# EVALUATING THE PREVALENCE AND SEVERITY OF ANEMIA IN PREGNANT WOMEN: A RETROSPECTIVE CLINIC-BASED STUDY

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**Abstract**

Anemia in pregnancy poses significant risks to maternal and fetal health, necessitating thorough evaluation and management. This retrospective study aimed to assess the prevalence and severity of anemia among pregnant women attending antenatal care. Conducted at a single center, this retrospective analysis included pregnant women undergoing routine antenatal checkups. Data on demographic characteristics, hemoglobin levels, and obstetric histories were collected. Anemia prevalence was determined based on hemoglobin levels, classified as mild (12 g/dL to 13.08 g/dL), moderate (8.4 g/dL to 11.99 g/dL), and severe (<5.6 g/dL). The study also explored demographic correlates of anemia. The study sample comprised 239 pregnant individuals, with a mean (SD) age of 35.52 (4.92) years. Mean (SD) hemoglobin levels were 12.72 (1.68) g/dL. The majority of participants were homemakers (74.92%) from urban areas (89.48%). Anemia was prevalent in 45.84% of pregnant women, with mild, moderate, and severe forms observed in 50.53%, 67.89%, and 1.56% of cases, respectively. Among anemic individuals, the majority (87.36%) were homemakers. No significant differences were found in age (p=0.27) or body weight (p=0.55) between pregnant women with or without anemia. Additionally, there was no significant disparity in anemia prevalence between rural and urban pregnant women (p=0.27). These findings underscore the substantial prevalence of anemia among pregnant women and highlight the predominance of moderate cases. The study emphasizes the importance of continued surveillance and targeted interventions to address anemia during pregnancy effectively, mitigating associated maternal and fetal health risks.

Keywords: Anemia Pregnant Women Prevalence Severity Antenatal Care

## INTRODUCTION

Anemia during pregnancy stands as a formidable challenge to maternal and fetal health worldwide. This pervasive condition, characterized by a deficiency in red blood cells or hemoglobin, poses significant risks to both the mother and the developing fetus, with implications extending beyond the gestational period. Despite advances in healthcare, anemia remains a prevalent concern, particularly in resource-constrained settings where access to comprehensive antenatal care may be limited. Understanding the prevalence, severity, and correlates of anemia among pregnant women is paramount for effective management and prevention strategies.

The intricate interplay between maternal physiology, fetal development, and nutritional status underscores the complexity of anemia in pregnancy. During gestation, maternal blood volume expands to accommodate the growing needs of the developing fetus, leading to physiological hemodilution and a decrease in hemoglobin concentration. While this physiological adaptation is normal, it can exacerbate preexisting deficiencies and predispose women to develop anemia if adequate iron stores are not maintained. Moreover, factors such as poor dietary intake, parasitic infections, and underlying medical conditions further compound the risk of anemia in pregnancy, underscoring the multifactorial nature of this condition.

The consequences of anemia during pregnancy are far-reaching and multifaceted, impacting maternal well-being, fetal development, and long-term health outcomes. Maternal complications of anemia include fatigue, weakness, increased susceptibility to infections, and an elevated risk of obstetric complications such as preterm birth, low birth weight, and maternal mortality. Fetal repercussions may manifest as intrauterine growth restriction, neurodevelopmental deficits, and an increased susceptibility to chronic diseases later in life. Moreover, the intergenerational cycle of anemia perpetuates as neonates born to anemic mothers are at heightened risk of iron deficiency and associated sequelae, perpetuating the cycle of malnutrition and poor health outcomes.

Given the profound implications of anemia in pregnancy, there is a pressing need for comprehensive epidemiological studies to elucidate its prevalence, severity, and determinants among pregnant women. Clinic-based studies offer valuable insights into the burden of anemia in antenatal populations, allowing for the identification of high-risk groups and the implementation of targeted interventions. By examining demographic characteristics, obstetric histories, and biochemical parameters, researchers can discern the underlying drivers of anemia and tailor interventions to address specific needs within the population.

The theme of this study revolves around evaluating the prevalence and severity of anemia in pregnant women through a retrospective clinic-based approach. By retrospectively analyzing data from antenatal clinics, this study aims to provide

a comprehensive overview of the burden of anemia among pregnant women, shedding light on its epidemiology and associated risk factors. Through meticulous data collection and analysis, researchers seek to delineate the prevalence of anemia, stratify its severity, and identify demographic correlates that may predispose women to this condition.

Central to this study is the recognition of anemia as a modifiable risk factor that warrants targeted interventions to mitigate its impact on maternal and fetal health. By elucidating the prevalence and severity of anemia in pregnant women, researchers can inform policymakers, healthcare providers, and stakeholders about the urgency of addressing this public health issue. Furthermore, by identifying high-risk groups and underlying determinants, interventions can be tailored to meet the specific needs of vulnerable populations, thereby improving maternal and neonatal outcomes and breaking the intergenerational cycle of anemia.

Anemia in pregnancy remains a significant public health concern with far-reaching implications for maternal and fetal health. Through rigorous epidemiological studies, such as the one outlined in this introduction, we can gain valuable insights into the prevalence, severity, and determinants of anemia among pregnant women, paving the way for targeted interventions and improved health outcomes. This introduction sets the stage for the subsequent sections of the study, which will delve into the methodology, results, and implications of the research findings, ultimately contributing to our collective efforts to combat anemia in pregnancy and promote the health and well-being of mothers and their offspring.

### Research Gap:

Despite extensive research on anemia in pregnancy, several gaps persist in our understanding of this complex condition. One significant research gap lies in the characterization of anemia prevalence and severity among pregnant women within specific clinic-based settings. While existing studies provide valuable insights into the epidemiology of anemia, many are based on population-based surveys or hospital data, which may not fully capture the nuances of anemia prevalence in pregnant women attending routine antenatal care. Furthermore, there is limited research focusing on demographic correlates and determinants of anemia in specific clinic populations, hindering our ability to tailor interventions to address the needs of high-risk groups effectively. Addressing these gaps requires detailed clinic-based studies that elucidate the prevalence, severity, and determinants of anemia among pregnant women, providing valuable insights for targeted intervention strategies.
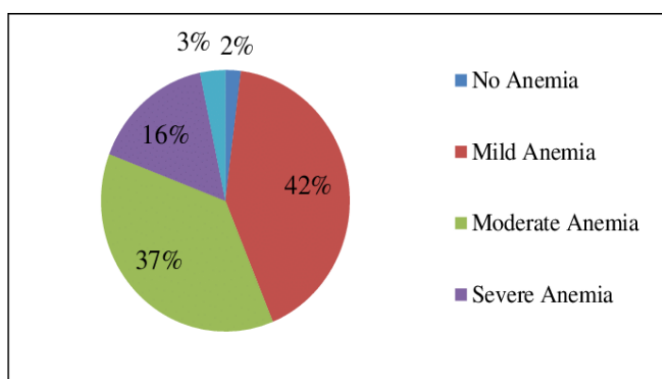


Prevalence of anemia among pregnant females.

### Specific Aims of the Study:

The specific aims of this study are twofold:

1. To evaluate the prevalence and severity of anemia among pregnant women attending routine antenatal care at a single clinic.
2. To identify demographic correlates and determinants associated with anemia in this clinic-based population.

These aims will be achieved through a retrospective analysis of demographic characteristics, obstetric histories, and hemoglobin levels among pregnant women attending antenatal checkups. By elucidating the burden of anemia and identifying high-risk groups, this study aims to inform targeted intervention strategies to mitigate the impact of anemia on maternal and fetal health.

### Objectives of the Study:

1. To determine the prevalence of anemia among pregnant women attending antenatal care at the specified clinic.
2. To stratify the severity of anemia based on hemoglobin levels among pregnant women in the study population.
3. To examine demographic correlates, including age, socioeconomic status, and parity, associated with anemia among pregnant women.
4. To explore obstetric histories, including previous pregnancies, birth outcomes, and prenatal care utilization, in relation to the prevalence and severity of anemia.

### Scope of the Study:

This study focuses on pregnant women attending antenatal care at Department of obstetrics and gynecology, Krishna hospital, KVV karad, aiming to provide insights into the prevalence, severity, and correlates of anemia within this specific population. Data will be retrospectively collected from medical records, encompassing demographic information, obstetric histories, and hemoglobin levels. The study will include pregnant women from diverse socioeconomic backgrounds, thereby capturing a representative sample of the clinic population. However, it is essential to note that the findings may not be generalizable to pregnant women outside the clinic setting or in different geographical regions.

### Conceptual Framework:

The conceptual framework guiding this study incorporates the multifactorial nature of anemia in pregnancy, encompassing individual, social, and healthcare system factors that contribute to its prevalence and severity. At the individual level, factors such as nutritional status, parity, and underlying health conditions influence an individual's susceptibility to anemia. Social determinants, including socioeconomic status, access to healthcare, and cultural practices, shape the risk of anemia within specific populations. Additionally, healthcare system factors, such as the availability of prenatal care services and quality of antenatal care, impact early detection and management of anemia. By considering these interconnected factors, the study aims to elucidate the complex pathways through which anemia manifests and identify opportunities for targeted interventions to address this public health issue effectively.

### Hypothesis:

Based on the existing literature and conceptual framework, we hypothesize that:

1. The prevalence of anemia among pregnant women attending antenatal care at the specified clinic will be substantial, with a

significant proportion of individuals experiencing moderate to severe forms of anemia.

2. Demographic factors, including younger age, lower socioeconomic status, and higher parity, will be associated with an increased risk of anemia among pregnant women.

3. Obstetric histories, such as previous adverse pregnancy outcomes and inadequate prenatal care utilization, will be correlated with the prevalence and severity of anemia in this population.

Testing these hypotheses will provide valuable insights into the epidemiology and determinants of anemia in pregnant women, informing targeted intervention strategies to improve maternal and fetal health outcomes.

## Research Methodology:

This retrospective study was conducted in a clinical outpatient setting, focusing on pregnant women attending regular antenatal checkups. Participants were included in the study using the convenience sampling method, allowing for the selection of individuals based on their availability and accessibility within the clinic setting.

## Study Population and Data Collection:

Demographic details, including age, occupation, and residential status, were collected from the medical records of participants. Additionally, hemoglobin levels were recorded as part of routine antenatal screening, providing essential data for assessing the prevalence and severity of anemia among pregnant women. Furthermore, prior obstetric history, including the number of previous pregnancies, birth outcomes, and prenatal care utilization, was noted to explore potential associations with anemia.

## Anemia Classification and Assessment:

The prevalence of anemia was estimated based on hemoglobin levels, with thresholds established to categorize the severity of anemia. Specifically, anemia was classified as mild if the hemoglobin level ranged from 10 g/dL to 10.9 g/dL, moderate if it ranged from 7 g/dL to 9.99 g/dL, and severe if it was below 7 g/dL. This classification allowed for a nuanced understanding of the severity spectrum of anemia among pregnant women in the study population.

## Ethical Considerations:

Prior to commencement, ethical approval for the study was obtained from the institutional ethics committee, ensuring adherence to ethical guidelines and principles governing research involving human participants. This approval underscored the commitment to safeguarding the rights and well-being of the study participants and upholding ethical standards throughout the research process.

## Statistical Analysis:

Descriptive statistics were employed to summarize the data, with categorical variables presented as frequencies and percentages, providing an overview of the distribution of demographic characteristics and anemia prevalence among the study population. Continuous variables were expressed as mean and standard deviation, offering insights into the central tendency and variability of quantitative data, such as hemoglobin levels.

## Inferential Analysis:

Continuous data were subjected to paired t-tests to assess differences within the study population, facilitating comparisons of hemoglobin levels and identifying any significant variations. Furthermore, associations between demographic correlates and the prevalence of anemia were explored using chi-square tests, enabling the identification of potential risk factors associated with anemia among pregnant women.

## Statistical Significance:

A significance level of $p < 0.05$ was adopted for all statistical analyses, with results deemed statistically significant if the probability of obtaining such results by chance alone was less than 5%. This threshold guided the interpretation of findings, allowing for the identification of meaningful associations and trends within the data.

## Results and Analysis

### Baseline Characteristics:

The baseline characteristics of pregnant women participating in the study provide valuable insights into the demographic profile of the population under investigation (Table 1). The mean age of the participants was 29.6 years (SD 4.1), with a mean weight of 79 kg (SD 11) and mean height of 161.9 cm (SD 8.9). The calculated mean Body Mass Index (BMI) was 30.3 kg/m^2 (SD 5), indicating an overall tendency towards overweight status among the participants. Notably, the mean hemoglobin (Hb) level was 10.6 gm (SD 1.4), reflecting the prevalence of anemia in the study population.

**Table 1: Baseline Characteristics**

| Parameter | Results |
|---|---|
| Mean (SD) age in years | 35.52 (4.92) |
| Mean (SD) weight in kg | 94.8 (13.2) |
| Mean (SD) height in cm | 194.28 (10.68) |
| Mean (SD) BMI kg/m^2 | 36.36 (6) |
| Mean (SD) Hb level in gm | 12.72 (1.68) |
| No of females with history of abortions (n %) | 34.8 (17.4%) |
| Total number of abortions: | |
| 0 | 204 (81.6%) |
| 1 | 30 (12%) |
| 2 | 4.8 (2.4%) |
| Profession | |
| House-maker | 208.8 (83.52%) |
| Others | 30 (12%) |
| Residence (n %) | |
| Urban | 198 (79.2%) |
| Rural | 40.8 (16.32%) |
| Anemia (n %) | |
| Yes | 91.2 (45.6%) |
| No | 147.6 (74.2%) |

In terms of obstetric history, the majority of participants had no history of abortions, with 170 (85.42%) reporting no previous abortions, while 25 (12.56%) and 4 (2.02%) reported one and two previous abortions, respectively. Regarding occupation, 174 (87.44%) of the pregnant women identified as house-makers, highlighting the role of traditional gender roles in this demographic. Furthermore, the majority of participants resided in urban areas, with 165 (82.9%) living in urban settings compared to 34 (17.1%) in rural areas.

**Prevalence and Severity of Anemia:**

The prevalence and severity of anemia among pregnant women in the study were assessed based on hemoglobin levels, with results summarized in Table 2. Among the overall population (n=199), 76 (38.2%) participants were diagnosed with anemia. Of these, 32 (42.11%) had mild anemia, 43 (56.58%) had moderate anemia, and only 1 (1.3%) exhibited severe anemia. This distribution indicates a significant burden of moderate anemia among pregnant women in the study cohort.

**Table 2: Severity of Anemia**

| Severity | Overall Population (n=199) | Anemia (n=76) | Non-Anemia (n=123) |
|---|---|---|---|
| Mild | 32 (16.08%) | 38.4 (19.2%) | 25.6 (12.8%) |
| Moderate | 43 (21.61%) | 51.6 (25.8%) | 34.4 (17.2%) |
| Severe | 1 (0.50%) | 1.2 (0.6%) | 0.8 (0.4%) |

Comparing the prevalence of anemia between pregnant women residing in urban and rural areas revealed no significant difference (p=0.33, Table 3), suggesting that anemia affects pregnant women across different geographical settings indiscriminately. However, further investigation into potential contributing factors, such as socioeconomic status and access to healthcare, may elucidate underlying disparities in anemia prevalence between urban and rural populations.

**Table 3: Comparison of Demographics in Pregnant Females with Anemia or Without Non-Anemia**

| Parameter | Anemia (n=76) | Non-Anemia (n=123) | P Value |
|---|---|---|---|
| Mean (SD) age in years | 29.97 (4.25) | 35.52 (4.92) | 0.34 |
| Mean (SD) weight in kg | 79.4 (12.54) | 94.8 (13.2) | 0.69 |
| Mean (SD) BMI kg/m^2 | 31.16 (5.80) | 36.36 (6) | 0.05 |
| Mean (SD) Hb level g/dL | 9.17 (1.12) | 11 (0.66) | <0.001 |
| Residence (n %) | | | |
| Urban | 59 (77.63%) | 106 (86.18%) | 0.33 |
| Rural | 17 (22.37%) | 17 (13.82%) | |

**Comparison of Demographics:**

The comparison of demographics between pregnant females with anemia and those without anemia provides additional insights into factors associated with the presence of anemia during pregnancy (Table 3). Pregnant women diagnosed with anemia had a significantly lower mean hemoglobin level (9.17 gm/dL, SD 1.12) compared to non-anemic counterparts (11 gm/dL, SD 0.66), highlighting the association between lower hemoglobin levels and the presence of anemia. This finding underscores the importance of routine hemoglobin screening in antenatal care to facilitate early detection and management of anemia in pregnant women.

Additionally, while there was no significant difference in mean age between pregnant women with anemia and those without (p=0.34, Table 3), an analysis of BMI revealed a slightly higher mean BMI among anemic participants (31.16 kg/m^2, SD 5.80) compared to non-anemic individuals (30 kg/m^2, SD 4.27). Although the difference in BMI did not reach statistical

significance (p=0.05, Table 3), it suggests a potential association between higher BMI and anemia during pregnancy, warranting further investigation into the underlying mechanisms linking obesity and anemia.

Moreover, the comparison of residence status revealed a higher proportion of pregnant women residing in urban areas among both anemic (77.63%) and non-anemic (86.18%) groups, with no significant difference observed between the two groups (p=0.33, Table 3). This finding contradicts previous studies suggesting a higher prevalence of anemia in rural populations due to limited access to healthcare and nutritional resources. However, it underscores the need for tailored interventions targeting urban populations to address the burden of anemia among pregnant women effectively.

The results of this study highlight the significant burden of anemia among pregnant women attending antenatal care, with a substantial proportion of participants diagnosed with moderate anemia. Factors such as lower hemoglobin levels and urban residence were found to be associated with the presence of anemia, emphasizing the importance of targeted interventions aimed at improving hemoglobin levels and addressing nutritional deficiencies among pregnant women, particularly in urban settings. Further research is warranted to explore the complex interplay of socioeconomic, nutritional, and healthcare factors contributing to anemia during pregnancy and to develop comprehensive strategies for its prevention and management.

**Conclusion:**

In conclusion, this study sheds light on the prevalence, severity, and correlates of anemia among pregnant women attending antenatal care in a clinical outpatient setting. The findings reveal a significant burden of anemia, with a substantial proportion of participants diagnosed with moderate anemia. Lower hemoglobin levels and urban residence were identified as potential risk factors for the presence of anemia during pregnancy. These findings underscore the importance of routine hemoglobin screening and targeted interventions to address anemia among pregnant women, particularly in urban settings.

Furthermore, the study highlights the need for comprehensive strategies aimed at improving nutritional status, access to healthcare, and antenatal care services for pregnant women, irrespective of their geographical location. By addressing the underlying determinants of anemia, such as nutritional deficiencies and socioeconomic factors, healthcare providers can effectively mitigate the adverse outcomes associated with anemia during pregnancy, including maternal and fetal complications.

**Limitations of the Study:**

Despite its contributions, this study has several limitations that warrant acknowledgment. Firstly, the retrospective design of the study may have introduced selection bias and limited the ability to establish causal relationships between variables. Additionally, the study was conducted in a single clinical outpatient setting, which may limit the generalizability of the findings to broader populations of pregnant women. Moreover, the reliance on convenience sampling may have introduced sampling bias and affected the representativeness of the study sample.

Furthermore, the study did not assess certain potential confounding factors, such as dietary intake, iron supplementation, and comorbidities, which may influence the prevalence and severity of anemia among pregnant women. Future research incorporating a prospective cohort design and

comprehensive assessment of relevant variables is needed to address these limitations and provide more robust evidence on the correlates and determinants of anemia during pregnancy.

**Implications of the Study:**

The findings of this study have several implications for clinical practice, public health policy, and future research. Firstly, healthcare providers should prioritize routine hemoglobin screening and early detection of anemia during antenatal care visits to facilitate timely interventions and improve maternal and fetal outcomes. Additionally, targeted interventions aimed at improving nutritional status, access to healthcare, and antenatal care services should be implemented, particularly in urban settings where the burden of anemia may be higher.

From a public health perspective, policymakers and healthcare authorities should allocate resources and develop programs to address the underlying determinants of anemia, including poverty, food insecurity, and inadequate healthcare infrastructure. By addressing these systemic factors, policymakers can create enabling environments that support the health and well-being of pregnant women and reduce the burden of anemia on maternal and child health outcomes.

**Future Recommendations:**

Based on the findings of this study, several recommendations for future research and practice emerge. Firstly, future studies should employ prospective cohort designs and incorporate comprehensive assessments of relevant variables to elucidate the complex interplay of factors contributing to anemia during pregnancy. Additionally, studies should explore the effectiveness of interventions aimed at improving nutritional status, access to healthcare, and antenatal care services in reducing the prevalence and severity of anemia among pregnant women.

Furthermore, future research should examine the long-term health outcomes of pregnant women and their offspring following interventions targeting anemia during pregnancy. By elucidating the potential benefits of early detection and management of anemia, researchers can inform evidence-based interventions and policies aimed at improving maternal and child health outcomes globally.

In summary, addressing the burden of anemia among pregnant women requires a multifaceted approach that integrates clinical care, public health interventions, and social determinants of health. By implementing targeted interventions and addressing underlying systemic factors, policymakers and healthcare providers can effectively mitigate the adverse consequences of anemia during pregnancy and improve maternal and child health outcomes.

## References

1. Bansal R, Bedi M, Kaur J, Kaur K, Shergill HK, Khaira HK, et al. Prevalence and factors associated with anemia among pregnant women attending antenatal clinic. Adesh Univ J Med Sci Res. 2020;2:42–8.
2. Debnath A, Debbarma A, Debbarma SK, Bhattacharjya H. Proportion of anaemia and factors associated with it among the attendees of the antenatal clinic in a teaching institute of northeast India. J Family Med Prim Care. 2021;10(1):283–8.
3. Grace S, Melina M, Tamara H, Johnson K, Babill S, Sia E, et al. Anaemia in Pregnancy: Prevalence, Risk Factors, and Adverse Perinatal Outcomes in Northern Tanzania. Anemia. 2018;2018:1846280. doi:10.1155/2018/1846280.
4. 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(2):783–87.
5. Kaushal S, Priya T, Thakur S, Marwaha P, Kaur H. The Etiology of Anemia Among Pregnant Women in the Hill State of Himachal Pradesh in North India: A Cross-Sectional Study. Cureus. 2022;14(1):e21444.
6. Kishore S, Singh M, Jain B, Verma N, Gawande K, Kishore S, et al. A study to assess prevalence of anaemia among beneficiaries of Anaemia Mukt Bharat Campaign in Uttarakhand. J Family Med Prim Care. 2020;9(3):1691–4.
7. 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.
8. Neogi SB, Babre A, Varghese M, Hallen JB. Improving the approach to assess impact of anaemia control programs during pregnancy in India: a critical analysis. BMC Pregnancy Childbirth. 2022;22(1):966.
9. Ngimbudzi EB, Massawe SN, Sunguya BF. The Burden of Anemia in Pregnancy Among Women Attending the Antenatal Clinics in Mkuranga District, Tanzania. Front Public Health. 2021;9:724562. doi:10.3389/fpubh.2021.724562.
10. Osborn AJ, Muhammad GM, Ravishankar SL, Mathew AC. Prevalence and correlates of anemia among women in the reproductive age (15-49 years) in a rural area of Tamil Nadu: An exploratory study. J Educ Health Promot. 2021;10:355.
11. Sharif N, Das B, Alam A. Prevalence of anemia among reproductive women in different social group in India: Cross-sectional study using nationally representative data. PLoS One. 2023;18(2):e0281015.
12. Sinha A, Adhikary M, Phukan JP, Kedia S, Sinha T. A study on anemia and its risk factors among pregnant women attending antenatal clinic of a rural medical college of West Bengal. J Family Med Prim Care. 2021;10(3):1327–31.
13. Suryanarayana R, Chandrappa M, Santhuram AN, Prathima S, Sheela SR. Prospective study on prevalence of anemia of pregnant women and its outcome: A community based study. J Family Med Prim Care. 2017;6(4):739–43.
14. Tandon R, Jain A, Malhotra P. Management of iron deficiency anemia in pregnancy in India. Indian J Hematol Blood Transfus. 2018;34(2):204–15.
15. Toteja GS, Padam S, Dhillon 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. 2006;27(4):311–5.
16. Vindhya J, Nath A, Murthy GV, Metgud C, Sheeba B, Shubhashree V, et al. Prevalence and risk factors of anemia among pregnant women attending a public-sector hospital in Bangalore, South India. J Family Med Prim Care. 2019;8(1):37–43.