Section: General Medicine

Research

A STUDY ON THE PREVELANCE OF ANEMIA AMONG ADOLESCENT FEMALES IN A TERTIARY CARE HOSPITAL IN CHENNAI

R. Sukumar[1], M. Pradeep Raj[2], Jai Mangla[3]

[1]Professor & Head, Department of General Medicine, Sri Muthukumaran Medical College Hospital and Research Institute, Chikkarayapuram, Kundrathur Road, Near Mangadu, Chennai, Tamil Nadu, India.
[2]Associate Professor, Department of General Medicine, Sri Muthukumaran Medical College Hospital and Research Institute, Chikkarayapuram, Kundrathur Road, Near Mangadu, Chennai, Tamil Nadu, India.
[3]3rdYear Post Graduate, Department of General Medicine, Sri Muthukumaran Medical College Hospital and Research Institute, Chikkarayapuram, Kundrathur Road, Near Mangadu, Chennai, Tamil Nadu, India.

Received : *21/09/2022*
Received in revised form : *25/10/2022*
Accepted : *05/11/2022*

Keywords:
Anemia, Adolescent girls, Malnutrition.

Corresponding Author:
Dr. M. Pradeep Raj,
Email:drpradeeprajm@gmail.com
ORCID: 0000-0001-5485-8844

DOI: 10.47009/jamp.2022.4.5.78

Source of Support: Nil,
Conflict of Interest: Nonedeclared

Int J AcadMedPharm
2022; 4 (5); 387-391

Abstract

Background: Prevalence of anemia is disproportionately high in developing countries due to poverty, inadequate diet, certain diseases, pregnancy and lactation, and poor access to health services. Anemia is ignored in most developing countries even though it is one of the most prevalent public health problems and has serious consequences for national development. Adolescent girls' health plays an important role in determining the health of the future population because adolescent girls' health has an intergenerational effect. The cumulative impact of the low health situation of girls is reflected in the high maternal mortality rate, the incidence of low birth weight babies, high perinatal mortality, fetal wastage, and consequent low fertility rates.
AIM: A study on the prevalence and severity of anemia among adolescent females. **Materials and Methods:** This cross-sectional study was conducted in the year 2021 over 6 months at Sri Muthukumaran Medical College Hospital and Research Institute, Chikkarayapuram, Kundrathur Road, Near Mangadu, Chennai - 600 069. Totally 500 adolescent girls who fill the criteria were selected for the study. The parents of the students were also informed about the test and written consent was obtained. Socio-demographic details regarding symptoms and signs of anemia were recorded using a pretest proforma. Hemoglobin was assessed by the cyanmethaemoglobin method. **Result:** The majority of them (81.7%) were belonging to a nuclear family. 17.5% of them belonged to a joint family and only 1% of them belonged to an extended family. None of the girls out of 300 had symptoms like breathlessness, palpitation, pedal edema, or fatigue. Loss of appetite was present in 27 girls. 134 adolescent girls have pallor in conjunctiva altogether. Going by pallor, 26.8% had anaemia, most of them had their nails neat, cut, and clean. The mean Hb level in the two groups is found to be different and it is statistically significant in menarche & non - menarche. There is no significant association between anemia status and age at onset of menarche/duration of the post- menarcheal period. The non-significant p-value of the chi-square test reveals that there is no significant association between the number of days of menstrual bleeding (duration) and the anemic status. 70% of normal weight bearing children are anemic. A statistically significant association is found between the level of nutrition and anemic status. **Conclusion:** Prevalence of anemia in adolescent girls is high (58.4%). The difference in nutritional needs widens after the onset of puberty. Lack of personal hygiene is found to be a major factor contributing to the prevalence of anemia. The higher prevalence of anemia among post-menarche can be explained by the fact that menstrual blood loss is a significant parameter of anemia.

INTRODUCTION

According to WHO health is defined as a state of well-being and not merely an absence of disease or infirmity. Levy (1980) states that Health care and good nutrition improve people's standard of living by reducing sickness and mortality and increasing life expectancy.[1] Health is not only an individual issue but also a community issue. Poor health reduces the physical and cognitive capacities of an individual. When people identify health problems, their health-seeking process is influenced by the availability, accessibility, affordability, adequacy, and acceptability of health infrastructure. Adolescence is a period of transition from childhood to adulthood.[2] Adolescent girls have been recognized as a special period in their life cycle that requires specific and special attention. Adolescence constitutes a very vital age group being an "entrant" population for parenthood. The status of health during the period is a major determinant of the health and nutrition of her future children.[3] The adolescent experiences markedly accelerated growth during 2 to 3 years growth spurt, and dramatic alteration in the adolescent body size and proportion occurs. The Health and Nutritional needs of adolescent girls are mostly ignored.[4] The cumulative effect of poverty, undernourishment, and neglect is reflected by their poor growth and development. Girls between 13-18 years of age show a lower percentage of iron, and with the onset of menarche become highly susceptible to anemia. In India, every year million marriages are taking place of which a large number of girls from poor households are pushed into early marriages, which are consummated almost.[5] Three million marriages involve girls in the 15-19 years of age group (Glimpses of girlhood in India). Girls bearing their first baby between the ages of 14-18 years result in low birth weight babies and postnatal complications. Adolescent girls' health plays an important role in determining the health of the future population because adolescent girls' health has an intergenerational effect.[6] The cumulative impact of the low health situation of girls is reflected in the high maternal mortality rate, the incidence of low birth babies, high perinatal mortality, fetal wastage, and consequent low fertility rates. A higher prevalence of anemia was found to be present in girls with the attainment of menarche (90.65%) as compared to girls who did not attain menarche (87.93%). Prevalence of anemia was slightly higher in girls below 14 years (92.2%) but the status of menarche and menarcheal age was not significantly associated with anemia.[7] There is no difference between the Hemoglobin of premenarcheal girls and girls with a regular menstrual cycle which shows the influence of menstrual bleeding on anemia that is significant statistically as well as clinically.[8,9] Though various factors contribute to the prevalence of anemia, the current study has helped to narrow down the major contributors such as BMI, socio-economic status, age, and menstrual discharge.[10]

MATERIALS AND METHODS

This cross-sectional study was conducted in the year 2021 over 6 months at Sri Muthukumaran Medical College Hospital and Research Institute, Chikkarayapuram, Kundrathur Road, Near Mangadu, Chennai - 600 069. 500 adolescent girls who fill the criteria were selected for the study. The parents of the students were informed about the test and written consent was obtained. Socio-demographic details regarding symptoms and signs of anemia were recorded using a pretest proforma. Hemoglobin was assessed by the cyanmethaemoglobin method. Socio-demographic details such as age, type of family, birth order, socioeconomic status of parents, personal hygiene, usage of sanitary latrine, and details regarding symptoms and signs of anemia were recorded using a pretest proforma. Height was measured with an inch tape to the nearest centimeter. Subjects were requested to stand upright without footwear with their back against the wall, with feet together and eyes directed forward. Weight was measured using a bathroom weighing machine that was kept on a firm horizontal surface. Subjects were asked to remove their footwear and then the weight was recorded to the nearest kilogram. The 0 mark in the weighing machine was checked before weighing each student to avoid errors in reading to categorize the girls into underweight, normal, overweight, and obese. Hemoglobin was assessed by the cyanmethemoglobin method. The same lab technician and same instrument were used during the whole study period. The subjects were made to sit and the fingertip was cleaned using spirit and cotton. The cleaned fingertip was pricked using a disposable sterile needle and blood of about 0.02 ml was drawn using a pipette and mixed with drabkin's solution of 5 ml in a test tube. Then the blood mixed solution was shaken and allowed to stand for 5 minutes for the RBCs to lyse and the hemoglobin to convert into cyanmethemoglobin. The hemoglobin was measured using a calorimeter after 5 minutes. Methods for hemoglobin determination are many and varied. The most widely used automated method is the cyanmethemoglobin method. To perform this method, blood is mixed with Drabkin's solution, a solution that contains ferricyanide and cyanide. The ferricyanide oxidizes the iron in the hemoglobin, thereby changing hemoglobin to methemoglobin. Methemoglobin then unites with the cyanide to form cyanmethemoglobin. Cyanmethemoglobin produces a color that is measured in a colorimeter. The color relates to the concentration of hemoglobin in the blood. For interpretation of anemia cut-off, the percent for hemoglobin was taken as <11.5 gm/dl for girls < 11 years and <12 gm/dl for girls >12 years.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Inclusion Criteria

The study included the adolescent girls who were: Aged between 13 - 25 years and who attained menarche and who are willing to participate in the study and available during the data collection procedure.

Exclusion Criteria

Adolescent girls who were, absent during the study period, under the treatment of anemia, not willing to participate.

Statistical Analysis

The data were subjected to statistical analysis using the package of the SPSS 20.0 version. The statistical test used to determine the attributes include descriptive statistics and the chi-square test. The level of significance was fixed at 5%.

RESULTS

[Table1] Among the total 500 study subjects, 50.4% of them were <12 years and 49.6% of them were >13 years of age.

[Table 3] None of the girls out of 500 had symptoms like breathlessness, palpitation, pedal edema, or fatigue. Loss of appetite was present in 27 girls.

[Table4] 134 adolescent girls have pallor in conjunctiva altogether. Going by pallor, anemia is found to be 26.8%.

[Table5] Among 249 girls, 48.2% attained menarche at the age of 13 years. Only 6% attained menarche before the age of 10 years.

[Table6] There is a statistically significant association exists between the age of the girls and anemic status. Chi-square value – 46.94. p-value – 0.001.

[Table7] The means Hb level in two groups is found to be different and it is statistically significant. to value = 5.988,P-value = <0.001

[Table8] There is no significant association between anemia status and age at onset of menarche/duration of the post-menarcheal period. Chi-square value – 0.934, p-value – 0.628

[Table9] 70% of weight children are anemic. A statistically significant association is found between the level of nutrition and anemia status. Chi-square value – 6.37, p-value – 0.041

Table 1: Age Distribution Among The Study Subjects

Age(in Years)	Number	Percentage
<12	253	50.4%
>13	247	49.6%
Total	500	100

Table 2: Severity of Anemia

Anemia stage	Total no of participants =500 (%)
Normal (11-14 g/dL)	180(29.4%)
Mild (9-10.9 g/dL)	129(47.4%)
Moderate (7-8.9 g/dL)	141(15%)
Severe (< 7 g/dL)	50(8%)

Table 3: distribution of symptoms of anemia among the adolescent girls

Symptoms	Present	Absent	Total
Breathlessness	0	500	500
Palpitation	0	500	500
Pedal edema	0	500	500
Fatigue	0	500	500
Loss of appetite	27	473	500

Table 4: distribution of pallor in various sites among the adolescents girls

Presence of Pallor	Present	Absent
Nail	19	481
Conjunctiva	134	366
Palm	21	479
Tongue	39	461

Table 5: distribution of age at menarche among the adolescent girls

Age at Menarche (in years)	Number	Percentage
9	3	1.2
10	12	4.8
11	24	9.7
12	75	30.1
13	120	48.2
14	15	6.0
Total	249	100

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 6: age-wise distribution of anaemic status in the study subjects

Age	Anemia				Total	
	Present		Absent			
	No.	%	No.	%	No.	%
<12 years	110	43.5	143	56.5	253	50.6
>13 years	182	73.7	65	26.3	247	49.4
Total	292	58.4	208	41.6	500	100

Table 7: mean and standard deviation of hb level between the girls who attained menarche and not attained

Hb Level	Number	Mean	Standard Deviation
Girls not attained menarche	251	11.879	1.2245
Girls attained menarche	249	11.086	1.7015

Table 8: anaemia status versus duration of post-menarcheal period

Post menarche Duration	Anemia Status				Total	
	Present		Absent			
	No.	%	No.	%	No.	%
1 year	128	72.7	48	27.3	176	70.7
2 years	34	73.9	12	26.1	46	18.5
>3 years	22	81.5	5	18.5	27	10.8
Total	184	73.9	65	26.1	249	100

Table 9: distribution of anaemia status based on body mass index

Body Mass Index	Anemia Status				Total	
	Present		Absent			
	No.	%	No.	%	No.	%
Under weight	25	69.4	11	30.6	36	7.2
Normal	231	59.7	156	40.3	387	77.4
Over Weight and Obese	36	46.8	41	53.2	77	15.4
Total	292	58.4	208	41.6	500	100

DISCUSSION

WHO (2005) reported that iron deficiency anemia is the most common nutritional disorder in the world. Globally anemia affected 1.62 billion people which corresponds to 24.85% of the population. However, in the population with the greater number of individuals that is nearly 95% of them were non-pregnant women.[11] The national nutritional anemia control program in India is implemented through the primary health centers and sub-centers. It aims at decreasing the prevalence and incidence of anemia in the woman of reproductive age. Iron deficiency is the most prevalent micronutrient deficiency and anemia is associated with impaired cognitive functioning, lower school achievement, and most likely lower physical work capacity.[12] Adolescent girls are at risk of developing iron-deficient anemia because of the increased iron requirement for growth. The difference in nutritional needs widens after the onset of puberty. Anemia in post-menarche is due to added burdens like menstrual blood loss which precipitates the crises often. Indian girls from affluent backgrounds are found to have a slightly lower age at menarche (12.5 yrs) compared to those of European origin in the United States (12.8 yrs).[13] The American girls, of American origin, have the same age at menarche as Indian girls. In this study, the majority of the girls have attained their menarche at 13 yrs. Similar findings are observed by Gupta VM et.al in which the mean age at menarche is 13.5 yrs ± 1.03yrs. Within India, girls from Urban Delhi have an average menarche age of 12.3 yrs.[14] Out of total study subjects, 49.8% are post-menarcheal. Prevalence of anemia in post menarcheal girls were much higher compared to the pre menarcheal girls (73.9% versus 43%). This difference was statistically significant. The higher prevalence may be explained by the fact that menstrual blood loss is a significant parameter for anemia. Mean Hb for pre-menarche girls was found to be 11.87 whereas, for post-menarche, it was 11.08 in the present study. This difference is statistically significant (P-value 0.001). In developing countries, parasitic infections and other infectious diseases are more common which peak the requirements of iron in the human body.[15] In the present study, there is a statistical association between Hb status and personal hygiene (Table No. 14; P-Value 0.001). Similarly, Gawarikar R et. al. have observed a statistically significant association between personal hygiene and anemia, i.e. 63% of anemic individuals have very poor personal hygiene.[16] Likewise, a similar finding has been observed by Indupulli. et al in their study 53.6% of subjects with poor personal hygiene were anemic. In the present study, there is a statistically significant association between body mass index and the hemoglobin status (P-value 0.041).[17] Joyce M Block et.al conducted a study on the prevalence of anemia among adolescent girls of the scheduled caste community of Punjab. The study concluded that only 29.43% of girls were normal and 70.57% were affected with various grades of anemia condition among them 30.57% of girls were mildly anemic and 27.17% were moderately anemic and

ISSN (O): 2687-5365; ISSN (P): 2753-6556

12.83% suffered from severe anemic.[18] Julia Critchley et.al stated that adolescent girls were a particularly vulnerable group as their requirements for iron as well as its uses in the body are high. Anemia during adolescence limits growth and delays the onset of menarche, which in turn may later lead to Cephalo Pelvic disproportion. Every often in India, girls get married and become pregnant even before the growth period is over, making anemic girls double risky.[19,20]

CONCLUSION

Prevalence of anemia in adolescent girls is high (58.4%). The difference in nutritional needs widens after the onset of puberty. Lack of personal hygiene is found to be a major factor contributing to the prevalence of anemia. The higher prevalence of anemia among post-menarche can be explained by the fact that menstrual blood loss is a significant parameter of anemia. Continuous education and awareness program regarding anemia is necessary among adolescent girls to prevent risk factors of anemia and mitigate the adverse effect of anemia in pregnancy. Early detection and management strategies should be adopted to prevent anemia.

REFERENCES

1. Kishore S, Singh M, Jain B, Verma N, Gawande K, Kishore S, et al. A study to assess prevalence of anaemia among beneficiaries of Anaemia Mukt Bharat Campaign in Uttarakhand. J Family Med Prim Care. 2020;9(3):1691-1694. doi: 10.4103/jfmpc.jfmpc_941_19.
2. AbalkhailB, Shawky S. Prevalence of daily breakfast intake, iron deficiency anaemia and awareness of being anaemic among Saudi school students. Int J Food Sci Nutr. 2002;53(6):519-28. doi: 10.1080/09637480220164370.
3. EngidawMT, Wassie MM, Teferra AS. Anemia and associated factors among adolescent girls living in Aw-Barre refugee camp, Somali regional state, Southeast Ethiopia. PLoS One. 2018;13(10):e0205381. doi: 10.1371/journal.pone.0205381.
4. AkramipourR, Rezaei M, Rahimi Z. Prevalence of iron deficiency anemia among adolescent schoolgirls from Kermanshah, Western Iran. Hematology. 2008;13(6):352-5. doi: 10.1179/102453308X343383.
5. AlaofèH, Zee J, Dossa R, O'Brien HT. Education and improved iron intakes for treatment of mild iron-deficiency anemia in adolescent girls in southern Benin. Food Nutr Bull. 2009;30(1):24-36. doi: 10.1177/156482650903000103.
6. BaralKP, Onta SR. Prevalence of anemia amongst adolescents in Nepal: a community based study in rural and urban areas of Morang District. Nepal Med Coll J. 2009;11(3):179-82.
7. VasanthiG, Pawashe AB, Susie H, Sujatha T, Raman L. Iron nutritional status of adolescent girls from rural area and urban slum. Indian Pediatr. 1994;31(2):127-32.
8. Kapoor D, Agarwal KN, Sharma S, Kela K, Kaur I. Iron status of children aged 9-36 months in an urban slum Integrated Child Development Services project in Delhi. Indian Pediatr. 2002;39(2):136-44.
9. Stellinga-Boelen AA, Storm H, Wiegersma PA, Bijleveld CM, Verkade HJ. Iron deficiency among children of asylum seekers in the Netherlands. J Pediatr Gastroenterol Nutr. 2007;45(5):591-5. doi: 10.1097/MPG.0b013e31810e76a5.
10. Deshmukh PR, Garg BS, Bharambe MS. Effectiveness of weekly supplementation of iron to control anaemia among adolescent girls of Nashik, Maharashtra, India. J Health PopulNutr. 2008;26(1):74-8.
11. Singh M, Rajoura OP, Honnakamble RA. Assessment of Weekly Iron-Folic Acid Supplementation with and without Health Education on Anemia in Adolescent Girls: A Comparative Study. Int J Prev Med. 2020;11:203. doi: 10.4103/ijpvm.IJPVM_552_18.
12. da Silva Lopes K, Yamaji N, Rahman MO, Suto M, Takemoto Y, Garcia-Casal MN, et al. Nutrition-specific interventions for preventing and controlling anaemia throughout the life cycle: an overview of systematic reviews. Cochrane Database Syst Rev. 2021;9(9):CD013092. doi: 10.1002/14651858.CD013092.pub2.
13. KumariR, Bharti RK, Singh K, Sinha A, Kumar S, Saran A, et al. Prevalence of Iron Deficiency and Iron Deficiency Anaemia in Adolescent Girls in a Tertiary Care Hospital. J Clin Diagn Res. 2017;11(8):BC04-BC06. doi: 10.7860/JCDR/2017/26163.10325.
14. Gupta VM. Adolescent Health. Indian J Public Health. 2001;2:42-47.
15. ChandrakumariAS, 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;8(4):1414-1417. doi: 10.4103/jfmpc.jfmpc_140_19.
16. ChandrakumariAS, 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;8(4):1414-1417. doi: 10.4103/jfmpc.jfmpc_140_19.
17. SivagurunathanC, Umadevi R, Rama R, Gopalakrishnan S. Adolescent health: present status and its related programmes in India. Are we in the right direction? J Clin Diagn Res. 2015;9(3):LE01-6. doi: 10.7860/JCDR/2015/11199.5649.
18. Malhotra S, Patra BN. Prevalence of child and adolescent psychiatric disorders in India: a systematic review and meta-analysis. Child Adolesc Psychiatry Ment Health. 2014;8:22. doi: 10.1186/1753-2000-8-22.
19. Darshana LG, Uluwaduge DI. Validation of the WHO HemoglobinColor Scale Method. Anemia. 2014;2014:531670. doi: 10.1155/2014/531670.
20. BarduagniP, Ahmed AS, Curtale F, Raafat M, Soliman L. Performance of Sahli and colour scale methods in diagnosing anaemia among school children in low prevalence areas. Trop Med Int Health. 2003;8(7):615-8. doi: 10.1046/j.1365-3156.2003.01062.x.

ISSN (O): 2687-5365; ISSN (P): 2753-6556