Prevalence and Associated Factors of Anemia among Pregnant Women Receiving Antenatal Care (ANC) at Fatima Hospital in Jashore, Bangladesh: A Cross-Sectional Study

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Abstract

Since anemia is one of the most skyrocketed public health problems worldwide, an investigation has thus been conducted to assess the prevalence and associated factors of anemia among the pregnant women receiving antenatal care (ANC) at Fatima Hospital in Jashore, Bangladesh. Facility-based cross-sectional study was carried out among 384 pregnant women at Fatima hospital, Bangladesh from February to April, 2019. Data were obtained using a structured questionnaire and participant's current medical record card. Binary logistic regression analysis was used to identify factors associated with anemia and a P-value < 0.05 was considered as statistically significance. The overall prevalence of anemia among pregnant women was 58.9% (226/384). Out of 226 anemic pregnant mothers, 36.3% (82/226) were mildly anemic, 62.4% (141/226) were moderately anemic and 1.3% (3/384) was severely anemic. Binary logistic regression analysis revealed that the following variables were significantly associated with anemia: Monthly family income (11,000 - 20,000 Taka) [AOR (95% CI) = 0.45 (0.21 - 0.98)], Family size (joint) [AOR (95% CI) = 1.59 (1.03 - 2.45)], Gestational age (third trimester) [AOR (95% CI) = 2.18 (1.40 - 3.40)], birth spacing < 2 years [AOR (95% CI) = 2.87 (1.51 - 5.44)], Excessive blood loss during previous surgery (Yes) [AOR (95% CI) = 2.08 (1.14 - 4.17)], Food group eaten 24 hours (1 - 4 groups) [AOR (95% CI) = 3.43 (1.84 - 6.39)], Breakfast regularly (No) [AOR (95% CI) = 3.64 (1.36 - 9.75)]. The results obtained showed that the prevalence of anemia among pregnant women is severe at Fatima Hospital in Jashore, Bangladesh.

1. Introduction

Anemia is a pathological condition arises when the concentration of hemoglobin (Hb) or hematocrit (HCT) or RBC (red blood cells) count is lower than the recommended normal range level rendering the reduction in the oxygen carrying capacity of red blood cells to tissues while affecting almost all age group of people, frequently pregnant women [1]-[8]. Anemia during pregnancy is a significant public health problem in low-income countries (56%) and developed countries (18%) [2]-[9]. Census and other exploratory studies estimated that anemia currently affecting 1.62 billion people worldwide and among those 56 million pregnant women were found anemic while contributing more than 115,000 maternal and 591,000 postnatal deaths globally every year [6] [10] [11] [12] [13]. Usually, Anemia during pregnancy is defined when the Hemoglobin (Hb) concentration level is <11 g/dl [14]. However, there is a detailed category definition are available previously proposed by World Health Organization (WHO) [14]. According to World Health Organization (WHO) anemia during pregnancy have been classified as mild (10.0 - 10.9 g/dl), moderate (7.0 - 9.9 g/dl) and severe (<7.0 g/dl) based on the level of hemoglobin concentration in blood [14] [15] [16] [17] [18]. Anemia has a number of contributing factors including poor nutritional status, poor diet, poor antenatal care service, socio-demographics, genetic, abortions, infectious disease, frequent labor and multi-parity [16]. However, iron deficiency is the cause of 75% of anemia cases [16]. Another leading cause of anemia is micro and macronutrients deficiency [18] [19]. Insufficient intake and poor bioavailability of iron-rich foods also have significant contribution for the onset of anemia during pregnancy [16]. According to many studies, severity of anemia during pregnancy has been found responsible for poor maternal and fetal outcomes [20] [21] [22] [23]. The most common obstetric problems of anemia during pregnancy include; abortion, prematurity, intrauterine fetal death, neonatal low birth weight, postnatal mortality and morbidity [20]-[27]. In Bangladesh, there were three different surveys previously conducted and estimating the prevalence of anemia among pregnant women and the percentage (%)prevalence were found as 50%, 59% and 63% [9] [25]. However, to our information there was no other studies have ever been conducted at the area we are investigating regarding the prevalence of anemia during pregnancy. Since information on anemia and its associated factors with maternal anemia is not available in this area so our purpose of this study was to investigate the prevalence and to probe the associated factors of anemia among pregnant women receiving Antenatal Care (ANC) at Fatima Hospital in Jashore, Bangladesh.

2. Materials and Methods

2.1. Study Design

A facility-based cross-sectional study.

2.2. Period and Area

The study was carried out from 2nd February to 24th April 2019 at Fatima Hospital in Jashore, Bangladesh, a Christian missionary hospital which was established in 1970 and providing high quality services, developing and implementing effective programs particularly for the vulnerable and poor people including pregnant women.

2.3. Study Population

The study populations were pregnant women in all trimester who visited at Fatima Hospital for antenatal care. Participants who were pregnant and fulfilled the inclusion criteria were included in the study. Each participant was enrolled only once on their first visit during the study period.

2.4. Sample Size Determination and Sampling Procedures

The actual sample size for the study was determined based on the prevalence rate of (50%) anemia in pregnant women in Bangladesh from the previous study and also to get maximum sample size. The 95% confidence interval and 5% marginal error, sample size (n) the formula is shown below was used to determine the sample size. Simple random sampling technique was applied. Individual women who self-reported to the health center were included until 384 sample sizes were obtained [2].

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

where,

D = Marginal error, 5%,

N = Sample size,

Z = Confident interval, 95%,

P = Based on 50% prevalence rate on the previous study in Bangladesh [9],

$N = (1.96)^2 \times 0.5 \, (1 - 0.50)/0.0025 = 384.16$.

2.5. Data Collection Procedures

A pretested structured questionnaire was used to get socio-demographic characteristics, clinical history, dietary habit and nutritional characteristics of pregnant women. The questionnaire was firstly translated into first language Bengali then retranslated into English. Five trained B.Sc. completed students from department of Nutrition and Food Technology, Jashore University of Science and Technology were hired for the collection and record of the data. The respondents were identified as follows: The interviewers informed the indoor partici-

pants about the motifs, aim and objectives, risks and benefits of the study, then the interviewers convinced the client to complete the interview process after receiving their routine antenatal care (ANC). Patients interviewed in a private study room and also current medical records were checked. We conducted interview in a safe, secure and confidential environment and then the biological tests result was recorded from the patient obstetric file. Anemia status of pregnant women was classified to mild (10.0 - 10.9 g/dl), moderate (7.0 - 9.9 g/dl) and severe (<7.0 g/dl) according to World Health Organization (WHO) [14] [15] [16] [17] [18]. Mid Upper Arm Circumference (MUAC) was also used to determine the nutrition status of pregnant women which was categorized as acute malnutrition or wasting < 21 cm, moderate 21 - 23 cm and normal > 23 cm [12].

2.6. Data Processing and Analysis

Data we reanalyzed using the Statistical Package for the Social Science (SPSS) (version 16.0) Descriptive analysis was employed to calculate frequency and percentage. Frequency tables and charts were used to present the summarized data. Binary logistic regression analysis was employed to identify factors associated with anemia. In every cases P Value < 0.05 was considered statistically significance.

2.7. Inclusion and Exclusion Criteria

Healthy pregnant women in all trimester, who were consented to provide information was included while excluding participants who were seriously ill and did not want to give their information.

2.8. Ethical Consideration

Ethical clearance was obtained from department of Nutrition and Food Technology; Jashore University of Science and Technology. Ethical Review Committee Permission letter was submitted to the Superintendent of Fatima hospital. The aim and objective of the study were explicated clearly to the pregnant women and their families. Their oral permission was taken to conduct this study while preserving the information of each mother under the study confidentially.

3. Results

3.1. Socio-Demographic Characteristics

A total of 384 pregnant women receiving hospital-based antenatal care (ANC) were including the study. Majority, 144 (37.5%) of the study participants were found 21 - 25 age group and only 6 (1.6%) were found 36 or more than 36 years old. More than half of the participants 200 (52.1%) lived in urban area and rest 184 (47.9%) pregnant women were in rural area. More than three-fourth 296 (77.1%) pregnant women were Muslim. Among all the participants 122 (31.8%) pregnant women attended secondary school and 112 (29.2%) completed their

graduation. All of the pregnant women were married and most of were house-wife 309 (80.5%) (Table 1).

Table 1. Socio-demographic characteristics of the pregnant women (N = 384).

Characteristics	Number	Percentage (%)
Age (Years)		
≤20	88	22.9
21 - 25	144	37.5
26 - 30	108	28.1
31 - 35	38	9.9
≥36	6	1.6
Residence		
Urban	200	52.1
Rural	184	47.9
Marital Status		
Married	384	100
Divorced	0	0
Widowed	0	0
Religion		
Muslim	296	77.1
Hindu	85	22.1
Other	3	0.8
Educational status		
Never attendant school	10	2.6
Primary school	42	10.9
Secondary school	122	31.8
Higher secondary	98	25.5
Graduation and above	112	29.2
Occupation		
Housewife	309	80.5
Govt. employee	11	2.9
Private employee	8	2.1
Student	56	14.6
Family monthly income (Taka)		
≤10,000	51	13.3
11,000 - 20,000	149	38.8
21,000 - 30,000	110	28.6
≥31,000	74	19.3
Family Size		
Nuclear	246	64.1
Joint	138	35.9
Age at marriage (Years)		
<16	52	13.5
16 - 18	172	44.8
>18	160	41.7

3.2. Clinical and Maternal Characteristics

More than half of the pregnant women 221 (57.6%) were third trimester (gestational age more than 28 weeks), while 127 (33.1%) were second trimester (gestational age between 13 to 28 weeks) and 36 (9.4%) were first trimester (gestational age less than 13 weeks). Among all pregnant women 221 (54.9%) were multi-gravida, more than half of the pregnant women were without child 222 (57.8%) and women with one child 139 (36.2%). More than half of the pregnant women 221 (57.6%) were attending antenatal more than three times (Table 2).

Table 2. Clinical and maternal characteristics of the study participants.

Characteristics	Number	Percentage (%)
Gestational age (trimester)		
First	36	9.4
Second	127	33.1
Third	221	57.6
Number of pregnancies		
Primigravida	173	45.1
Multigravida	221	54.9
Number of deliveries		
No child	222	57.8
1	139	36.2
2 - 3	23	6.0
4 and more	0	0
Level of birth spacing		
First pregnancy	176	45.8
<2 years	71	18.5
>2 years	137	35.7
Frequency of ANC		
First	76	19.8
Second	87	22.7
Third or more	221	57.6
History of miscarriage		
Yes	100	26
No	284	74
History of previous surgery		
Yes	122	31.8
No	262	68.2
Excessive blood loss during previous surgery		
Yes	45	11.7
No	339	88.3
Current Malaria attack		
Yes	0	0
No	384	100

3.3. Dietary and Nutrition Related Characteristics

Almost all of the pregnant women 345 (89.8%) consumed meat once or less per week. Everyday fish and green leafy vegetables consumption by participants were 155 (40.4%), 145 (37.8%). More than half of the participants 227 (59.1%) consume fruits once or less per week. Near half of the responded said they ate egg and milk or milk products daily 191 (49.7%) and 188 (49%). Iron supplement taken by pregnant mother were 260 (67.7%) and iron supplement taken by respondent among 260 participants <30 days 59 (22.7%), 30 - 60 days 93 (35.8%), and 60 - 90 days 108 (41.5%). Near three-fourth of respondent 278 (72.4%) eaten five to eight group of food daily. Near half of the pregnant women 179 (46.6%) drink tea or coffee and among 179 participants 86 (48%) were consume tea or coffee immediately after meal. Majority of the respondents 355 (92.4%) were daily breakfast taken. Nutritional status of the participants was determined by Mid Upper Arm Circumference (MUAC) and above 384 participants 19 (4.9%) had MUAC of <21 cm, 46 (12%) had MUAC among 21 to 23 cm, and residual 319 (83.1%) had an MUAC within the normal limit (>23 cm) (Table 3).

3.4. Prevalence of Anemia

Among 384 pregnant women who were receiving antenatal care at Fatima Hospital in Jashore 226 (58.9%) were anemic according on their hemoglobin (Hb) test result and the rest of 158 (41.1%) did not show anemia (Table 4). Among 226 anemic pregnant mother 82 (36.3%) had mild anemia, 141 (62.4%) had moderate anemia and 3 (1.3%) had severe anemia and (Figure 1).

3.5. Associated Factors of Anemia among Pregnant Women

Binary logistic regression analysis was applied to find out the possible associations of anemia and socio-demographic factors: Monthly family income (11,000 - 20,000 Taka) [AOR (95% CI) = 0.45 (0.21 - 0.98), P = 0.04] and family size (joint) [AOR (95% CI) = 1.59 (1.03 - 2.45), P = 0.03], Clinical and Maternal
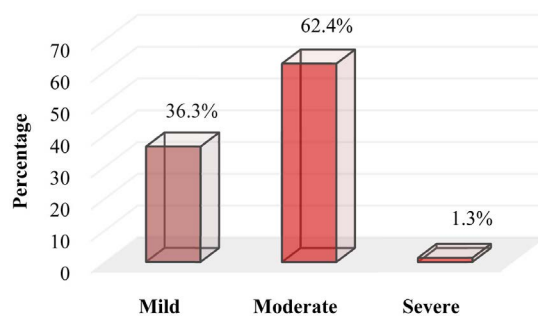

Figure 1. Prevalence of anemia among pregnant women receiving Antenatal Care (ANC) at Fatima Hospital in Jashore, Bangladesh, the percentage were calculated according to the classification recommended by World Health Organization (WHO) of anemia during pregnancy as classified as mild (10.0 - 10.9 g/dl), moderate (7.0 - 9.9 g/dl) and severe (<7.0 g/dl) based on the level of hemoglobin concentration in blood [17].

Table 3. Dietary and nutritional characteristics of the participants.

Characteristics	Number	Percentage (%)
Meat consumption		
Everyday	0	0
Every two days	39	10.2
Every week or less	345	89.8
Fish consumption		
Everyday	155	40.4
Every two days	164	42.7
Every week or less	65	16.9
Green leafy vegetables consumption		
Everyday	145	37.8
Every two days	163	42.4
Every week or less	76	19.8
Fruits consumption		
Everyday	43	11.2
Every two days	114	29.7
Every week or less	227	59.1
Egg consumption		
Everyday	191	49.7
Every two days	111	28.9
Every week or less	82	21.4
Milk consumption		
Everyday	188	49.0
Every two days	70	18.2
Every week or less	126	32.8
Iron supplement taken in this antenatal (ANC) period		
Yes	260	67.7
No	124	32.3
Iron supplement taken level		
<30 days	59	22.7
31 - 60 days	93	35.8
61 - 90 days	108	41.5
Food group eaten in 24 hours		
>8 groups	54	14.1
5 - 8 groups	278	72.4
1 - 4 groups	52	13.5

Continued

Drink tea or coffee		
Yes	179	46.6
No	205	53.4
Consumption of tea or coffee immediately after meal n = 179		
Consume	86	48.0
Not consume	93	52.0
Daily breakfast taken		
Yes	355	92.4
No	29	7.6
MUAC (cm)		
<21	19	4.9
21 - 23	46	12.0
>23	319	83.1

Table 4. Prevalence of anemia at Fatima hospital in Jashore of the study participants from 2nd February to 24th April, 2019.

Characteristics	Number	Percent
Overall prevalence of anemia		
Anemia	226	58.9
No anemia	158	41.1
Severity of anemia n = 226		
Mild	82	36.3
Moderate	141	62.4
Severe	3	1.3

characteristics: Gestational age (third trimester) [AOR (95% CI) = 2.18 (1.40 - 3.40), P = 0.001], level of birth spacing < 2 years [AOR (95% CI) = 2.87 (1.51 - 5.44), P = 0.001] respectively and blood loss during previous surgery (Yes) [AOR (95% CI) = 2.08 (1.04 - 4.17), P = 0.03], nutritional characteristics: Food group eaten 24 hours (1 - 4 groups) [AOR (95% CI) = 3.43 (1.84 - 6.39), P = 0.001] and breakfast regularly (No) [AOR (95% CI) = 3.64 (1.36 - 9.75), P = 0.01] were significantly associated with anemia (Table 5).

4. Discussion

This study was carried out to assess the prevalence and factors associated of anemia among pregnant women receiving antenatal care (ANC) at Fatima Hospital, Bangladesh. The overall prevalence of anemia among pregnant women in this study was 58.9%. Out of 226 anemic pregnant mothers, 36.3% (82/226) were mildly anemic, 62.4% (141/226) were moderately anemic and 1.3% (3/384) was severely anemic. According to the World Health Organization classification, the

Table 5. Associated factors of anemia among pregnant women receiving antenatal care (ANC) at Fatima Hospital in Jashore, 2nd February to 24th April, 2019.

Variable	Anemia (%)	Normal (%)	P-value	AOR (95% CI)
		Anemia status		
		Age of mothers (Years)		
≤20	45 (51.1)	43 (48.9)		1
21 - 25	83 (57.6)	61 (42.4)	0.47	1.91 (0.33 - 10.98)
26 - 30	69 (63.9)	39 (36.1)	0.66	1.47 (0.26 - 8.29)
31 - 35	25 (65.8)	13 (34.2)	0.89	1.13 (0.20 - 6.46)
≥36	4 (66.7)	2 (33.3)	0.97	1.04 (0.17 - 6.45)
		Residence		
Urban	113 (56.5)	87 (43.5)		1
Rural	113 (61.4)	71 (38.6)	0.33	1.23 (0.82 - 1.84)
		Family monthly income (Taka)		
≤10,000	38 (74.5)	13 (25.5)		1
11,000 - 20,000	83 (55.7)	66 (44.3)	0.04*	0.45 (0.21 - 0.98)
21,000 - 30,000	63 (57.3)	47 (42.7)	0.88	1.04 (0.60 - 1.83)
≥31,000	42 (56.8)	32 (43.2)	0.94	0.98 (0.54 - 1.78)
		Family size		
Nuclear	135 (54.9)	111 (45.1)		1
Joint	91 (65.1)	47 (34.1)	0.03*	1.59 (1.03 - 2.45)
		Gestational age (trimester)		
First	25 (69.4)	11 (30.6)		1
Second	58 (45.7)	69 (54.3)	0.58	0.81 (0.38 - 1.73)
Third	143 (64.7)	78 (35.3)	0.001*	2.18 (1.40 - 3.40)
		Number of pregnancies		
Primigravida	98 (56.6)	75 (43.4)		1
Multigravida	128 (60.7)	83 (39.3)	0.42	1.18 (0.79 - 1.78)
		Number of deliveries		
No	128 (57.7)	94 (42.3)		1
1	80 (57.6)	59 (42.4)	0.06	2.64 (0.95 - 7.38)
2 - 3	18 (78.3)	5 (21.7)	0.06	2.66 (0.93 - 7.56)
		Level of birth spacing N = 208		
>2 years	72 (52.6)	65 (47.4)		1
<2 years	54 (76.1)	17 (23.9)	0.001*	2.87 (1.51 - 5.44)
		Frequency of ANC		
First	47 (61.8)	29 (38.2)		1
Second	48 (55.2)	39 (44.8)	0.69	0.90 (0.53 - 1.53)
Third or more	131 (59.3)	90 (40.7)	0.51	1.18 (0.72 - 1.95)

Continued

Excessive blood loss during previous surgery				
Yes	33 (73.3)	12 (26.7)	0.039*	2.08 (1.04 - 4.17)
No	193 (56.9)	146 (43.1)		1
Iron supplement taken in this antenatal (ANC) period				
Yes	148 (56.9)	112 (43.1)		1
No	78 (62.9)	46 (37.1)	0.26	1.28 (0.83 - 1.99)
Food group eaten in 24 hours				
>8 groups	17 (31.5)	37 (68.5)		1
5 - 8 groups	170 (61.2)	108 (38.8)	0.06	0.53 (0.27 - 1.03)
1 - 4 groups	39 (75.0)	13 (25.0)	0.001*	3.43 (1.84 - 6.39)
MUAC (cm)				
<21	10 (52.6)	9 (47.4)		1
21 - 23	30 (65.2)	16 (34.8)	0.63	1.26 (0.50 - 3.18)
>23	186 (58.3)	133 (41.7)	0.37	0.75 (0.39 - 1.42)
Breakfast regularly				
Yes	202 (56.9)	153 (43.9)		1
No	24 (82.8)	5 (17.2)	0.01*	3.64 (1.36 - 9.75)

1 = Reference; AOR = Adjuster Odds Ratio; CI = Confidential Interval; *P < 0.05 statistically significant association for the Adjusted Odds Ratio.

prevalence of anemia among pregnant women in this study was a severe public health problem [17] [28] [29]. The prevalence determined in this study area was comparable with other studies reported in different countries: Bangladesh (59%), Bhutan (59%), and Sri Lanka (60%) [25], China (58.6%) [18], Malaysia (57.4%) [27]; higher than Republic in Korea (30.2%), South Africa (19.7%) [15], in rural area of Southern Ethiopia (29%); and lower than India (87.2%), Pakistan (90.5%) [27] and Nepal (73%) [9]. Socio-demographic factors are associated with anemia among pregnant women [22]. The current study has showed that only monthly family income (in Bangladeshi Taka) and family size were significantly associated with anemia. Participants who had family monthly income (Taka) (11,000 to 20,000 Bangladeshi Taka) [AOR (95% CI) = 0.45 (0.21 - 0.98), P = 0.04] were less likely to be anemic as compared to those with low monthly family income (Taka) (<10,000 Bangladeshi Taka). The similar findings had also been reported in another study conducted in China [1], Southern Ethiopia [6], Dhaka, Bangladesh [25], Arba Minch, Ethiopia [26], Northwest Ethiopia [30], and Addis Ababa, Ethiopia [31]. Numerous studies have transpired that low household monthly income disturbs the household food purchasing capacity while affecting the household food security. In addition, people living in poor households are found with diminished dietary intake and high risk of nutritional deficiencies [30] [31]. The present study revealed that, the family size was also significantly associated with anemia. Participants with family size (joint) [AOR

(95% CI) = 1.59 (1.03 - 2.45), P = 0.03] were 1.59 times higher risk of anemia than family size nuclear. This finding is similar with a study conducted at Tikur Anbessa Hospital, Ethiopia [32], JigJiga, Eastern Ethiopia [13], and Southern Ethiopia [31]. The large family size is related to anemia among pregnant women could be due to food insecurity [31]. Clinical and maternal characteristics are known important determinants of anemia [32]. The current study showed that gestational age (trimester) was a significantly associated with anemia among pregnant women and the risk of developing anemia increases with the gestational age. The risk of developing anemia was higher in the third trimester compared than the first and second trimester. The current study showed that, the prevalence of anemia was 2.18 times higher at third trimester [AOR (95% CI) = 2.18 (1.40 - 3.40), P = 0.001] than first trimester. The study finding was well-matched with other studies conducted at Adigrat General Hospital, Northern Ethiopia [5], Southern Ethiopia [6], JigJiga, Eastern Ethiopia [13], Addis Ababa, Ethiopia [27], Southern Ethiopia [31], and Tikur Anbessa Specialized Hospital, Addis Ababa Ethiopia [32]. Pregnant women's birth interval having less than two years [AOR (95% CI) = 2.87 (1.51 - 5.44), P = 0.001] were 2.87 times more likely to be anemic compared to those with birth interval more than two years. This study finding is also found similar with other studies conducted in at Northern Ethiopia [4], Addis Ababa Ethiopia [32], and Arba Minch Town, Ethiopia [26]. The birth interval less than two years might be associated with a decreased iron store of women due to increase the incidence of anemia in pregnancy. The present study also showed that, history of blood loses (yes) [AOR (95% CI) = 2.08 (1.04 - 4.17), P = 0.03] was statistically significant association with anemia. Findings were similar with the study conducted at Southern Ethiopia [2], Northern Ethiopia [5], Southeast Ethiopia [7], Tigray region, northern Ethiopia [21], and Addis Ababa Ethiopia [32]. Food group eaten 24 hours (1 - 4 groups) [AOR (95% CI) = 3.43 (1.84 - 6.39), P = 0.001] 3.43 times were more anemic than who are eaten > 8 food groups. Breakfast regularly (No) [AOR (95% CI) = 3.64 (1.36 - 9.75), P = 0.01] 3.64 times were more anemic than who were breakfast regularly. The result was reliable with studies conducted at Northern Ethiopia [10], Mekelle Town [12], and Tigray region, northern Ethiopia [21]. In those studies participants were showed more anemic who were meal frequency less than two or three times. However, the current study did not show any statistically significant association between anemia and occupation (housewives), mother's education level, and iron supplement but previously statistically significant association s was reported in different studies.

5. Conclusions

More than half (58.9%) the pregnant mothers were anemic among those participants which are a severe public health problem. In the current study we found a high prevalence of anemia and the majority of them were showed the moderate type anemia (Hb level: 7 - 9.9 g/dl). Monthly family income, family size, gestational age, level of birth spacing, excessive blood loss in the previous surgery,

food group eaten 24 hours and breakfast regularly were a significant association of anemia. Therefore, it is recommended to enhance the socio-economic status, diversifying food intake and increasing meal frequency of pregnant women. Moreover, using family planning methods and maternal health education is highly recommended to reduce anemia during pregnancy.

Limitations

The study was institutional based study. Further study should be conducted based on a community level to make this finding stronger. We did not consider other factors like parasitic infections which is an important factor of anemia. We were therefore not able to determine their contribution to anemia in our study population. Being a cross-sectional study, therefore, we could not identify the cause and effect relationship.

Acknowledgements

Conflicts of Interest

The authors declare no conflict of interest.

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