

## AN OBSERVATIONAL STUDY ON THE RELATIONSHIP BETWEEN ANEMIC GRADES DURING PREGNANCY AND BLOOD GROUPS

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### Abstract

Anemia in pregnancy remains a critical public health concern in India, where it affects a substantial portion of the population, leading to adverse maternal and fetal outcomes. This study aimed to investigate the correlation between pregnant women's blood groups and anemic grades in the rural Datia area of Madhya Pradesh. Data from 200 pregnant women with mild and moderate anemia were collected through antenatal checkups, focusing on hemoglobin levels and blood groups. The results revealed a notable association between blood groups and anemia severity, with the B+ve blood type being most prevalent in both mild and moderate cases, followed by O+ve, A+ve, and AB+ve. This finding underscores the importance of understanding the interplay between blood groups and anemia severity in maternal and child health. Early detection through personalized healthcare approaches, considering both hemoglobin levels and blood group profiles, is crucial for timely interventions and improved maternal and fetal health outcomes. The study highlights the significance of targeted screening and intervention strategies to mitigate the burden of anemia-related complications and enhance maternal and child health outcomes in resource-limited settings.

### Keywords

Anemia, haemoglobin, pregnant female, blood group

### INTRODUCTION

India has the highest prevalence of anemia in pregnancy and is the home of largest number of anemic pregnant women in the world <sup>1,2</sup>. Several investigations have supported similar findings, highlighting the urgent requirement for intervention techniques to address the complex etiology of anemia. Fascinatingly, studies point to a possible relationship between hemoglobin levels during pregnancy and blood types. The International Society of Blood Transfusion recognizes 33 blood groups, so examining this link may shed light on the risk factors for anemia in particular populations.

Pregnancy-related anemia is still a major public health issue in India, where it is linked to high rates of infant death, low birth weight, and mother morbidity and mortality. Anemia affects a significant section of the population and is mostly caused by dietary deficiencies such as iron, vitamin B12, and folate deficiencies in the diet. Anemia is defined by the World Health Organization (WHO) as a hemoglobin concentration less than 11g/dL. It is divided into three categories: mild anemia (9–10.9g/dL), moderate anemia (7-9g/dL), and severe anemia (<7g/dL).

These findings have been supported by other research <sup>3</sup>, highlighting the urgent need for intervention measures to address the complex causes of anemia. Fascinatingly, studies point to a possible relationship between hemoglobin levels during pregnancy and blood types. The International Society of Blood Transfusion recognizes 33 blood types, therefore examining this link may shed light on factors that contribute to anemia predispositions.

The purpose of this study is to investigate any possible relationships between pregnant women's hemoglobin levels and blood types. It is being carried out in the rural Datia area of Madhya Pradesh. By analyzing data from this population, we seek to elucidate any significant correlations, contributing to a deeper understanding of anemia's etiology and informing targeted interventions to mitigate its impact on maternal and child health <sup>4</sup>.

### **OBJECTIVE**

The main objective of this study is to ascertain the correlation between pregnant women's blood groups and anemic grades. It looks at possible relationships to determine whether particular blood types are more likely to experience particular levels of anemia during pregnancy, offering insights into potential predispositions in this population.

### **METHODS**

For this observational study, data was collected from antenatal checkups at the District Hospital of Datia, Madhya Pradesh. The study focused on investigating the hemoglobin levels and blood groups of 200 pregnant anemic females. Among them, 100 had mild anemia and the other 100 had moderate anemia, with ages ranging from 20 to 35 years. Hemoglobin levels were measured using Sahli's method, a standard technique for detecting hemoglobin concentration. Blood groups were determined using the slide method, which is a commonly used approach in healthcare settings<sup>5</sup>.

The rationale for selecting pregnant females with anemia is due to the prevalence of anemia during pregnancy, particularly in resource-limited settings like rural India. By focusing on anemic pregnant females, the study aims to understand the correlation between hemoglobin levels and blood groups, which could provide valuable insights into potential predispositions or risk factors for anemia in this population<sup>6</sup>.

Observational studies are crucial in public health research as they allow researchers to observe and analyze real-world data without intervening in the natural course of events. In this study, the observational approach enables the researchers to gather information on hemoglobin levels and blood groups as part of routine antenatal care, providing valuable data for understanding the prevalence and factors associated with anemia among pregnant women in the study area.

By examining the relationship between hemoglobin levels and blood groups, the study seeks to contribute to the body of knowledge on anemia in pregnancy and inform strategies for its prevention and management. Additionally, findings from this study could potentially guide healthcare providers in tailored approaches for addressing anemia among pregnant women, thereby improving maternal and fetal health outcomes in the region<sup>7</sup>.

## RESULTS

The study involved 100 pregnant women with mild anemia and another 100 with moderate anemia.

Anemic grades	Blood group B+ve	O+ve	A+ve	AB+ve	Other Blood groups
Mild (9-10.9gm/dl)	44	31	13	8	6
Moderate (7-9gm/dl)	40	24	16	10	10

## DISCUSSION

Anemia poses significant health risks to both mothers and children, impacting their physical, psychological, and developmental well-being. Studies have consistently shown its association with impaired cognitive and physical development in children and decreased work performance in adults. Furthermore, certain blood groups, such as A, have been linked to a higher susceptibility to pernicious anemia. Additionally, a research highlighted differences in blood hemoglobin values across various ABO blood groups, indicating a potential genetic predisposition to anemia<sup>8</sup>. Similarly, another study found that the B+ve blood group was most common, with an average hemoglobin level of 9.9 gm/dl, indicating variations in hemoglobin levels among different blood groups<sup>9</sup>. In the current study, B+ve emerged as the most prevalent blood group in both mild and moderate anemia, followed by O+ve, A+ve, and AB +ve. This finding underscores the importance of understanding the interplay between blood groups and anemia severity in maternal and child health, providing insights for targeted interventions and personalized healthcare approaches to mitigate the adverse effects of anemia<sup>10</sup>.

## CONCLUSION

The correlation between blood groups and anemic grades in pregnant females is a significant finding with implications for early detection and prevention of anemia-related complications. Detecting anemia before conception or in early pregnancy can help mitigate adverse outcomes for both the mother and fetus<sup>11</sup>.

In this study of mild and moderate anemia, B positive blood type was found to be the most common, followed by O positive, A positive, and AB positive. This pattern was consistent across both mild and moderate cases.

So by identifying the most prevalent blood groups associated with mild and moderate anemia, such as B+ve, O+ve, A+ve, and AB+ve, healthcare providers can tailor interventions and monitoring strategies accordingly.

Early diagnosis allows for timely interventions, such as iron supplementation or dietary modifications, to address anemia and prevent its progression to more severe forms. Additionally, understanding the distribution of anemic grades across different blood groups provides valuable insights into potential genetic predispositions or physiological factors contributing to anemia in pregnancy<sup>12</sup>.

Moreover, this study underscores the importance of personalized healthcare approaches, where screening protocols consider not only hemoglobin levels but also the individual's blood group. By incorporating blood group-specific considerations into prenatal care, healthcare providers can optimize maternal and fetal health outcomes while minimizing the risks associated with anemia<sup>13</sup>.

Overall, this research contributes to the body of evidence supporting proactive measures for anemia management in pregnancy, emphasizing the role of early detection and tailored interventions based on blood group profiles. Through targeted screening and intervention strategies, healthcare providers can work towards reducing the burden of anemia-related complications and improving maternal and child health outcomes.

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