmed et al conducted the study on anemia and its associated factor among adolescents in the eastern region of Ethiopia and found 31.5% anemia prevalence among adolescent girls due to the lack of health and nutrition education, irregular dietary habits and non-adherence to adolescent anemia prophylaxis programme.[11] Stunting of anemia and its inherent existence is prevalent in most of the low- and middle-income countries due to the crucial factors like poverty, limited education, inadequate literacy, nutrition and infectious disease control.[12] Tran et al conducted one study on the cause and consequence of anemia by selecting the population from among 6-59 months age children by introducing multinomial logistic modelling analysis.[13] The study also emphasized on the remedial measures to be undertaken for the target age group to prevent early onset of anemia during adolescent. Wati et al through quantitative approach pointed out regarding the incidence of anemia in adolescent girls due to diet behaviour and consumption of iron inhibitors.[14] The study also identified the adolescent anemia onset as 20% which requires to be addressed. Verma et al conducted the study among the school going adolescent girls in a remote area of western Rajasthan of India and found 56.32% of the school going adolescent were prone to anemic and the situation is subjected to alarming one if not addressed correctly for preserving reproductive potential later on.[15]

Government of India (GoI) under the aegis of National Health Mission as introduced one programme “POSHAN ABHIYAN” during March 2018 where “Anemia Mukt Bharat” (AMB) being regarded as the flagship programme introduced under the umbrella of this “Poshan Abhiyan” programme focusing on “6×6×6 strategies” encapsulated to six beneficiary age groups, six core interventions and six institutional mechanism.[16] Presently to strengthen the malnutrition across the developing country, GoI has made the “Misson Poshan 2.0” in force.

The condition is more challenging in case of the state Odisha.[6,17,18] It is situated in the parallels of ~17.49/N and ~22.34/N latitude ~81.27/E and 87.29/E longitude in the eastern coast line of Bay-of-Bengal having 4.1974 crore inhabitants as per 2011 census and the value was elevated up to ~4.60 crore as on 2018 (NHM-HMIS; www.hmis.mohfw.gov.in) with a ~30% tribal population (www.tribal.gov.in). It is a matter of concern in addressing the state fact sheet (SFS) of Odisha through NFHS-5 and the present report of AMB programme, the major prevalence of anemia in case of pregnant women between the age of 15-49 is 59.5% in urban and 62.2% in rural area.[19,20] It is also high time to address the situation in light of the district Mayurbhanj covering ~10418 sq. km area being situated ~21.16/N and ~22.34/N latitude and ~85.40/E and ~87.12/E longitudes with major population engulfing tribal and rural based. The major central portion of this district is covered with the Similipal Biosphere Reserve, a dense habitat attributes of flora and fauna covering 2750 sq. km area including core tiger reserve and buffer area (http://www.ntca.gov.in). The selection of our study setting in the district head quarter-based institutions would be more noticeable to address our aim of the study due to the geographical importance.

In this context we have focused this study by selecting three academic institutions of Baripada by taking 170 samples with the objective to evaluate the knowledge level of adolescent girls as this age is regarded as one of the bridges between children and women of reproductive age group keeping in view of the modalities of AMB programme (www.anemiamuktbharat.info). Knowledge as one of the primary factors regarded as the catalyst to enhance attitude and practice level changes to refrain from anemia.[21] More nutrition related knowledge, attitude and practice would be accountable for maintaining healthy life style.[22]

Adoption of early intervention in terms of awareness with respect to life style modification among adolescent girls can be one of the measures to prevent onset of anemia in subsequent stages through acquiring knowledge and modifying attitude and practices.

Objectives

To assess the level of knowledge, attitude and practice regarding anemia among adolescent girls. To find out the association between knowledge score with selected demographic variables. To find out the correlation between knowledge, attitude and practice score.

Hypothesis

The following hypotheses are tested at 0.5 level of significance:

H_1: There is significant association between knowledge score with their selected demographic variables.

H_2: There is a significant correlation between knowledge, attitude and practice.

Assumption

Adolescent girls may have some knowledge regarding anemia.

The adolescent girls will share their response honestly as per the tool.

Adolescent girls need some interventional programme for prevention of anemia.

Delimitations

The setting boundary is limited to:

Adolescent girls between the age group of 14-19 years from class IX, X, XI, XII and Under graduate 1st year (UG). Adolescent girls of some selected schools and colleges. The adolescent girls who were available during the period of data collection. The adolescent girls who were willing to participate in the study.

METHODS

The quantitative research approach with cross sectional descriptive study design is used for the present study

Variables of the study

In this study, the dependent variables are knowledge, attitude and practice of adolescent girls on anemia are regarded as dependent variable. Age, educational status, occupation of parents, family income, dietary habits, religion etc. are taken as demographic variables.

Setting of the study

This study was conducted in some selected schools and college of the district headquarter, Baripada of Mayurbhanj District during December 2024 to March 2025. i) Government Lady Hamilton School, Baripada, Mayurbhanj; ii) Prince Higher Secondary School, Baripada, Mayurbhanj; iii) Sri Sai Sidhhi +3 Science Degree College, Takhatpur, Baripada, Mayurbhanj.

Population

The population referred to the entire aggregates of person/subject in which the researcher is interested. In the present study population comprises of adolescent girls from selected school and college.

Sample

A sample is the subset of population selected to participate in the research study. The sample of this study comprises adolescent girls (14-19 years.) in the selected school and college of Mayurbhanj district, Odisha.

Sampling technique

Sampling technique is the process of population for the purpose of determining the characteristics of the whole population.

Non probability convenient sampling is adopted for the present study to assess the knowledge, attitude and practice of the adolescent girls.

Inclusion criteria

Adolescent girls 14-19 years of age with menarche. Adolescent girls willing to participate in the study. Available during the period of data collecting. Able to communicate Odia/Hindi/English.

Exclusion criteria

Not willing to participate. Not available during the period of data collection. Any other disease that interferes with metabolism of iron.

Method of data collection

Development and description of tool

Tool was formulated and selected on the basis of objectives of the study after extensive review of research with literature, discussion with subject experts, survey tools used in similar studies, formal and informal discussion with peer group.

It was divided into four sections comprising of ten numbers of socio-demographic based questionnaire

(section-1), fifteen knowledge-based questionnaires (section-2), five attitude based questionnaire in a 5-point likert scale (section-3) and six practice based dichotomous close ended questionnaire (section-4).

Procedure for data collection and analysis

Before the actual collection of data, the investigator met the authority of selected school and college for obtaining permission to conduct the study. After obtaining prior approval from the authority concerned, the selected samples were explained about the purpose and usefulness of the study along with assurance about the confidentiality of responses. All the responses of respective samples were recorded in a master datasheet and the statistical analysis was carried out by using Origin Pro 2022.

RESULTS

It is evident from the table (Table 1) that the mean knowledge score is at the level of poor as per Bloom's cut off method regarding anemia out of total score being taken as 15.[23-25] The data were analyzed for inferential statistics by calculating χ^2 at α=0.05 and $p<0.05$ level. All the calculated values are presented in Table 1. The knowledge score at par their demographic variables are significantly associated with class, age and family size at p=0.008, p=0.032 and p=0.005 respectively.

Table 1: Frequency and percentage distribution of the sample according to their demographic variables and inferential statistics with knowledge score.

Variables	Group	Frequency (N)	%	Mean Knowledge ($\bar{X}$)	SD (σ)	χ^2 at α=0.05	p	Inference S/NS
Class	IX	33	19.41	6.66	2.36	20.866 df=08	0.008	S
	X	24	14.12	6.50	3.25			
	XI	43	25.29	7.67	2.12			
	XII	52	30.59	7.14	2.21			
	UG 1st	18	10.59	8.72	2.81			
Age (years)	14-15	28	16.47	7.11	2.30	16.833 df=08	0.032	S
	15-16	22	12.95	6.14	3.12			
	16-17	51	30.00	7.41	2.26			
	17-18	49	28.82	7.20	2.42			
	18-19	20	11.76	8.45	2.87			
Occupation of parent	Farmer	50	29.41	6.60	2.56	7.435 df=06	0.283	NS
	Daily wager	20	11.77	7.65	3.05			
	Business	50	29.41	7.38	2.39			
	Employed	50	29.41	7.64	2.42			
Type of family	Nuclear	101	59.41	7.50	2.56	4.399 df=02	0.111	NS
	Joint	69	40.59	6.91	2.52			
Family income	<10000	29	17.06	8.45	2.25	6.502 df=06	0.369	NS
	10001-20000	47	27.65	7.00	2.60			
	20001-30000	33	19.41	7.18	2.52			
	>30000	61	35.88	6.93	2.56			
Religion	Hindu	164	96.47	7.27	2.54	9.030 df=06	0.172	NS
	Muslim	1	0.59	8.00	0			
	Christian	3	01.77	6.00	2.0			
	Others	2	01.17	8.00	5.66			
Dietary Habit	Vegetarian	22	12.94	7.45	2.30	1.784 df=02	0.410	NS
	Non-vegetarian	148	87.06	7.23	2.59			
Family Size	≤3	16	09.42	7.81	3.08	15.071 df=04	0.005	S
	4-5	88	51.76	7.34	2.56			
	≥6	66	38.82	7.02	2.41			
Literacy status either of the parents	No formal education	6	03.53	5.17	2.04	13.182 df=08	0.106	NS
	Primary	15	08.82	6.53	2.53			
	Secondary	39	22.94	6.85	2.50			
	Higher secondary	46	27.06	7.11	2.39			
	Graduate and above	64	37.65	7.98	2.58			

S: Significant; NS: Not-significant, n=170.

Table 2: Attitude based questionnaire and their overall scores in a five-point Likert scale.

Statement	Overall score Σ (*X*)
Anemia is a health problem	760
Iron rich food should be a part of daily diet	672
Feeling good to eat iron rich food	644
Deworming helps in prevention of anemi	572
IFA tablet prevents anemia	638

Attitude towards anemia prevention were tested with five-point Likert scale (for strongly agree: 5, agree: 4, uncertain: 3, disagree: 2 and strongly disagree: 1). The questionnaire pertaining to the attitude towards anemia are presented in the table (Table 2). The overall scoring total for the attitude with respect to likeliness towards iron rich food, usefulness of deworming and IFA tablets consumptions are significantly lower. The demographic based scoring for attitude was also being calculated and categorized as per Bloom's cut off scale. All the data are ascribed in the table (Table 3).

Table 3: Frequency and percentage distribution of the sample according to their demographic variables along with attitude score as per Bloom's cut off scale n=170.

Variables	Group	Frequency	%	Attitude score		
				Poor	Average	Good
Class	IX	33	19.41	3	14	16
	X	24	14.12	2	11	11
	XI	43	25.29	2	13	28
	XII	52	30.59	2	27	23
	UG 1ST	18	10.59	1	5	12
Age (years)	14-15	28	16.47	2	12	14
	15-16	22	12.95	2	10	10
	16-17	51	30.00	3	15	33
	17-18	49	28.82	2	27	20
	18-19	20	11.76	1	6	13
Occupation of parent	Farmer	50	29.41	3	21	26
	Daily wager	20	11.77	1	8	11
	Business	50	29.41	4	22	24
	Employed	50	29.41	2	19	29
Type of family	Nuclear	101	59.41	5	38	58
	Joint	69	40.59	5	32	32
Family income	<10000	29	17.06	5	12	12
	10001-20000	47	27.65	2	16	29
	20001-30000	33	19.41	0	11	22
	>30000	61	35.88	3	31	27
Religion	Hindu	164	96.47	8	69	87
	Muslim	1	0.59	1	0	0
	Christian	3	01.77	1	1	1
	Others	2	01.17	0	0	2
Dietary habit	Vegetarian	22	12.94	0	10	12
	Non-vegetarian	148	87.06	10	60	78
Family Size	≤3	16	09.42	0	7	9
	4-5	88	51.76	3	37	48
	≥6	66	38.82	7	26	33
Literacy status either of the parents	No formal education	6	03.53	0	2	4
	Primary	15	08.82	2	5	8
	Secondary	39	22.94	4	16	19
	Higher Secondary	46	27.06	2	21	23
	Graduate and above	64	37.65	2	26	36

Table 4: Practice based dichotomous questionnaire and their overall responses.

Practice based questionnaire	Response (Yes)	Response (No)
Washing hand before food	169	01
Washing fruits and vegetables before eating	164	06
Getting deworming twice in a year	102	68
Consuming Vitamin-C rich food	136	34
Avoiding tea or coffee during meal	104	66
Taking iron rich diet like meat, green leafy vegetables, finger millets etc.	148	22

Table 5: Descriptive statistics for knowledge, attitude and practice.

Particulars	Mean score	SD (σ)	Dispersion		
			Minimum	Median	Maximum
Knowledge (fifteen closed-ended)	7.26	2.55	0	7	12
Attitude (5-point Likert scale)	19.33	2.8	10	20	25
Practice (six dichotomous based)	4.84	0.94	3	5	6

Table 6: Spearman correlation analysis.

		Knowledge	Attitude	Practice
Knowledge	Spearman correlation (ρ)	1	0.31278	0.24311
	P value	--	0.00003	0.0014
Attitude	Spearman correlation (ρ)		1	0.29036
	P value		--	0.0001
Practice	Spearman correlation (ρ)			1
	P value			--

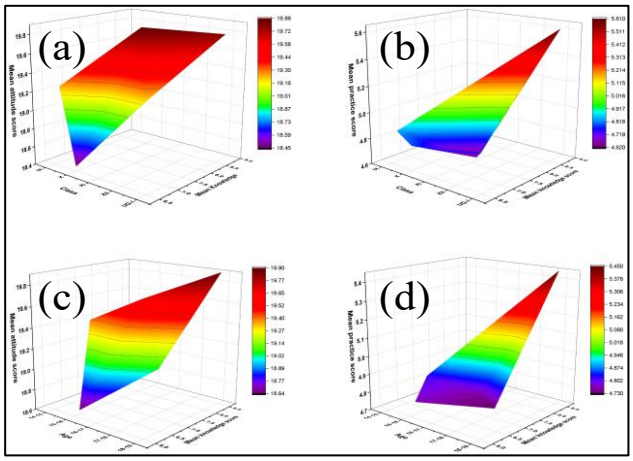

Figure 1 (A-D): 3D-surface plots to find out the association between attitude and practice with that of knowledge at par class and age.

It is evident from the table (Table 4), a significant portion of the sample has given negative responses towards deworming twice a year, consumption of vitamin-C food and avoiding tea and coffee during meal. Their practice level in this regard should be addressed by means of information with relation to the direct impact on anemia prevention. To have an overall idea of the sample on knowledge, attitude and practice we have presented the descriptive statistics in the table (Table 5). To find out the association between knowledge, attitude and practice Spearman correlation (ρ) was carried out and the respective data are presented in the table (Table 6).

DISCUSSION

It is pertinent to mention that the significant upward rise in mean knowledge score is realized while moving from high school (IX, X) to higher secondary (XI, XII) followed by UG 1st year student. It can be accredited as higher classes having significant understanding of knowledge for anemia prevention due to increase exposure to health-based education and co-curricular awareness for increasing level of academic classes. Low mean score values in knowledge level indicate the requirement for further educating the adolescents regarding anemia. The same type association is realized during the inferential case of age with knowledge score. The increasing in mean knowledge score for the late adolescent due their exposure to education, increasing maturity level requires to be explored in a precise manner to have overall increase in knowledge score to a good level.[26,27] There was a significant association of knowledge score with that of family size. The mean knowledge score (7.81±3.08) for the adolescent belongs to the family (≤3) in comparison to the family (≥6) with the score (7.02±2.41) may be due to the impact of more individual attention in case of smaller family size towards

the wards which leads to the development of overall awareness regarding health education.

It was revealed that majority attitude were still remaining at the average level which needs to be upgraded in terms of awareness to prevent onset of anemia in this stage. If it will not be addressed properly, it may put direct negative impact during their women hood. A major percentage of the girls irrespective of their demographic association were lagging behind the good attitude score with special reference to the likeliness towards iron rich food, deworming and IFA supplementation. It indicates most of the adolescents are not aware about the synergistic effect of both the factor responsible for the iron deficiency.

Parasites being attached with the intestinal wall if clinically not being corrected through deworming leads to chronic blood loss along with their direct impact on impair nutrient absorption reducing iron and folate uptake from food.[28-32] Similarly IFA tablets especially for adolescent girls are utmost essential to maintain balance during their rapid growth, menstruation and increase in iron demand.[33-36] Their attitude should be addressed through awareness implementation which is also one of our objective of the study.

To have a clear understanding and the relevance of our study we have conducted the parallel study of attitude and practice with knowledge by taking class and age as their variables and presented through surface plots (Figure 1). It is evident that increase in knowledge would be a factor in developing the good attitude and better practice. If the knowledge level in the adolescent will be properly addressed through proper teaching methods or information booklet, it must be a driving force in managing anemia during their women hood. To get further insight in to it, the spearman correlation (ρ) has been given for knowledge, attitude and practice at par class and found to be moderately correlated. The detail regarding the correlation analysis is presented in the table. (Table 6).

CONCLUSION

Adolescent girls with class, age and size of the family as their demographic variables have significant association in their knowledge level. Mean knowledge score at poor level might be a factor for developing average attitude which in turn directly influenced the practice not to a good level. Different structured teaching module and information booklet may be developed to acquaint the adolescent girls for taking self-care to prevent anemia onset in future.

ACKNOWLEDGEMENTS

Authors would like to thanks the Head Master-Government Lady Hamilton School, Principal and Director- Prince Higher Secondary School and Sri Sai Sidhhi +3 science degree college for their co-operation and providing facility to conduct the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sur SS, Jasline M. Study to assess the knowledge, attitude and practice regarding prevention of anemia among adolescent girls in a view to develop an information booklet. Int J Community Med Public Health 2026;13:288-95.