Prevalence of anaemia and its association with dietary habits among pregnant women in the urban area of Haryana

Kashish Grover[1], Tarun Kumar[1], Aashima Doda[2], Rashi Bhutani[1], Sarika Yadav[1], Pankaj Kaushal[1], Roopam Kapoor[2], Sandeep Sharma[1]

[1]Department of Community Medicine, Pt. B.D. Sharma, PGIMS, Rohtak, Haryana, [2]Department of Paediatic Dentistry, PDM Dental College, Bahadurgarh, Haryana, India

Abstract

Introduction: Anaemia is a major health problem in India especially among pregnant women and nutritional anaemia, primarily iron deficiency, is the most common type of anaemia caused primarily due to iron deficiency. About 58% of pregnant women in India are anaemic and it is estimated that anaemia is the underlying cause of 20–40% of cases of maternal deaths. Therefore, the present study was planned to study the prevalence of anaemia among pregnant women and to explore the relationship between anaemia during pregnancy and different dietary factors. **Aim and Objective:** To study the prevalence of anaemia and dietary habits among pregnant women in an urban slum of Haryana. **Materials and Methods:** A cross-sectional study was carried out among pregnant women in the urban field practise area of Pt. B.D. Sharma PGIMS, Rohtak. All Pregnant women registered in 2018 were interviewed using a semi-structured pretested questionnaire. Observations were interpreted as per the WHO criteria. The data were analysed by SPSS statistical software version 20. **Results:** Out of 408 study participants, 348 (85.3%) were anaemic with mild, moderate and severe anaemia in 80 (19.6%), 244 (59.8%) and 24 (5.9%), respectively. More than half (50.5%), of the anaemic mothers, were found in the first trimester, respectively. The association of vegetarian diet and tea consumption was statistically significant with the severity of anaemia. ($P < 0.05$). **Conclusion:** The present findings showed a high prevalence of anaemia and unhealthy dietary habits significantly associated with it among pregnant women. Efforts to identify anaemia that may be responsive to modifiable factors such as diet to improve health outcomes are needed.

Keywords: Anaemia, dietary habits, pregnant women

Introduction

Anaemia is defined as a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status.[1] Anaemia during pregnancy is very common and is defined as haemoglobin concentration during pregnancy below 11 gm/dL.[2]

Anaemia is also one of the most commonly encountered medical disorders during pregnancy. It is responsible for many serious complications in the mother as well as the foetus. Maternal complications include PPH (postpartum haemorrhage) and foetal complications include preterm birth, low-birth-weight babies and small for gestational age babies.[3]

In India, 50.3% of pregnant women are anaemic, i.e., every second pregnant woman is facing this problem.[4] It is also a major killer of pregnancy in southeast Asian countries and India contributes to about 80% of the maternal death due to anaemia.[5]

Address for correspondence: Dr. Tarun Kumar,
Deptartment of Community Medicine, PGIMS, Rohtak,
Haryana, India.
E-mail: tkgmrmc@gmail.com

Access this article online

Quick Response Code:

Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_1062_19

How to cite this article: Grover K, Kumar T, Doda A, Bhutani R, Yadav S, Kaushal P, *et al*. Prevalence of anaemia and its association with dietary habits among pregnant women in the urban area of Haryana. J Family Med Prim Care 2020;9:783-7.

Diet can play a major role in the prevention of such complications. Meat, fish, pulses, jaggery and green leafy vegetable are few easily available iron rich sources. Dietary supplementation in pregnancy is highly recommended because of the increased needs during pregnancy that can be hardly satisfied.[6]

The present study highlights the problem of anaemia and its association with dietary habits among pregnant women from the urban field practise area of the Department of Community Medicine, Pt. B.D. Sharma PGIMS, Rohtak, Haryana.

Methodology

Study design and study setting

The clearance for this observational study was obtained on 16/11/2017, from the eminent academicians of department of Community Medicine, Pt. B.D. Sharma's PGIMS, Rohtak. The present study is a community-based cross-sectional study conducted in an urban field practise area attached to the Department of Community Medicine, Pt. B.D. Sharma PGIMS, Rohtak. The urban field practice area caters a total population of 25,528 and there are a total of three urban health posts in the area.

Study population

All the pregnant women seeking antenatal care from urban health posts attached to the department of community medicine.

Inclusion Criteria:
a. Pregnant women registered in the ANC register and are permanent residents of the study area.
b. Pregnant women who are willing to give informed consent.

Exclusion criteria
a. Any other medical and surgical obstetric complications.
b. Any other haematopoietic disease.

Study period

The study was conducted over a period of 1 year from January 2018 to December 2018.

Sampling method

Universal sampling method.

Sampling technique

All the pregnant women who were enrolled in ANC registers of all the urban health posts under PGIMS, Rohtak and were willing to give consent were included in the study.

Study tools

A semi-structured, predesigned, pretested, interviewer-administered questionnaire was used for the present study. The questionnaire obtained information on the sociodemographic profile, obstetric history, dietary habits and haemoglobin level. Haemoglobin concentration was measured using Sahli's haemoglobinometer. Anaemia was defined as a haemoglobin concentration <11 g/dL. Mild anaemia was defined as haemoglobin concentration between 10.0 and 10.9 g/dL, moderate anaemia as haemoglobin concentration between 7.0 and 9.9 g/dL while severe anaemia was defined as a haemoglobin concentration below 7 g/dL.

Sample size

The sample size is calculated using the statistical formula for sample size determination.

$$N = \frac{Z^2 P (1-P)}{D^2}$$

Where n = sample size, Z = statistic for level of confidence 95% (1.96), P = prevalence of anaemia (57.8%),[7] and absolute error 5%, n comes out to be 370. A total of 408 pregnant women were included in the study.

Data collection

The study was carried out among pregnant women. All the pregnant women in the area were interviewed using a semi-structured pretested questionnaire.

Haemoglobin estimation was performed by Sahli's haemoglobinometer and observations were interpreted as per the WHO criteria.

The data was analysed by SPSS statistical software version 20.

Results

The present study was conducted among 408 pregnant females registered with three urban health posts under PGIMS, Rohtak. The average age of the participants was 26.55 ± 3.46 years. About 348 (85.3%) of the pregnant females were anaemic, 292 (71.6%) participants had gravidity less than or equal to 2 and the rest had gravidity more than 2. It was observed that the prevalence of anaemia and that of severe anaemia was higher in women with gravidity more than 2. Majority (85.3%) women have education level above secondary education and there was a significant relationship between education and severity of anaemia. The majority (87.25%) of the participants were housewives and it was observed that the prevalence of anaemia among working women was more as compared to housewives [Table 1].

The association of anaemia status with different dietary factors such as consumption of non-veg food, jaggery, tea, green leafy vegetables and use of iron utensils for food preparation and so on were analysed and the association was found to be statistically significant [Table 2].

Table 1: Association of anaemia status with sociodemographic factors

Characteristic	Anaemia Category					
	Normal Hb level (> 11 gm%)	Mild Anaemia (10.0-10.9 gm%)	Moderate Anaemia (7.0-9.9 gm%)	Severe Anaemia (<7 gm%)	Total	Chi-square and *P*
1. Gravida						χ^2=21.09
≤2	52 (17.8%)	68 (23.3%)	156 (53.4%)	16 (5.5%)	292 (100%)	df=3
>2	8 (6.9%)	12 (10.3%)	88 (75.9%)	8 (6.9%)	116 (100%)	P=0.001
2. Type of Family						χ^2=75.909
A. Nuclear	56 (18.7%)	76 (25.3%)	164 (54.7%)	4 (1.3%)	300 (100%)	df=3
B. Joint	4 (3.7%)	4 (3.7%)	80 (74.1%)	20 (18.5%)	108 (100%)	P=0.001
3. Education						
A. Illiterate	0 (0%)	4 (20%)	16 (80%)	0 (0%)	20 (100%)	
B. Primary	0 (0%)	8 (20%)	32 (80%)	0 (0%)	40 (100%)	χ^2=60.893
C. Secondary	08 (6.3%)	28 (21.9%)	88 (68.8%)	04 (3.0%)	128 (100%)	df=12
D. Senior Secondary	40 (24.4%)	32 (19.5%)	72 (43.9%)	20 (12.2%)	164 (100%)	P=0.001
A. Graduation and Above	12 (21.4%)	08 (14.3%)	36 (64.3%)	0 (0%)	56 (100%)	
4. Occupation						
A. Housewife	60 (16.9%)	80 (22.5%)	200 (56.2%)	16 (4.5%)	356 (100%)	χ^2=39.772
B. Labourer	0 (0%)	0 (0%)	12 (75%)	04 (25%)	16 (100%)	df=6
C. Job (Govt./Private)	0 (0%)	0 (0%)	32 (88.9%)	04 (11.1%)	36 (100%)	P=0.001

Table 2: Association of anaemia status with dietary factors

Characteristic	Anaemia Category					
	Normal Hb level (>11 gm%)	Mild Anaemia (10.0-10.9 gm%)	Moderate Anaemia (7.0-9.9 gm%)	Severe Anaemia (<7 gm%)	Total (100%)	Chi-square and *P*
1. H/O Worm Infestation						χ^2=13.47
Yes	8 (28.6%)	0 (0%)	16 (57.1%)	4 (14.3%)	28	df=3
No	52 (13.7%)	80 (21.1%)	228 (60%)	20 (5.3%)	380	P=0.004
2. Consumption of Non-Vegetarian Foods						χ^2=43.92
Yes	44 (11.6%)	76 (20%)	236 (62.1%)	24 (6.3%)	380	df=3
No	16 (57.1%)	4 (14.3%)	8 (28.6%)	0 (0%)	28	P=0.001
3. Use of Iron Utensils						χ^2=158.34
Very Rarely	24 (75%)	4 (12.5%)	4 (12.5%)	0 (0%)	32	df=6
Sometimes	32 (11.1%)	76 (26.4%)	172 (59.7%)	8 (2.8%)	288	P=0.001
Often	4 (4.5%)	0 (0%)	68 (77.3%)	16 (18.2%)	88	
4. Consumption of Green Leafy vegetable						χ^2=122.32
Very rarely	0 (0%)	4 (2.9%)	112 (80%)	24 (17.1%)	140	df=3
Occasionally	60 (22.4%)	76 (28.4%)	132 (49.3%)	0 (0%)	268	P=0.001
5. Consumption of Jaggery						χ^2=2.075
Occasionally	32 (16.7%)	40 (20.8%)	108 (56.2%)	12 (6.2%)	192	df=3
Often	28 (13%)	40 (18.5%)	136 (63%)	12 (5.6%)	216	P=0.557
6. Consumption of tea with meals						χ^2=85.79
Occasionally	36 (47.4%)	16 (21.1%)	24 (31.6%)	0 (0%)	76	df=3
Often	24 (7.2%)	64 (19.3%)	220 (66.3%)	24 (7.2%)	332	P=0.001

Discussion

Anaemia is a known public health problem affecting both men and women, especially in pregnant women, not only affecting the health of the mother but also the outcome of the pregnancy and health of the baby. Iron-deficiency anaemia resulting from inadequate intake and low absorption of dietary Fe is the most common form of anaemia in India as well as worldwide. India has the highest burden of anaemia among pregnant women.

In the present study, 408 pregnant women participated and the mean age of participants was 26.55 ± 3.46 years. Shwetha and Prasad conducted a study on pregnant women in Bengaluru in which mean age of participants was 24.4 ± 4.2 years whereas Mangla and Singhla conducted a study in Haryana with a mean age of pregnant women as 26.17 years.[8,9]

In the present study, the prevalence of anaemia was found to be 85.3% (348/408) with 5.88% participants (24/348) having severe anaemia (Hb <7 gm%). A multicentric study conducted in 11 states of India, reported a prevalence of anaemia as 84.9%.[10] Similar prevalence of anaemia (91.3%) and severe anaemia (4.9%) was reported by Kant *et al*. among pregnant women in Ballabhgarh, Haryana.[11] The prevalence of

anaemia was significantly higher in our study when compared to prevalence in DLHS Haryana data of Rohtak district with a prevalence of anaemia being 55.7% and that of severe anaemia as 8.4%. Rajmouli *et al.* in Telangana found the prevalence of anaemia and severe anaemia in pregnant women as 58.36% and 8.8%, respectively.[12] A study conducted in rural Tamilnadu by Rajaratnam *et al.* concluded the prevalence of anaemia as 69.3% with a prevalence of severe anaemia as 3.3%.[13] Shwetha and Prasad reported a prevalence of anaemia as 68.6% among pregnant women in Bengaluru.[8] However, the study done by Mangla and Singla in Sonipat, Haryana found the prevalence of anaemia among pregnant women to be 98% and that of severe anaemia to be 15.88%.[9]

Such variations among different may be due to the difference in the study area and as well as the sampling techniques used for choosing the participants. In the present study, all the participants were chosen from a single urban area and universal sampling was used whereas in studies done in Bengaluru and Sonipat participants were chosen from a rural area and random sampling was used. In DLHS, participants from both urban and rural population were chosen. Still, the prevalence in all the studies was quite high and need to be addressed.[7]

The association of socioeconomic factors such as education, occupation, type of family and so on with anaemia status of the participants was found to be statistically significant. Participants who were illiterate or were educated until primary classes were more prone to being anaemic in comparison with those having higher education. Similar findings were reported by Kaur and Mangla *et al.*, in which they found a significant association between literacy, gravidity/parity and occupation of the pregnant women with anaemia status.[9,14]

The association of dietary factors such as vegetarian diet, worm infestation, use of iron utensils, consumption of green leafy vegetables, consumption of tea with meals and consumption of jaggery with anaemia status among pregnant women was all found statistically significant. Saaka and Rauf from Ghana also observed that consumption of green leafy vegetable and consumption of non-vegetarian diet was significantly associated with improved haemoglobin level in pregnancy.[15] Worm infestation was found to be present in 28.5% of cases in a study conducted by Singal *et al.* as compared to 6.86% found in our study.[16] This difference might be due to different preference in dietary habits. However, in the study done by Shweta and Prasad and Sholeye *et al.*, the association between anaemia status and a vegetarian diet was found insignificant.[8,17]

Conclusion

Despite the measures taken to control anaemia in pregnancy, the severity of nutritional anaemia continues to remain a public health issue of great magnitude. The present findings showed a high prevalence of anaemia and bad dietary habits among pregnant women. It was evident from the study results that

food preferences affect the anaemia status in pregnancy quite significantly. Thus, awareness regarding the importance of food preferences and use of iron utensils for cooking should be increased. Furthermore, more efforts to identify anaemia that may be responsive to modifiable factors like diet are needed to improve health outcomes are needed. We should update our IEC material and focused supervision should be warranted by the grassroots level workers to get improved haemoglobin levels.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. World Health Organization. Anaemia. Geneva: World Health Organization; 2019.

2. World Health Organization. Haemoglobin Concentrations for the Diagnosis of Anemia and Assessment of Severity. Geneva: World Health Organization; 2011.

3. Nair M, Choudhury MK, Choudhury SS, Kakoty SD, Sarma UC, Webster P, *et al.* Association between maternal anaemia and pregnancy outcomes: A cohort study in Assam, India. BMJ Glob Health 2016;1:1-9.

4. International Institute for Population Sciences. National Family Health Survey-4 Factsheet. Mumbai: International Institute for Population Sciences; 2016.

5. Ministry of Health and Family Welfare. Anaemia During Pregnancy (Maternal Anaemia). New Delhi: MOHFW National Health Portal of India; 2019.

6. BanjariI, Kenjeric D, Mandic ML. What is the real public health significance of iron deficiency and iron deficiency anaemia in croatia? A population-based observational study on pregnant women at early pregnancy from eastern croatia. Cent Eur J Public Health 2015;23:122-7.

7. International Institute for Population Sciences. District Level Household and Facility Survey -4/State Fact Sheet Haryana. Mumbai: International Institute for Population Sciences; 2013.

8. Shwetha, Prasad KN. Prevalence of anemia among pregnant women-A cross-sectional study. Int J Med Sci Public Health 2018;7:1023-6.

9. Mangla M, Singla D. Prevalence of anaemia among pregnant women in rural India: A longitudinal observational study. Int J Reprod Contracept Obstet Gynecol 2016;5:3500-5.

10. Toteja GS, Singh P, Dhillion BS, Saxena BN, Ahmed FU, Singh RP, *et al.* Prevalence of anemia among pregnant

women and adolescent girls in 16 districts of India. Food Nutr Bull 2017;27:311-5.

11. Kant S, Malhotra S, Haldar P, Kaur R, Kumar R. Anemia among pregnant women attending antenatal clinic at a secondary health care facility in district Faridabad, Haryana. Indian J Community Fam Med 2019;5:51-5.

12. Rajamouli J, Ravinder A, Reddy SCK, Pambi S. Study on orevalence of anemia among pregnant women attending antenatal clinic at Rural health training centre (RHTC) and Chalmeda Anand Rao institute of medical sciences teaching hospital, Karimnagar, Telangana. Int J Contemp Med Res 2016;3:2388-91.

13. Rajaratnam J, Rajaratnam A, Ganesan C, Jayaseelan SA. Maternal anaemia: A persistent problem in rural Tamil Nadu. Natl Med J India 2000;13:242-5.

14. Kaur K. Anaemia 'a silent killer' among women in India: Present scenario. Euro J Zool Res 2014;3:32-6.

15. Saaka M, Rauf AA. Role of dietary diversity in ensuring adequate haematological status during pregnancy. Int J Med Res Health Sci 2015;4:749-55.

16. Singal N, Setia G, Taneja B, Singal K. Factors associated with maternal anaemia among pregnant women in rural India. BJMS. 2018;17:583-92.

17. Sholeye OO, Animasahun VJ, Shorunmu TO. Anemia in pregnancy and its associated factors among primary care clients in Sagamu, Southwest, Nigeria: A facility-based study. J Family Med Prim Care 2017; 6:323-9.