Review Article

Anemia prevalence and factors associated among pregnant women in India

N. H. Simon¹, Ajoke Akinola², Neha Dinesh Kumar^{3*}

¹Director School of Nursing and Health Sciences, Noida International University, Greater Noida, Uttar Pradesh, India

²Department of Public Health, Noida International University, Greater Noida, Uttar Pradesh, India

³MPH Student, Noida International University, Greater Noida, Uttar Pradesh, India

Received: 26 July 2021

Revised: 04 September 2021

Accepted: 06 September 2021

*Correspondence:

Dr. Neha Dinesh Kumar,

E-mail: dkumar372016@gmail.com

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ABSTRACT

The objective of this review is to evaluate the prevalence of anemia and factors associated with Anemia among pregnant women in India. A search was conducted through electronic databases PubMed, google scholar and I Medline, non-electronic databases were also search for articles published between 2017 to 2021. PRISMA guided the reporting of items. All articles were included in qualitative analysis. A total of nine (9) studies (N=7,29,485) conducted among pregnant women in India were included in this review. The overall prevalence of anemia ranged from 23.16% to 81.8%, mild anemia reported in three studies ranged from 35.0% to 60.6%, moderate anemia from 8.0% to 49.5% and severe anemia ranged from 1.4% to 6.9% only. Education status of both wife and husband, maternal age, occupation, income, residence, dietary habits, parity, child spacing, attendance of ANC services and interventions nutrition programs were the main factors associated with the hemoglobin status of the pregnant women. The prevalence of anemia was high among the study participants. Sociodemographic factors were associated with Hb levels of the women. Efforts should be made to encourage women to attend antenatal services (ANC) and nutritional programs should also cover pregnant women.

Keywords: Anemia, Pregnant women, Factors associated, India

INTRODUCTION

Anemia is defined by the World Health Organization (WHO) as a condition in which a woman's hemoglobin concentration during pregnancy is less than 11 g/dl.¹ In underdeveloped nations, anemia affects over two-thirds of pregnant women, contributing to maternal deaths and low birthweight.^{2,3} Nutritional anaemia, also known as iron deficiency anaemia (IDA), is the most frequent cause of anaemia in pregnancy, affecting approximately 32 million women worldwide and at least half of all pregnant women in medium and low-income nations.^{4,5} Anemia is more common in these countries due to a variety of reasons including poor food, hemoglobinopathies, and sicknesses like HIV and infections of malaria.⁶ When compared to all

other developing countries, India's prevalence of anaemia is considered to be greater. It is also the country's second greatest cause of maternal death.^{7,8}

There have been numerous governmental health programmes aimed at preventing and controlling anaemia. Iron-folic acid supplementation was first introduced as the National Nutritional Anemia Prophylaxis Program (NNAPP) in 1973 and is now part of the Reproductive and Child Health Program, in which pregnant women are given 100 mg of elemental iron and 0.5 mg of folic acid.⁹ The prevalence of anaemia in Karnataka is estimated to be 50.3 percent, with an overall burden of 45.4 percent, according to latest data from the National Family Health Survey (NFHS-4). Although the prevalence of anaemia has

declined from 58.3 percent (NFHS-3) to 50.3 percent (NFHS-4), there is no variation between the prevalence of anaemia recorded in NFHS-2 (49.7%) and NFHS-4 (50.3%). (50.3 percent).

Anemia prevalence varies significantly depending on population parameters such as age, gender, socioeconomic position, and biodemographic factors such as pregnancy.^{10,11} Because they are physiologically and nutritionally at a higher risk, women in the reproductive age range are more prone to iron deficiency resulting in anaemia, especially during pregnancy.¹² However, due to foetal growth, changes in maternal tissues, metabolism, and breast feeding, many women in impoverished nations fail to take the additional food and supplements needed to satisfy the demands during pregnancy and breastfeeding.^{13,14} In this regard, this review is being conducted with the objective of assessing hemoglobin status and factors associated among pregnant women in India.

RESEARCH QUESTIONS

To answer the objectives of this review stated above, the primary research question was formed as “What is the prevalence of anemia among pregnant women in India?” and the secondary research question as “What are the factors associated with hemoglobin status of the pregnant women in India?”.

The primary outcome of interest is the prevalence of anemia among pregnant women in India and the secondary outcome of interest is factors associated with hemoglobin level among the pregnant women.

SEARCH STRATEGY

To answer the research questions stated above, a search was conducted through PubMed/Medline and google scholar using the keywords “Prevalence of anemia”, “Pregnant women”, “Factors associated”, “India”. All studies that met the inclusion criteria stated below, were extracted and entered in table 1, under the titles “Author(s)/Year of publication/Country”, “Study design”, “Sample size”, “Prevalence of anemia”, “Factors associated” and “conclusion”.

Inclusion and exclusion criteria

All studies assessing prevalence of anemia and factors associated with anemia among pregnant women in India published in English between 2017 to 2021 were included in this study. All studies assessing prevalence among men or general population, published in languages other than English in years from 2016 below in India and other countries were excluded.

After entering the selected keywords above in the electronic databases, a sum of 17,000 articles were retrieved. The articles were screened for duplicates, a total

of 16500 duplicates were removed. The remaining articles were screened on basis of title and abstract, 350 were removed as the titles were not related to this review and only abstracts were available. The eligibility criteria were applied, only 9 full texted articles qualified to be included in the final systematic review. Figure 1 above is a PRISMA diagram showing the selection process of studies included in the study.

Figure 1: PRISMA flow diagram.

A total of nine (9) studies (N=7,29,485) conducted among pregnant women in India were included in this review. High prevalence of anemia was reported in majority (7) studies. The overall prevalence of anemia ranged from 23.16% to 92.4%, mild anemia reported in three studies ranged from 35.0% to 60.6%, moderate anemia from 8.0% to 49.5% and severe anemia ranged from 1.4% to 6.9% only.

Several factors such as age, parity, occupation, Time of first ANC visit and IFA intake, spacing between pregnancy as well as uptake of integrated child development nutritional services, the educational status of wife & husband and wife, residence, monthly family income, dietary habits of not eating green leafy vegetables, meat and animal products, and drinking tea and coffee immediately after meal, women without toilet facilities and poor water sources, underweight women, and women with at least one children born in last 5 years and program factors like nutrition advice and supplementary nutrition during anti natal care and postnatal care were all reported to be associated with the hemoglobin status of the pregnant women included in the various studies.

Table 1: Descriptive table of studies included in the systematic review

Author(s) /Year of publication and country	Study design	Sample size	Prevalence of anemia	Factors associated	Conclusion
Kumar et al, 2019, India	Cross-sectional	280	81.8% were anemic. 35.0% mild anemic, 45.4% moderate and 1.4% had severe anemia	Age, Parity, occupation, Time of first ANC visit and IFA intake	High anemia prevalence among the pregnant women
Prasad et al, 2018, India	Retrospective study	300	68.6% overall (60.6% with mild anemia and 8.0% were moderately anemic	Spacing between pregnancy as well as uptake of integrated child development nutritional services and Hb status of the women.	High prevalence of anemia. Spacing between pregnancies will have a visible impact on hemoglobin level of pregnant mothers
Manju et al, 2018, India	Cross sectional	786	50.9% were anemic.	Educational status of wife and husband and wife, increasing gestational age, and increased with increased number of births and pregnancies	High prevalence Husband's education had a greater impact than education of mother
Nath et al, 2019 India	Cross sectional	280	The prevalence of anemia was 33.9%, 48.4% mild and 49.5% moderate anemia	Parental depression	"The burden of maternal anemia was considerably high in the study population"
Bansal et al, 2020, India	Cross sectional	500	Overall anemia prevalence was 81.8%.	"Residence, educational status, monthly family income, occupation, gestational age, iron folic acid supplementation, dietary habits of not eating green leafy vegetables, meat and animal products, and drinking tea and coffee immediately after meal"	High prevalence Sociodemographic factors associated
Ram et al, 2020	Cross sectional	726,164	Prevalence of anemia was 52.5%	Women aged (15–24 years), with primary or no education, poverty, women without toilet facilities and poor water sources, underweight women, and women with at least one children born in last 5 years	Household, environmental and personal factors are responsible to the increased chances of anemia
Zahid et al, 2017, India	Cross sectional		59% among pregnant women. Older pregnant women (67%) had a bigger burden of anemia	Socioeconomic factors, "demographic indicators such as children ever born and program factors like nutrition advice and supplementary nutrition during anti natal care and postnatal care"	High prevalence
Gustavo et al, 2017. India	Cross sectional study	575	Prevalence of anemia was 92.4% while severe anemia was 6.9%	NA	High prevalence

Continued.

Author(s) /Year of publication and country	Study design	Sample size	Prevalence of anemia	Factors associated	Conclusion
Madhu et al, 2017. India	Cross-sectional	600	Overall prevalence of anemia was 23.16%	NA	Low prevalence

Table 3: Prevalence of anemia.

Author(s)	Overall prevalence	Mild	Moderate	Severe	Level
Vinod et al	81.8%	35.0%	45.4%	1.4%	High
Shwetha et al	68.6%	60.6%	8.0%	NA	High
Manju et al	50.9%	NA	NA	NA	High
Anita et al	33.9%	48.4%	49.5%	NA	Low
Bansal et al	81.1%	NA	NA	NA	High
Ram et al	52.5%	NA	NA	NA	High
Zahid et al	59%	NA	NA	NA	High
Gustavo et al	92.4%	NA	NA	6.9%	High
Madhu et al	23.16%	NA	NA	NA	Low

DISCUSSION

This review was conducted with the aim of assessing the prevalence of anemia and factors associated with anemia among pregnant women in India. The findings revealed a high prevalence of anemia 81.8% in Vinod et al, 68.6% in Shwetha et al, 50.9% in Manju et al, a low prevalence of 33.9% in Anita Nath et al, 81.1% in Bansal et al, 52.5% in Ram et al, 59% in Zahid et al, 92.4% in Gustavo et al and a low of 23.16% in Madhu et al.¹⁵⁻²³ A mild prevalence of anemia was reported by three studies Vinod et al (35.0%), Shwetha et al (60.6%) and 48.4% in Nath et al 45.5%, 8.0% and 49.5% moderate levels of anemia were reported in Vinod, Shwetha and Anita et al respectively. Severe anemia was only reported in two studies 1.4% (Vinod et al) and 6.9% (Gustavo et al). The high prevalence of overall anemia recorded in this study could be due to the fact that they were conducted among pregnant women. Even though most studies did not report the severity of anemia according to mild, moderate and severe, in the studies that reported severity, there is low prevalence of severe anemia. This could be due to the fact that most of the studies were conducted in hospital settings where the women might be receiving IFA tablets and other iron supplements and nutritional advice from medical personnel. According to the factors associated, this review found out that most sociodemographic variables were associated with hemoglobin level of the pregnant women as reported in many studies.²⁴⁻²⁶

Limitations of the study

Just like any research, this review had some limitations. Article not published in PubMed/Medline and google scholar were excluded; it was also only limited to studies conducted in India. Studies with similar objectives carried

outside India might have different outcomes. Finally, only few articles met the inclusion criteria set for this article and hence few studies were reviewed.

CONCLUSION

The overall prevalence of anemia among these pregnant women is high, however, the prevalence of severe anemia is considerable low among the women included in this review. Several factors have been found to be associated with the hemoglobin status of the women. More reviews should be done to compare Hb level of pregnant women attending antenatal services and those not attending ANC.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Simon NH, Akinola A, Kumar ND. Anemia prevalence and factors associated among pregnant women in India. *Int J Community Med Public Health* 2021;8:5084–8.