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Prevalence of Anemia Among Adolescent School Girls of Bardoli Taluka, Surat, Gujarat.

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Abstract

Introduction: Anemia is a serious public health challenge in India. It affects women, adolescents and children throughout the lifecycle. In boys and girls it limits their development, learning ability, reduce concentration in daily task, increases risk of infections, increases school dropout rates and reduces their physical activity. Anemia in girls can increase risk of pregnancy associated complications like premature births, low birth weight of baby and perinatal and maternal mortality.

Aims of the study: The aim of the present study was to identify the prevalence of anemia and its associated factors among adolescent school girls of Bardoli, Surat.

Material and methods: A cross sectional survey was carried out to identify the prevalence of anemia among 815 adolescent school girls from both Government and Private schools by using non probability purposive sampling technique and who fulfilled the inclusion criteria Digital hemoglobinometer was used to collect capillary blood for estimation of hemoglobin level.

Result: Study results showed that, 694 (85 %) girls were having anemia and 15% of them had normal hemoglobin level. 48% had mild anemia and 37% had moderate level of anemia. 2 (0.24%) girls had severe anemia. It was highly prevalent among 417 (60.15 %) girls of government schools than the private school. Majority 551 of them were under weight (BMI < 18.5). Level of anemia was significant with age, residence, dietary pattern, education and occupation of parents, family income. Menstruation related factors like regularity, amount of blood loss was significant.

Conclusion: Anemia is still a major health problem in our country. Anaemia among adolescent girls still continues to be a significant public health problem.

Keywords: Prevalence, Menarche, Adolescent Girls, Anemia

Introduction

According to WHO, anemia is a condition in which the number of red blood cells or the hemoglobin concentration is lower than normal level. [1] Anemia is a serious public health challenge in India. The prevalence of anemia among six groups as per the National Family Health Survey 5 (2019-21), is 25.0 percent in men (15-49 years) and 57.0 percent in women (15-49 years). 31.1 percent in adolescent boys (15-19 yrs), 59.1 percent in adolescent girls,52.2 percent in pregnant women (15-49 years) and 67.1percent in children (6-59 months).[2] It affects women, adolescents and children throughout the lifecycle. In boys and girls it limits their development, learning ability, reduce concentration in daily

task, increases risk of infections, increases school dropout rates and reduces their physical activity. Anemia in girls can increase risk of pregnancy associated complications like premature births, low birth weight of baby and perinatal and maternal mortality.[3] Moreover, small studies was carried out among adolescents from different parts of India reported that the prevalence of anemia was 61.5% in Gujarat, 52.5% in Madhya Pradesh, 41.1% in Karnataka, 50% in Bihar, and 56.3% in Uttar Pradesh.[4] adolescent girls are at higher risk to develop anemia due to poor socio-economic status, lack of parents education, faulty dietary habits, worm infestation, malaria and heavy menstruation can be the leading cause of anemia. Despite of multiple National and State level programs addressing anemia and many are specifically focusing on adolescent girls, deficiency of micronutrient in diet leading to anemic conditions still continue to prevail in school going adolescents. Hence, the aim and objective of the present study is to identify the prevalence of anemia and various factors associated with it among school going adolescent girls.

Material and Methods

Using a cross sectional survey design, 815 adolescent school girls were examined for their Hemoglobin (Hb) and associated factors. After obtaining ethics committee permission from Uka Tarsadia University (MPC/IHEC/11/2022). 11 schools were approached for permission and six schools management gave permission. The survey was conducted class wise from 16-10-23 to 4-11-2023. Using non probability purposive sampling technique, female adolescent girls who fulfilled the inclusion criteria was recruited for the study, who belonged to 4 private and 2 government schools. Written consent was obtained from the parents and assent was obtained from the students. Tool consisted of Socio demographic variables, Medical history, Hb value, Height, Weight, BMI, details of Menstrual history and Signs and Symptoms experienced by the students. With a CVI of 0.83 and reliability of 0.84 (Cronbach's alpha). Hb was tested from capillary blood using Mission HB, digital hemoglobinometer as recommended by WHO & ICMR, after calibrated it (S. No: 195F1000AE1). After testing Hb and measuring height and weight, the students completed the tool by themselves. Level of Hb and BMI was graded as per WHO classification. The data was analyzed using statistical software IBM SPSS version 22.0. Descriptive statistics were used to describe the socio- demographic variables and inferential statistics was used to find out the association of anemia with factors.

Results:

Socio demographic variables

Table I: Socio demographic Variables of sample studied.

Sl. No	Demographic variables	Frequency	Percentage
1	**Age in years**		
	10-11	66	8.1
	12-13	575	70.6
	14-15	172	21.1
	16-17	2	0.2
2	**Residence**		
	Urban	657	80.6
	Rural	158	19.4
3	**Type of family**		

	Nuclear	503	61.7
	Joint	262	32.2
	Extended	50	6.1
4	**Religion**		
	Hindu	633	77.7
	Muslim	170	20.9
	Christian	10	1.2
	Any other	2	0.2
5	**Standard of studying**		
	6^{th} standard	205	25.2
	7^{th} standard	252	30.9
	8^{th} standard	252	30.9
	9^{th} standard	106	13.0
6	**Education of Mother**		
	Professional degree	92	11.3
	Graduate	29	3.6
	Diploma	75	9.2
	High school Certificate	94	11.5
	Middle School Certificate	178	21.8
	Primary school certificate	236	29.0
	No formal education	111	13.6
7	**Education of Father**		
	Professional degree	117	14.3
	Graduate	34	4.2
	Diploma	65	8.0
	High school Certificate	105	12.9
	Middle School Certificate	205	25.1
	Primary school certificate	216	26.5
	No formal education	73	9.0
8	**Occupation of Mother**		
	Senior Officer & Managers	25	3.1
	Professional	51	6.3
	Clerks	9	1.1
	Skilled Workers / Shop / Market Sales Workers	79	9.7
	Skilled Agricultural	21	2.6
	Craft & Related Trade Workers	20	2.4
	Homemaker	610	74.8
9	**Occupation of Father**		
	Senior Officer & Managers	66	8.1
	Professional	186	22.8

	Clerks	40	4.9
	Skilled Workers / Shop / Market Sales Workers	339	41.6
	Skilled Agricultural	135	16.6
	Craft & Related Trade Workers	32	3.9
	Unemployed	17	2.1
10	**Total Monthly Income of the Family**		
	>185,895	21	2.6
	92952-185894	53	6.5
	69535-92950	95	11.6
	46475-68534	95	11.6
	27883-46474	65	8.0
	9308-27882	237	29.1
	<9307	249	30.6
11	**Dietary pattern**		
	Vegetarian	417	51.2
	Mixed	398	48.8
12	**Source of health information**		
	News paper/ Magazine	128	15.7
	Radio/ Television	237	29.1
	Friends / Relationships	113	13.9
	Health professionals	337	41.3

It is evident from table- I, 70.6 % of students were from the age group of 12-13 years, 80.6 % of them resided in urban area, 61.7% of them belonged to nuclear family, Majority (77.7%) were from Hindu religion, 91% of their father and 86.4% of mothers had varied education levels (Primary to Professional education). 74.8% of their mothers were home makers and 97.9% of fathers were working in capacities and 59.7% of them were from average income group (<9307-27882).

Medical data of samples

Table: II Medical History of samples studied.

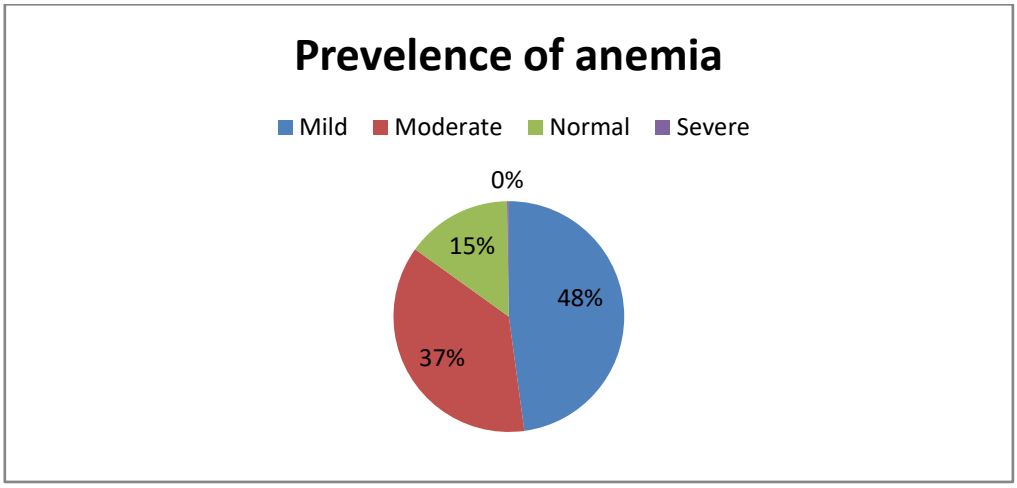
Sr. No.	Parameters	Frequency	Percentage
1.	**Anemia in Family**	61	7.5
2.	**On treatment of anemia**	21	2.6
	If yes, which of the following		
	IFA supplementation	13	52
	Vitamin supplementation	2	8
	Balanced diet	5	20
	Treatment of underlying illness	5	20
3.	**History of Malaria Infection**	49	6 .0
4.	**Treatment Taken for Malaria**	49	6 .0
5.	**History of worm Infestation**	37	4.5
	Treatment taken for worm infes-	25	67.57

	tation		

As shown in table no:2 , only 61 (7.5%) sample had positive family history of anemia. 21 (2.6 %) of them have received treatment for anemia which varied from supplementation of IFA (52%), Vitamins (08%), Balanced diet (20%). Six percent of the sample had Malaria for which they received treatment. History of worm infestation was known to only 4.5 % of them, where as 67.57 % reported that, they have taken treatment for worm infestation.

Prevalence of Anemia

It is evident from Graph –I, 85% of the adolescent girls had anemia where as only 15% them had Normal Hb. Majority (48%) of them had Mild level of anemia and 37% of them had Moderate level of anemia. Mild anemia was highest among Private school going students (67%), where as Moderate level of anemia was highest among Government School children (95%).



Graph 1: Prevalence of anemia among adolescent girls

BMI :

Both government (75%) and private (25%) school going children were underweight and 92 (92%) of them adolescent girls from private schools had Normal BMI. However five percent of total adolescent girls were overweight and 1.34% of them were obese.

Data related to Menarche:

Table : 3 Distribution of samples according to their menstrual history

Sr. No	Menstrual History	Frequency	Percentage
1.	**Menarche**		
	Yes	411	50.00
	No	404	50.00
2.	**Age of Menarche**		
	8-10 years	13	03
	10-12 years	116	28
	12-14 years	270	66
	> 14 years	12	03

3.	**Cycle of menstruation**		
	Regular	316	77
	Irregular	95	23
4.	**Days of cycle**		
	< 28 days	24	06
	28- 30 days	295	72
	> 30 days	92	22
5.	**Days of menstruation bleed**		
	2-4 days	59	14
	4-6 days	211	51
	6-8 days	131	32
	More than 8 days	10	03
6.	**Number of pads used for menstrua-tion per day**		
	Less than 3 pads (Scanty)	75	18
	3-6 pads (normal)	295	72
	More than 6 pads (heavy)	41	10

It is evident from table 3 that 50% of the sample only have attained Menarche, out of which 66% of them attained it between 12-14 years of age. 77% of them had regular cycle, 72 % of them had 28-30 days cycle.Majority, (51%) of them had menstrual bleed for 4-6 days of duration and 72% of them had normal flow.

Physiological parameters studied

Maximum (72%) of the girls did not have any signs/symptoms. From the rest of the girls,50% of them reported fatigue, 45% of them had headache, 72 % of them had pallor , 20 % of them each had glossitis and stomatitis respectively.

Association of hemoglobin levels with selected socio- demographic variables.

Low level of hemoglobin was significantly associated with age in years, type of residence , type of family religion, class in which studying, education and occupation of mother and father, monthly income, dietary pattern. Adolescent girls from age group of 12-13 years, residing in urban area, living in Nuclear family , belonging to Hindu religion, studying in 7^{th} & 8^{th} standard , parents with primary level of education and home makers and semiskilled workers with low socio economic back ground and consuming vegetarian diet had higher levels of anemia as compared with others. (x^2 =P<0.05)

Association of hemoglobin levels with medical and paramedical history

Significant association was identified with family history of anemia, history of worm infestation , menarche, regularity , interval, duration and menstrual blood flow. Level of anemia was significant among girls with no family history, no history of worm infestation, with onset of menarche, those with regular cycle, 28-30 days interval, 4-6 days of bleeding with normal flow as compared to others. (x^2 =P<0.05)

Association of level of hemoglobin with BMI :

Adolescent girls with underweight had higher level of anemia as compared to normal and above normal bodyweight.(x^2 =P<0.05)

Association of level of hemoglobin with physiological parameters.

Low level of hemoglobin was significantly associated with physiological parameters such as pallor, fatigue, loss of appetite, headache, stomatitis and bone pain as compared with others. (x^2 =P<0.05)

Discussion:

Anemia among adolescent females is a major public health challenge. Prevalence of anemia reported by researchers varies from 59.1% to 71.7%. This study was aimed to identify prevelance and risk factors of anemia among adolescent female girls from Government and Private schools. 815 female students were surveyed.

Prevalence of anemia among the adolescent girls studied was 85% which was higher than the reported rates so far. National Family Health Survey-5 (2019-21) have reported, 59.1% in adolescent girls [5] and Muthathal Subramanian et al. (2017) reported 71.7% from Haryana. [6]. Moderate level of anemia was highest (95%) among government school going students where as Mild anemia (67%) was seen in private school children. Mild level (55.64%) of anemia was reported by Chandrakumari, Abilash Sasidharannair (2019) from Tamilnadu.[7]

75% of the girls from Government schools and 25 % of them from private schools were under weight and low level of Hb was significantly associated with it (X^2 =P<0.05). N. Ashok et al. in their study reported that underweight prevalence was more in government school (32.5%) when compared with private school (18.2%). [8]

Significant association was identified between low level of hemoglobin and age group of 12-13 years, residing in urban areas, living in Nuclear families, parents educated up to primary level and having low income and consumed regular diet. (X^2 =P<0.05). Chandrakumari, et al. (2019) in their study finally reported that prevalence of anemia was seen in rural adolescents and girls of the age of 12 years and above.[7] Premalatha T (2012) and Sachan Beena (2008) supports the findings significant association of anemia among girls with low income, Hindu religion , urban residence, low education of parents and residing in nuclear families. [09,10].

Low level of hemoglobin was significantly associated with girls who have attained menarche, those with regular cycle, 28-30 days interval, 4-6 days of bleeding with normal flow (X^2 =P<0.05). Above finding were supported by Suchitra. Rati A (2014) in their exploratory survey findings.[11]

50% of the girls reported fatigue and 72 % of them had pallor and it was significantly associated with low level of hemoglobin. Alisha Aggarwal et al. (2019) in their longitudinal interventional community-based study identified that 75% adolescent had pallor, and 52 % of them had fatigue. [12]

Limitations:

Screening of sample size of 1000, would have been better but due to denial of permission by school authorities, it was not possible. Venous blood sample would have given more accurate levels of hemoglobin. However capillary blood samples testing method for community study is approved by who and ICMR.

Recommendations

- This study reveals that anemia prevails more among adolescent girls which stresses the need to increase awareness of consequences of anemia in community.
- Periodic health surveys are needed in schools on anemia for updating prevalence rate.
- Health programs for mothers on utilization of easily available and affordable iron rich diet should be carried out.
- Educating to parents, children and school teachers for periodic deworming and proper treatment of anemia.
- Parents as well as teachers should be sensitized on under nutrition, role of healthy diet and consequences of anemia.

Conclusion

Anemia is still a major health problem in our country. Anaemia among adolescent girls still continues to be a significant public health problem. Total of 815 adolescent school girls were screened for hemoglobin level and total 694 girls were found with anemia. It was highly prevalent among 417 (60.15 %) girls of government schools. As prevalence of anemia is very high among adolescent girls, it presents that they are at high risk to develop iron deficiency anemia. As a result awareness regarding prevention of iron deficiency anemia should be created among government schools than the private schools.

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References

1. World Health Organization (2023), key facts and overview of anemia.
2. Ministry of Health and Family Welfare; Anemia Mukt Bharat (2022)
3. National Rural Health Mission; Government Of India; Guidelines for control of Iron Deficiency Anemia (2013): 16.
4. Chuahan S, Pradeep Kumar, Marbaniang P., Srivastava Shobhit et al. (2022), Prevalence and predictors of anemia among adolescent in Bihar and Uttar Pradesh, India. National library of Medicine 12(1).
5. Ministry of Women and Child development, Health Survey on Women and Children(2019-21)
6. Subramanian M, Malhotra S, Kant S, et. al. Prevalence of Anemia Among Adolescent Girls Residing in Rural Haryana: A Community-Based Cross-Sectional Study. Cureus. 2022 Jan 10;14(1)
7. Chandrakumari AS, Sinha P, Singaravelu S, Jaikumar S. Prevalence of Anemia Among Adolescent Girls in a Rural Area of Tamil Nadu, India. J Family Med Prim Care. 2019 Apr;8(4).
8. Ashok, N., et al. "A comparative study of nutritional status between government and private primary school children of Mysore city." International Journal of Health & Allied Sciences, vol. 3, no. 3, July-Sept. 2014, p. 164.

9. Premalatha T., et al. " Prevalence of anemia and its associated factors among school girls of Chennai, Tamil Nadu. Epidemiol 2012, 2:2.
10. Sachan, B., Idris, M., & Singh, A. Effect of socio-demographic characteristics on the prevalence of anemia among school going adolescent girls in Lucknow district, India. South East Asia Journal of Public Health, (2013). 2(1), 8–12.
11. Suchitra. A. Rati , Shashikumar Jawadagi. Prevalence of anemia among Adolescent girls studying in selected school. International Journal of Science and Research (IJSR) (2012).
12. Alisha Aggarwal, Anisha Aggarwal, Sanjiv Goyal, Saroj Aggarwal. Iron-deficiency anemia among adolescents: A global public health concern. Int J Adv Community Med 2020;3(2):35-40.