Prevalence of Anemia among Adolescent Girls in Uttar Pradesh and Sharing Field Experience of Community-based Anemia Management Program

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Abstract

Introduction: The anemia management program for adolescent girls (15–19 years) was part of Eastern Uttar Pradesh Health Initiative implemented by Tata Trusts in 9 districts and 19 blocks in partnership with block level community-based organizations. Objective of the Health Initiative was to build community-based platform (In the form of Village Health and Nutrition Day – VHND) to provide primary healthcare services for basic maternal, child and adolescent health. The anemia management component in the program was based on the National Iron Plus Initiative guideline.

Objectives: To ascertain prevalence of anemia in adolescent girls registered in the program; to demonstrate a community-based model for anemia management with the help of adolescent collectivization facilitated by trained front line health workers.

Materials and Methods: Total 26,982 girls were screened in first phase of the program from April 2014; followed by second and third screenings with average duration of 3–6 months between each screening. Total 18,428 girls participated in second screening and total 13,979 girls were part of all three screenings till September 2015. WHO recommended Hemoglobin (Hb) Color Scale Method was used as a screening tool, implemented by auxiliary nurse midwives and lab technicians. Girls' collectivization was facilitated by the trained frontline health workers to spread awareness, mobilize girls for screening and conduct health education sessions. Data is from the project MIS and was analyzed with the help of Microsoft Excel and SPSS.

Results: Project implementation level data across 19 sites for 3 checkups with mean interval between each checkup as 3–6 months, shows prevalence of anemia in adolescent girls was 86.80%. Mean rise of hemoglobin from checkup 1 to checkup 3 is 0.6 gm. Drastic reduction in severe anemia from 5.66% to less than 1% is seen in the program. In case of non-school-going girls, reduction in severe anemia was from 17% to 1.5%.

Conclusion: Overall burden of anemia in adolescent girls (15–19 years) is very high in girls in late adolescence stage. As age increases, prevalence increases, non-school-going girls are worst affected with severe anemia. It is promising to implement anemia management program through a platform led by a trained frontline health worker facilitated adolescent girls' collectivization. Community-based strategies and individual follow up is significant to reduce burden of severe anemia.

Keywords: Anemia management, Adolescent girls, Uttar Pradesh

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Introduction

Adolescence is considered as a nutritionally critical period of life. Nutritional anemia in India is a common morbidity seen in late adolescent and young female population. Prevalence of adolescents' anemia across India is 60–70%. The pre-pregnancy nutritional status of young girls is important as it impacts on the course and the outcome of their pregnancy. Hence, the health of adolescent girls demands special attention.¹ Low dietary intake of micronutrients including iron, vitamin B-12, and folate is important determinant for anemia in adolescent girls. Nutrition knowledge may affect dietary intake but its transformation in better hemoglobin level is lacking due to other bio-social factors.² Anemia results from nutrition-related causes and from inflammatory or infectious diseases, as well as from blood loss. Iron-deficiency anemia resulting from inadequate intake and low absorption of dietary iron is the most common form of anemia in India.³ As future mothers, nutritional status of adolescent girls is important as it impacts on the course and the outcome of their pregnancy. Reproductive health and nutrition interventions introduced early in marriage or during the first pregnancy may come too late to substantially improve the health status of young women and the children she bears.⁴

The annual health survey data for UP (2012-13) shows that 43% girls between the age of 15 and 19 years are either pregnant for the first time or are already mothers. Further, anemia in adolescent girls affects their physical work capacity and reproductive physiology. Clearly, to address anemia, this adolescence age group becomes important.

For the control of anemia at the population level, universally a three-pronged strategy is recommended: 1) Dietary diversification and improvement; 2) Food fortification with iron and other essential micronutrients (vitamins and minerals); and 3) Regular consumption of iron and folic acid (IFA) supplements. In India's current socio-economic situation, it is difficult for large segments of the population to consume a diversified iron-rich diet able to ensure optimal intake of iron, folic acid and other essential micronutrients as indicated by the high prevalence of anemia among adolescent girls and women of reproductive age, showing the cumulative effects of nutritional deficiencies along the life cycle and across generations. Therefore, the regular consumption of IFA supplements is essential for the prevention of iron deficiency and anemia in adolescent girls.⁵

This paper is to share field-level experiences of screening of adolescent girls (15–19 years) for anemia with the help of WHO recommended Hb color scale method tool and management of anemia in adolescent girls with the help of therapeutic provision of IFA supplementation, deworming, education, counseling around diet diversification and iron tablets consumption. Interventions were community-based through trained frontline health workers who facilitated collectivization of adolescent girls in 1035 project villages of 9 districts, 19 blocks of Eastern Uttar Pradesh. Study in Gujarat has provided evidence that Hb color scale is accurate in diagnosing severe and moderately-severe anemia in high prevalence area in hands of community health workers in real-life field condition.⁶ In current community-based anemia management program in Eastern UP Health Initiative, Hb color scale method was used through auxiliary nurse midwives (ANMs) and lab technicians for anemia screening.

Material and Methods

Eastern Uttar Pradesh (UP) Health Initiative was implemented across 19 blocks of 9 districts of Uttar Pradesh (Pratapgarh, Varanasi, Ambedkar Nagar, Siddharth Nagar, Maharajganj, Mau, Azamgarh, Basti, and Ghazipur). The initiative was implemented in these blocks through 19 community-based organizations. Objective of the Health Initiative was to build community-based service delivery platform (in the form of Village Health and Nutrition Day-VHND) to provide primary healthcare services for basic maternal, child and adolescent health. The anemia-management component in the program was based on the National Iron Plus Initiative guideline. Deployment of trained community health workers (CHWs) was done for every 800 households (around 4000 population) who were expected to keep track of all adolescent girls (15–19 year age group) enrolled in the program. Total 1505 adolescent girls' groups were formed in 1035 project villages. Girls met regularly to discuss health and nutrition issues, menstrual hygiene and other concerns. Most of these meetings are facilitated by frontline workers.

Study Participants

Participants included for the anemia management program represented girls between 15 and 19 years of age from project villages. Total catchment for the Eastern UP Health Initiative is 11.50 lakh and adolescent girls (15–19 years) registered in the program is 71,713. The project was implemented in

three phases and total 26,982 girls were included in the first phase of the program (from April 2014 to September 2015). School-going as well as non-school-going girls were part of the interventions.

Materials and Methods

The anemia management project was designed on the basis of National Iron Plus Initiative (NIPI) guideline. WHO recommended Hb color scale was used across all sites for screening girls for anemia. Post screening, based on the hemoglobin status, iron and folic acid (IFA) tablets were distributed to girls. It was ensured that girls receiving tablets were also explained about the regime of tablets, do's and don'ts in case of side effects, etc. Monthly adolescent girls' group meetings were facilitated as well as monitored by trained community health workers with focused message delivery on requisite diet, importance of supplementary as well therapeutic dose consumption of iron tablets, physiological proneness of girls towards iron loss and anemia, sociocultural factors affecting diet and nutrient status in girls, etc. Second screening was introduced after 3–6 months after first screening. 18,428 girls participated in this checkup of the same lot. Supplementary and therapeutic post checkup measures were repeated. Third checkup was conducted after 3–6 months interval and total 13,979 girls participated in it. This implies, total 13,979 girls participated in all three checkups. Biannual deworming was ensured at the site of screening camps, at VHND sites.

Table 1. Categorization of Anemia in Adolescent Girls as per NIPI Guideline

Hb Value (in g/dL)	Category
More than 12	Normal
Between 11 and 11.9	Mild
Between 8 and 10.9	Moderate
8 and below 8	Severe

All checkups were conducted as a part of health camps and VHND activities. Village-based screening was done through trained ANMs and lab technicians working at block CHCs. Hb color scale method strips and iron tablets supply was leveraged from the public health system. The project relied on skills of ANMs and lab technicians. Categorization of anemia was referred as per Table 1.

Across all checkups, girls found out to be severely anemic were referred to community health center or

district hospital to confirm their status with the help of reliable accurate laboratory methods available at the facilities. On confirmation of diagnosis of severe anemic status with the lab method too, girls received medical attention and necessary therapeutic measures. The community health workers' monthly work plans included individual tracking and follow up of severely anemic girls through home visits. Home visit checklist for the workers included education on IFA intake, consumption of Vitamin C rich locally available fruits, focus on iron rich diet, things to do for side effects due to iron tablets consumption and compliance to the treatment as per the medical advice in select cases. Adolescent girls' collectivization was village/hamlet based. It included a mixed group of school going and non-school going girls with approximately 30–50 girls owing to size of the village or hamlet. Monthly meetings were facilitated by frontline health workers monitored by supervisory cadre. Health education topic included information of body parts, menstrual cycle and hygiene, dietary requirements of micronutrients, sociocultural factors intervening in maintaining appropriate hemoglobin levels, utility of kitchen gardens, dietary alterations required to keep optimum hemoglobin level, etc.

Data was analyzed with the help of Microsoft MS Excel and SPSS version 21.

Findings

Table 2. Description of Study Participants

Characteristics	Values
Age	
Mean	16.78
Median	17
Mode	15
Schooling status	
School-going	25,036 (92.78%)
Non-school going	1,946 (7.22%)

Study Participants' Profile

Total 26,982 girls within age group of 15–19 years were from 19 blocks of 9 districts. The profile of girls is as explained in Table 2. There were considerable number of girls enrolled in junior colleges, but did attend colleges only during exams. Operationally, these girls were considered under category of school-going for the project. Mean interval between all three checkups was 3–6 months across 19 project sites.

Overall burden of anemia: Checkup 1

Figure 1. Overall Burden of Anemia as per Checkup-1

Figure 1 shows that overall burden of anemia in adolescent girls was 86.8% with 5.6% girls severely anemic. This is for all sites, for the mentioned age group between 15 and 19 years, across all girls, irrespective of schooling status. When prevalence of anemia was studied as per the age groups, it was seen that moderate anemia was within the range of 74–81%. Further, across all groups, only 13.2% girls were found out to be non-anemic. Girls at the age 15 years

were found out to be relatively healthier with maximum number of girls (16%) being non anemic and only 4% being severely anemic. Moderate anemia was also seen lowest at the age 15 years. The figure 2 shows that as age increases, burden of anemia increases. As much as 81% girls who were 19 years old were moderately anemic. Burden of severe anemia was most in 18-year-old girls.

Figure 2. Age-Specific Burden of Anemia as per Checkup - 1

When prevalence of anemia was studied as per the region, it was seen that maximum prevalence for severe anemia was found in blocks under Siddharth Nagar, Mau and Azamgarh districts. Maximum

prevalence of moderate anemia was found in blocks of Ambedkar Nagar, Pratapgarh and Maharjganj districts. Figure 3 depicts more or less high burden of anemia across all project sites.

Figure 3. District-Specific Burden of Anemia as per Checkup - 1

Further to age- and region-specific burden of anemia when distribution of Hb levels across schooling status was studied, it was seen that severe anemia cases were more common in group of non-school-going girls

(9.81%) than of school-going girls (5.31%). An Hb value in normal range was same (13%) irrespective of the schooling status as per Figure 4.

Figure 4. Schooling Status and Burden of Anemia as per Checkup - 1

Prevalence of Anemia: Comparative among 3 Checkups

When studied burden of anemia across all three checkups, results were encouraging as per Table 3.

Table 3. Prevalence and Categorization of Anemia across 3 Checkups

Checkup Details	Total No. of Girls	Normal (%)	Mild (%)	Moderate (%)	Severe (%)
Checkup - 1	26,982	12.89	4.08	77.35	5.66
Checkup - 2	18,428	14.32	1.96	81.05	2.66
Checkup - 3	13,979	11.42	0.71	87.01	0.83

From Table 3, it is clear that overall prevalence of anemia did not significantly change across three checkups for girls who have participated in all three checkups. In a period of over one year from checkup-1 to checkup-3, normal Hb level was found in the range from 11% to 12% girls. Prevalence of moderate anemia increased from 77% to 87%; however, prevalence of severe anemia drastically reduced from 5.66% to below 1%. This can be considered as a significant finding. However, prevalence of moderate anemia has increased. Figures show the transition of mild and severe cases to moderate zone. Shift of

severe cases to moderate zone can be attributed to home visits and personalized counseling inputs received by severely anemic girls from frontline health workers. Field-level understanding needs to be built over this and also to find out factors causing shift of mild cases to moderate zone.

Prevalence of Anemia: Across 3 Checkups

If prevalence is considered across three checkups for 13,981 girls who have participated across all three checkups, almost similar trends were noticed as mentioned in Table 4 below.

Table 4. Prevalence of Anemia among Girls who Have Undergone All 3 Checkups

Checkup Details	Total no. of Girls	Normal (%)	Mild (%)	Moderate (%)	Severe (%)
Checkup - 1	13,979	11.0	0.10	84.1	4.9
Checkup - 2	13,979	5.8	0.10	91.0	3.2
Checkup - 3	13,979	11.42	0.71	87.01	0.83

The summary is, though the overall prevalence of anemia did not alter much; major decline in prevalence of severe anemia cases was reported. Difference across the three checkups was found to be statistically significant with P value <0.001.

If the prevalence of anemia for 13,979 girls across all checkups as per the schooling status is studied, interesting results were obtained. As much as 95.76% girls were school-going. Only 592 girls (less than 5%) were non-school-going out of girls who have participated in all three checkups. Trends seen in Figure 5 follow trends similar to that of checkup-1. In both school-going as well non-school-going girls, prevalence of moderate anemia during checkup-2 was

increased. Further, it shows that prevalence of severe anemia was significantly more in non-school-going girls across all checkups. The table also shows that overall prevalence of anemia more or less remained same in school-going girls though severe anemia cases were brought down. In case of non-school-going girls, it was seen that overall prevalence of anemia had gone down by increase in number of girls with normal level of Hb from 14% to 21%. It also shows that prevalence of severe anemia was drastically reduced from 17% to just 1.5% in non-school-going girls. Important factor contributing for this can be deliberate home visits by community health workers for severe anemia cases and individual counseling on diet, IFA consumption, etc.

Figure 5. Prevalence of Anemia in Girls who Have Undergone All 3 Checkups: Non-School Going versus School Going

Overall, the mean Hb rise across three checkups (0.6 mg) was found out to be statistically significant as shown in Figure 6.

Figure 6. Mean Rise in Hb Value from Checkup - 1 to Checkup - 3

Discussion

Supplementation through IFA tablets has been part of the government programs for the last three decades; still the level of iron intake remains low. There are significant challenges in reaching the at-risk population as well as in managing the side effects of IFA consumption. Peer educator lead behavior change focused approaches for diet diversification, IFA consumption through adolescent girls' collectivization has provided evidence for better health outcomes in terms of increase in awareness on anemia, uptake of IFA consumption resulting into lowering the burden of anemia in school going as well as non-school going girls.⁷ In Lucknow district of Uttar Pradesh, the Vatsalya project has demonstrated that interventions such as training anganwadi workers for adolescents' nutrition and growth, uplifting marriage age, nutrition, mobilizing adolescent girls for distribution of IFA tablets have resulted in increase in knowledge about anemia. The Eastern UP health initiative have also adopted similar approach through adolescent girls' collectivization to spread awareness about anemia and control measures. Major interventions for the program were counseling on diet diversification, awareness on dietary alterations required, discussions of sociocultural issues to be considered through adolescent girls' meetings, supplementary and therapeutic provision of IFA tablets in collaboration

with the public health system, followed by focused efforts to refer severely anemic cases to secondary and tertiary centers, follow up home visits by trained community health workers. The interrupted supply of IFA tablets was tackled with complementary provision from project funds. Overall prevalence of anemia figures of checkup 1 can be compared with prevalence figures of Badau and Lakhimpur Kheri districts of Uttar Pradesh as per the prevalence study in 16 districts of India. As per this study, in Badau 9.4% and in Lakhimpur Kheri, 8.8% girls were found severely anaemic.⁹ The same study also concludes that overall burden of anemia in adolescent girls is 90.1% which means, less than 10% girls have hemoglobin values in normal range. In this project, checkup - 1, total 12.89% girls were found within normal range of hemoglobin and total 5.66% girls were reported to have severe anemia. Another large scale project in Uttar Pradesh with strategy of weekly IFA supplementation for school as well as non-school going girls have reduced overall prevalence of anemia in girls from 73.3% to just 25.4%. The project concludes that appropriate counseling, irrespective of supervision, is critical for achieving positive outcomes in anemia management. Similar experience is there in the Eastern UP Health Initiative; however, overall prevalence is not drastically altered in participants, reduction in level of severe anemia is significant.

Factors associated with unaltered status of overall burden of anemia need to be studied further in depth.

Important limitation of this data is that it is part of the implementation project, directly taken from the program MIS rather than data from a pure research project. Project interventions through adolescent girls' collectivization (such as sessions of health education, group as well as individual counseling for IFA consumption, diet, etc.) were not captured in MIS. Some important challenges of the program were huge workload of mobilizing huge number of girls for screening, liaising with the local public health staff such as an ANM and a lab technician to the screening venue on the days other than VHNDs. In case of school or college going girls, it was not always possible to mobilize and organize screenings during week days. Further, recording IFA tablets consumption at individual level was not possible for this huge number of girls. Once distribution of tablets is ensured post screening, group sessions on compliance of tablets intake, do's and don'ts in case of side effects, etc. were organized, but it was not possible to record all these sessions.

Conclusion

It was seen that overall burden of anemia in adolescent girls (15-19 years) was very high across all project sites of eastern Uttar Pradesh and as age increases, prevalence increases. Among the 9 project districts in the eastern Uttar Pradesh, maximum prevalence of severe anemia was seen in blocks of Siddharth Nagar, Azamgarh and Mau districts. Also, the prevalence of severe anemia is high in non-school going girls. It is realized that half of the girls participated till third checkups over the period of 1.5 years and the overall prevalence is unaltered. However significant findings in reduction of severe anemia are encouraging. This may be due to the fact that as per the mandate of the program, community health workers had to track severe anemia cases more actively, do home visits for severe anemia cases to provide individual counseling. Mean rise of Hb by 0.6 g/dL from checkup - 1 to checkup - 3 is encouraging and reiterates significance of counseling on IFA consumption, diet diversification and sociocultural factors for better health outcomes.

Learning from the community-based management of anemia program as a part of Eastern UP Health Initiative is clear that prevalence of anemia was extremely high in adolescent girls and the platform of adolescent girls' collectivization was helpful for awareness generation, mobilizing girls for checkup for

the hemoglobin status. The mean increase in Hb value over the period of 1–1.5 years is 0.6 mg/dL can be increased further with individual tracking of every girl for IFA consumption. In context of inadequate infrastructure and complex systemic issues of public health system, convergence of frontline workers (ANMs, AWWs, and ASHAs) at grassroots level can be achieved with effective community processes and VHND can be utilized as a platform for anemia management program for adolescent girls.

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Conflict of Interest: Nil

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