

Prevalence of anaemia among school going adolescent girls attending Test, Treat and Talk (T-3) camp under Anaemia Mukht Bharat in Delhi

Bhushan D. Kamble¹, Mahaur Gunjan², Jethani Sumit², Sunil K. Singh²,
Diwakar Jha², Saudan Singh³

¹Department of Community Medicine, IMS, BHU, Uttar Pradesh, ²Department of Community Medicine, ³Dean, North DMC Medical College and Hindu Rao Hospital, Delhi, India

ABSTRACT

Background: Adolescent period is signalized by marked physical activity and rapid growth spurt; therefore, they need additional nutritional supplements and are at utmost risk of developing nutritional anaemia. Anaemia play a major role in affecting the adolescents especially girls. On September 2019, Ministry of Health and Family welfare, Govt. of India directed to all state and district health authority to conduct Test, Treat and Talk (T-3) anaemia camps for celebration of nutrition month (Poshan Maah) in all government schools and colleges. The present study aimed to assess prevalence of anaemia and factors associated with it among school going adolescent girls attending T-3 camp in Delhi. **Methods:** A cross-sectional study was conducted among 203 adolescent girls in government girls' school in central district of Delhi. Hb estimation was done by HemoCue 201 and data regarding socio-demographic details, deworming, dietary preferences were collected. Clinical examination and anthropometric measurements were done by resident doctors. Data was analysed using STATA vs. 13. **Results:** The prevalence of anaemia was found to be 59% with mean (\pm SD) Hb of 11.3 gm/dl (\pm 1.55) among 203 participants. The majority (48%, n = 119) of anaemic girls had mild degree of anaemia. Among 203 girls, 65% participants were of age 14-15 years with mean (\pm SD) age of 14.6 years (\pm 1.18). There was a significant relationship between anaemia and diet, deworming status, and BMI ($P < 0.05$). **Conclusion:** The study revealed that anaemia was highly prevalent among adolescent girls. Among anaemic girls, majority had mild anaemia. Factors like vegetarian diet, underweight, deworming and presence of pallor were found to be associated with anaemia. There is need to conduct T-3 camps at regular interval in all schools to curb the problem of adolescent anaemia.

Keywords: Adolescent girls, anaemia, Anaemia Mukht Bharat, Delhi, T-3 camp

Introduction

WHO defines 'Adolescents' as individuals in the 10-19 years age group and 'Youth' as the 15-24 years age group. While 'Young People' covers the age range 10-24 years.^[1] Adolescents are the

important age group of the society yet neglected in many ways. Adolescents are tomorrow's future; they are important for the country's progress. Therefore, their health is an important issue to deal with at present.

Anaemia is most common nutritional deficiency disorder in India and remains a formidable health challenge. It is a condition when haemoglobin (Hb) level goes <12 g/dl in women and <13 g/dl in men of age 15 years and above.^[2] The iron needs are high in adolescent girls because of the increased requirements for

Address for correspondence: Dr. Bhushan D. Kamble, Assistant Professor, Dept. of Community Medicine, IMS, BHU, Uttar Pradesh - 221 005, India.
E-mail: dr.bhushan@hotmail.com

Received: 20-08-2020

Revised: 29-09-2020

Accepted: 29-10-2020

Published: 27-02-2021

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_1510_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Kamble BD, Gunjan M, Sumit J, Singh SK, Jha D, Singh S. Prevalence of anaemia among school going adolescent girls attending Test, Treat and Talk (T-3) camp under Anaemia Mukht Bharat in Delhi. J Family Med Prim Care 2021;10:898-903.

expansion of blood volume associated with the adolescent growth spurt and the onset of menstruation. Prevalence of anaemia among adolescent girls (Hb <12 gm/dL) is alarmingly high, as per National Family Health Survey 4 (NFHS-4), 54% of the adolescent girls are anaemic.^[3] Data shows that between NFHS 3 and 4 there was only 2% decline in the prevalence of anaemia among Adolescent girls. In India over 50% women in reproductive age are reported to be anaemic.^[3] Many a times in India girls get married and becomes pregnant in late adolescent period and increases the risk of Anaemia. Occurrence of pregnancy during adolescence with anaemia increases not only the maternal morbidity and mortality but also the incidence of poor birth outcomes such as stillbirth, low birth weight, and prematurity and also has negative impact on infant iron status.^[4] According to available literature inadequate nutrition, menstruation, socioeconomic status, personal hygiene and worm infestation are important risk factors which leads to anaemia.^[5] There are number of schemes directly/indirectly affecting the nutritional status of adolescents and pregnant women.^[6,7] In spite of these, level of malnutrition and related problems in the country is high. There is no dearth of schemes but lack of creating synergy and linking the schemes with each other to achieve common goal.

According to NFHS-4, anaemia prevalence varies from 30 percent to 69 percent across different age groups.^[3] POSHAN Abhiyan was launched in March 2018 with one of the objectives as reduction in anaemia.^[8] Anaemia Mukht Bharat strategy was set to achieve targets of POSHAN Abhiyan and National Nutrition Strategy set by NITI Aayog. It has been decided that prevalence of anaemia will reduce by three percentages per year across all age groups between year 2018 to 2022 through Anaemia Mukht Bharat strategy.^[8] All villages, blocks, and districts of all the States/UTs of India will be covered under POSHAN Abhiyan. On September 2019, Health ministry directed to all state and district health authority to conduct Test, Treat and Talk (T-3) Anaemia camps for celebration of Nutrition month (Poshan Maah) in all government schools, colleges, and institutions across India to decrease the anaemia prevalence in the country.^[9] Primary care physicians and grassroot health workers who are the first contact point for rural patients will have a good opportunity to decrease anaemia burden among adolescent age group through T-3 anaemia camps under Anaemia Mukht Bharat strategy.

Our study population is adolescent girls because by decreasing anaemia and improving awareness regarding anaemia among adolescent girls, maternal morbidity and mortality especially during pregnancy can be improved. Hence, this study was carried out along with T-3 camp to find out the prevalence and factors associated with anaemia among school going adolescent girls in Delhi.

Material and Methods

Study setting

The present study was cross-sectional in nature and carried out in Delhi during October 2019. Delhi has population of

1.68 crores and is divided in 11 districts for administrative purpose. The present study was carried along with Test, Treat and Talk (T-3)^[9] anaemia camp in Government Girls Secondary School (GGSS) of Vivekanand Puri area of central Delhi district.

Study population

School going adolescent girls attending classes 9th, 10th, 11th and 12th standards of GGSS school were included in the study. Girls who did not give the consent and who were absent at the time of data collection were excluded from the study. In this study, data was collected from 203 adolescent girls who gave consent for the participation. Pre-tested, semi-structured questionnaire was used. It included information regarding socio demographic factors, dietary habits and deworming. General examination and anthropometric measurements were done by resident doctors.

Sampling strategy

Complete enumeration of all adolescent girls of class 9th to 12th of GGSS school was attempted.

Procedure

- In September 2019, Ministry of Health and Family Welfare (MoHFW), Govt. of India directed to all state and district health authority to conduct Nutrition Month (POSHAN Mah) Test, Treat and Talk (T-3) anaemia camps under Anaemia Mukht Bharat^[8] programme in all government schools, colleges, and institutions across India.
- A typical T-3 Camp^[9] is a key strategy to generate demand and mobilise people on anaemia. And it works in three steps:
 - Test:** with the help of a digital haemoglobinometer
 - Treat:** with iron-folic acid tablets (IFA) and referral
 - Talk:** counselling beneficiaries on healthy lifestyle measures, to increase iron levels in the body and on foods rich in iron, protein and vitamin C.
- Integrated District Health Society (IDHS), Central District of Delhi in collaboration with Department of Community Medicine, North DMC Medical College & Hindu Rao Hospital, Delhi conducted T-3 camp in GSS, Vivekanand Puri, Delhi on 11st October 2019.
- Under T3 camp after taking written informed consent haemoglobin was tested using Hemocue 201 machine and general health check-up was done by resident doctors and interns. Hb testing was done by trained lab technician of IDHS, Central district of Delhi.
- Nutritional counselling was done on the one-to-one basis by interns.
- Health talk on Menstrual Hygiene was also given.
- Iron folic Acid tablets for one month were given if student found mild to moderate anaemic and severely anaemic students were referred to paediatric OPD of Urban Health Training Centre (UHTC), Vivekanand Puri for further investigation and management.

Definitions

Adolescents^[10]

Individuals in the age group of 10-19 years is defined as adolescent. 10 years to 14 years age group considered as Early Adolescence and 15 years to 19 years age group considered as Late adolescence.

Anaemia among adolescent girls was classified according to WHO cut off values^[2]

- Normal >12 gm/dl
- Mild anaemia >11 gm/dl and <11.9 gm/dl
- Moderate anaemia >8 gm/dl and <10.9 gm/dl
- Severe anaemia <8 gm/dl

Cut-offs for classifying underweight and overweight as per WHO growth reference for adolescents^[11]

- According to WHO growth charts body mass index (BMI) less than 2 standard deviation (SD) below the WHO growth standard median was considered as underweight, BMI greater than 1 SD above the WHO growth standard median was considered as overweight.

Ethical issues

Ethical clearance was obtained from institutional ethics committee of North DMC Medical College, Delhi (F.No. 199/IEC/NDMC/2019 dated 5th October, 2019). The research was conducted in complete accordance with the principles of the World Medical Association Declaration of Helsinki. Study purpose was explained to school principle and written informed consent was obtained for participation of minor students (<18 years). Written consent for participant of age >18 years and assent for participants of age <18 years were obtained from each participant after explaining them the purpose of the study. Data was used for research purpose only and all personal information revealing details were kept confidential.

Data analysis

MS-Excel and STATA version 13 software were used for data entry and analysis. Data were presented in the form of frequencies and percentages. Significant association was established by using Chi-square tests and Fisher exact tests considering $P < 0.05$ as statistically significant.

Results

In this study, 203 (84.6%) out of 240 adolescent girls of class 9th to 12th participated in T-3 camp. Majority (65%) participants were of age 14-15 years with mean (\pm SD) age of 14.6 years (\pm 1.18). Most of them (96%) were Hindu and nearly half (51%) were vegetarian by diet. Majority of participants (73.9%) were underweight as per BMI-for age for girls [Table 1].

Table 1: Distribution of study participants according to socio-demographic characteristics (n=203)

Variables		Number	Percentage
Age (years)	12-13	31	15
	14-15	131	65
	16-17	34	17
	18 and above	7	3
Class	9 th standard	100	49
	10 th standard	55	27
	11 th standard	43	21
	12 th standard	5	3
Diet	Mix	100	49
	Vegetarian	103	51
Religion	Hindu	195	96
	Other*	8	4
BMI	Normal	53	26.1
	Underweight	150	73.9
No. of Siblings	0	15	7.4
	1	37	18.2
	2	61	30.1
	3	50	24.6
Occupation of Mother	≥4	40	19.7
	Home-maker	172	84.7
	Working	31	15.3

*Other: Islam, Sikh, Christian

Table 2: Distribution of anaemia according to severity among study participants (n=119)

Hb (gm/dl)	Severity of Anaemia	Number	Percentage
<8	Severe	9	7
8-9.99	Moderate	53	45
10-11.99	Mild	57	48
Total		119	100

It was found that out of 203 adolescent girls, more than half (59%) were anaemic (Hb < 12 gm/dl). The mean (\pm SD) Hb of the participants was 11.3 gm/dl (\pm 1.55). Among 119 anaemic girls, majority (48%) were mild anaemic followed by moderately anaemic (45%). Only nine participants had severe anaemia (Hb < 7 gm/dl) [Figures 1 and Table 2].

In the present study, it was found that the prevalence of 61.7% in early and mid-adolescent age group (<15 years) as compared to 46.3% in late adolescent age group (>15 years), but difference was not statistically significant ($p = 0.74$). Anaemia among adolescent girls who took albendazole tablet for deworming on national deworming day was significantly lower than who did not undergo deworming ($p < 0.001$). It was found that adolescent girls who were underweight had higher prevalence of anaemia than adolescent girls having normal BMI and this difference was statistically significant ($p < 0.001$). It was found that school girls who were vegetarian by diet were more anaemic than girls consuming mixed diet ($p < 0.001$). Factors like religion, number of siblings and occupation of mother did not find to be associated with anaemia ($P > 0.05$) [Table 3].

Table 3: Association of anaemia with selected study variables

Variables	Anaemia		Total (n=203) n (%)	P
	Present (Hb <12) n (%)	Absent (Hb >12) n (%)		
Age in years	<15	100 (61.7)	62 (38.3)	0.74
	>15	19 (46.3)	22 (53.7)	
Religion	Hindu	114 (58.5)	81 (41.5)	0.82
	Other	5 (62.5)	3 (37.5)	
No. of Siblings	≤2	71 (62.8)	42 (37.2)	0.17
	>2	48 (53.3)	42 (46.7)	
Occupation of mother	Home-maker	98 (57)	74 (43)	0.26
	Working	21 (67.7)	10 (32.3)	
BMI	Normal	20 (38)	33 (62)	<0.001
	Underweight	99 (66)	51 (34)	
Deworming	Yes	30 (27.5)	79 (72.5)	<0.001
	No	89 (94.7)	5 (5.3)	
Pallor	Yes	79 (53.4)	69 (46.6)	0.013
	No	40 (72.7)	15 (27.3)	
Diet	Mix	45 (45)	55 (55)	<0.001
	Vegetarian	74 (72)	29 (28)	

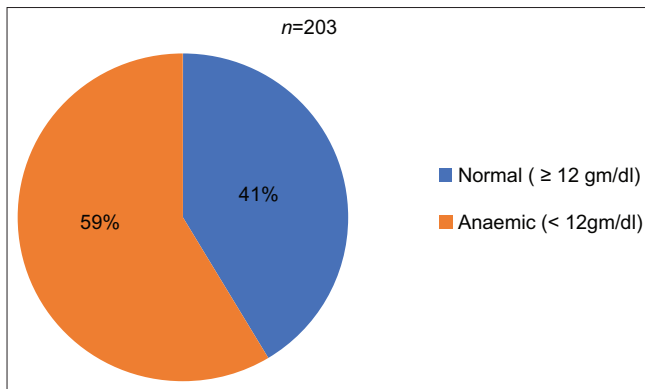


Figure 1: Distribution of anaemia among study participants

Discussion

Nutritional anaemia among adolescent girls is a key health concern and remains persistently high despite of various national programmes like national nutritional anaemia prophylaxis programme, national iron plus initiative, WIFS, etc., The present study highlights the magnitude of anaemia among school going girls of Delhi attending T-3 camp under Anaemia Mukht Bharat.

The mean (\pm SD) Hb of 203 adolescent girls who participated in the study was 11.3 gm/dl (\pm 1.55) which was similar to one reported by Rakesh Kumar *et al.*^[12] and Kaur S *et al.*^[13] In the present study, the prevalence of anaemia among adolescent girls found to be 59% which was similar to that reported by NFHS-4^[3] (54%), DLHS-3^[14] (57.9%), Kaur S *et al.*^[13] in Wardha (59.8%) and Kishore S *et al.*^[15] in Uttarakhand (57.1%). Various studies on prevalence of anaemia among adolescent girls reported prevalence ranging from 39% to 90% in different parts of India.^[12,15-21] This vast range of prevalence of anaemia may be due to different methods of haemoglobin estimation, different study settings and different study periods. Few studies had adopted standard method for haemoglobin estimation, thus

calling for a uniform prospective study of adolescent population using digital haemoglobinometer with high precision.

In the present study prevalence of mild, moderate and severe anaemia was 48%, 45% and 7% respectively which was similar to one reported by Chandrakumari AS *et al.*^[16] in Tamilnadu and Habib N *et al.*^[22] in Pakistan. DLHS-4^[23] report of Haryana revealed that prevalence of mild and moderate anaemia was 57.9% and severe anaemia was 6.3% among adolescent girls which was supporting our finding. However, in our study prevalence of mild, moderate and severe anaemia was higher compared to various studies by Premlatha T *et al.*^[20] in Chennai, Siva PM *et al.*^[5] in central Kerala, Kumar A *et al.*^[12] in Jorhat, Agrawal A *et al.*^[19] in Udupi and Patil N *et al.*^[17] in North Karnataka. This difference in findings may be due to different cut-off used to classify anaemia in different studies. We observed that early adolescent age group girls were more anaemic than late adolescent (84% vs 16%). Whereas other studies reported higher prevalence of anaemia among late adolescent than early adolescent.^[12,13,15,16,19] The high prevalence of anaemia among early adolescent age group in our study may be due to the small sample size of our study and low number of participants in late adolescent age group.

In this study, problem of anaemia was more prevalent among underweight girls than normal girls ($p < 0.001$). This result is consistent with studies conducted by Kaur S *et al.*^[13] in Wardha, Kumar A *et al.*^[12] in Jorhat, Basu S *et al.*^[24] in Chandigarh, Mengistu G *et al.*^[14] in North West Ethiopia, Tura MR *et al.*^[25] in West Shewa, Ethiopia and Fentie K *et al.*^[26] in Southwest Ethiopia. We found that adolescent girls who were vegetarian by diet had statistically significant proportion of anaemia than girls taking mixed diet ($p < 0.001$). Similar finding was reported by Kumar A *et al.*^[12] and Agrawal A *et al.*^[19] among adolescent girls of Jorhat and Udupi respectively. Kaur S *et al.*^[13] in their study conducted in Wardha found that vegetarian adolescent girls had higher odds of becoming anaemic than adolescent girls

who consume non-vegetarian diet (OR: 8.5, 95% C.I: 5.7, 12.8). This can be explained by fact that meat products, poultry and fish have haem iron which is superior to non-haem iron found in rice, cereals etc., in terms of absorption and bioavailability. In the present study, adolescent girls who undergone the deworming had lower prevalence of anaemia than girls who did not undergo deworming during national deworming days ($p < 0.001$). Kaur S *et al.*,^[13] Siva PM *et al.*^[5] and Mengistu G *et al.*^[4] in their study found that history of worm infestation was strong predictor of anaemia. This draws attention toward more effective implementation of national deworming days in schools to prevent surge of anaemia among adolescents. It was also found that adolescent girls who were having pallor on examination had high chance of anaemia ($P < 0.05$). This may be due to depleted iron stores along with low haemoglobin level among anaemic girls. In our study, factors like occupation of mother, age, religion and number of siblings were not associated with anaemia.

The strength of our study was use of standardised digital hemoglobinometer (HemoCue 201) for Hb estimation and use of WHO growth reference for BMI calculation. This study also gives an important insight into effectiveness of current anaemia prophylaxis programmes for adolescent age group. Limitation of our study was sample size was not calculated for this study as it was part of T-3 camp, so results of this study cannot be generalized. Recall bias may be possible. Few important factors associated with anaemia such as menstrual history, hand hygiene, socio-economic status, history of chronic disease were not included in the study.

Conclusion

The present study revealed higher prevalence of anaemia among school going adolescent girls of Delhi. The prevalence of mild and moderate anaemia was higher compared to severe anaemia. Factors like diet, deworming, BMI and presence of pallor found to be associated with anaemia among adolescent girls. There is urgent need for review of various Iron and Folic acid supplementation programmes for school going adolescent population in addition to regular T-3 camps in all schools. Special package of policies and interventions under Anaemia Mukht Bharat (Anaemia Free India) programme could help to curb the problem of anaemia among adolescent.

Acknowledgment

We acknowledge all staff of Urban Health Training Centre, Vivekanand Puri and principle of Govt. Girl Secondary School, Vivekanand Puri who helped to conduct the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Key points:

1. It was found that out of 203 adolescent girls, more than half (59%) were anaemic (Hb < 12 gm/dl). The mean (\pm SD) Hb of the participants was 11.3 gm/dl (\pm 1.55).
2. Among 119 anaemic girls, majority (48%) were mild anaemic followed by moderately anaemic (45%). Only nine participants had severe anaemia (Hb < 7 gm/dl).
3. It was also found that prevalence of anaemia was high among adolescent girls who were vegetarian by diet, underweight and did not take albendazole tablet on national deworming days.

References

1. World Health Organization, Adolescent health and development [Internet]. SEARO. World Health Organization, South-East Asia Regional Office; [cited 2020 Apr 20].
2. World Health Organization. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva: World Health Organization; 2011. (WHO/NMH/NHD/MNM/11.1).
3. International Institute for Population Sciences (IIPS). National Family Health Survey -4 (2015-16) India Factsheet. Mumbai: International Institute for Population Sciences; 2017.
4. Mengistu G, Azage M, Gutema H. Iron deficiency anemia among in-school adolescent girls in rural area of Bahir Dar City Administration, North West Ethiopia. *Anemia* 2019;2019:1097547.
5. Siva PM, Sobha A, Manjula VD. Prevalence of anaemia and its associated risk factors among adolescent girls of central Kerala. *J Clin Diagn Res* 2016;10:19-23.
6. Adolescent Division. Guidelines for Control-of-Iron-Deficiency-Anaemia. New Delhi: Ministry of Health and Family Welfare, Government of India; 2013.
7. Aguayo VM, Paintal K, Singh G. The Adolescent Girls' Anaemia Control Programme: A decade of programming experience to break the inter-generational cycle of malnutrition in India. *Public Health Nutr* 2013;16:1667-76.
8. National Health Mission. Anemia-Mukt-Bharat-Brochure. New Delhi: Ministry of Health and Family Welfare, Government of India; 2018. pdf.
9. National Health Mission. Test-Treat-Talk (T-3) Guidance Note for State Programme Managers. New Delhi: Ministry of Health and Family Welfare, Government of India; 2019.
10. Barzelatto J. United Nations Population Fund. State of World Population, 2003: Making 1 Billion Count: Investing in Adolescents' Health and Rights. New York: United Nations Population Fund; 2003.
11. De Onis M. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organ* 2007;85:660-7.
12. Kumar A, Goyal A, Verma N, Mahesh A. Study of anemia among adolescent school girls and young adults. *Int J Adv Med* 2018;5:877.
13. Kaur S, Deshmukh PR, Garg BS. Epidemiological correlates of nutritional anemia in adolescent girls of rural Wardha. *Indian J Community Med* 2006;31:255-8.
14. International Institute for Population Sciences (IIPS). INDIA REPORT of District Level Household Survey-3 (2007-08).

- Mumbai: International Institute for Population Sciences; 2016.
15. 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 Mukht Bharat Campaign in Uttarakhand. *J Fam Med Prim Care* 2020;9:1691-4.
 16. Chandrakumari AS, Sinha P, Singaravelu S, Jaikumar S. Prevalence of anemia among adolescent girls in a rural area of Tamil Nadu, India. *J Fam Med Prim Care* 2019;8:1414-7.
 17. Patil N, Jagadeesh K, Priyanka K, Kari A, Angolkar M. Prevalence of anemia among adolescent girls in a North Karnataka school: A cross sectional study. *Int J Community Med Public Health* 2018;5:5360-4.
 18. Kumari R, 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:BC04-6.
 19. Agrawal A, Shetty A, Jacob GP, Ka-math A. Anaemia among adolescents in a coastal district of India. *Natl J Community Med* 2018;9:396-401.
 20. T Premalatha T, Valarmathi S, Sriyayanth P, Sundar JS, Kalpana S. Prevalence of anemia and its associated factors among adolescent school girls in Chennai, Tamil Nadu, India. *Epidemiol* 2012;2:118. doi: 10.4172/2161-1165.1000118.
 21. Upadhye JV, Upadhye JJ. Assessment of anaemia in adolescent girls. *Int J Reprod Contracept Obstet Gynecol* 2017;6:3113.
 22. Habib N, Abbasi S-U-RS, Aziz W. An analysis of societal determinant of anemia among adolescent girls in Azad Jammu and Kashmir, Pakistan. *Anemia* 2020;2020:1628357. doi: 10.1155/2020/1628357.
 23. International Institute for Population Sciences (IIPS). Haryana factsheet of District Level Household Survey-4 (2012-13). Mumbai: International Institute for Population Sciences; 2016.
 24. Basu S, Basu S, Hazarika R, Parmar V. Prevalence of anemia among school going adolescents of Chandigarh. *Indian Pediatrics* 2005;42:593-7.
 25. Tura MR, Egata G, Fage SG, Roba KT. Prevalence of anemia and its associated factors among female adolescents in Ambo Town, West Shewa, Ethiopia. *J Blood Med* 2020;11:279-87.
 26. Fentie K, Wakayo T, Gizaw G. Prevalence of anemia and associated factors among secondary school adolescent girls in Jimma Town, Oromia Regional State, Southwest Ethiopia. *Anemia* 2020;2020:5043646.