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Original Research Article

Prevalence of anemia and factors affecting anemia among adolescent girls under field practice area of rural health training centre of western Maharashtra

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ABSTRACT

Background: India has the largest adolescents population in the world, 253 million, nearly 23 percent of India's population. Adolescents anemia is severe public health problem in India, 59.1% by NFHS. As adolescent age is formative years for development, anemia at this stage of life has some long-term consequences, as maternal and foetal deaths.
Methods: It was observational cross sectional study under field practice area of Rural Health Training Centre of Western Maharashtra. 350 adolescent girls were interviewed using predesigned, pretested questionnaire and their anemic status was assessed by hemoglobin estimation. Results were analyzed with the help of Microsoft Excel.
Results: The prevalence of anemia in this study was found to be 64.8%. The prevalence of mild and moderate anemia among study participants was 29.4 and 35.4%, respectively. Mean age of study participants was 14.8±2.36 years. The majority 68.57% of girls were Hindu by religion and nuclear family (43.42%). Most of the girls belonged to socioeconomic class III (30%) followed by class IV (21%). A significant association was found between the prevalence of anemia with, educational status of mother, and status of attainment of menarche with excessive bleeding and not receiving iron folic acid tablets and girls had history of worm infestation ($p<0.05$).
Conclusions: The prevalence of anemia among adolescent girls was very high, as compared to 59.1% by NFHS-5, which was higher in lower socio-economic strata and among those whose mothers were less educated and who attained menarche with excessive bleeding and not receiving iron folic acid tablets with history of worm infestation.

Keywords: Adolescent, Anemia, Menarche

INTRODUCTION

Anaemia is currently one of the most common and intractable nutritional problems globally. Anemia impairs cognitive and motor development among children, increases their susceptibility to illness, and in adults reduces work capacity and productivity. Adolescents (age 10-19 years) are at high risk of iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy. India has the largest adolescents population in the world, 253 million, nearly 23 percent of India's population.[1-,3] Irrespective of severity, prevalence of anemia among adolescent girls ranges between 17%-90% within the South-East Asia region, is particularly affecting populations living in rural settings, in poorer households and who have received no formal education.

Adolescents anemia is severe public health problem in India, 59.1% by NFHS-5.[4] In Indian girls, the highest

prevalence of anaemia is reported between the ages of 12-13 years which also coincides with the average age of menarche. As adolescent age is formative years for development, anemia at this stage of life may have some long-term consequences, as maternal and foetal deaths. Several factors as nutritional deficiencies, infections, chronic diseases, gynecological and obstetric conditions, and inherited red blood cell disorders and socio-demographic factors affects anemia most of which are preventable causes.[5-6]

Adolescents are the future generation of any country and their health and well-being are important for the progress of society. Anemia in adolescent girls not only affects the present status of their health but also shows its deleterious effect when they become mothers. The control of anemia in pregnant women can be more easily achieved if a satisfactory nutritional status can be ensured during adolescence. [7]

The prevalence of anemia among adolescent girls in rural area of Osmanabad district, Maharashtra and rural areas of Western India was observed to be 67.4 and 42.73%, respectively in previous studies.[15] In spite of the vast body of literature on anemia, a research gap remains, particularly in determining its prevalence and factors affecting anemia. Therefore, the present study was undertaken to find out the prevalence of anemia in adolescent girls and to study the factors affecting anemia in rural western Maharashtra, India.

METHODS

A cross-sectional study was conducted under field practice area of Rural Health Training Centre of western Maharashtra. The study period was 6 month (1 Feb 2024 to 31 July 2024). Approval from institutional ethical committee was sought.

Inclusion criteria

Adolescent girls of age 10 to19 years residing in field practice area of Rural Health Training centre and who are willing to participate in the study were included.

Exclusion criteria

The locked houses at 3 consecutive visit and married girls were excluded.

Sample size

The prevalence of anemia in Adolescent girls was 65.7% in one of the studies on rural adolescent girls in Aurangabad Maharashtra 2023.[7] With level of significance set at 5% with 95% confidence interval sample size calculated 350. Total population of field practice area is 20248. As per Anganwadi centres record, there were 1487 adolescent girls aged 10-19 years. Out of the total adolescent girls, the desired sample size of 350 was selected by systematic random.

Data regarding variables affecting on anemia was collected using predesigned and semi-structured questionnaires. Haemoglobin estimation done by capillary blood sample was collected from index finger with cutting needle using aseptic measures and haemoglobin estimation was done by using Sahli's haemoglobinometer.[8] For interpretation of anemia, cut-off point for hemoglobin level taken was <12g/dl. Results were analyzed by the help of Microsoft Excel.

RESULTS

A total of 350 adolescent girls were selected for the study using systematic random sampling. The prevalence of anemia in this study was found to be 64.8%. The prevalence of mild and moderate anemia among study participants was 29.4 and 35.4%, respectively (Figure 1).

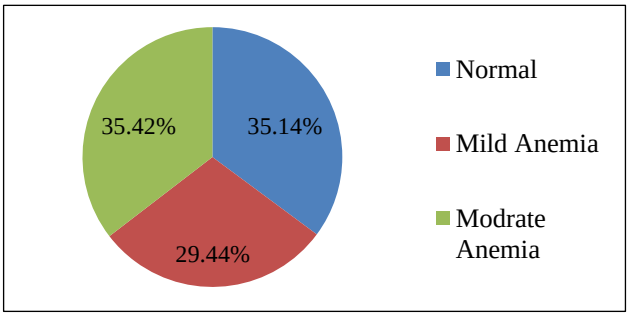

Figure 1: Prevalence of anemia among adolescent girls (n = 350).

Mean age of study participants was 14.8±2.36 years. 50.47% early adolescent girls (n=105) were anemic, 77.84% mid adolescent girl (n =158) were anemic and 50.47% late adolescent girls (n=87) were anemic (Figure-2).

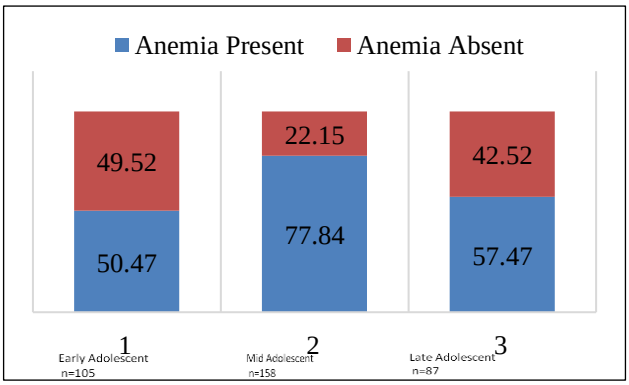

Figure 2: Distribution of girls according to age group and anemia (n = 350).

The majority 68.57% of girls were Hindu religion and belonged to a nuclear family (43.42%). As per the

modified BJ Prasad classification, most of the girls belonged to socioeconomic class III (30%) followed by class IV (21%). A significant association was found between the prevalence of anemia with, educational status of mother, and status of attainment of menarche with excessive bleeding and not receiving iron folic acid tablets tablets and girls had history of worm infestation. ($p<0.05$) (Table 1).

Table 1: Association between socio-demographic, other factors and anemia among adolescent girls.

Variables	Anemia		Total (%)	Chi-square test
	Present (%)	Absent (%)		
Religion				$\chi2 = 2.25$ df = 1, p> 0.05
Hindu	155 (64.58)	85 (35)	240 (68.57)	
Muslim	44 (64.7)	24 (35)	68 (19.42)	
Others	30 (71.42)	12 (28.57)	42 (12)	
Type of family				
Nuclear	89 (71)	63 (50.4)	152 (43.42)	$\chi2 = 6.93$, df = 2, p < 0.05
Joint	83 (74)	29 (25.89)	112 (32)	
3 Generation	57 (66.27)	29 (33.72)	86 (24.57)	
Socioeconomic class				
Class 1	11 (26.19)	31 (73.80)	42 (12)	$\chi2 = 78.05$ df = 4, p < 0.01
Class ii	35 (49.29)	36 (50)	71 (20)	
Class iii	68 (64.15)	38 (35.8)	106 (30.28)	
Class iv	63 (82.89)	13 (17.1)	76 (21.71)	
Class V	52 (94.54)	3 (5.45)	55 (15.71)	
Mother's education				
Illliterate	17 (85)	3 (15)	20 (5.7)	$\chi2 = 28.06$ df = 4, p = 0.01
Primary	30 (71)	12 (28.57)	42 (12)	
Secondary	133 (72.28)	51 (27.71)	184 (52.57)	
Higher secondary	41 (50.61)	40 (49.38)	81 (23.14)	
Graduate and above	8 (34.78)	15 (65.21)	23 (6.57)	
Menarche				$\chi2 = 35.43$, df = 1, p< 0.001
Attained	206 (72.79)	77 (27.2)	283 (80.85)	
Not attened	23 (34)	44 (65.67)	67 (19)	
Excessive bleeding				$\chi2 = 4.166$ df = 1, p< 0.041
Yes	44 (77.19)	13 (22.8)	57 (16.2)	
No	185 (63.10	108 (36.8)	293 (83.7)	
Weekly iron folic acid taken				$\chi2 = 8.693$ df = 1, p< 0.0032
Yes	7 (35)	13 (65 0	20 (5.8	
No	222 (67.27)	108 (32.7)	330 (94.2)	
Worm infestation				
Yes	126 (73,2)	46 (26.7)	172 (49.1	$\chi2 = 9.16$ df = 1, p< 0.002
No	103 (57.8)	75 (42,1	178 (50)	
Diet				$\chi2 = 2.04$ df = 1, p> 0.152
Mix	182 (67.4)	88 (32.5)	270 (77.14	
Veg.	47 (58.7)	33 (41,2)	80 (22.8)	
Total	229 (65)	121 (34.5.	350 (100)	

DISCUSSION

This study reflected prevalence of anemia, socio-demographic and other factors affecting anemia among adolescent girls under field practice area of Rural Health Training Centre of western Maharashtra. Anemia is one of the major public health problems among adolescent girls, especially in the rural areas of India. The prevalence of anemia in this study was found 64.8%. Similar prevalence reported by Dutt et al (61%) and Bodat et al (87.6%) in Maharashtra.[8,9] High prevalence can be attributed to menstrual blood loss, post menarche, adolescent age group.

In the present study, mean age of study participants was 14.8±2.36 years and 77.84% mid adolescent girl (n =158) and 50.47% late adolescent girls (n=87) were anemic as similarly Subramanian et al study the prevalence of

anemia was more than 50% among late adolescents (15-19 years).[10]

Most of the girls belonged to low- socioeconomic class 94.54 % were anemic in the present study and in the study Gore et al revealed that 106 (99%) of girls from the upper-lower socioeconomic group found to be anemic. Low socioeconomic factors, such as poverty, limited access to healthcare, inadequate nutrition, and suboptimal living conditions, contribute to anemia's prevalence. Limited financial resources often lead to reduced food diversity, which can result in poor iron intake adolescent girls from these backgrounds are less likely to receive regular health check-ups and iron supplementation.[15]

A significant association was found between the prevalence of anemia with, educational status of mother in the present study as in Nair et al study 70.9% girls were anemic those mother illiterate.[7] Several factors were identified as associated with anemia, including mothers' illiteracy, belonging to a low socioeconomic class of family. There is need for developing and implementing policies to improve and eliminate these socioeconomic disparities.

77.19% girls had anemia with excessive bleeding, in the present study. A significant association was found between the prevalence of anemia with excessive bleeding ($p<0.05$) in our study. The International Federation of Gynecology and Obstetrics provides a broader definition of high menstrual bleeding: they identify the condition as excessive menstrual blood loss that interferes with a woman's physical, emotional, social, and material quality of life. Similarly, history of excessive menstrual bleeding were significantly associated with anemia in Dutt et al study.[8,16]

The present study shows that the prevalence of anemia among adolescent girls who had attained menarche was 72.79%. Similar study done by Subramanian et al reported that 71.7% adolescent girls were anemic who had attained menarche.[10]

In our study Weekly IFA was not given to 65.9% adolescent girls which was significantly associated with anemia. As study done by Mulianingsih et al and Soman et al concluded that adherence to consuming iron supplements during menstruation was essential.[11,12] Anemia Mukt Bharat (AMB) was launched in India to reduce anemia. The weekly iron and folic acid supplementation (WIFS) program is an evidence-based response to the prevailing anemia situation among adolescents and includes weekly supervised ingestion of iron and folic acid supplementation and bi-annual helminthic control.

History of worm infestation were significantly associated with anemia in Dutt et al study, Jeff Walter Rajadurai stated that parasitic worms lodged in the gut for a long time can lead to persistent anemia, similarly as in the present study significant association was found between the prevalence of anemia with history of worm infestation ($p<0.05$).[8,13]

In Mahajani et al study concluded that prevalence of anaemia was higher observed in vegetarian group as in this study it was 58.7% in vegetarian group but not statistically significant.[14]

Multiple factors affecting anemia; the study did not include other important factors such as nutritional status, infections, chronic diseases, and inherited red blood cell disorders. These are limitations of this study.

CONCLUSION

The prevalence of anemia among adolescent girls was very high, as compared to 59.1% by NFHS-5, which was higher in lower socio-economic strata and among those whose mothers were less educated and who attained menarche with excessive bleeding and not receiving iron folic acid tablets with history of worm infestation early intervention are necessary to reduce the prevalence of anemia in mild and moderate stage.

Recommendations

Improvement in mother's educational status and socio-economic status. There is need for regular supply of iron and folic acid tablets with supervisory biannual worm infestation control.

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