



ISSN Print: 2394-7500  
ISSN Online: 2394-5869  
Impact Factor: 5.2  
IJAR 2020; 6(3): 277-282  
[www.allresearchjournal.com](http://www.allresearchjournal.com)  
Received: 06-01-2020  
Accepted: 10-02-2020

**Jomy Joy**  
MSC Nursing Student, MOSC  
College of Nursing,  
Kolenchery, Ernakulum,  
Kerala, India

**Jisha Joseph**  
Associate Professor,  
Department of Obstetrics and  
Gynaecological Nursing, MOSC  
College of Nursing, Kerala,  
India

**Dr. Sheela Shenai NA**  
Principal, Malankara  
Orthodox Syrian Church  
College of Nursing, Kerala,  
India

**Correspondence Author:**  
**Jomy Joy**  
MSC Nursing Student, MOSC  
College of Nursing,  
Kolenchery, Ernakulum,  
Kerala, India

## Prevalence and risk factors of anemia among pregnant women attending antenatal clinic of MOSC medical college hospital, Kolenchery

**Jomy Joy, Jisha Joseph and Dr. Sheela Shenai NA**

### Abstract

**Introduction:** Anemia is one of the most prevalent nutritional deficiency problems affecting pregnant women. Anemia in pregnancy is commonly considered as a risk factor for the poor pregnancy outcome and can result in complications that threaten the life of both mother and fetus. According to WHO, anemia in pregnancy is a condition in which the hemoglobin concentration in the peripheral blood is less than 11gm/100ml. Given the multifactorial nature of this disease, correcting anemia often requires an integrated approach. In order to effectively combat anemia, the contributing factors must be identified and addressed.

**Aim and objectives:** The study was aimed to estimate the prevalence of anemia among pregnant women and to identify the risk-factors of anemia among pregnant women.

**Materials and Methods:** A descriptive cross sectional study was conducted among 398 antenatal women attending antenatal clinic of MOSC Medical College Hospital, Kolenchery from 16/11/2018 to 10/12/2018. Convenience sampling technique was adopted for this study. Questionnaire on risk factors of anemia was used to collect the data. Medical record of all antenatal women who visits the antenatal OPD during the data collection period was reviewed to assess the hemoglobin value. The results were analyzed by using R software and p value <0.05 was considered as significant.

**Results:** The findings of the study revealed that from the total 398 antenatal women, the prevalence of anemia was 42.96%. Among them, about 18.09% were moderately anemic, 24.87% were mildly anemic and no severe anemia was found out. The multiple logistic regression results showed that antenatal bleeding, contraceptive use, iron supplements, irregular menstrual cycle, history of heavy menstruation, loss of appetite, hemorrhoids and bleeding gums were the risk factors of anemia in pregnancy.

**Conclusion:** This study is one of the few studies in Kerala that has focused on exploring and identifying the risk factors of anemia among pregnant women. It is suggested that early detection of risk factors of anemia will help for the effective management of anemia in pregnancy.

**Keywords:** prevalence, risk factor, anemia, pregnant women

### 1. Introduction

Pregnancy is not just a matter of waiting to give birth but a joyful and a fulfilling period in a woman's life <sup>[1]</sup>. Poor nutritional status during pregnancy is associated with inadequate weight gain, anemia, retarded fetal growth, low birth weight, still births, preterm delivery, intrauterine growth retardation and increased mortality and morbidity <sup>[2]</sup>.

Anemia in pregnancy is commonly considered as a risk factor for the poor pregnancy outcome and can result in complications that threaten the life of both mother and fetus <sup>[3]</sup>. Anemia is a major public health hazard in India where nearly 40-90% of pregnant women are considered anemic <sup>[4]</sup>.

According to WHO, anemia in pregnancy is a condition in which the hemoglobin concentration in the peripheral blood is less than 11gm/100ml <sup>[5]</sup>. According to WHO, anemia during pregnancy is considered severe when hemoglobin concentration is less than 5.0g/dl, moderate when hemoglobin falls between 5.0 and 7 g/dl, mild when hemoglobin concentration is from 8 to 11 g/dl <sup>[6]</sup>.

The risk factors of anemia during pregnancy among women in developing countries are multifactorial and vary by geographic region <sup>[7]</sup>. The confounding factors are iron deficiency secondary to chronic inadequate dietary intake, economic status, race, lifestyles such as

smoking, tropical areas, menstruation heightened by the physiological demands of fetus and maternal blood volume expansion during pregnancy<sup>[8]</sup>. Other contributing factors are worm infestation, multiple pregnancies, malaria, multiple gestation, inadequate spacing, chronic illness and infection<sup>[9]</sup>.

The survey were conducted by the WHO revealed that 51.4 of women in reproductive ages are anemic and the incidence of anemia among pregnant women in developed countries is about 14%, whereas it is still as high as 51% in the developing world<sup>[10]</sup>. So the determination of the magnitude of anemia among pregnant women helps to monitor health of the pregnant women contributing to reduction in maternal morbidity and mortality<sup>[11]</sup>. Also, identification of risk factors of anemia in local population enables antenatal care providers to plan and initiate preventive strategies as anemia during pregnancy has a significant impact on the health of the fetus as well as that of the mother. Therefore, this study will help in identifying the prevalence and risk factors of anemia among pregnant women which can in turn help in preventing its occurrence.

## 2. Aim and Objectives

The aim of the study was:

1. Estimate the prevalence of anemia among pregnant women.
2. Identify the risk-factors of anemia among pregnant women.

## 3. Materials and Methods

The study was conducted at antenatal clinic of MOSC Medical College Hospital, Kolenchery from 16/11/2018 to 10/12/2018. It was a cross-sectional questionnaire – based study. By using convenience sampling technique, 398 antenatal women were selected for the study.

The questionnaire consists of 4 sections such as socio-demographic factors (9 items), obstetric related factors (15 items), nutritional related factors (11 items) and health related factors (8 items).

Clinical records of women who were enrolled for the antenatal check up were screened for the antenatal hemoglobin status. Hemoglobin level less than 11 gm / dL was considered the criteria for anemia in pregnancy. The

prevalence of anemia among women attending antenatal clinic was studied based on their inclusion. Women whose hemoglobin level is less than 11 gm/dL were considered as cases and those whose hemoglobin level above 11 gm/dL were considered as controls in order to identify the risk factors of anemia in pregnancy. Risk factors of anemia related to socio demographic, obstetric, nutritional and health related factors were assessed by using structured questionnaire which was given to the subjects. Statistical analyses were performed according to the objectives of the study by using descriptive and inferential statistics in R software. The demographic, nutritional and health related data were analyzed and expressed in terms of Frequency and percentage. The prevalence rate of anemia was calculated and logistic regression used to determine the risk factors of anemia (p value less than 0.05 was considered significant).

## Inclusion criteria

- Pregnant women in all trimesters whose hemoglobin value is available.
- Pregnant women, who are able to read, write and understand Malayalam.

## Exclusion criteria

- Debilitated illness, medical co-morbidities such as renal, hepatic and cardiovascular pathologies.
- Ethical clearance was taken from institutional ethics committee before conducting the study.

## 4. Results

A total of 398 antenatal women were enrolled in the study based on their inclusion criteria and risk factors of anemia related to socio demographic, obstetric, nutritional and health related factors were assessed by using structured questionnaire which was given to the subjects. The data obtained from the study participants were analyzed by using descriptive and inferential statistics in R software.

In the study, the analysis result showed that the overall prevalence of anemia was 42.96% in pregnant women. Among the anemic pregnant women, about 18.09% were moderately anemic, 24.87% were mildly anemic and no severe anemia was found out (Figure 1 and 2).

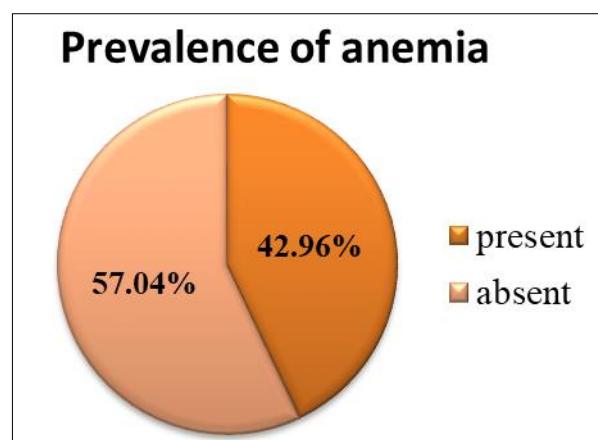
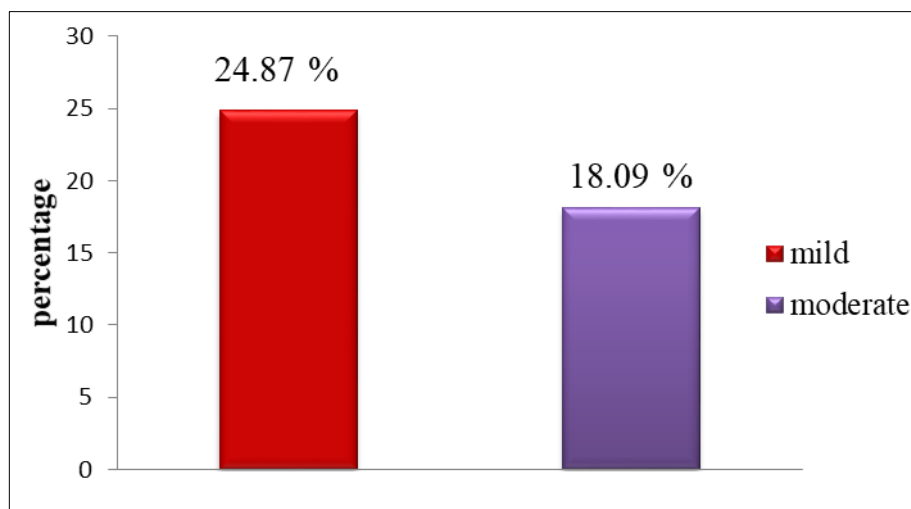


Fig 1: Pie diagram showing the prevalence of anemia among pregnant women



**Fig 2:** Bar diagram showing the distribution of the degree of anemia among pregnant women.

Univariate and multiple logistic regressions were used to identify the risk factors of anemia among pregnant women. The Univariate regression analysis revealed that the variables including type of family (OR=0.05,  $p=0.01$ ), antenatal visits (OR=4.64,  $p=0.02$ ), antenatal bleeding (OR=6.59,  $p<0.001$ ), contraceptive use (OR=1.87,  $p=0.03$ ), iron supplements (OR=0.38,  $p=0.006$ ), irregular menstrual cycle (OR=6.46,  $p<0.001$ ), history of heavy menstruation (OR=11.60,  $p<0.001$ ), diet history (OR=0.51,  $p=0.01$ ), loss of appetite (OR=0.13,  $p<0.001$ ), worm infestation (OR=5.55,  $p<0.001$ ), deworming (OR=0.19,  $p=0.001$ ), hemorrhoids

(OR=3.80,  $p=0.006$ ) and bleeding gums (OR=22.20,  $p<0.001$ ) were found to be significant and these variables were selected for multiple logistic regression.

Multiple logistic regression revealed that antenatal bleeding (AOR=4.46,  $p<0.001$ ), contraceptive use (AOR=2.73,  $p=0.015$ ), iron supplements (AOR=0.28,  $p=0.007$ ), irregular menstrual cycle (AOR=4.56,  $p<0.001$ ), history of heavy menstruation (AOR= 11.00,  $p<0.001$ ), loss of appetite (AOR=5.57,  $p<0.001$ ), hemorrhoids (AOR=4.76,  $p=0.01$ ) and bleeding gums (AOR=13.40,  $p<0.001$ ) were the risk factors of anemia in the study population (Table1).

**Table 1:** Simple and Multiple Logistic regression analysis of risk factors of anemia among pregnant women.

Variables	Anemia		Univariate analysis		Multiple Regression	
	Yes <11gm/dL	No $\geq$ 11gm/dL	Odds ratio	P value	Adj. Odds ratio	P value
<b>Age in years</b>						
<20 years	9	7	-	-	-	-
20-25 years	63	75	0.65	0.42		
26-30 years	69	104	0.52	0.21		
31-35 years	19	34	0.44	0.15		
>36 years	11	7	1.22	0.77		
<b>Type of family</b>						
Nuclear family	118	137	-	-		
Joint family	34	72	0.55	0.01*	0.55	0.09
Extended family	19	18	1.23	0.56	1.15	0.79
<b>BMI</b>						
<18.5	9	4	-	-	-	-
18.5-24.9	95	124	0.34	0.08		
25-29.9	66	99	0.29	0.05		
$\geq$ 30	1	0	346000	0.98		
<b>Gestational age</b>						
1-12 weeks	15	30	-	-	-	-
13-28 weeks	68	94	1.45	0.29		
29-40 weeks	88	103	1.71	0.12		
<b>Birth spacing</b>						
Primigravida	94	121	-	-	-	-
<2 years	18	27	0.86	0.65		
>2 years	59	79	0.96	0.86		
<b>Number of children</b>						
0	96	122	-	-	-	-
1	54	86	0.79	0.31		
2	17	16	1.35	0.42		
$\geq$ 3	4	3	1.69	0.49		
<b>Gravida</b>						
Primi	93	123	-	-	-	-
2-5	76	102	0.99	0.94		
>5	2	2	1.32	0.78		

<b>Weight gain</b>						
<10 kg	78	121	-	-	-	-
11-15 kg	80	86	1.44	0.09		
>15 kg	13	20	1.01	0.98		
<b>First antenatal booking</b>						
First trimester	159	211	-	-	-	-
Second trimester	12	16	0.99	0.99		
Third trimester	-	-	-	-		
<b>Antenatal visits</b>						
Regular	161	224	-	-		
Irregular	10	3	4.64	0.02*	2.53	0.33
<b>Antenatal bleeding</b>						
Absent	125	215	-	-		
Present	46	12	6.59	P<0.001*	4.46	P<0.001*
<b>Contraceptive use</b>						
No	140	203	-	-		
Yes	31	24	1.87	0.03*	2.73	0.015*
<b>Abortion</b>						
No	139	197	-	-		
Yes	32	30	1.51	0.14	-	-
<b>Iron supplements</b>						
Never taken / irregularly	25	14	-	-		
Regularly	146	213	0.38	0.006*	0.28	0.007*
<b>Folic acid supplements</b>						
Never taken	4	1	-	-		
Preconception	18	17	0.27	0.26	-	-
First trimester	149	209	0.18	0.13		
<b>Irregular menstrual cycle</b>						
No	95	202	-	-		
Yes	76	25	6.46	P<0.001*	4.56	P<0.001*
<b>History of heavy menstruation</b>						
No	125	220	-	-		
Yes	46	7	11.60	P<0.001*	11.00	P<0.001*
<b>Hemoglobin</b>						
7-9 gm/dL	72	0	-	-		
9-11 gm/dL	99	0	1.00e <sup>+00</sup>	1.00	-	-
11-12 gm/dL	0	148	8.41e <sup>-24</sup>	0.99		
12-14 gm/dL	0	79	8.41e <sup>-24</sup>	0.99		
<b>Diet history</b>						
vegetarian	38	29	-	-		
Non vegetarian	133	198	0.51	0.01*	0.94	0.87
<b>Loss of appetite</b>						
No	86	202	-	-		
Yes	85	25	0.13	P<0.001*	5.57	P<0.001*
<b>Worm infestation</b>						
No	152	222	-	-		
Yes	19	5	5.55	P<0.001*	3.14	0.13
<b>Deworming</b>						
No	35	11	-	-		
Yes	136	216	0.19	0.001*	0.34	0.05
<b>Hemorrhoids</b>						
No	155	221	-	-		
Yes	16	6	3.80	0.006*	4.76	0.01*
<b>Bleeding gums</b>						
No	114	222	-	-		
Yes	57	5	22.20	P<0.001*	13.40	P<0.001*

\*Level of Significance at P&lt;0.05

## 5. Discussion

The study revealed that the prevalence of anemia among pregnant women was 42.96%. Among the anemic pregnant women, about 18.09% were moderately anemic, 24.87% were mildly anemic and no severe anemia was found out. It

was concluded that there was moderate prevalence of anemia among pregnant women.

The result of the present study was consistent with another study conducted at Enugu on prevalence of anemia which revealed that the prevalence of anemia was 40.4% and

majority (90.7%) were mildly anemic and 9.3% were moderately anemic [12]. Similar studies were also conducted in Sudan [13], Kathmandu [14] and Andaman and Nicobar Island [15] on prevalence of anemia among pregnant women which showed that the prevalence was 53.0%, 42.6% and 50.9% respectively.

On the contrary, the studies conducted in pregnant women in Kerman district of Iran [16], Turkey [17], China [18] and Nigeria [19] revealed that the prevalence of anemia was 4.7%, 27.1%, 19.9% and 23.2% respectively. This discrepancy might be due to the routine supplementation of iron and folic acid, successful prevention programmes for iron deficiency anemia.

In the present study the multiple logistic regression revealed that antenatal bleeding (AOR=4.46,  $p<0.001$ ), contraceptive use (AOR=2.73,  $p=0.015$ ), iron supplements (AOR=0.28,  $p=0.007$ ), irregular menstrual cycle (AOR=4.56,  $p<0.001$ ), history of heavy menstruation (AOR=11.00,  $p<0.001$ ), loss of appetite (AOR=5.57,  $p<0.001$ ), hemorrhoids (AOR=4.76,  $p=0.01$ ) and bleeding gums (AOR=13.40,  $P<0.001$ ) were the risk factors of anemia.

The result was consistent with the results from other studies conducted in Vietnam [20], Indonesia [21] and Singapore [22] and these studies revealed that the irregular intake of iron supplementation in antenatal period as one of the most significant risk factors for developing anemia during pregnancy. Thus, it supports the conclusion that routine iron supplementation during pregnancy will reduce the occurrence of anemia during pregnancy.

In addition to that, the history of heavy menstruation was another identified risk factor in the present study which was supported by a cross-sectional study conducted in Butajira General Hospital, Southern Ethiopia [23].

A study conducted in the Maternity Clinic of Pravara Rural Hospital (PRH), India revealed that mother's age group ( $p<0.001$ ), religion ( $p<0.001$ ), women with lower BMIs ( $p<0.001$ ), parity ( $p<0.001$ ) and abortions ( $p<0.001$ ) were significantly associated with anemia [24] which was contradictory to the findings of the present study.

This study was conducted in single setting and hence the generalization of findings is limited. This probably could be one of the limitations of this study.

## 6. Conclusion

This study was one of the few studies in Kerala that have focused on assessing the prevalence and risk factors of anemia among pregnant women. Findings of the research study revealed that nearly 42.96% of pregnant women were anemic. Hence, it is evident from the study that regular antenatal check up, antenatal care and early checking of hemoglobin in first trimester itself are important strategies to prevent anemia in pregnancy.

## 7. Acknowledgment

We extend our sincere thanks to institution and subjects who participated in this study.

## 8. Conflict of interest

The authors declare no conflict of interest in the study

## 9. References

1. World Health Organization. Make Every Mother and Child Count. 2005 Available from: <http://www.who.int/2005/en/index.html>
2. Kansal B, Guleria K, Agarwal N, Sethi K. Effect of maternal nutritional supplementation on foetal growth parameters and doppler flow velocity in growth restricted fetuses. *Ind J Nutr Diet.* 2004; 41:198-204.
3. Gregory P, Taslim A, Gergen PJ, *et al.* Health status of the Pakistani population: Health profile and comparison with the United States. *Am J Public Health.* 2001; 91(1):93-8.
4. Brews and Holland. *Manual of Obstetrics.* 4<sup>th</sup>ed. New Delhi: Elsevier publications. 2008, 104-108.
5. Dutta DC. *Text book of obstetrics.* 7<sup>th</sup>ed. New Delhi: New central bookagency. 2013, 262-276.
6. Ehrenthal DB, Chichester ML, Cole OS, *et al.* Maternal risk factors for peripartum transfusion. *J Womens Health (Larchmt).* 2012; 21:792.
7. Van den Broek N. Anaemia in pregnancy in developing countries. *Br J Obstet Gynaecol.* 1998; 105:385-90.
8. Varney Helen, Kriebs. M.Jan, Geger. L. Carolyn. *Varneys Midwifery.* 4<sup>th</sup> ed. Johns and Barlett publishers, 2010.
9. Balakrishnan S. *Textbook of Obstetrics.* Paras medical publishers, 2010, 246-249.
10. World Health Organization, Centers for Disease Control and Prevention. *Worldwide prevalence of anemia 1993–2005;* Geneva: WHO, 2008.
11. Rouse DJ, Mac Pherson C, Landon M, Varner MW, Leveno KJ, Moawad AH, *et al.* Blood transfusion and cesarean delivery. *Obstet Gynecol.* 2006; 108:891.
12. Dim CC, Onah HE. The prevalence of anemia among pregnant women at booking in Enugu, South Eastern Nigeria. *Medscape General Medicine.* 2007; 9(3):11.
13. Adam I, Ibrahim Y, Elhardello O. Prevalence, types and determinants of anemia among pregnant women in Sudan: a systematic review and meta-analysis. *BMC hematology.* 2018; 18(1):31.
14. Marahatta R. Study of anemia in pregnancy and its outcome in Nepal Medical College Teaching Hospital, Kathmandu, Nepal. *Nepal Med Coll J.* 2007; 9(4):270-4.
15. Mehrotra M, Yadav S, Deshpande A, Mehrotra H. A study of the prevalence of anemia and associated socio demographic factors in pregnant women in Port Blair, Andaman and Nicobar Islands. *Journal of family medicine and primary care.* 2018; 7(6):1288.
16. Mirzaie F, Eftekhari N, Goldozeian S, Mahdavinia J. Prevalence of anemia risk factors in pregnant women in Kerman, Iran. *Iranian Journal of Reproductive Medicine.* 2010; 8(2):66.
17. Karaoglu L, Pehlivan E, Egri M, Deprem C, Gunes G, Genc MF, Temel I. The prevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey. *BMC Public Health.* 2010; 10(1):329.
18. Zhao SY, Jing WZ, Liu J, Liu M. Prevalence of anemia during pregnancy in China, 2012-2016: a Meta-analysis. *Zhonghuayu fang yixuezazhi [Chinese journal of preventive medicine].* 2018; 52(9):951-7.
19. Buseri FI, Uko EK, Jeremiah ZA, Usanga EA. Prevalence and risk factors of anemia among pregnant women in Nigeria. *The open hematology journal.* 2008; 2(1).
20. Aikawa R, Khan NC, Sasaki S, Binns CW. Risk factors for iron-deficiency anemia among pregnant women living in rural Vietnam. *Public health nutrition.* 2006; 9(4):443-8.

21. Suega K, Dharmayuda TG, Sutarga IM, Bakta IM. Iron-deficiency anemia in pregnant women in Bali, Indonesia: a profile of risk factors and epidemiology. *Southeast Asian journal of tropical medicine and public health*. 2002; 33(3):604-7.
22. Singh K, Fong YF, Arulkumaran S. Anemia in pregnancy—a cross-sectional study in Singapore. *European journal of clinical nutrition*. 1998; 52(1):65.
23. Getahun W, Belachew T, Wolide AD. Burden and associated factors of anemia among pregnant women attending antenatal care in southern Ethiopia: cross sectional study. *BMC research notes*. 2017; 10(1):276.
24. Ahmad N, Kalakoti P, Bano R, Aarif SM. The prevalence of anemia and associated factors in pregnant women in a rural Indian community. *Hindu*. 2010; 208:67-1.