Original Article

Prevalence, knowledge, and related factor of anemia among school-going adolescent girls in a remote area of western Rajasthan

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Abstract

Introduction: Anemia is a significant health problem among adolescent girls. This study aimed to determine the prevalence, related factors, and knowledge about anemia among adolescent girls in a remote area of western Rajasthan. **Methods:** In a rural area of western Rajasthan, a cross-sectional study of 625 adolescent girls aged 11 to 19 years was carried out. Participants completed a questionnaire that included sociodemographic, clinical, and knowledge questions about anemia and its related factors. An HemoCue was used for hemoglobin analysis and anemia diagnosis. **Results:** Anemia was found in 56.32% (n = 352) of the recruited population, with a mean of 9.92 (SD = 1.40). Mild, moderate, and severe anemia were found in 29.12%, 22.24%, and 4.96% of the participants, respectively. Girls aged 11 to 14 (AOR = 3.63, 95% CI: 1.76–6.38, P value = 0.042) and those with lower socioeconomic status (AOR = 4.37, 95% CI: 1.39–8.25, P value = 0.022) were more likely to have anemia than those of older age and higher socioeconomic status. Anemia was less prevalent in only one child/no siblings (AOR = 0.36, 95% CI: 0.16–0.73, P value = 0.041), and more prevalent in girls having less than 21 days of menstruation cycle (AOR = 5.37, 95% CI: 2.38–9.63, P value = 0.013), and 21 to 25 days of menstruation cycle (AOR = 3.81, 95% CI: 1.27–5.94, P value = 0.027). A total of 39.84% stated that anemia was caused by iron deficiency, followed by improper diet (32.64%). Furthermore, 56.32% agreed that the most common symptoms of anemia were weakness, and 51.36% of girls were told that anemia was treated with iron supplementation and a balanced diet (39.68%). Green leafy vegetables were considered a good source of iron by 56.48%, and 53.28% were educated about anemia by a teacher, followed by books (45.44%) and media (43.36%). **Conclusion:** The study shows high prevalence of anemia among adolescent females in the remote area of western Rajasthan. To improve girls health, it is necessary to increase their knowledge, attitudes, and practices in this area. Educational intervention and routine health check-up would be excellent ways to accomplish this.

Keywords: Anemia, knowledge, prevalence, Rajasthan, remote area, schoolgirls

Introduction

Anemia is an important public health problem, and it can affect people of all ages and from any region.[1] The most prevalent type of anemia is nutritional anemia, caused by a lack of iron, folate, or vitamin B12.[2] Iron deficiency anemia (IDA) is a quite simple disease to identify, but because of its generic clinical indications, it can lie untreated for a long period.[3]

According to the World Health Organization (WHO), adolescent age is defined as a period between the ages of 10 and 19.[4] As the youth age is in a formative developmental year, anemia has long-term implications at this stage in life, including developmental problems, cognitive functioning, decreased immunity, irregular menstrual cycles, and subsequent poor

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pregnancy effects.[5,6] Furthermore, a higher prevalence of anemia has been linked to a number of medical conditions such as essential hypertension, hypothyroidism, congestive heart failure, coronary artery disease, and rheumatoid arthritis.[7] Mild-to-severe anemia typically manifests during adolescence, and if treated early, most anemia-related consequences can be avoided.[8]

According to the WHO, anemia affects 24.8% of the world's population and affects 27% of adolescent females in impoverished countries and 6% of adolescent females in affluent nations.[9] According to National Family Health Survey (NFHS-4), 53% of Indian women aged 15 to 49 are anemic.[10] The prevalence of anemia varies significantly across India, with a particularly high prevalence in rural Rajasthan.[11] As a result, it is critical to comprehend the factors linked to anemia in rural regions. Adolescent girls who are aware of anemia and its symptoms will be better prepared to take care of their own health as they grow older. Also, understanding these factors enables the development of a multimodal strategy for the prevention and management of anemia in adolescent girls. Keeping these aspects in mind, the purpose of this study was to determine the prevalence, knowledge, and associated factors of anemia among school-going adolescent girls in a remote area of western Rajasthan.

Material and Methods

Sample and setting

A cross-sectional study was conducted among school-going adolescent girls (11–19 years) in the rural field practice area of Government Medical College, Barmer, Rajasthan, in February 2020. The district Barmer lies between 24,58' to 26, 32'N Latitudes and 70, 05' to 72, 52' E Longitudes in the western part of the Rajasthan, India. The district covers an area of approximately 28,387 square kilometers. Population of Barmer district is 2,923,593. The sex ratio in the Barmer district is 902 females to 1,000 males.[12]

The prevalence of anemia in school-going girls is between 40% and 50%. Using this prevalence, with 95% confidence interval and 10% relative error the minimum sample size was 315.

The study participants were chosen randomly from secondary schools. This study only included schools for girls, while schools for both boys and girls were excluded. All the girls aged 11 to 19 who gave their consent for hemoglobin estimation were included. Personal interviews were conducted to elicit data using a pretested questionnaire, and hemoglobin estimation was performed using HemoCue (Hb 201). The sensitivity of HemoCue is 75%–91%, and the specificity is 88%–100%. The anemia status of the study participants was scored using WHO cut-off points for anemia diagnosis. Hemoglobin level was used to determine the prevalence of anemia.

A semistructured questionnaire was used to collect information about their sociodemographic characteristics, menstrual cycle, eating habits, awareness of anemia, causes, symptoms, and therapy. Weight was determined using a portable manual weighing machine to the nearest 100 g. A measuring tape was mounted to the wall to determine height in centimeters. HemoCue (Hb 201) was used to determine the level of hemoglobin. Mild (11–11.9 g/dL), moderate (8–10.9 g/dL), and severe (8 g/dL) hemoglobin reference ranges were utilized for anemia categorization.

Procedure

An invitation was sent to the various educational institutions, requesting them to participate in the research. Schools that demonstrated an interest and provided written consent were considered for the study. A female investigator clarified the study's specifics and purpose in classroom to all female students. The importance of the current research, as well as the details of the blood collection were described to them. Girls who decided to participate were required to fill out informed consent forms and questionnaires, which included standardized demographic and clinical characteristics. The researcher assisted in data collection and answered queries pertaining to the questionnaires during the process.

Statistical analysis

Where appropriate, questionnaire data were precoded to facilitate collection and to ensure accuracy. Data were entered into Microsoft Excel 365 and then exported to SPSS V.20 for Windows, a statistical software package for social science. The dependent variable in this study is anemia as per the definition described above. Independent variables included age, socioeconomic status, type of family, religion, type of diet, no of siblings, education level of parents, and menstrual cycle in days.

Continuous data were described using descriptive statistics like mean and standard deviation (SD), whereas categorical variables were described using numbers and percentages. An independent sample *t*-test or Chi-square test was used for each outcome variable to distinguish between girls with and without anemia. Both statistical tests were two-tailed, with 5% degree of statistical significance. The association of independent variables with anemia (the outcome) and the strength of the association was then investigated in multivariable analysis. In the bivariate analysis, only independent variables with a statistically significant effect on anemia and/or mean hemoglobin level were kept for the multivariable analysis. *P* values and Odds ratios with 95% confidence intervals (95% CI) were presented. Significance was defined as a *P* value of less than 0.05.

Ethical approval

The institutional ethics committee endorsed the research. This research was carried out in conjunction with the Helsinki Declaration. The ethical issues of the research were all addressed. Before beginning the interview, the participants were given and signed an informed consent form; they were willing participants in the study. They were also assured that all information gathered would be kept private.

Results

Five schools were approached, and three of them agreed to participate in the study, with an 80% turnout. A total of 667 girls from the three schools agreed to have their hemoglobin levels measured and were thus included in the study, with 42 being excluded (15 taking treatment for medical disorder, 27 produced incomplete item responses). As a result, the final sample size was 625 girls. The age range of the participants was 11 to 19 years old (mean = 15.54, SD = 2.72). The average body mass index (BMI) of the participants was 18.55 (SD = 1.71). Two hundred and eighty-nine participants (46.24%) were from a middle socioeconomic class; 418 girls (66.88%) lived in joint families, and 444 girls (71.04%) were Hindus. A total of 455 people (72.80%) of the participants were vegetarian. Two hundred and fourteen (34.24%) of the girls had one sibling, whereas 173 (27.68%) had two. Two hundred and ninety-nine girls (47.84%) had only their father educated, whereas 224 girls (35.84%) had both parents educated. At the time of the study, 547 girls (87.52%) had reached menarche. Their menarche ages ranged from 10 to 15 years old (mean = 12.74, SD = 1.55). The average duration of menstruation days for all girls was 4.35 days (SD = 1.13). Two hundred and forty-three (44.42%) of the teenagers had a menstrual cycle spanning from 26 to 30 days. Participants with anemia were significantly younger (15.14 vs. 15.93), had a lower BMI (18.4 vs. 18.7), were younger at menarche (12.63 vs. 12.85), and had more menstruation period days (4.57 vs. 4.13) than those without anemia (*P*-value < 0.05). Furthermore, there was a statistically significant difference between the anemic and nonanemic groups in terms of socioeconomic status, family type, number of siblings, and parental education status (*P*-value < 0.05) [Table 1].

Based on WHO criteria, anemia was found in 56.32% (*n* = 352) of the recruited population, with a mean of 9.92 (SD = 1.40). In terms of severity, mild, moderate, and severe anemia were observed in 29.12%, 22.24%, and 4.96% of the individuals, respectively [Figure 1].

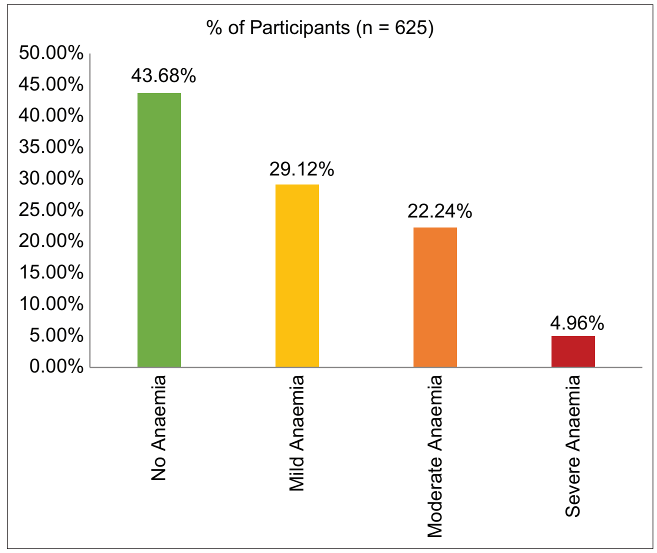

Figure 1: Graph depicting the severity of anemia among study participants

The data in the Table 2 indicate the Hb percentiles in increasing order for teenage girls between the ages of 11 and 12, 13 and 14, 15 and 16, and 17 and 19 years. The mean and median (50%) values rose with age, with the exception of the 25th percentile cutovers, which drop-in age groups from 15 to 16 years. Even though the relationship between age and Hb concentration was significant (correlation coefficient was 0.231, with *P* value of 0.012), the link only emerged in the 11–12 age group (correlation coefficient of 0.39, with *P* value of 0.046) and the 17–19 age group (correlation coefficient of 0.541, with *P* value of 0.031). [Table 2].

Two hundred and forty-nine girls (39.84%) stated that anemia was caused by iron deficiency, followed by improper diet (32.64%), vitamin deficiency (19.04%), and 24.48% stated that they had no idea what caused anemia. Three hundred and fifty-two girls (56.32%) agreed that weakness was the most common cause of anemia, followed by vertigo (23.04%) and fatigue (23.04%). Similarly, when it came to knowledge about anemia treatment, 51.36% of girls were told about iron supplementation, followed by a balanced diet (39.68%), whereas 35.20% girls had no knowledge about anemia treatment. Three hundred and fifty-three girls (56.48%) considered green leafy vegetables to be a good source of iron while 35.04% considered pomegranate. Three hundred and thirty-three girls (53.28%) were educated about anemia by a teacher, followed by books (45.44%) and media (43.36%) [Table 3].

Anemia-related factors were determined using binary logistic regression data analysis. In the bivariate analysis, independent variables with *P* values of 0.025 for anemia were used in multivariate logistic regression. We utilized a *P* value of 0.05 to identify factors linked with the dependent variable in the multivariate analysis. The final model revealed that girls aged 11 to 14 (AOR = 3.63, 95% CI: 1.76–6.38, *P* value = 0.042) and those with lower socioeconomic status (AOR = 4.37, 95% CI: 1.39–8.25, *P* value = 0.022) were more likely to have anemia than those of older age and higher socioeconomic status. Anemia was also substantially less prevalent with a single child or no siblings (AOR = 0.36, 95% CI: 0.16–0.73, *P* value = 0.041), and more prevalent in girls having less than 21 days of menstruation period (AOR = 5.37, 95% CI: 2.38–9.63, *P* value = 0.013), and 21 to 25 days of menstruation period (AOR = 3.81, 95% CI: 1.27–5.94, *P* value = 0.027) [Table 4].

Discussion

As only a healthy girl will be able to give birth to a healthy child, and the future of any country will be determined by the health of this half of the country's populace. The purpose of this study was to determine the prevalence and predictors of anemia in adolescent girls, as well as to assess adolescent girls' knowledge about anemia.

Table 1: Participants' sociodemographic and clinical characteristics

Variable	With anemia (<12 g/dL) (*n*=352) (%)	Without anemia (≥12 g/dL) (*n*=273) (%)	Total sample (*n*=625) (%)	Chi-square/ *t*-test *P*
Age (years) Mean (SD)	15.14 (2.54)	15.93 (2.91)	15.54 (2.72)	3.618, 0.00*
Age group				
10-14 years	93 (26.42)	65 (23.81)	158 (25.28)	7.491, 0.023*
15-17 years	145 (41.19)	91 (33.33)	236 (37.76)	
18-19 years	114 (32.39)	117 (42.86)	231 (36.96)	
Height (cm) Mean (SD)	152.24 (5.41)	155.44 (5.37)	153.84 (5.39)	7.358, 0.00*
Weight (kg) Mean (SD)	42.54 (6.84)	45.24 (6.35)	43.89 (6.60)	5.049, 0.00*
BMI Mean (SD)	18.4 (1.73)	18.7 (1.68)	18.55 (1.71)	2.177, 0.029*
Socioeconomic status				
Lower	143 (40.63)	87 (31.87)	230 (36.80)	8.496, 0.014*
Middle	161 (45.74)	128 (46.89)	289 (46.24)	
Higher	48 (13.96)	58 (21.25)	106 (16.96)	
Type of family				
Nuclear	105 (29.83)	102 (37.36)	207 (33.12)	3.939, 0.047*
Joint	247 (70.17)	171 (62.64)	418 (66.88)	
Religion				
Hindu	255 (72.44)	189 (69.23)	444 (71.04)	0.78, 0.677
Muslim	78 (22.16)	68 (24.91)	146 (23.36)	
Others	19 (5.40)	16 (5.86)	35 (5.60)	
Dietary habit				
Vegetarian	263 (74.72)	192 (70.33)	455 (72.80)	1.494, 0.221
Nonvegetarian	89 (25.28)	81 (29.67)	170 (27.20)	
No. of siblings				
Single child/No siblings	28 (7.95)	36 (13.19)	64 (10.24)	11.403, 0.022*
One Sibling	110 (31.25)	104 (38.10)	214 (34.24)	
Two siblings	105 (29.83)	68 (24.91)	173 (27.68)	
Three siblings	69 (19.60)	36 (13.19)	105 (16.80)	
Four or more siblings	40 (11.36)	29 (10.62)	69 (11.04)	
Education of parents				
None	46 (13.07)	27 (9.89)	73 (11.68)	8.425, 0.037*
Only father	176 (50.00)	123 (45.05)	299 (47.84)	
Only mother	10 (2.84)	19 (6.96)	29 (4.64)	
Both	120 (34.09)	104 (38.10)	224 (35.84)	
Attain menarche				
Yes	315 (89.49)	232 (84.98)	547 (87.52)	2.859, 0.091
No	37 (10.51)	41 (15.02)	78 (12.48)	
Menarche age (in years) Mean (SD)	12.63 (1.37)	12.85 (1.72)	12.74 (1.55)	−0.481, 0.63
Menstruation duration (days) Mean (SD)	4.57 (1.12)	4.13 (1.14)	4.35 (1.13)	−4.507, 0.00*
Menstrual cycle (days)	(*n*=315)	(*n*=232)	(*n*=547)	
<21	15 (4.76)	7 (3.02)	22 (4.02)	13.784, 0.017*
21-25	97 (30.79)	43 (18.53)	140 (25.59)	
26-30	129 (40.95)	114 (49.14)	243 (44.42)	
31-35	46 (14.60)	48 (20.69)	94 (17.18)	
36-40	16 (5.08)	11 (4.74)	27 (4.94)	
>40	12 (3.81)	9 (3.88)	21 (3.84)	

*BMI: Body Mass Index; SD: Standard Deviation

In this study, the total prevalence of anemia among teenage girls was 56.32%, with 51.70% having mild anemia, 39.49% having moderate anemia, and 8.81% having severe anemia. A study by NFHS-4 reported that 53% of adolescents are anemic in Rajasthan.[13] Bodat *et al.*[14] observed that the overall prevalence of anemia among school-going adolescent girls in a rural area of Pune, Maharashtra was 87.60%, with 47.06%, 52.48%, and 0.46% of the girls having mild, moderate, and severe anemia, respectively.

A higher prevalence of anemia was identified in our study because of remote parts of western Rajasthan having an awful environment and poor economic situation, preventing them from accessing sufficient nutrition and healthcare facilities. This is the situation of the girls who were attending school; however, the situation may be worse in the case of girls who dropped out or did not attend school due to poor economic or other family circumstances.

Table 2: Hemoglobin percentiles (g/dL) in adolescent girls by age group

Percentile	11-12	13-14	15-16	17-19
n				
5th	7.62	7.85	7.85	7.90
10th	8.10	8.24	7.95	8.30
25th	8.46	8.46	8.37	8.84
50th (Median)	9.76	10.35	10.35	10.69
75th	10.85	11.24	11.34	11.42
90th	11.53	11.64	11.66	11.72
95th	11.77	11.82	11.86	11.90
Mean (SD)	9.73 (1.33)	9.94 (1.38)	9.91 (1.43)	10.10 (1.46)
(95% C. I.)	9.52-9.86	9.67-10.35	9.78-0.40	9.81-10.57
Correlation coefficient with age	0.39	0.074	0.046	0.541
Significant	0.046*	0.078	0.348	0.031*

Table 3: Knowledge of the study participants regarding anemia

Variable	With anemia (<12 g/dL) (*n*=352) (%)	Without anemia (≥12 g/dL) (*n*=273) (%)	Total sample (*n*=625) (%)	Chi-square, *P*
Cause of Anemia				
Iron deficiency	144 (40.91)	105 (38.46)	249 (39.84)	0.86
Improper diet	113 (32.10)	91 (33.33)	204 (32.64)	0.973
Underlying infection	21 (5.97)	16 (5.86)	37 (5.92)	
Vitamin deficiency	70 (19.89)	49 (17.95)	119 (19.04)	
Excessive blood loss	25 (7.10)	19 (6.96)	44 (7.04)	
Do not know	83 (23.58)	70 (25.64)	153 (24.48)	
Symptoms of anemia				
Pallor	74 (21.02)	56 (20.51)	130 (20.80)	1.625
Weakness	201 (57.10)	151 (55.31)	352 (56.32)	0.950
Fatigue	78 (22.16)	66 (24.18)	144 (23.04)	
Headache	53 (15.06)	44 (16.12)	97 (15.52)	
Dizziness/vertigo	84 (23.86)	60 (21.98)	144 (23.04)	
Others	62 (17.61)	56 (20.51)	118 (18.88)	
Do not know	60 (17.05)	52 (19.05)	112 (17.92)	
Treatment of Anemia				
Balanced diet	142 (40.34)	106 (38.83)	248 (39.68)	0.073
Vitamin supplementation	63 (17.90)	46 (16.85)	109 (17.44)	0.999
IFA supplementation	183 (51.99)	138 (50.55)	321 (51.36)	
Treatment of underlying illness	28 (7.95)	22 (8.06)	50 (8.00)	
Do not know	127 (36.08)	93 (34.07)	220 (35.20)	
Food item rich in iron				
Green leafy vegetable	197 (55.97)	156 (57.14)	353 (56.48)	1.064
Carrot	70 (19.89)	57 (20.88)	127 (20.32)	0.993
Sugar beets	11 (3.13)	7 (2.56)	18 (2.88)	
Pomegranate	123 (34.94)	96 (35.16)	219 (35.04)	
Jaggery	36 (10.23)	29 (10.62)	65 (10.40)	
Nonveg	14 (3.98)	12 (4.40)	26 (4.16)	
Others	56 (15.91)	38 (13.92)	94 (15.04)	
Do not know	70 (19.89)	49 (17.95)	119 (19.04)	
Received education about anemia				
Parents	45 (12.78)	36 (13.19)	81 (12.96)	0.643
Teacher	186 (52.84)	147 (53.85)	333 (53.28)	0.985
Books	162 (46.02)	122 (44.69)	284 (45.44)	
Health worker	119 (33.81)	94 (34.43)	213 (34.08)	
Friends	32 (9.09)	30 (10.99)	62 (9.92)	
Media	150 (42.61)	121 (44.32)	271 (43.36)	

Anemia was found, with the mean Hb level of 9.92 (1.40) g/dL, which is much lower than the cut-off of 12 g/dL used to diagnose it. This number is far lower than what we found through studies conducted with a national sample of girls

Table 4: Factors associated with anemia in participants with varying sociodemographic and clinical characteristics

Variable	AOR	95% CI	*P*
Age group			
11-14 years	3.63	1.76-6.38	0.042*
15-17 years	1.45	0.42-1.82	0.267
18-9 years	1.00	-	-
Socioeconomic status			
Lower	4.37	1.39-8.25	0.022*
Middle	2.14	0.48-3.26	0.084
Higher	1.00	-	0.173
Type of family			
Nuclear	1.00		
Joint	1.63	0.62-2.94	0.252
Religion			
Hindu	1.42	0.63-2.29	0.351
Muslim	0.86	0.48-1.26	0.763
Others	1.00		
Type of Diet			
Vegetarian	1.19	0.76-1.74	0.532
Nonvegetarian	1.00		
No. of siblings			
Single child/No siblings	0.36	0.16-0.73	0.041*
One sibling	0.85	0.57-1.98	0.068
Two siblings	1.32	0.74-2.31	0.125
Three siblings	1.49	0.68-1.97	0.832
Four or more siblings	1.00		
Education of parents			
None	1.00		
Only father	1.64	0.58-2.13	0.112
Only mother	0.78	0.46-1.72	0.436
Both	1.06	0.73-1.85	0.096
Menstrual cycle (days)			
<21	1.00		
21-25	5.37	2.38-9.63	0.013*
26-30	3.81	1.27-5.94	0.027*
31-35	2.16	0.74-3.41	0.143
36-40	1.06	0.87-1.78	0.479
>40	0.73	0.51-1.62	0.721

*AOR: Adjusted Odds Ratio

in school (11.3 g/dL) by Kamble *et al.*,[15] but slightly near in a study by Dhillon *et al.*,[16] (9.99 g/dL) and Ahankari *et al.*,[17] (10.1 g/dL) in rural areas of Maharashtra. However, all of these studies noted substantial regional variation and included data for community-based and urban area-based cross-sectional surveys of adolescent girls, who have better option on health and nutrition care as compared with remote area.

In this study, significant association of anemia was found with younger age. Other research corroborates these findings.[3,18] In this time, the demand of iron rises significantly. As girls achieve puberty before boys, so their growth will continue up to the age of 14, and after that linear growth begins up to the age of 18. In the absence of adequate nutritional intake, rapid growth causes increasing depletion of iron reserves, and affects physical and mental health.[19]

In our study, lower socioeconomic status of girls and the number of siblings were associated with anemia. Low Hb concentrations were related to poor living conditions with a high prevalence of parasitic diseases and undernutrition, which were exacerbated by substandard housing and sanitary services.[20,21] Apart from that, as the number of members increases, the likelihood of receiving nutritious food decreases, and appropriate childcare is also unattainable. Other individual factors associated with anemia were short-cycle length of mensuration period (16 to 20 and 21 to 25 days). More frequency and heavy bleeding were found responsible for low Hb concentrations in girls than those measured less frequently and regularly. When a young girl's period begins, she is terrified, and she is unable to express herself to anyone for fear of embarrassment, which has an impact on her diet and health.[22]

In our study, more than half of participants had insufficient knowledge of cause, symptoms, treatment, and food rich in iron. Similar findings were observed in previous research.[23] However, study conducted in urban areas of school-going adolescent girls found better knowledge of anemia and its related factors.[24] The reason may be for it there is low awareness of the national health program and health and hygienic practice in remote areas of western Rajasthan. Besides this, some studies based on community and on non-school-going adolescents observed poor knowledge of anemia and related factors.[25] The findings of this study underscored the importance of comprehensive anemia education for teenagers, highlighting how limited current educational resources in schools and homes are. Anemia is a straightforward diagnosis that goes missed for a long time due to nonspecific clinical indications and a lack of screening among adolescent girls.

We expect that implementing a nutrition education program effectively increases female adolescents' anemia knowledge, attitude, and practice.[26] It is critical to establish policies and make decisions to care for adolescents by implementing effective educational programs. The results of the study could also help primary care physicians give the right advice and treatment to patients and their families.

Limitations

Sample size was small, so it does not reflect the entire population. Only hemoglobin was calculated. Due to financial constraints, further hematological parameters could not be evaluated. Another drawback is that because this was a cross-sectional study, the cause-and-effect link could not be determined because a long-term investigation would have been required. Despite these limitations, we believe that our study contributed to the generation of ideas for epidemiological investigations on a large scale across this area to overcome these constraints because of the scarcity of literature concerning anemia in the remote area of western Rajasthan.

Conclusion

This study showed a prevalence of anemia of 56.32%. The current study found that the prevalence of anemia among school-going adolescent girls was alarming, raising serious worries about their reproductive potential. The study participants had limited knowledge of anemia, its symptoms, causes, and treatments.

To lessen the burden of anemia among adolescent girls, adequate iron and folic acid supplements, iron-rich food intake, good nutrition education, and frequent deworming are required. It should be emphasized that health check-up camps should be held in schools regularly so that timely diagnosis and treatment can be provided for any medical illness. In addition, attention should be paid to the necessity for a female counselor in a girl's school, who should counsel students regularly about their personal issues so that they do not experience unnecessary stress. Anemia should be routinely checked by the attending primary care physician in any facility for any adolescent girls presenting with any disease, and if anemia is clinically present, a complete hemogram should be evaluated. Our findings regarding the high prevalence of anemia, knowledge, and associated factors in adolescent girls should be expanded and replicated by others, as well as used by primary care physicians for early detection and timely management of anemia with proper counseling of girls and their families, as well as schools. This study's findings can help policymakers and primary care physicians in the region assess anemia prevalence and create efficient diagnostic approaches.

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Conflicts of interest

There are no conflicts of interest.

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