A study to assess the prevalence of anemia among patients attending an urban health training center in Bihar: One year experience of anemia Mukt Bharat test and treat campaign

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ABSTRACT

Background: Anemia is a major and serious public health problem. Its prevalence is disproportionately high in developing countries due to its low socio-economic status and poor access to health services. Consequently, this study was conducted to sought the prevalence of anemia as well as its association with the sociodemographic characteristics among the beneficiaries of Anemia Mukt Bharat test and treat campaign in an Urban Health Training Centre in Bihar. **Aims and Objectives:** The aim of the study was to assess the prevalence of anemia among patients attending an Urban health training center in Bihar. **Materials and Methods:** It was a retrospective record based study conducted at Urban Health Training Centre running under Department of Community and Family Medicine of a Tertiary care teaching hospital. The registered cases from September 2018 to August 2019 were taken up and case records were retrieved. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS Inc., Chicago, State of Illinois, United States) version 21 software. **Results:** Screening of total 2042 was done over the study period of 1 year. The overall prevalence of anemia among the beneficiaries was 64.3% (95% CI: 62.3–66.5%) in the study. Significantly higher prevalence of anemia was noted among the adolescent girls (62.5%), pregnant women (62.4%), and reproductive age female (71.1%). Whereas, only 32.3% male were found to be anemic. Furthermore, illiteracy (73.5%), non-consumption of non-vegetarian diet (69.3%), and IFA tablet (84.6%) were found to be associated with anemia. **Conclusion:** The association of anemia with few socio demographic and dietary factors has been highlighted through the study findings. Screening programs for anemia, awareness campaigns, deworming program, fortification of food and salt with iron and folic acid, and non-pharmacological interventions such as cooking in iron utensils are some of the measures that can be implemented.

Key words: Adolescent girls; Anemia; Pregnant women; Prevalence; Reproductive age women

INTRODUCTION

Anemia is defined as a decreased hemoglobin concentration in the blood. It is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet the body's physiological requirements, which vary by age, sex, altitude, smoking habits, and during pregnancy.[1] Its prevalence is disproportionately high in developing countries due to its low socio-economic status and poor access to health services.[1,2] Anemia is a major and serious public health problem. The WHO estimates one-third of all women under reproductive age group are anemic, 42% of children <5 years of age and 40% of pregnant women worldwide are anaemic.[1] Deficiency of iron is a known risk factor for preterm birth, low birth weight, small for gestation age babies, and it increases the risk of postpartum hemorrhage as well.

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It is the direct and indirect cause of 20% of all the maternal deaths. About half of these occur in South Asian countries, among which India contributes 80%.[3] As far as the state of Bihar is concerned, the latest NFHS-5 survey findings highlights that the prevalence of anemia among the women of reproductive age group, pregnant women, men (15–49 years), adolescent girls and boys is 63.6%, 63.1%, 29.5%, 63.5%, and 34.8%, respectively.[4] Because anemia has a serious negative effect on strength of an individual, irrespective of age and gender.[5] Therefore, Anemia Mukt Bharat initiative targets a national reduction in the prevalence of anemia among women of reproductive age, adolescent girls and boys to 35%, 36%, and 11%, respectively.[6] In an effort to achieve this target, the patient's initial point of contact plays a prominent role in the identification and management of anemia. Consequently, this study was conducted to sought the prevalence of anemia as well as its association with the sociodemographic characteristics among the beneficiaries of Anemia Mukt Bharat test and treat campaign in an Urban Health Training Centre in Bihar. Furthermore, the study finding will contribute in updating the information regarding the anemia status and its associated factors in the study setting.

Aims and objectives

The aim of the study was to assess the prevalence of anemia among patients attending an Urban health training center in Bihar.

MATERIALS AND METHODS

Ethical consideration

Ethical clearance for conducting the study was obtained from the institutional ethics committee (IEC/2020/680 dated 17 April, 2021). Personal information in the data was kept private and solely utilized for research purposes.

Study design

Retrospective record-based study.

Study setting

Urban Health Training Centre running under Department of Community and Family Medicine of a Tertiary care teaching hospital.

Study procedure and study period

As per the action plan proposed by Ministry of Health and Family Welfare, a test and treat anemia campaign was carried out at the UHTC with support of State Government. Hemoglobin level of Pregnant females, Non pregnant females (≥15 years), Males (≥15 years), adolescent girls, were tested by HemoCue hemoglobin meter. Demographic details, hemoglobin level, history of albendazole consumption, iron and folic acid uptake, and dietary habits were recorded after registering the beneficiary. For the purpose of this current research, the registered cases from September 2018 to August

2019 were taken up and case records were retrieved. On the basis of hemoglobin level, the cases were classified as anemic and non-anemic based on the WHO classification[7] (Table 1).

Statistical analysis

The categorical variables were expressed as frequency and percentages with 95% confidence interval. Whereas, continuous date were checked for normality of data by using Kolmogorov–Smirnov test and Q-Q plot. Accordingly, it was expressed as mean±standard deviation or median±Interquartile range. Any association of anemia status with the sociodemographic characteristics was examined by applying Pearson Chi-square test. $P<0.05$ was considered significant. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS Inc., Chicago, State of Illinois, United States) version 21 software.

RESULTS

As shown in Table 2, screening of total 2042 was done over the study period of 1 year, out of which majority were reproductive age female (1385) followed by pregnant women (356) and male (269), whereas, least were adolescent girls, that is, 32 only. More than two third were literate in all the four groups, with highest being 100% among the adolescents and least being 67.3% among the reproductive age female. As many as half of reproductive age female and male, one fourth of the pregnant female and two third of the adolescent girls resided in urban area. Approximately three fourth of beneficiaries of all the four groups were consuming non-vegetarian diet.

As per Table 3, adolescent girls, pregnant women and reproductive age female were asked for the history of consumption of iron/folic acid and deworming tablet. Almost half of the beneficiaries in all the three groups, that is, adolescent girls 46.9%, pregnant women 50.3% and reproductive age female 55.9%; had ever taken iron/folic acid supplement. While around one third adolescent girls (37.5%), one fifth reproductive age females (25.7%), and only 19.2% pregnant women gave history of consumption of deworming tablet.

Figure 1 the mean hemoglobin of the different beneficiary groups in the study. Males had highest mean Hb (13.6 [±1.74]) followed by adolescent girls (11.26 [±1.67]), reproductive age female (11.22 [±1.36]) and pregnant females (10.38 [±1.5]).

Table 1: Hemoglobin cut off value to diagnose anemia	
Group	**Cut off value of Hemoglobin (g/dl)**
Adolescent girls	<12
Male	<13
Pregnant women	<11
Reproductive age female	<12

Table 2: Group-wise distribution of demographic profile of participants in the study (n=2042)

Variables	Adolescent Girls (n=32)	Male (n=269)	Pregnant Women (n=356)	Reproductive age female (n=1385)
Mean age (±SD) (in years)	13.3 (±1.3)	39.1 (±18.4)	23.5 (±3.8)	33.9 (±13.4)
Education status				
Illiterate	0	46 (17.1)	109 (30.6)	453 (32.7)
Literate	32 (100%)	223 (82.9)	247 (69.4)	932 (67.3)
Residence				
Urban	20 (62.5)	140 (52)	92 (25.8)	605 (43.7)
Rural	12 (37.5)	129 (48)	264 (74.2)	780 (56.3)
Non-veg diet				
No	6 (18.8)	56 (20.8)	98 (27.5)	377 (27.2)
Yes	26 (81.3)	213 (79.2)	258 (72.5)	1008 (72.8)

Table 3: Distribution of adolescent girls, pregnant women, and reproductive age female in the study as per consumption of Iron/Folic acid and deworming tablets (n=1773)

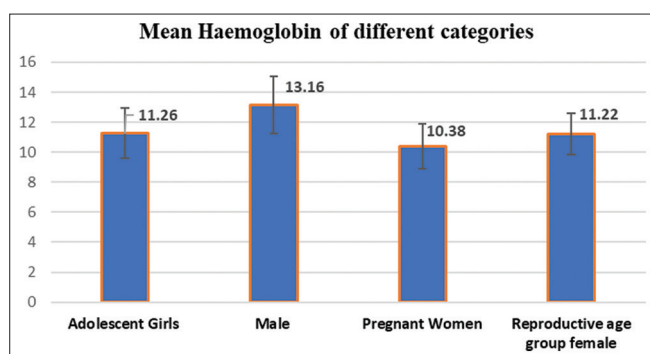| Variables	Adolescent girls (n=32)	Pregnant women (n=356)	Reproductive age female (n=1385)	Pearson Chi-square (P-value)
Iron and folic acid			n (%)	
No	17 (53.1)	177 (49.7)	611 (44.1)	4.371 (0.112)
Yes	15 (46.9)	179 (50.3)	774 (55.9)	
Deworming tablet				
No	20 (62.5)	286 (80.8)	1017 (76.9)	9.326 (0.009)
Yes	12 (37.5)	68 (19.2)	352 (25.7)	

Figure 1: Group-wise distribution of mean hemoglobin of the beneficiaries

Table 4 depicts that the overall prevalence of anemia among the beneficiaries was 64.3% (95% CI: 62.3–66.5%) in the study.

Significantly higher prevalence of anemia was noted among the adolescent girls (62.5%), pregnant women (62.4%) and reproductive age female (71.1%). Whereas, only 32.3% male were found to be anemic.

Furthermore, illiteracy (73.5%), non-consumption of non-vegetarian diet (69.3%), and IFA tablet (84.6%) were found to be associated with anemia.

DISCUSSION

Overall, 64.3% beneficiaries were found anemic in the study. Thus, reflecting that despite implementation of various national programs such as national iron plus initiative, and WIFS; anemia

still persist as a global public health problem.[8] In the present study, the prevalence of anemia was high among females (69.2%) as compared with males (32.3%). Our study finding was in line with the NFHS 5 report for Bihar state, where in the prevalence among male and female was found to be 29.5% and 63.5%, respectively.[4] In a similar study conducted by Kishore et al., 5776 beneficiaries were screened and they also reported higher prevalence among females (54.9%) as compared with the males (45.1%).[7] Another study conducted by Retnakumar et al.,[5] in an urban slum of South India, also reported similar pattern of prevalence with 66% anemic females and 49% anemic males in the study. Although, the reported prevalence among males in both the studies was higher as compared with our study and NFHS 5 findings.[4] The gender difference in anemia prevalence may be attributed to the male centric nature of our society as well as the discrimination against women in the form of access to medical care, education and food.[9,10] Furthermore, in the present study, more than two third of the beneficiaries in all the three subgroups of female beneficiaries, that is, adolescent girls, pregnant, and non-pregnant were anemic.

About 62.5% adolescent girls were anemic in the present study, which is in consensus with the findings of different studies wherein anemia prevalence is documented from 59% to 65.7%.[4,11,12] On the other hand, in contrast to our study findings Chandrakumari et al.,[2] and Bodat et al.,[13] reported comparatively lower and higher prevalence of 48.3% and 87.6%, respectively, among the adolescent girls in their study.

Similar to adolescent girls, 62.4% pregnant women in this current study were anaemic as well. Alternatively, a

Table 4: Association of demographic variables with the anemia status of the participants

Variables	Anaemia status		Pearson Chi-square (P-value)
	Non anemic (n=728)	Anemic (n=1314)	
	n (%)	n (%)	
Groups			148.45 (<0.001)
Adolescent Girls	12 (37.5)	20 (62.5)	
Male	182 (67.7)	87 (32.3)	
Pregnant Women	134 (37.6)	222 (62.4)	
Reproductive age women	400 (28.9)	985 (71.1)	
Residence			0.367 (0.545)
Urban	312 (36.4)	545 (63.6)	
Rural	416 (35.1)	769 (64.9)	
Education			31.742 (<0.001)
Illiterate	161 (26.5)	447 (73.5)	
Literate	567 (39.5)	867 (60.5)	
Non-vegetarian diet			7.704 (0.006)
No	165 (30.7)	372 (69.3)	
Yes	563 (37.4)	942 (62.6)	
Consumption of IFA tablet*			163.89(<0.001)
No	124 (15.4)	681 (84.6)	
Yes	422 (43.6)	546 (56.4)	
Consumption of deworming tablet*			0.372 (0.542)
No	405 (30.6)	918 (69.4)	
Yes	139 (32.2)	293 (67.8)	

*p <0.05 is considered significant

study conducted by Sinha et al.,[14] in rural West Bengal and Mangla and Singla[9] in Haryana, reported an unusual higher prevalence of more than 90%. Whereas, Vindhya et al.,[15] and Natarajan et al.,[16] reported a lower prevalence of 33.9% also, conducted a study in Vellore, where they reported a prevalence of 23.16%. As far as non-pregnant women in our study are concerned, it was found that 71.1% were anemic. This is quite higher than the findings from NFHS 5 data (63.5%) and Bharati et al.,[17] study in Bihar (64.7%).

This wide disparity in anemia prevalence across different studies could be attributed to variations in other factors such as the method of estimation of hemoglobin, dietary factors, comorbidities, and the sample size as well. Further adding to the study findings, illiteracy, vegetarian diet, and non-consumption of iron folic acid were found to be associated with higher prevalence of anemia. This can be explained on the basis that education also has a significant impact on dietary consumption and health behavior, which might be mirrored in the prevalence of anemia.[18] In similar line with our study, Mangla et al.,[10] and Sinha et al.,[14] also documented significant association between illiteracy and anemia. Furthermore, Sinha et al.,[14] studied the risk factors of anemia and reported in his study that less dietary intake of iron and folic acid as well as lack of education may contribute to high prevalence of anemia. Mangla et al.,[9] also mentioned in their study that vegetarian diets are deficient in iron rich food items such as meat, chicken, and fish. Further adding to it, Nguyen et al.,[19] studied the trends and drivers of change in the prevalence of anemia among women and children in India. They documented that maternal schooling; IFA consumption and meat and fish consumption

are some of the potential common divers contributing to anemia. No significant regional difference in prevalence of anemia was found our study. In consensus with our study, Bharati et al.,[17] also found no significant rural-urban difference for probability of being anemic.

Limitation of the study

Only sociodemographic and dietary factors were investigated in the study. No reports or tests were carried to rule out other explanations of anemia such as hemolytic illness, malaria, iron bioavailability. Over and above that, if the study had been a prospective study, a better association between anemia and associated risk factors could have been discovered.

CONCLUSION

This research contributes to our understanding of the link between anemia and a few socio demographic and dietary factors. Screening programs for anemia, awareness campaigns, deworming program, fortification of food and salt with iron and folic acid and non-pharmacological interventions such as cooking in iron utensils are some of the measures that can be implemented. Active involvement of locals in the planning may have a possible substantiate role in implementation of programs. Measures like this would go a long way towards improving the nutritional status.

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