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A Study on Prevalence of Anemia and Effect of Weekly Iron and Folic Acid Supplementation Program, Among School Adolescent Girls of Rural Field Practicing Area of PIMS, Karimnagar (TS)

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Abstract

Introduction: Anemia is a common nutritional problem worldwide. It is an issue of public health concern for all countries. According to WHO estimates, 2 billion people all over the world are anemic. Among them, 50% are due to iron deficiency. Iron deficiency anemia can occur at each stage of the life cycle. Although, certain critical stages of life include antenatal period, first five years of age and adolescence.

Objective: 1. To estimate the prevalence of anemia among school going adolescent girls in the rural field practicing area of PIMS, Karimnagar District. 2. To identify the risk factors associated with anemia among school going adolescent girls 3. To study the effectiveness of weekly iron & folic acid supplementation on anemia

Methods: This study was planned to estimate the prevalence and the risk factors associated with anemia and effectiveness of weekly iron and folic acid supplementation program among school going adolescent girls aged 13 to 17 in rural field practicing area, RHTC, of PIMS, Karimnagar. Study design: Observational study, Study population: School going adolescent girls of age 13 to 17 years. Study period: June 2023 to November 2023 including data analysis Participants were assessed through pre-tested questionnaire, with prior written informed consent.

Results: This study estimated that the prevalence of anemia was74.6 % (95% C.I: 69.2 – 80) in the study population and remaining 25.4% (95 % C.I: 20 – 30.8) students were normal. Majority of the girls (65.8% with 95% C.I.: 60.4 – 71.50) were affected by mild anemia. This study also estimated 7.7% had moderate and only1.1%were affected by severe anemia.

Conclusions: Prevalence of anemia was significantly associated with type of the family, maternal education, socio economic status, junk food intake, IFA supplement intake, dysmenorrhea and menorrhagia in the study population. The weekly iron-folic acid supplementation and regular de-worming program was beneficial to reduce the prevalence of anemia

Introduction

According to the World Health Organization, adolescence has been defined as the period of life between 10-19 years of age.[4] the world population has 1 to 2 billion adolescents out of which, one-fifth live in India. Approximately half of the Indian adolescent population are girls.[5] Anemia and malnutrition are the major nutritional health consequences in adolescent girls. Anemia can occur due to multiple reasons, out of which Iron deficiency plays an important role. The relative proportion of causes can probably vary between different populations and geographical regions according to the conditions prevalent there.[1,8,9] Adolescent girls need extra iron requirement due to onset of menstruation in addition to physical growth. Anemia is caused by other factors such as deficiency of micronutrients, acute or chronic infections, and haemoglobinopathies. Iron deficiency anemia in addition to affecting the motor and cognitive development, also causes fatigue and low productivity in young adults and adolescents.[10,11]

Reduced iron stores during childhood might manifest as impaired immune response and delayed menarche. Anemia in adolescent girls, in future attributes to high maternal mortality rate, high perinatal mortality and increased incidence of low-birth-weight babies. It can also have a negative impact on the infant's iron status.[12,13]

As adolescent anemia is a critical public health problem in India. The Ministry of Health and Family Welfare, Government of India, has launched the Weekly Iron and Folic Acid Supplementation (WIFS) Program in 2012 to reduce the prevalence and severity of nutritional anemia in adolescent population (10-19 years). Under the WIFS program for adolescents, IFA supplements are to be distributed free of cost on a weekly basis to the target group and in addition to weekly IFA supplements, Albendazole tablets for de-worming are to be administered twice a year to the same target groups and information and counselling for improving dietary intake and for taking actions for prevention of intestinal worm infestation.32There is very little data available on effectiveness of WIFS to control anemia. Hence, this study was planned to be conducted among the school going adolescent girls of age 13 to 17 years residing at rural area of Karimnagar district. The study aims to estimate the prevalence of anemia as well as to study specific associated factors like socio demographic factors, dietary factors and menstrual factors and effectiveness of weekly iron and folic acid supplementation program. Adolescent anemia is most common nutritional problem affecting the reproductive period, pregnancy and childbirth.

Methods

An observational study was conducted in 2023.This study was planned to estimate the prevalence and the risk factors associated with anemia and effectiveness of weekly iron and folic acid supplementation program among school going adolescent girls aged 13 to 17 in rural field practicing area, RHTC, PIMS, Karimnagar.

Study design: Observational study, Study population: School going adolescent girls of age 13 to 17 years Study period: June 2023 to November 2023 including data analysis Sample size estimation: For an expected prevalence (P) of 60% (0.6) with Z value of 1.96 at 95 % C.I. and with limit of accuracy (L) at 10% of P (relative precision) Q = 1- (Proportion of people without anemia) = 40 % (0.4). The sample size required for the study was calculated as follows N = (Z2 αPQ / L2) = (1.96 × 1.96 × 0.6 × 0.4) / 0.06 X 0.06 =256 Totally, 260 sample was selected for the research

Questionnaire:

- Section –A – **Socio demographic details** a) Name b) Age c) Class d) Address e) Birth order of the participant f) Type of the family g) Total no of family members h) Paternal education i) Maternal

education j) Head of family-occupation k) Socio economic status:

- Section: B – **Dietary Information** a) Do you include green leafy vegetables? Yes / No If yes, how often - Daily / Alternate/twice a week /once a week b) Do you include other vegetables? Yes / No If yes, how often - Daily / Alternate/twice a week /once a week c) Do you include CITRUS fruits in your diet? Yes / No If yes, how often - Daily / Alternate/twice a week /once a week d) Do you include milk in your diet? Yes / No

) If yes, how often - Daily / Alternate/twice a week /once a week f) Do you take junk foods? Yes /No If yes, how often - Daily / Alternate/twice a week /once a week g) Do you take IFA tablet supplementation? Yes / No 4 in a month / < 4 in a month

Section: C - **Menstruation Information** a) Age at menarche b) Frequency of menstrual cycle Normal/ Polymenorrhea (21-35ays) / (5days d) Menorrhagia > 5 days / > 3pads - day/ blood clots f) Dysmenorrhea: Present /Not present g) Menstrual cycle: Regular /Irregular

Section – D **Anthropometric data** a) Height b) Weight c) B.M.I. Clinical examination Signs of Anemia: Biochemical data: Haemoglobin1: gm/dl

Results:

Study was conducted to estimate the prevalence of anemia and risk factors associated with anemia among adolescent girls and effectiveness of weekly iron and folic acid supplementation program in 13 to 17 years of age. Five Government schools were selected under RHTC. A total of 260 school going adolescent girls were included.

Table 1: Distribution of age among WIFS program study group

Age (in completed yrs)	N (%)
13	52 (20)
14	50 (19.2)
15	52(20)
16	55(21.2)
17	51(19.6)

Figure 1: Distribution of age among WIFS program study group

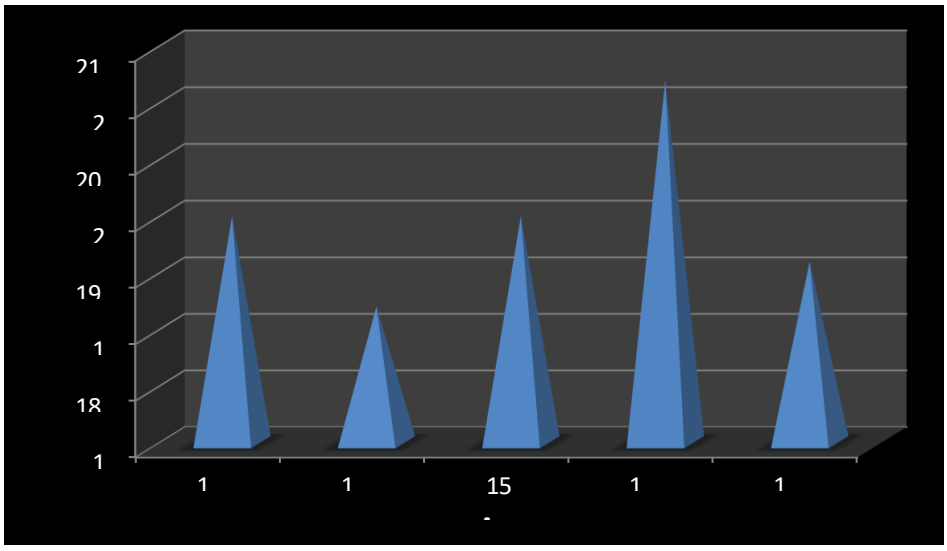

Table 2: Distribution of type of family among WIFS program study group.

Type of family	N (%)
Nuclear family	216(83.1)
Joint family	44(16.9)

Table 3: Distribution of SES among WIFS program study group

Class	**N (%)**
Upper	0
Upper middle	1.5
Middle	20.8
Lower middle	44.6
Lower	33.1

Table 4: Categories of anemia among WIFS program study group

Anemia	**Percentage**
Mild	65.8
Moderate	7.7
Severe	1.1

Normal	25.4

Table 5: IFA supplementation intake & deworming among WIFS program study group:

ıption of iron tablets	Yes	56	P <0.001
	No	44	
ming in last 6 months	Received	52	P < 0.001
	Not received	48	
story of worm infestation	Present	16	P <0.018
	absent	84	

Table 6: Distribution of Birth Order among WIFS program study group.

Birth order	**N (%)**
First	87(33.5)
Second	93(35.8)
Third and above	80(30.7)

In this study, majority of the participants were from nuclear families 216 (83.1%) while the rest of them, 44(16.9%) were from joint families. Education status of parents / paternal occupation: Half of the participants had fathers who were either illiterate (19.2%) or completed primary school (31.9%). There were a higher proportion of illiterates among the mothers of the study participants (23.1%). The rest of them had completed their primary school (32.3%), high school (26.2%) or higher secondary school (17.7%). Only two mothers were graduates. Agriculture was the predominant occupation of the head of the family among three-fourths of the study participants. Modified B.G. Prasad socio economic scale based on per capita income of the family was used for SES classification. 44.6% of the people belonged to lower middle class (Class IV) and 33.1% of them belonged to lower class (Class V).

Based on severity of anemia, participants were classified into mild, moderate and severe. In which two third (65.6 %) of the adolescent girls are affected by mild anemia, 7.7 % are affected by moderate anemia and only 1.1% were affected by severe anemia. Mild anemia was found to be higher in this study group. Remaining 25.4 % of the adolescent girls were found to be healthy. 69 | P a g e Compared to NFHS -4 surveys (59.8%), this study found that higher prevalence (74.6%) of anemia in the study area. Study results found to be higher prevalence when compared to National average of anemia. 51, 53 Suman Bod et. al.97 conducted in Maharashtra, found that the prevalence is 87.6%. Siddharam et.al. 58 found the prevalence of anemia was 45.6% in adolescent girls. Studies to estimate the prevalence of anemia among adolescent girls, Kaurs et.al. 71 conducted in rural Wardha found that the prevalence of Anemia in those areas was 59.8%, The difference between the age groups was statistically significant. Similarly, the study conducted by Sanjeev et.al. 84 reported that the prevalence of anemia was high among late adolescents as compared to early and mid -adolescents.

This study was found a statistically significant (p value: 0.02, OR: 0.466 (0.235- 0.925) association between type of the family and the prevalence of Anemia, in contrast to the study by Rawat et. al. 61where the prevalence was found to be higher in joint families. In this study, association between birth order of the participant and anemia prevalence was not significant in contrast to the study conducted by Rawat et. al. 61. This study found that there was a significant association between maternal education and anemia. This was found to be statistically significant [p value: 0.03, OR: 0.53 (95%; 0.30 to 0.94)] but not associated with paternal education. Rajaratnam et. al. 54 , 70 | P a g e choi et.al. 63 had reported similar findings that a significant association between anemia and parental educational status, particularly maternal education.

In this study prevalence of anemia was significantly associated with lower socioeconomic status (P < 0.01, COR – 7.5 (95% C.I. 3.95 to 14.34). similar studies KaurS et. al. 64 and Gawarika et. al. 71 found that significant association between lower socio-economic status and anemia. Saluja N et.al. 62found that the prevalence of anemia was significantly higher among adolescent girls belonging to joint family (45.2%) than nuclear family (28.3%).

Prevalence of anemia was also found to be significantly higher in those adolescent girls having illiterate (42.2%) and just literate mother (51.9%) as compared to better literate mothers, Dietary variables studied in this study were frequency of citrus fruits intake, green leafy vegetables intake, consumption of milk, junk food intake and IFA supplementation intake were studied.

This study found a strong association between frequency of junk food intake and the prevalence of anemia. Strong association between IFA intake and prevalence of anemia [p value: <0.01, OR: 3.12 (95% C.I. 1.66 to 5.86)] was found in this study, which is similar to studies of P.R Deshmukh, Sheila C et. al

This study found that mean age at menarche was 13.24 ± 0.93 with 95% C.I. of 13.13 to 13.36 with distribution on 12 to 16 years. In this study menstruation related Variables studied were age at menarche, polymenorrhea, regularity of menstrual Cycle, menorrhagia, dysmenorrhea. In this study there was a statistically significant association [p value: 0.01, OR: 0.41 (95 % C.I: 0.22 TO 0.74)] between menorrhagia and the prevalence of anemia. These results are similar to Piush kanodia et. al. In this study, found that compliance of iron and folic acid tablets was not good, and adolescent girls consuming IFA tablets were less likely anemic compared to those not consuming with significant difference. This is similar to other studies of P.R Deshmukh, Srivastava A et. al. 72, 89 in India. Positive history of passage of worms was significantly related to anemia, this is consistent with findings of other studies, Srivastava A, Dutt R. In the current study the overall prevalence of anemia was 74.6%. The proportion of mild, moderate and severe Anemia was 65.6%, 7.7% and 1.1% respectively. After one year of IFA supplementation the mean hemoglobin concentration increased from 10.5 g/dl to 11.6 g/dl i.e.,1.1gm/ dl, and this difference in rise in haemoglobin level was found Statistically significant. The average compliance rate was 56%.In the present study prevalence of all grades of anemia reduced significantly from the baseline and the proportion of normal (non-anemia) girls increased from 25.4% to 37.4%. Thus, the benefit of the program is reaching almost every participating adolescent girl. It was observed in rise in haemoglobin concentration after IFA supplementation. The weekly administration of iron and folic acid supplements is practical and effective strategy to prevent anemia among adolescents. In present study, prevalence of mild anemia reduced by 10%. This observation is consistent with studies conducted by Deshmukh PR et. al.[7] (10%)

IFA stock out was a key barrier. Lack of training led to a lack of awareness about procedures for procurement of tablets. Each school was expected to make a requisition of IFA tablets; however, none of the school made any requisitions and 74 | P a g e relied on whatever supplies it received. Teachers did not immediately address these stock outs, as they perceived their role was limited to distribution. This IFA stock out is despite the allocation of dedicated funds for WIFS program in state annual plan. There was a lack of effective training of teachers and health personnel involved in the program. The training was done during the inception of the program, 2013. One day training is not sufficient to make teacher competent in executing the program. The program should also consider the attrition of teachers.

Conclusion

In this study, the overall prevalence of anemia was high among the study population, estimated at 74.6% (95 % C.I: 69.2 –80). ➢ Majority of the girls were found to be affected by mild anemia (65.8%) in this study. ➢ Prevalence of anemia was significantly associated with type of the family, maternal education, socio economic status, junk food intake, IFA supplement intake, dysmenorrhea and menorrhagia in the study population. ➢ Other factors such as age, paternal occupation, green leafy vegetables intake, citrus fruits intake, consumption of milk, polymenorrhea, frequency of menstrual cycle was not associated with anemia. ➢ The weekly iron-folic acid supplementation and regular de-worming program was beneficial to reduce the prevalence of anemia and improve the mean hemoglobin status of the adolescent girls. The supplementation was beneficial to both anemia and non-anemia girls. All the adolescent age groups are benefited if they consume regularly

References:

1. Murray CJL, Salomon JA, Mathers CD, Lopez AD. The global burden of disease. Geneva, World

Health Organization, 2002.
2. Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe Anemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. Lancet Glob Health.2013;
3. World Health Organization. The world health report 2002: reducing risks, promoting healthy life. Geneva: WHO, 2002.
4. WHO Programming for adolescent health and development. WHO Tech Rep Ser No. 886. Geneva: World Health Organization, 1996.
5. Government of India Census Bureau (2001) Population of States and UT India (UIndia.http://www.censusindia.gov.in/Census_Data_2001/ Projected_Population / Projected_Population.pdf (accessed May 2020)
6. World Health Organisation (WHO), Global Anemia prevalence report,2011.
7. National Family Health Survey- III report
8. United Nations Children's Fund, United Nations University, World Health Organization. Iron deficiency Anemia assessment, prevention, and control: Guide for programme managers.Geneva: World Health Organization; 2001 (WHO/NHD/01.3;http://www.who.int/nutrition/publications/en/ida_assessm ent_prevention_control.pdf, accessed 7 May 2020)
9. Balarajan Y, Ramakrishnan U, Ozaltin E, Shankar AH, Subramanian SV. Anemia in low-income and middle-income countries. Lancet. 2011; 378:2123–35. Doi: 10.1016/S0140- 6736(10)62304-5.
10. Kozuki N, Lee AC, Katz J, Child Health Epidemiology Reference Group. Moderate to severe, but not mild, maternal Anemia is associated with increased risk of small-for-gestational-age outcomes. J Nutr. 2012; 142:358–62.doi:10.3945/jn.111.149237.
11. Steer PJ. Maternal hemoglobin concentration and birth weight. Am J ClinNutr. 2000; 71(5 Suppl.): 1285S–7S.
12. United Nations Children's Fund, World Health Organization, The World Bank, United Nations Population Division. Levels and trends in child mortality: report 2014.UN Inter-agency Group for Child Mortality Estimation.NewYork:UnitedNationsChildren"sFund;2014(http://www.data.u nicef.org/fckimages/uploads/1410869227_Child_Mortality_Report_2014.p df, accessed 7 May 2020).
13. Trends in maternal mortality: 1990 to 2010. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division. Geneva: World Health Organization; 2014).
14. World Health Organization; Global health estimates 2014 summary tables: deaths by cause, age and sex, by WHO region, 2000–2012. Geneva:2014 World Health Organization. The World Health Report 2002: Reducing risks, promoting healthy life. Geneva, World Health Organization, 2002.
15. World Bank report. Public health at a glance. December 2004.
16. Government of India Census Bureau (2011) Population of States and Union Territories of India. (UIndia.http://www.censusindia.gov. in/Census_Data_2011
17. Levin HM. A benefit-cost analysis of nutrition program for Anemia reduction. Res Observer. 1986; 1:219-45. 22. Webb TE, Oski FA. Behavioural status of young adolescents with iron deficiency Anemia. J. Spec. Educ. 1974; 8:153-6.
18. Scholl TO, Hediger ML, Fischer RL, Shearer JW. Anemia vs iron deficiency: Increased risk of preterm delivery in a perspective study. Am J ClinNutr. 1992; 55(5): 985-8.32.

19. Scholl TO, Hediger ML. Anemia and iron deficiency Anemia: complications of data on pregnancy outcome. Am J ClinNutr. 1994; 59(2): 492S-500S, discussions500S-501S.
20. Black RE, Allen LH, Bhutta ZA, et al. Maternal and child under nutrition: global and regional exposures and health consequences. Lancet2008; 371(9608):243-60.
21. Ezzati M, Lopus AD, Dogers A, Vander HS, Murray C. Selected major risk factors and global and regional burden of disease. Lancet 2002.
22. World Health Organization. WHO Vitamin and Mineral Nutrition / Anemia
23. Karine Tolentino, Jennifer F. Friedman. An Update on Anemia in Less Developed Countries. Am J Trop Med Hyg. 2007.
24. Yip R, Ramakrishnan U. Supplement: Forging Effective Strategies to Combat Iron Deficiency Experiences and Challenges in Developing Countries. The American Society for Nutritional Sciences J Nutr. 2002.
25. 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
26. United Nations Children Emergency Fund, 2012, Prevention and control of nutritional Anemia – A South Asia
27. Operational framework, Weekly iron & folic acid supplementation Program for adolescents – MOHFW. Available from www.mohfw.org. Accessed 5th September 2012.
28. B. Srilakhsmi (2002) Dietetics (4th edition), Adolescent nutrition
29. World population prospects, UN report2015
30. Government of India Census Bureau (2011) Population of States and UT India (UIndia.http://www.censusindia.gov.in/Census_Data_2011/ Projected_ Population / Projected_Population.pdf (accessed May 2019).
31. C.Ramaswamy and G.Venkatesh Kumar. Assessment of adolescent health problems in rural and urban areas, Journal of Indian Academy of applied psychology, Jan 2012, vol 38, No,1
32. WHO Nutrition in adolescence- Issues and challenges for health sector, 2005. 38. National Iron plus Initiative. 2013., Guidelines for control Iron deficiency
33. Nunes SMT, Yuyamada LKO, Guedes DP, Oliveira MC. Ane- mia ferroprivaematletas adolescentes da Fundação Vila Olímpi- ca de Manaus-AM. ActaAmaz 2008;
34. (2):263-6. 48. Massawe SN, Ronquist G, Nyström L, Lindmark G. Iron status and iron deficiency Anemia in adolescents in a Tanzanian subur- ban area. GynecolObstet Invest 2002; 54 (3):137-44.
35. CaballoRoig N, Garcia P, Valdemoro M, del Castillo ML, San- tos Tapia M, González Vargaz A et al. [The prevalence of ane- mia in the children and adolescents of Madrid]. Br J Nutr 1993; 70 (1): 147-55
36. Basu S, Hazarika R, Parmer V. Prevalence of Anemia among the school going adolescents of Chandigarh. Indian Paediatr 2005; 42:593-8.
37. Goyal N et al., Prevalence of Anemia among school adolescent girls: Indian journal of community health / vol 27 / issue no 03 /jul– sep 2015