International Journal of Advanced Community Medicine

E-ISSN: 2616-3594
P-ISSN: 2616-3586
www.comedjournal.com
IJACM 2020; 3(2): 14-21
Received: 02-01-2020
Accepted: 25-01-2020

Dr. Palle Lokhnath Reddy
Assistant Professor, Department of Community and Family Medicine, Surabhi Institute Medical Sciences, Siddipet, Telangana, India

Dr. Aluka Anand Chand
Assistant Professor, Department of General Surgery, Osmania Medical College, Hyderabad, Telangana, India

Corresponding Author:
Dr. Aluka Anand Chand
Assistant Professor, Department of General Surgery, Osmania Medical College, Hyderabad, Telangana, India

Comparative study on prevalence of anemia and menstrual health problems among urban and rural adolescent girls

Dr. Palle Lokhnath Reddy and Dr. Aluka Anand Chand

DOI: https://doi.org/10.33545/comed.2020.v3.i2a.145

Abstract
Aim& Objective: This study was undertaken to know the prevalence of anemia and menstrual health problems in both urban and rural areas of Siddipet District.
Methodology: It is comparative cross sectional study
Results: In the present study, total mean hemoglobin of students is 10.95±4.43. In rural area, mean hemoglobin is 10.49±1.71 which is low compared to the mean hemoglobin levels of students in urban area 11.42±5.99. The contributing factors of anemia seen in this study are: low socioeconomic status, onset of menarche, nuclear families, vegetarian diet, religion and caste, birth order, body mass index, deworming, age of menarche and menstrual cycle length. Some students experienced symptoms like lack of concentration, headache, tiredness, lack of interest in studies, leg cramps, dizziness, shortness of breath and rapid heartbeat due to anemia. On examining the students, most of them were having palmar pallor, tongue pallor, nail pallor and conjunctival pallor. The adolescent girls are facing various menstrual health problems like abdominal pain, menorrhagea, polymenorrhoea etc. In this study, students who have heavy menstrual flow were prone to anemia. Knowledge and practices of students of urban area like frequency of changing pads and disposal of sanitary pads in dustbins were better than the students in rural area. While students in rural area were using sanitary pads more than the students in urban area
Conclusion: The findings of the study can be used for planning programs, making new policies for improving the level of information especially, for rural adolescent girls. So, students should be educated regarding improvement of their nutrition, diet and exercise, hand washing, health seeking behavior and life style habits in order to build healthy nation.

Keywords: Comparative, prevalence, anemia and rural adolescent girls

Introduction
Anemia is the most prevalent nutritional problem worldwide and it is mainly caused due to iron deficiency. Its prevalence is highest among young children and women of childbearing age; particularly in pregnant women [1]. The prevalence of anemia is disproportionately high in the developing countries, due to poverty, inadequate diet, worm infestations, pregnancy/ lactation and poor access to the health services [2].
Adolescent girls are at a high risk for anemia and malnutrition. Inadequate nutrition during adolescence can have serious consequences throughout the reproductive years of life and beyond [3]. Very often, in India, girls get married and pregnant even before the growth period is over, thus doubling the risk for anemia [4].
Menstruation" is a physiological process that occurs throughout the reproductive years of every woman [5, 6]. In many instances, this phenomenon is associated with various mental as well as physical morbidities like premenstrual syndrome. Menstruation can also predispose women to life threatening RTI (Reproductive Tract Infection), if hygiene is not maintained throughout menstruation.Especially in Indian scenario where joint families are common in the society, the issues of menstrual hygiene practices are needed to be tackled at early age, as adolescence. The knowledge, attitudes and practices regarding menstrual hygiene, which establish at this age, are usually followed by them throughout life and also passed on to the next generation. Therefore faulty practices pertaining to menstruation will affect health of large number of women in reproductive age group.
Most girls are unaware about proper menstrual practices at the age of menarche.

Use of unhygienic cloths may lead to development of infection of reproductive tract which may seriously hamper the reproductive capacity or even life of female.
So, this study was undertaken to know the prevalence of anemia and menstrual health problems in both urban and rural areas of Siddipet District.

Hence the present studies emphasize to know and compare the prevalence of anemia and menstrual health problems in both urban and rural areas of Siddipet District.

Materials and Methods
A study entitled "Comparative Study on Prevalence of Anemia and Menstrual Health Problems among Urban and Rural Adolescent Girls in Siddipet District" was under taken from July 2018 to August 2019.

Study design
A cross sectional comparative study.

Study subjects
School girls aged between 10-19yrs.

Sample size
It is calculated by using formula ($4pq/l^2$) with 10% allowable error. As the prevalence rate of Anemia in 10-19years adolescent girls is 69% in Andhra Pradesh according to DLHS-4 [7].
p= Prevalence of anemia among adolescent girls in India-69%
q=100-p =100-69 = 31
l= 10% of prevalence = 10/100×69=6.9
n=4×69×31/6.9×6.9 =180
180 girls from urban and 180 girls from rural areas are taken into study.

Data collection
A list of schools in Guntur district and prior permission was obtained from District Educational Officer, Siddipet. Prior Permission from Heads of Institutions and informed consent from study subjects was taken. Data was collected by using semistructured questionnaire.

Study method
Current cross sectional study was conducted in Siddipet District of Andhra Pradesh state, India. The sampling was done using multistage random sampling technique.
First Stage: Siddipet District is divided into 4 different field areas

Second Stage
Random selection of single mandal from each revenue division was done. From each selected mandal, one govt school from the urban area and one Govt School from the rural area were taken into study.
Third Stage: Random selection of 45 girl students from secondary and higher secondary classes of the selected schools was done and were taken into study, there by obtaining the total sample size to be 360.

Study setting
Government schools in Urban and Rural areas of Siddipet District.

Study period
July 2018 to August 2019.

Test used
Hemoglobin levels are estimated by using Cyanmethaemoglobin method. Blood samples were collected with the help of a lab technician and sent to the pathologist for evaluation. 2ml of venous blood was collected in a test tube with EDTA for haemoglobin estimation.

Materials
Semi structured questionnaire, measuring tape, marking pencil, weighing machine, plastic ruler.

Weight
Weight recording of every subject was done with help of a Standardized weighing machine.

Height
Height was measured by using a non -stretchable measuring tape.
Body Mass Index (BMI):-BMI was calculated by dividing weight in kilograms and the square of height in meters [Quetelet's Index].

$BMI=Weight\ (kg)/Height\ (m)^2$

WHO Classification of BMI [8]

Under Weight	-	<18.50
Normal range	-	18.50-24.99
Overweight	-	25-29.99
Obese	-	≥30

Hemoglobin estimation
Cyanmethemoglobin method

Data analysis
The data was analyzed using SPSS (Statistical package for Social Sciences) Version 23. Descriptive results were expressed in terms of percentage, means, proportions and relevant tests of significance like Standard error of difference between proportions, Chi-square test were applied and $p<0.05$ was considered as statistically significant.

Ethical clearance
Was taken from Ethical committee of Surabhi Institute of Medical Sciences, Siddipet.
Inclusion criteria: All adolescent girls of age between 10 to 19 years who are willing to participate, who gave consent and who were present in the school on the day of study.

Exclusion criteria
1. Girls who are not willing to participate.
2. Girls who did not obtained menarche.
3. Absentees and dropouts from schools during the day of visit.

Results

Table 1: Hemoglobin Levels of Students in Urban & Rural Areas

Area	Non-Anemic	%	Anemic	%	Total
Rural	22	12.22%	158	87.78%	180
Urban	58	32.22%	122	67.78%	180
Total	80	22.22%	280	77.78%	360

In this study, out of 80 students who were having normal levels of hemoglobin, 22 students were from the rural areas and 58 students were from the urban areas. While out of 280 students who were anemic, 158 students were in the rural areas and 122 students were in the urban areas. The analysis of chi-square test suggests that the Proportion of Anemia is significantly higher in the rural area as compared to the Urban area (P<0.001). Normal levels of Hemoglobin were seen in 58 students (32.22%) belonging to the urban areas and only in 22 students (12.22%) of the rural areas.

Mild anemia was seen in 73 students (40.56%) belonging to the urban areas while higher rates were seen in 99students (55%) belonging to the rural areas. Moderate anemia was seen in 45students (25%) belonging to urban areas and 54(30%) students belonging to rural areas. Severe anemia was seen in 4 students (2.22%) belonging to urban areas and 5(2.78%) students belonging to rural areas. There was significant association between Anemia and Place of stay. (P<0.0001*S).

Sociodemographic factors in relation to anemia in students

Table 2: Age Wise Distribution of the Study Population

AGE	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
10-14	22	6.73%	54	16.51%	150	45.87%	101	30.89%	327
15-19	0	0	4	12.12%	8	24.24%	21	63.64%	33
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Fisher Exact Test: 0.57;NS					Chi-square test: 10.95; P value:<0.0009*S				

In the present study, majority 327 (90.83%) of adolescent girls were in 10-14 years age group followed by 33(9.17%) in 15-19 years age group. Students in rural areas having the age group between 10-14 years have anemia of 45.87% while students in urban area belonging to the same age group have anemia of 24.24%. Higher levels of anemia was seen in students of urban areas (63.64%) aged between 15-19 years. There was significant association between Age, Place of stay and Anemia (P<0.0001*S).

Table 3: Distribution of students by their Education

Class	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
7	4	8.00%	0	0.00%	46	92.00%	0	0.00%	50
8	6	15.00%	1	2.50%	33	82.50%	0	0.00%	40
9	7	5.38%	34	26.15%	44	33.85%	45	34.62%	130
10	5	3.57%	23	16.43%	35	25.00%	77	55.00%	140
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Chi-square:25.99; P value:<0.0001*S					Chi-square: 91.65 P value:<0.0001*S				

In this study, Students in rural area studying 7th class (92%) have high levels of anemia and later decreasing with increase in education. While in contrast, anemia tends to increase with increase in education in urban areas (55%), there by showing statistical significance (P<0.0001*S) between place of stay, education and anemia.

Table 4: Descriptive Statistics for Hb % (Overall Sample)

Class	N	Mean	SD	SEM	95% CI		Min	Max
					Lower Bound	Upper Bound		
7	50	10.45	1.74	0.25	9.96	10.94	6	15.1
8	40	10.50	1.87	0.30	9.90	11.09	6.2	15
9	130	11.21	1.76	0.15	10.90	11.51	5.5	16.6
10	140	11.03	6.74	0.57	9.90	12.15	5.7	87
Total	360	10.95	4.43	0.23	10.49	11.41	5.5	87

In this study, for overall sample 50 students are studying 7th class having mean hemoglobin as 10.45±1.74, and 40 students are studying 8th class having mean hemoglobin as 10.50±1.87, and 130 students are studying 9th class having mean hemoglobin as 11.21±1.76, and 140 students are studying 10th class having mean hemoglobin as 11.03±6.74. While all the 360 students are having mean hemoglobin as 10.95±4.43.

Table 5: Descriptive Statistics for Hb % (Rural Area)

Class	N	Mean	SD	SEM	95% CI		Min	Max
					Lower Bound	Upper Bound		
7	50	10.45	1.74	0.25	9.96	10.94	6	15.1
8	39	10.40	1.79	0.29	9.82	10.98	6.2	15
9	51	10.59	1.56	0.22	10.16	11.03	5.5	15.6
10	40	10.48	1.84	0.29	9.90	11.07	5.7	15
Total	180	10.49	1.71	0.13	10.24	10.74	5.5	15.6

In this study, for rural area 50 students are studying 7th class having mean hemoglobin as 10.45±1.74, and 39 students are studying 8th class having mean hemoglobin as 10.40±1.79, and 51 students are studying 9th class having mean hemoglobin as 10.59±1.56, and 40 students are studying 10th class having mean hemoglobin as 10.48±1.84. While all the 180 students in the rural area are having mean hemoglobin as 10.49±1.71.

Table 6: Descriptive Statistics for Hb % (Urban Area)

Class	N	Mean	SD	SEM	95% CI		Min	Max
					Lower Bound	Upper Bound		
8	1	14.30	---	---	---	---	14.3	14.3
9	79	11.60	1.78	0.20	11.20	12.00	6.6	16.6
10	100	11.24	7.90	0.79	9.68	12.81	6.1	87
Total	180	11.42	5.99	0.45	10.53	12.30	6.1	87

In this study, from urban area, 1 student studying 8th class having mean hemoglobin as 14.30. Students studying 9th class (79) were having mean hemoglobin as 11.60±1.78. Students studying 10th class (100) were having mean hemoglobin as 11.24±7.90. While all the 180 students in the urban area were having mean hemoglobin as 11.42±5.99.

Anemia with relation to Nutrition

Table 7: Distribution of students based on Body Mass index

BMI	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
Under Weight	16	6.56%	33	13.52%	123	50.41%	72	29.51%	244
Normal	6	6.19%	18	18.56%	31	31.96%	42	43.30%	97
Overweight	0	0.00%	4	33.33%	4	33.33%	4	33.33%	12
obese	0	0.00%	3	42.86%	0	0.00%	4	57.14%	7
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Chi-square: 3.38 P value:0.33;NS					Chi-square: 14.61 P value:<0.002*S				

In this study, most of the students were underweight 244(67.78%) followed by normal weight 97(26.94%), overweight 12(3.33%) and obese 7(1.94%).
In this study, students belonging to rural areas and underweight have 50.41% of anemia, while in contrast students belonging to urban area and obese (57.14%) were having higher rates of anemia. Statistical significance was seen between Body mass Index, Area and Anemia**.**

Table 8: Distribution based on intake of Iron containing foods

IRON FOODS	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
NO	7	12.07%	10	17.24%	26	44.83%	15	25.86%	58
YES	15	4.97%	48	15.89%	132	43.71%	107	35.43%	302
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Fischer Exact Test:0.2;NS					Chi-square: 0.95 P value:0.32;NS				

In this study, 302 (83.89%) students were taking iron containing foods regularly, while 58(16.11%) students were not taking any iron containing foods. Most of the students were anemic in rural (132) even after taking of iron rich foods regularly compared to students in urban area (107).

Table 9: Associated Symptoms in study subjects

Symptoms	Rural		Urban		Total		p-value
	n	%	n	%	n	%	
Concentration	90	50.00%	36	20.00%	126	35.00%	<.001**
Tiredness	82	45.56%	34	18.89%	116	32.22%	<.001**
Headache	51	28.33%	55	30.56%	106	29.44%	.447, NS
Lack Of Interest	50	27.78%	35	19.44%	85	23.61%	<.001**
Leg Cramps	29	16.11%	52	28.89%	81	22.50%	<.001**
Soreness Of Mouth	39	21.67%	35	19.44%	74	20.56%	.432, NS
Worms In Stools	20	11.11%	23	12.78%	43	11.94%	.489, NS
Dizziness	23	12.78%	8	4.44%	31	8.61%	<.001**
Shortness Of Breath	17	9.44%	10	5.56%	27	7.50%	0.022*
Rapid Heart Beat	13	7.22%	9	5.00%	22	6.11%	0.024*
Odema	3	1.67%	2	1.11%	5	1.39%	0.544,NS
***: Sig. at 1% level, *: Sig. at 5% level, NS: Not Sig.*							

In this study, Out of 126 (35.00%)students who complained of lack of concentration, 90 (50%) students in rural area were having it, while it is in 36 (20.00%) students in urban area, which is statistically significant (<0.001). Similarly, out of 116 (32.22%) students who complained of tiredness, 82 (45.56%) in rural were having it, while it was in 34 (18.89%) students in urban area, which is statistically significant (<0.001).

Out of 85(23.61%) students, who have lack of interest in studies, 50 (27.78%) students were in rural area and 35 (19.44%) students were in urban area, which is statistically significant (<0.001).

Out of 81(22.50%) students, who complained of leg cramps, 29 (16.11%) students in rural were complaining of it, while it is seen in 52 (28.89%) students in urban area, which is statistically significant (<0.001). Similarly, out of 31 (8.61%) students complained of dizziness, 23 (12.78%) were from rural and 8 (4.44%) students were from urban area.

Anemia in relation to Menstrual Factors

Table 10: Anemia in Relation with Age of Menarche

Age Of Menarche	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
11	2	7.41%	5	18.52%	7	25.93%	13	48.15%	27
12	9	6.77%	16	12.03%	81	60.90%	27	20.30%	133
13	8	5.71%	23	16.43%	58	41.43%	51	36.43%	140
14	2	3.92%	13	25.49%	9	17.65%	27	52.94%	51
15	1	11.11%	1	11.11%	3	33.33%	4	44.44%	9
TOTAL	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Chi-square: 2.97 P value:0.5;NS					Chi-square: 34.33 P value:<0.001*S				

In this study, 27 (7.5%) students attained menarche at 11yrs, 133 (36.94%) students at 12 years, 140 (38.89%) students at 13 years, 51 (14.17%) students at 14 years and 9 (2.5%) students at 15 years of age.

In this study, students who attained menarche at an earlier age were having anemia compared to the students who attained menarche at a later age. There was statistical significance between age of menarche, Area & Hb%. The mean age of menarche in both urban and rural areas was 12.5 years.

Table 11: Anemia with Relation to Menstrual Regularity

Menstrual Regularity	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
Irregular	4	7.02%	4	7.02%	27	47.37%	22	38.60%	57
Regular	18	5.94%	54	17.82%	131	43.23%	100	33.00%	303
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Fischer Exact Test:0.2;NS					Chi-square: 0.04 P value:0.83;NS				

In this study, 303(84.17%) students were having regular menstrual cycle, 57(15.83%) students were having irregular menstrual cycle. Irregular menstrual cycles were seen most in students who were anemic and living in (27) rural area compared to (22) urban area.

Table 12: Anemia in relation to menstrual cycle length

Cycle Length	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
<21	4	7.41%	8	14.81%	26	48.15%	16	29.63%	54
21-35	16	5.65%	46	16.25%	127	44.88%	94	33.22%	283
>35	2	8.70%	4	17.39%	5	21.74%	12	52.17%	23
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Chi-square:0.40 P value:0.8;NS					Chi-square: 5.66 P value:0.059;S				

In this study, 54(15%) students were having menstrual cycle length <21 days, 283(78.61%) students between 21-35 days, while 23(6.39%) students were having the cycle length of >35 days. In this study, anemia was high in students, who were having cycle length more than 35 days in urban areas.

Table 13: Distribution based on No. of days of flow

No. Of Days of Flow	Non-Anemic				Anemic				Total
	Rural	%	Urban	%	Rural	%	Urban	%	
<4	13	8.67%	25	16.67%	60	40.00%	52	34.67%	150
4 - 6	8	4.47%	31	17.32%	83	46.37%	57	31.84%	179
>6	1	3.23%	2	6.45%	15	48.39%	13	41.94%	31
Total	22	6.11%	58	16.11%	158	43.89%	122	33.89%	360
Chi-square: 1.86 P value:0.39;NS					Chi-square: 0.93 P value:0.6;NS				

In this study, 179 (49.72%) students were having 4-6 days of flow, 150 (41.67%) students were having <4 days of flow and 31 (8.615) students were having flow of >6 days. In this study, higher rates of anemia were seen in students who have flow more than 6 days in rural areas.

Table 14: Distribution of students having Menstrual Problems

Menstrual Problems	variable	Non-Anemic		Anemic		Total
		Rural	Urban	Rural	Urban	
Bleeding B/W Periods	No	19	57	149	114	339
	Yes	3	1	9	8	21
Menstrual Disorder	No	22	56	150	118	346
	Yes	0	2	8	4	14
Clots during menstruation	No	16	53	117	114	300
	Yes	6	5	41	8	60
Pain during Menstruation	No	10	16	82	32	140
	Yes	12	42	76	90	220
Symptoms of Premenstrual syndrome	No	4	34	47	72	157
	Yes	18	24	111	50	203

Most of the students had menstrual problems like pain during menstruation and symptoms of premenstrual syndrome in both rural and urban areas. In rural areas those who were anemic, 76 students were having pain during menstruation, while in urban area, relatively higher number of students (90) were complaining.

Similarly, in rural areas those who were anemic, 111 students were having symptoms of premenstrual syndrome, while in urban area, relatively less number of students (90) were complaining.

Table 15: Healthy Habits during Menstruation

Knowledge and Practices	variable	Non-Anemic		Anemic		Total
		Rural	Urban	Rural	Urban	
Using	Sanitary Napkins	20	55	153	114	342
	Old cloth Pieces	2	3	5	8	18
Reusing old cloth pieces	No	22	56	156	118	352
	Yes	0	2	2	4	8
Frequency of changing pads/ day	1	0	0	4	2	6
	2	11	31	64	71	177
	3	11	27	80	45	163
	>3	0	0	10	4	14
Availability Of water & Toilets	No	0	0	6	0	6
	Yes	22	58	152	122	354
Attending School	No	0	0	10	1	11
	Yes	22	58	148	121	349
Disposal	Dustbins	19	58	124	122	323
	Throwing	2	0	25	0	27
	Toilets	1	0	9	0	10

In this study, most of the students were using sanitary napkins while few (18) students were using and reusing (8) old cloth pieces during menstruation. Most of the students were changing pads twice daily in urban areas (102) compared to rural areas (75). Most of the students were attending school during menstruation and are having toilets and water facilities in the schools. Most of them were disposing sanitary pads in dustbins.

Discussion

Haemoglobin levels of all students

In this study, out of 80 (22.22%) students who were having normal hemoglobin, 22 (27.50%) students in rural area and 58 (72.50%) students in urban area were having normal levels of Hemoglobin. While out of 280 (77.78%) students who were anemic, 158 students (56.43%) in rural area and 122 students (43.57%) in urban area were having anemia.

In this study, overall prevalence of anemia is 77.78%. While Prevalence of anemia in different settings among adolescent girls in India was follows

	Age Group	n	(%)
Rural			
Rajasthan [9]	10-18	941	73.7
Tamil Nadu [10]	13-19	281	44.8%
Haryana (School going) [11]	13-17	218	80.8%
Haryana (Non-school going) [11]	13-17	206	90.3%
Rajasthan [12]	11-18	185	85.4%.
Setting	**Age Group**	**n**	**(%)**
Urban			
Delhi (high socio economic) [13]	11-18	251	46.6%

Delhi (low socio economic) [13]	11-18	195	56%
Slums of Vadodara, Baroda [14]	10-18	203	81%
Schools of Vadodara, Baroda [14]	10-19	2090	75%
Delhi [12]	11-18	520	61.9%
Slums Hyderabad [15]	10-19	2500	88%

In this study, Out of 360 students, 280 were found anemic. Majority of girls 172(47.78%) were having mild anemia, 99 (27.50%) students were having moderate anemia and only 9(2.5%) students have severe anemia. Overall mean Hemoglobin level was 11 which have similar findings from the study conducted in urban slum by Meenal Vinay Kulkarni *et al.* [16]. Out of 272 adolescent girls in the study population, 245 (90.1%) girls were found to be anemic. Majority of the girls (88.6%) were having mild to moderate anemia and only1.5% girls were severely anemic. Overall mean hemoglobin level was 10.33±1.34.

Age

In the present study, majority 327 (90.83%) of adolescent girls were in 10-14 years age group followed by 33(9.17%) in15-19 years age group. Mean age in our study population was14.05 ± 1.19 yrs. In this study, students of rural areas in the age group 10-14 years have anemia of 45.87% while students of urban area in the same age group was 24.24%.Higher levels of anemia was seen in students of urban areas (63.64%) aged between 15-19 years. There was significa nt association between age, place of stay and anemia (P<0.0001*S). Similar findings were seen in study conducted in urban area by Premalatha *et al.* [17], while this denies the report of studies done in rural area by Rajani *et al.* [18].

Education

In this study, Students in rural area studying 7th class (92%) have high levels of anemia and later decreasing with increase in education. There was a statistical significance (P<0.0001*S) between place of stay, education and anemia.

In this study, an inverse relation between education of girl and anemia was observed in the students of rural area while contrast findings were seen in studies done by Kaur [2] and Gautham *et al.* [19] done in rural area.

Body mass index

In this study, most of the students are underweight 244(67.78%), followed by normal weight 97(26.94%), overweight 12(3.33%) and obese 7(1.94%). Choudhary *et al.* (2003) [20] reported that 68.2% of adolescence had BMI of less than 18.5.

Type of diet

In this study, vegetarians were more anemic than non-vegetarian students which have similar findings to the study conducted by Verma *et al.* [21].

Iron containing foods

In this study, 302 (83.89%) students are taking iron containing foods, while 58(16.11%) students are not taking any iron containing foods. In the study conducted by Baliga *et al.* [22], the average intake of iron was 11%.

Menstrual cycle length

In this study, 54(15%) students were having menstrual cycle length <21 days, 283(78.61%) students between 21-35 days, while 23(6.39%) students are having the cycle length of >35 days. Similar findings were seen in study conducted in the rural area by Rana *et al.* [23].

No. Of Days of Flow

In this study, 179 (49.72%) students are having 4-6 days of flow, 150 (41.67%) students are having <4 days of flow and 31 (8.6%) students having flow of >6 days. In the study done in rural area by Wasnik VR *et al.* [24], the duration of blood flow was within 5 days in 75.8% of adolescent girls with 24.2% having prolonged menses.

Type of flow

In this study, students having heavy flow, 59 (81.94%) students were having anemia. In students who were having moderate flow, 194 (78.22%) students were having anemia. In students who were having scanty flow, 27 (67.50%) students were having anemia.

In this study, students who were having heavy flow in rural area (50%) were more anemic compared to other students, which was similar with studies conducted in the rural area by Jagannath *et al.* [25].

Usage of sanitary pads

In this study, most of the students were using sanitary pads (95%), which is similar to study conducted in Lebanon [26] and slightly less in the study conducted by Tarhane *et al.* [27].

Conclusion

The present study revealed a comprehensive picture of socio demographic factors and menstrual factors which influenced the prevalence and severity of anemia. Students in rural area are more anemic than the students of urban Area. Most of them are mild anemic followed by moderate and severe anemic.

Acknowledgement

The author thankful to Dept of Community and Family Medicine for providing all the facilities to carry out this work.

Conflict of Interest

None

References

1. Shah BK, Gupta P. Weekly Vs Daily Iron and Folic Acid Supplementation in Adolescent Nepalese Girls. Arch Paediatr Adolesc Med. 2002; 156:131-35.
2. Kaur S, Deshmukh PR, Garg BS. Epidemiological Correlates of Nutritional Anemia in Adolescent Girls of Rural Wardha. Indian J Community Med. 2006; 31:255-58.
3. Nayar PD, Mehta R. Child Health. In: Gupta P, Ghai OP, Editors. Textbook of Preventive and Social Medicine. 2nd Ed. New Delhi: CBS Publishers and Distributors, 2007, 428-37.
4. Shobha S, Sharada D. Efficacy of Twice Weekly Iron

Supplementation in Anemic Adolescent Girls. Indian Paediatr. 2003; 40:1186-90.
5. Medicine, American Institute of Preventive. Menstrual Cramps, 1996.
6. Beek JS *et al.*. "Puberty And Dysmenorrhea Treatment", Novice's Gynecology. SL.: Williams and wilkins, 1996, 771-780.
7. State Fact Sheet Andhra Pradesh. District Level Household and Facility Survey, 2012-13.-4.http://rchiips.org/pdf/dlhs4/ report/AP.pdf.
8. Park's Textbook of Preventive and Social Medicine.23rd Edition. Jabalpur: Banarsidas bha not Publishers, 2015.
9. Chaturvedi S, Kapil U, Gnanasekaran N, Sachdev HPS, Pandey RM, Bhantit. Nutrient In take Amongst Adolescent Girls Belonging to Poor Socio-Economic groups of Rural Area of Rajasthan. Indian Pediatr. 1996; 33:197-201.
10. Rajaratnam J, Abel R, Asokan JS, Jonathan P. Prevalence of Anemia among Adolescent Girls of Rural Tamilnadu. Indian Pediatr. 2000; 27:532-536.
11. Raina N, Gupta A, Sharma M, Data G. Prevention and Control of Anemia In Pregnant Women And Adolescent Girls In Rural Areas Of Haryana. India Available From: Http://Www.Jsi.Com/Mother Care! RHF/ Anemia India SW ACH. Pdf.
12. Sharma A, Prasad K, Rao V. Identification of an Appropriate Strategy to Control Anemia In Adolescent Girls Of Poor Communities. Indian Pediatr. 2000; 37:261-267.
13. Kapoor G, Aneja S. Nutritional Disorders In Adolescent Girls. Indian Pediatr.1992; 29:969-973.
14. Kanani S, Poojara R, Zararia V, Mistry M. The Impact of Iron Supplements on Adolescent Growth and Anemia Prevalence. Vadodara, IndiaAvailable From: Http://Wwwjsi.Com/Mother Care! RHF/Issue 31_ India Ad. Pdf.
15. Saibaba A, Ram MM, Ramana Rao GV, Devi U, Sayamala TS. On Nutritional Status of Adolescent Girls of Urban Slums and the Impact of IEC on Their Nutritional Knowledge And Practices. Indian Journal of Community Medicine. 2002; 27:4.
16. Meenal Vinay Kulkarni, Durge PM, Kasturwar NB. Prevalence of Anemia among Adolescent Girls In An Urban Slum. National J of Community Med. 2012; 3(1):108-111.
17. Premalatha T, Valarmathis Srijayanth P, Sundar JS, Kalpana S. Prevalence of Anemia and Its Associated Factors among Adolescent School Girls In Chennai, Tamil Nadu, India. Epidemiol. 2012; 2:118.
18. Rajini S. "Prevalence of anemia and factors influencing among rural adolescent girls." Indian journal of maternal and child health. 2010; 12(4):1-7. 16.
19. Gautham VP, Bansal Y, Tanejadk, Saha R. Prevalence Of Anemia Amongst Pregnant Women And Its Sociodemographic Associates In A Rural Area Of Delhi, Indian J Of Community Med. 2002; 27(4):157-160.
20. Choudhary S, Mishra CP, Shulka PK. Indian Journal of Preventive and Social Medicine, 2003, 34-1-2.
21. Verma A, Rawal VS, Kedia G, Kumar D, Chauhan J. Factors Which Influenced Anemia Among Girls Of The School Going Age(6-18years) From The Slum Of Ahmedabad City. Indian J Community Med. 2004; 29(1):25-26.
22. Baliga SS, Naik VA, Mallapur MD. Nutritional Status of adolescent girls residing in rural area: A Community-based cross-sectional study. J Sci. Soc. 2014; 41:22-5.
23. Bhavik Rana, Arpitprajapati, Sonaliya KN, Venu Shah, Mansi Patel, Asha Solanki. An Assessment Of Menstrual Hygiene Practices Amongst Adolescent Females At Kheda District Pf Gujarat State, India. Health line J, 6(1):23-29.
24. Wasnik VR, Dhumale D, Jawarkarak. A Study of the Menstrual Pattern and Problems among Rural School Going Adolescent Girls of Amravati District Of Maharashtra, India. Int J Res Med Sci. 2015; 3:1252-6.
25. Jagannath KD, Sheetal KD, Narendra SM, Hrishikeshak Vivek SB. Prevalence and Sociodemographic Factors Related To Anemia among Adolescent Girls In A Rural Area Of Aurangabad District, Maharashtra. Int. J Sci. Stud. 2014; 2(8):19-23.
26. Tania Santina, Nancy Wehbe, Fouad Ziade M, Monanehme. Assessment of Beliefs and Practices Relating To Menstrual Hygiene of Adolescent Girls In Lebanon. Lebanon: Int. J of Health Sci. and Research, 2103, 80.
27. Tarhane S, Kasulkar A. Awareness of Adolescent Girls Regarding Menstruation and Practices during Menstrual Cycle. Panacea J of Med Sci. 2015; 5(1):29-32.