

Prevalence of Anaemia and Thrombocytopenia in Pregnant Females in Amreli District, Gujarat

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ABSTRACT

Introduction: Anaemia in pregnancy is a major public health problem in India. It leads to high maternal morbidity and mortality, low birth weight and high infant mortality. Thrombocytopenia can also affect the pregnancy state and along with preeclampsia, there is a high risk of complications to both mother and baby. So, it should be aimed to keep in normal range. With early intervention, maternal morbidity and mortality as well as infant mortality can be reduced.

Aim: To assess the prevalence of anaemia and thrombocytopenia in pregnant females.

Materials and Methods: This retrospective study was conducted to evaluate the prevalence of anaemia and thrombocytopenia in pregnant females. Blood samples of 500 pregnant females of Shantabaa Medical College and General Hospital, Gujarat, India were evaluated to assess the frequency of anaemia and thrombocytopenia using haematology analyser. It was hospital-based study done for

six months, from August 2020 to January 2021. All these females were divided into mild (10-10.9 gm/dL), moderate (7-9.9 gm/dL) and severe degree (below 7 gm/dL) anaemia according to haemoglobin values. For thrombocytopenia, all females were divided into mild ($100-150 \times 10^9/L$), moderate ($50-100 \times 10^9/L$) and severe (below $50 \times 10^9/L$) category according to platelet level.

Results: Total 500 pregnant females were included in this study. Out of these, total 351 (70.2%) females were anaemic and 26 females (5.2%) were thrombocytopenic. Most of the anaemic pregnant females were from 26 to 32 years age group (47%) followed by 18 to 25 year age group (34%) and 33 to 40 year age group (19%).

Conclusion: It is important to diagnose the effects of anaemia and thrombocytopenia in pregnant females and their offsprings. Anaemia in pregnancy is a challenging health problem in India, particularly in rural area. Early correction of anaemia and thrombocytopenia can reduce maternal morbidity and mortality.

Keywords: Haemoglobin, Morbidity, Mortality, Platelets

INTRODUCTION

The most frequent haematological complication during pregnancy is anaemia. Pregnancy represents stress period and increased demand of nutrients for both the mother and foetus. "Physiological anaemia of pregnancy" term was given due to many normal physiological processes that leads to low haemoglobin level during pregnancy. The plasma volume increases relative to red cell mass and accounts for the fall in haemoglobin level [1]. However, if the haemoglobin level falls below 11 gm/dL, iron deficiency anaemia should be evaluated since iron deficiency is responsible for majority of anaemias diagnosed during pregnancy. World Health Organisation (WHO) in 2011 has defined anaemia in pregnancy as the haemoglobin concentration of less than 11 gm/dL [2]. Prevalence of anaemia in all the age groups is much greater in developing countries in contrast to developed countries. It has been observed in many studies that severe anaemia (below Hb 9 g/dL) has very high chances of maternal morbidity and mortality. Therefore, iron supplementation should be given universally to all pregnant females according to their Recommended Dietary Allowance dose [3]. During pregnancy there is increased demand of iron in the body, so daily intake should be increased from 18 mg per day to 27 mg per day [4]. Megaloblastic anaemia due to deficiency of folic acid and vitamin B¹² can also be a cause of anaemia during pregnancy.

Thrombocytopenia is second most common haematologic complication after anaemia encountered during pregnancy and usually secondary to physiologic changes during gestation, like increase in blood volume, platelet activation and increased platelet clearance. Gestational thrombocytopenia accounts for the majority of thrombocytopenias during pregnancy and most cases are mild (100000 to $150000/\mu L$) and not associated with any adverse events for either the mother or baby [5].

So, it is necessary to identify risk factors of pregnant females and evaluate the current situation and correct them with proper management.

Thus, the aim of the study was to assess the prevalence of anaemia and thrombocytopenia in pregnant females of Amreli district, Gujarat.

MATERIALS AND METHODS

This retrospective study was conducted for a duration of six months from 1st August 2020 to 31st January 2021, to evaluate the prevalence of anaemia and thrombocytopenia in pregnant women. Blood samples of pregnant females from Shantabaa Medical College and General Hospital, Amreli, Gujarat, India were collected. By simple random sampling technique, total 500 pregnant females of 18-40 years were selected from Obstetrics and Gynaecology unit. Blood samples were collected in Ethylenediamine tetraacetic acid (EDTA) anticoagulant tubes from the antecubital vein using a sterile dry disposable needle and syringe in Gynaecology Department and were send to Pathology laboratory. All haemoglobin and platelets were measured by using haematology analyser Abacus (Abacus 380).

Inclusion criteria: All female patients with urine pregnancy test positive who came to Gynaecology Outpatient Department (OPD) and all pregnant females who came to the casualty were included in the study.

Exclusion criteria: All females with false positive urine pregnancy test (Urine pregnancy test positive with negative USG) were excluded from the study.

According to WHO (2011), haemoglobin (Hb) level below 11 g/dL is considered as cutoff point for anaemia during pregnancy. For mild category, it is 10-10.9 g/dL, 7-9.9 g/dL for moderate, <7 g/dL for severe and <4 g/dL for very severe category [2].

For thrombocytopenia cut-off of platelet count is $150 \times 10^9/L$.

STATISTICAL ANALYSIS

The data obtained were statistically analysed using Microsoft Excel Sheets and divided into mild, moderate and severe category according to their Hb and platelet level. Out of 500 female patients, according to percentage and frequency, data were evaluated for anaemia and thrombocytopenia.

RESULTS

Out of 500 pregnant females from Obstetrics and Gynaecology Department, Shantabaa Medical College and General Hospital, total 351 (70.2%) females were anaemic. Out of this, 238 (47.6%) females were mildly anaemic (Hb 10-11 g/dL), 102 (20.4 %) females were moderately anaemic (Hb 7-10 g/dL) and 11 (2.2)% females were severely anaemic (Hb <7 g/dL) [Table/Fig-1].

Haemoglobin (g/dL)	Number of pregnant females	Percentage (%)
>11	149	29.8
10-10.9	238	47.6
7-9.9	102	20.4
<7	11	2.2
Total	500	100

[Table/Fig-1]: Haemoglobin (g/dL) levels of pregnant females.

All these 500 pregnant females were divided into different age groups. Out of them, most of the anaemic pregnant females were from 26 to 32 years age group (47%) followed by 18 to 25 year age group (34%) and 33 to 40 year age group (19%) [Table/Fig-2].

Age (years)	Frequency	Percentage (%)
18-25	170	34
26-32	235	47
33-40	95	19
Total	500	100

[Table/Fig-2]: Age-wise distribution of pregnant females.

Out of 500 pregnant females, 26 (5.2%) had thrombocytopenia. Out of these females, 2 were severely thrombocytopenic (Platelet count <50×10⁹/L), 7 females were having moderate thrombocytopenia (platelet count in between 50-100× 10⁹/L) and 17 were mildly thrombocytopenic (platelets count ranges 100-150×10⁹/L) [Table/Fig-3] [6].

Platelet count (10 ⁹ /L)	Number of pregnant females	Percentage (%)
>150	474	94.8
>100-150	17	3.4
50-100	7	1.4
<50	2	0.4
Total	500	100

[Table/Fig-3]: Platelet count (10⁹/L) of pregnant females [6].

DISCUSSION

India had the highest prevalence of anaemia in pregnancy. Largest number of anaemic pregnant women in the world are from India [7,8]. Anaemia in pregnancy is considered as a major public health problem in India. It leads to high maternal morbidity and mortality, low birth weight and high infant mortality [9,10]. Different researchers have shown a prevalence of anaemia in pregnancy from 19-50%. Hyder S et al., study showed 50% prevalence of anaemia in pregnant females [11]. According to Chotnopparatpattara P et al., study, 19.2% pregnant females were anaemic [12]. Marti-Carvajal A et al., study showed 34.4% prevalence of anaemia in pregnant females [13]. Pathological anaemia of pregnancy is mainly due to iron deficiency [14].

In this study, anaemic pregnant females were 70.2% and thrombocytopenic females were 5.2%. Anaemia prevalence vary in different geographical region. The range of low Hb among pregnant female in other developing countries is from 35% to 81% which is 41.8% in McLean E et al., study and more than 50% in Seshadri S study [15,16]. A study from Lahore in 2016 showed 70.5% of anaemia in pregnant females which was in accordance with this study. According to this study, in Lahore showed maximum pregnant females from 26 to 33 years age group (48%) which is in accordance with the present study [17].

The term thrombocytopenia is commonly defined as a platelet count below 150×10⁹/L. Thrombocytopenia is related with a higher occurrence of intrauterine growth retardation, preterm delivery and also found as an important risk factor. Thrombocytopenia is reported commonly in severe preeclampsia with the occurrence range of 11-29% [18].

In this study, platelet count was measured in 500 pregnant females and prevalence of thrombocytopenia noted was 5.2%. Similar study in Lahore during 2016 showed thrombocytopenia in 16.5% which is higher than the present study [17].

The prevalence rates of anaemia and thrombocytopenia in Ethiopia study were 11.62% and 7.7%, respectively which is not in accordance with this study [19]. Bansal R et al., study conducted at Punjab, India showed 81.8% anaemia in pregnant females which is higher than this study [20].

According to Mohseni M et al., prevalence of thrombocytopenia among pregnant women was 4.3% in Taiwan which is similar with this study, while prevalence rate of thrombocytopenia was 15.3% in Ghana which is higher than this study [21]. According to Henri E et al., study, the prevalence of anaemia among pregnant women in Douala Cameroon was 22% with a majority (18.4%) of these women being mildly anaemic which is not in accordance with this study [22]. So, anaemia and thrombocytopenia are present not only in India, it is seen in different parts of the world also. Early detection and prophylactic management can reduce the poor outcome of pregnancy.

Limitation(s)

Limitation of the present study was limited sample size and short duration of the study.

CONCLUSION(S)

Anaemia in pregnancy is a major public health problem in India. It leads to high maternal morbidity and mortality, low birth weight and high infant mortality. It is often ignored in rural areas. Thrombocytopenia can also affect the pregnancy state and is very important during the time of delivery. So, time to time detection and early management is necessary for healthy outcome of pregnancy.

REFERENCES

- [1] Sifakis S, Pharmakides G. Anemia in pregnancy. *Ann N Y Acad Sci.* 2000;900:125-36. <https://doi.org/10.1111/j.1749-6632.2000.tb06223.x>.
- [2] WHO. 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] Screening for Iron deficiency anemia in childhood and pregnancy: Update of the 1996 US preventive task force review. Rockville (MD): 2006. Rockville (MD): Agency for Healthcare Research and Quality (US); 2006 Apr 21. Report No.: 06-0590-EF-1.U.S. Preventive Services Task Force Evidence Syntheses, formerly Systematic Evidence Reviews. PMID: 20722137, Bookshelf ID: NBK33399.
- [4] Institute of Medicine. Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc: A Report of the Panel on Micronutrients. Washington, DC: National Academy Press; 2001.
- [5] Burrows RF, Kelton JG. Incidentally detected thrombocytopenia in healthy mothers and their infants. *The New England Journal of Medicine.* 1988;319(3):142-45.
- [6] Magann EF, Martin JN Jr. Twelve steps to optimal management of HELLP syndrome. *Clinical Obstetrics and Gynaecology.* 1999;42(3):532-50.
- [7] Sharma JB, Shankar M. Anemia in pregnancy. *Journal of International Medical Sciences Academy.* 2010;23(4):253-60. https://www.researchgate.net/publication/289052043_Anemia_in_pregnancy.

- [8] Indian Council of Medical Research. Evaluation of the National Nutritional Anaemia Prophylaxis Programme. Task Force Study. New Delhi: ICMR, 1989.
- [9] Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F, et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: A systematic analysis of population-representative data. *Lancet Glob Health*. 2013;1:e16-25.
- [10] World Health Organization. Geneva: WHO; 2015. (accessed on April, 2021). The global prevalence of anaemia in 2011. Available from: http://www.who.int/nutrition/publications/micronutrients/global_prevalence_anaemia_2011/en/.
- [11] Hyder SMZ, Persson LÅ, Chowdhury M, Lönnnerdal BO, Ekström EC. Anaemia and iron deficiency during pregnancy in rural Bangladesh. *Public Health Nutrition*. 2004;7(08):1065-107.
- [12] Chotnopparatpattara P, Limpongsanurak S, Charngam P. The prevalence and risk factors of anemia in pregnant women. *J Med Assoc Thai*. 2003;86(11):1001-07.
- [13] Martí-Carvajal A, Peña-Martí G, Comunian G, Muñoz S. Prevalence of anemia during pregnancy: Results of Valencia (Venezuela) Anemia during Pregnancy Study. *Archivos Latinoamericanos De Nutrición*. 2002;52:05-11.
- [14] Beard JL. Effectiveness and strategies of iron supplementation during pregnancy. *Am J Clin Nutr*. 2000;71(5Suppl):1288S-94S. Doi: 10.1093/ajcn/71.5.1288S. PMID: 10799404.
- [15] McLean E, Cogswell M, Egli I, Wojdyla D, de Benoist B. Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. *Public Health Nutr*. 2009;12(4):444-54.
- [16] Seshadri S. Prevalence of micronutrient deficiency particularly of iron, zinc and folic acid in pregnant women in South East Asia. *Br J Nutr*. 2001;85(Suppl 2):S87-92. PMID: 11509095.
- [17] Ijaz T, Atif M, Ullah M, Arshad S, Ashraf S, Munir S, et al. Prevalence of anaemia and thrombocytopenia in Pregnant females of Lahore. *Life Sciences International Journal*. 2016;10(01):38-42.
- [18] Burrows RF, Hunter DJ, Andrew M, Kelton JG. A prospective study investigating the mechanism of thrombocytopenia in pre-eclampsia. *Obstet Gynaecol*. 1987;70(3Pt 1):334-38. PMID: 3627580.
- [19] Gebreweld A, Bekele D, Tsegaye A. Haematological profile of pregnant women at St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. *BMC Hematol*. 2018;18:15. <https://doi.org/10.1186/s12878-018-0111-6>.
- [20] Bansal R, Bedi M, Kaur J, Kaur K, Shergill HK, Khaira HK. Prevalence and factors associated with anemia among pregnant women attending antenatal clinic. *Adesh Univ J Med Sci Res*. 2020;2:42-48.
- [21] Mohseni M, Asgarlou Z, Azami-Aghdash S, Sheyklo SG, Tayananezhad N, Moosayi A. The global prevalence of thrombocytopenia among pregnant women: A systemic review and meta-analysis. *Nurs Midwifery Stud*. 2019;8:57-63.
- [22] Henri E, Valere M, Lucas E, Calixte P, Ngalame C, Grâce T, et al. Hematological profile and risk factors of anemia in pregnant women: A cross sectional descriptive and analytical study in Douala Cameroon. *Open Journal of Obstetrics and Gynaecology*. 2019;9:968-80. Doi: 10.4236/ojog.2019.97094.

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