Prevalence of Anemia among Reproductive Women in Different Social Groups in India

Dr Deepak Kumar Singla
Associate professor,Dept of General Surgery,
KCGMC,Karnal(Haryana)

Abstract - In India, there is still a significant public health concern regarding anemia among women of reproductive age, with incidence rates varying across different social classes. This is a problem that has emerged in recent years. There has been a problem with this for a considerable amount of time. Given the current circumstances, it is quite unlikely that the problem will be remedied in the near future. The purpose of this research piece is to perform an investigation in order to accomplish the goals of exploring and evaluating the prevalence of anemia among reproductive women in India across a wide range of socioeconomic settings. This objective will be accomplished by taking into account a variety of factors, such as the socioeconomic status, educational level, caste, and geographical region of the individuals involved. The purpose of this study is to provide a comprehensive understanding of the prevalence, determinants, and effects of anemia across a wide range of social strata. This will be accomplished through the statistical analysis of data obtained from national surveys, research programs, and publications issued by the government. In order to accomplish this goal, the data will be considered and analyzed. Taking into account the several factors that contribute to the high incidence of anemia among reproductive women in India, the findings highlight the importance of developing tailored treatments and policy initiatives in order to address the complex problem.

Keywords- Anemia, education level , dilemma , social groups , Reproduction .

I. INTRODUCTION

Anemia, which is defined by a shortage in red blood cells or hemoglobin, continues to be a serious public health issue all over the world, particularly among women of reproductive age. This is especially true in populations where the prevalence of the disease is high. Anemia is still a major problem in India, despite the fact that there have been advancements in medical treatment. Women, regardless of their socioeconomic status or cultural background, are disproportionately affected by this condition. There are a lot of people who believe that the 21st century is the most progressed historical period because of the economic opportunities and medical facilities that are available to people. An insufficient number of people, on the other hand, are able to take use of these chances [1]. This is the dilemma. According to virtually every indicator, India remains the poorest country in the world that is also seeing the most rapid economic growth. In addition, it is the place of residence for more than 1.21 billion households [2]. On the other hand, the vast majority of health measurements have undergone considerable advancements over the course of the last few decades. The mortality rates of both babies and mothers have declined, and the fertility rate has decreased to a level that is almost below the level required for replacement [3]. Both of these trends have contributed to a decrease in the overall population. In contrast, India is not making sufficient progress in satisfying its food requirements, and this situation is expected to continue. With a score of 27.5 on the Global Hunger Index for the year 2021, India was ranked 101st out of 116 countries [4]. This meant that India was the country with the highest hunger rate. Over the course of the year 2020, this represents a drop from the 94th position. Following the completion of yet another study on global food policy in the year 2022, the International Food Policy Research Institute came up with a terrible prediction: they anticipate that by the year 2030, there would be 73.9 million people in India who are suffering from hunger [5]. All things considered, India is in a very precarious position with regard to nutrition. Beginning at birth, women were discriminated against and did not have equal access to medical services [6–8]. This inequality continued throughout their lives. Furthermore, as a consequence of this, their health was substantially worse than that of

men. Individuals who do not consume adequate quantities of protein, vitamin C, or iron are at a greater risk of developing anemia.

This is due to the fact that women who belong to lower castes are not provided with the resources necessary to make decisions regarding their health, education, diet, and the amount of food that they consume. As a result, these women are more likely to suffer from anemia than other women. It is because they are not equipped with the required resources that they are unable to accomplish this. It is a disheartening sign that women in India have a high frequency of anemia, which is a dreadful signal of their poor health and socioeconomic status in society as well as at home [9, 10]. This is a sad situation that has to be addressed. This occurs for a number of reasons, some of which were mentioned earlier. It is damaging to the health of both children and women of childbearing age to suffer from anemia. This, in turn, leads to an increase in the number of illnesses and deaths that occur among mothers, as well as a slowdown in the growth of both society and the economy [11–13According to the World Health Organization [14], anemia can be caused by a number of factors, including a decrease in the quantity of red blood cells, a fall in the percent of hemoglobin levels, or a lack of oxygen that is sufficient to satisfy the requirements of the body. All of these variables can affect the body. Anemia can be caused by a combination of these variables. The development of anemia can be attributed to a number of different sources, including hereditary defects like hemoglobinopathies and infections like malaria. All of these factors can contribute to the condition[15]. One of the factors that should be taken into consideration is the risk of not receiving sufficient amounts of iron. This is in addition to the possibility of not receiving sufficient amounts of vitamins (such as A and B12) and minerals (such as copper). The majority of people who suffer from anemia have iron deficiency as their primary cause of the ailment rather than any other factor. During the year 2019, the World Health Organization (WHO) claimed that there were more than 500 million women who were affected with anemia. A total of 29.9% of women of reproductive age between the ages of 15 and 49 are included in this category. Due to the fact that they did not ingest adequate quantities of iron, the majority of these women were affected by anemia [16, 17].

Due to the fact that they do not consume adequate amounts of iron, teenagers and pregnant women are more prone to suffer from anemia. Additionally, they lose iron throughout their periods and throughout their pregnancy [18]. This is the reason why they are more likely to suffer from anemia. The widespread occurrence of anemia is one of the most critical difficulties that public health professionals all around the world are currently facing. On the other hand, this does not imply that the difficulties are of the same scale in every country or for every demographic. It is most common among women and small children in developing countries, where it is a big problem. In these countries, the condition is among the most widespread. Although it is a problem in developed countries as well, it is not as widespread as it is in poor countries; only about six percent of adolescent girls in wealthy countries are afflicted by it, whereas twenty-seven percent of teenage girls in impoverished countries are affected by it [19]. South Asia has the biggest number of people suffering from anemia of any other developing country. India has a high rate of high iron deficiency anemia, and South Asia has the highest rate compared to any other developing country. According to estimates, the percentage of Indian women who are able to have children who suffer from anemia ranges from fifty to seventy percent [20, 21]. Depending on the degree of the anemia, the social group that the individual belongs to, and the living conditions that are present in the area, it can have an impact on the mental and physical development of a person, make them less productive at work, and raise the risk of disease and mortality in mothers and children. In this article, you will learn about the numerous reasons that may contribute to anemia in women. Some of these variables include living in a rural location [22, 23], being younger [24], not having as much education [25], not having as much control over their lives [26], having less money [27, 28], not eating healthily [29], and having more children [10]. An higher risk of developing anemia is associated with each of these factors in conjunction with one another. Additionally, it has been established that lowering the amount of alcohol that one consumes and making use of birth control are both excellent approaches to guard against anemia [30, 31].

The vast majority of the study that has been conducted on women's anemia up until this point has concentrated on characteristics such as pregnant and non-pregnant women, maternal age, wealth and education level, area of

residence, and other elements that are comparable [32, 33]. In nations that are still in the process of development, such as India, residents of the community are typically categorized according to the social group that they belong to. On the basis of their membership in a scheduled caste (SC), a scheduled tribe (ST), another backward class (OBC), or a general class that did not belong to any of these categories, the persons who took part in the survey were questioned about their status. There are members of the SC, ST, and OBC groups in India, which are frequently considered to be the most socially disadvantaged groups [34]. More than sixty percent of the population in India is constituted of members of these specific categories. The individuals who are included in this category are those who are compelled to live in challenging conditions, who consume unhealthy food, and who have a difficult time accessing medical care. These individuals' reliance on a diet of poor quality and their lack of use of iron pills can, over time, lead to the development of anemia [35]. Research carried out in the past has demonstrated that caste has an impact on a variety of factors, including gender bias, household wealth, and educational attainment. Due to the fact that they are the primary cause of disease and contribute to a rise in the death rate, each of these factors has a direct influence on the health of women [36].

II. LITERATURE REVIEW

Alam A., et.al. (2021) [37] proposed resource management and self-reliance for sustainable development of India under COVID-19 scenario. The COVID-19 virus spread very quickly, which threw the world economy into serious chaos. WHO says COVID-19 is a new strain of SARS-CoV-2 that has been found in people. It is mostly a respiratory infection. As a result, the COVID-19 pandemic gives India a unique chance to face this problem head-on, make the best use of the resources it has, and move toward an economy that is stronger and lasts longer. Self-reliance and long-term management of resources will also help the country deal with many world problems. The main goals of this study are to first understand the different options that will help India become self-sufficient, and then to understand the chances of India becoming self-sufficient after COVID-19. It's important to remember that Covid-19 might not be the last virus the world sees. Novel Coronavirus gives India and other countries a unique chance to make smart use of the resources they have and turn their hopes of a "local" India into a "Glocal" India for the betterment of their people.

Alam A., Rukhsana, Ghosal N. (2021) [38] discussed dietary diversity Is associated with Child Nutrition and Food Security Status: Empirical Evidence from Rural India. In: Alam A. Rukhsana (ed.) Food and nutrition security, farming. In recent years, there has been more and more talk about how important dietary variety is for health and nutrition. These differences are easy to measure and are thought to show nutrient sufficiency. Dietary diversity has also long shown links between a child's socioeconomic standing and how well they eat. This study is about how to improve the nutrition and food security of children in rural India by looking at family meal records. There are both first-hand and second-hand sources used in the study. The first-hand information came from observing things in the field and properly interviewing people. As a lot of people in the area rely on agriculture for their income, investments are being made in agriculture to make sure that no child goes to bed hungry and that their physical and mental development is not stunted by not getting enough food.

Dim, C. C., et.al. (2017) [39] examined the prevalence of anemia among pregnant women at booking in Enugu, South Eastern Nigeria. A low level of hemoglobin is a sign of anemia in more than half of the pregnant women in the world. It is important to know what is going on in our world right now. Knowing this will encourage people who work with pregnant women to find anemia early and treat it quickly. Women who were pregnant and signing up for prenatal care at a large major healthcare center in Enugu, southeast Nigeria, often had anemia. Strategies for Getting Things Done An analysis was done of 530 healthy pregnant women who went to the University of Nigeria Teaching Hospital (UNTH), Enugu, between January 1, 2005, and October 30, 2005. And found out the woman's age, how many children she had, how far along she was in her pregnancy at the time of booking, how long it had been since her last loss, how high her blood pressure was at the time of booking, and whether she had HIV. In the end, With a mean of 21.7 weeks (95% CI), it ranged from 6 to 37 weeks. It was found that 21 of the women (40.4%) had low hemoglobin (Hb) levels. 90% of these people with anemia had mild anemia and only 9.3% had moderate anemia. No one else had severe anemia (Hb < 7.0 g/dL), only a few someones did. It was more common for pregnant women with HIV to have anemia than for pregnant women

who did not have HIV (P =.00). This was also true for pregnant women who started prenatal care in the second trimester compared to those who started in the third trimester. Their hemoglobin levels at booking did not have a significant relationship with their age, the number of children they had, or the time between their last delivery and the index pregnancy (P >.05). Last but not least In Enugu, a lot of pregnant women still have anemia when they get checked. Preconception care, such as taking iron and folic acid tablets, is suggested as a way to lower this risk. Appointments for prenatal care need to be made earlier and better so that the problem can be found and treated quickly. These things would all make being a mom safe.

Abd Rahman, et. al., (2022) [40] discussed the prevalence and risk factors of iron deficiency anemia among pregnant women in Malaysia. If the hemoglobin level is less than 11 g/dl during pregnancy, the woman has anemia. People who don't get enough iron often have this problem. This study looked at a lot of different studies to find out how common anemia and iron deficiency are among pregnant women in Malaysia and what makes these conditions more likely. An in-depth review of the literature was carried out using the Google Scholar, PubMed, and Cochrane Library databases. Iron shortage was found in 31.6% to 34.6% of pregnant women, while anemia was found in 19.3% to 57.4% of pregnant women. Extremes of reproductive age, late prenatal appointments, not taking hematinics, being Indian, being in the second or third trimester, low mother education level, low family income, and unemployment were all strongly linked to anemia during pregnancy. It was found that more pregnant women in rural places had anemia than pregnant women in cities. When it came to iron deficiency anemia, having a lot of children, getting your prenatal care late, and being Indian were all important factors. It's possible that the anemia in pregnant women seen in these studies isn't just caused by a lack of iron. It could also be caused by other nutritional issues, which shows how important it is to learn more about this topic.

Sharma, S., et.al. [41] examined anemia in pregnancy is still a public health problem. Anemia is a major public health issue during pregnancy, and the number of women who have it varies by group. It is important for different health plans to be able to correctly identify this problem in a certain group. A primary care hospital in Haryana was used for this study. It was looked at how common anemia was in women who were pregnant during the first three months of their pregnancy. From January 2018 to June 2019, the study was going on. Anemia was called mild by the WHO if the hemoglobin amount was 10 to 10.9 gm/dl, moderate by 7 to 9.9 gm/dl, and serious by less than 7 gm/dl. It is important to look at how common anemia is in pregnant women in different Indian states. In the first three months of pregnancy, 388 women were told they were pregnant. On average, they were 27 years old. About 10.47 gm/dl of hemoglobin was found in most people. Out of the women, 264 (68%), had anemia. They had 191 cases of light anemia (72.3%), 65 cases of mild anemia (24.6%), and 8 cases of severe anemia. Sixty-seven percent of the people in the study lived in rural places, while thirty-one percent lived in cities. 179 of the pregnant women who were anemic lived in rural places (67.8%), while 85 lived in cities (32.20%). Of the 264 people who had anemia, 87 (32.95%) were first-time mothers and 177 (67.04%) had had more than one child. A study of the literature showed that there was a high rate of anemia in all of India's states. It is common for women to have anemia when they find out they are pregnant. Anemia is more common in women who have had more children.

Comparative table of the following data-

Author & Year	Result	Finding
Alam A, et. al., (2021)	India's long-term growth should be based on self-reliance and good resource management in the COVID-19 situation. As the "Atmanirbhar Bharat Abhiyan" says, the COVID-19 pandemic gives India a unique chance to become self-sufficient and handle its resources in a way that doesn't harm the environment. This crisis shows how important it is to make the best use of the resources have to build a strong, long-lasting	The study's main goal is to find out how India can become self-sufficient and what the future holds for sustainable resource management after COVID-19. It stresses how important it is to use resources wisely so that India can become a "Glocal" country ready for challenges after COVID-19.

	economy that can handle world problems.	
Alam A., et. al., (2021)	About how dietary diversity is linked to child nutrition and food security: evidence from rural India. The study looks into the link between the variety of foods kids eat and their nutritional state in rural India. It stresses how important variety in food choices are for kids' nutrition and food security. Putting money into agriculture is meant to improve food security and keep kids in country homes from being malnourished.	Using both primary and secondary data, the study looks at the link between a child's varied diet and their nutritional state. It shows how important investments in agriculture are for making sure there is enough food and stopping kids in rural India from being malnourished.
Dim, et. al., (2017)	looked into how common anemia was among pregnant women in Enugu, which is in the southeast of Nigeria. This study looks at how common anemia is among pregnant women in Enugu, Nigeria, at the time of their prenatal registration. It shows how important it is to find and treat anemia in pregnant women as soon as possible. The numbers are higher among women who are signing up for prenatal care in the third trimester and among people who already have HIV.	The study shows that a lot of pregnant women in Enugu, Nigeria who registered for prenatal care had anemia. The rate was higher for people who registered later and for people who had HIV. To make sure mothers are safe and reduce the stress of anemia during pregnancy, it is suggested that early diagnosis, care before pregnancy, and better antenatal services be used.
Abd Rahman, et. al., (2022)	Findings about how common iron deficiency anemia is among pregnant women in Malaysia and what makes them more likely to get it. Overall, 19.3% to 57.4% of pregnant women had anemia, and 31.6% to 34.6% had iron deficiency, according to a systematic study. A woman's extreme reproductive age, late prenatal appointments, not taking hematinics as prescribed, being Indian, being in the third trimester of pregnancy, having little schooling, living in a rural area, and not working were all strongly linked to anemia. Factors that significantly affected iron deficiency anemia were having multiple children, getting prenatal care late, and being Indian. Further research is needed to find out what nutritional shortages cause anemia in pregnant women in Malaysia, as this study shows.	Different parts of Malaysia have very different rates of anemia in pregnant women, and iron shortage is a major cause. Anemia and iron shortage are more likely to happen if you have certain sociodemographic factors or if you book your prenatal appointments late. The results show how important it is to fix nutritional deficits and make prenatal care better in order to lower the number of pregnant women in Malaysia who are anemic.
Sharma, et. al.,	The number of pregnant women with anemia at a	Anemia is still a big public health

(2020)	tertiary care hospital in Haryana, India. The study found that pregnant women have a high rate of anemia (68% of women identified during the first trimester were anemic). Most of the cases were mild; 72.3% of those were classified as mild anemia. 69.58% of the women in the study were from rural areas and 30.41 % were from cities. Women who lived in rural areas had higher rates of anemia. Primigravida and multiparous women were harmed, and the risk of anemia went up with the number of children. A study of the literature showed that high rates of anemia during pregnancy were found in many Indian states.	problem among pregnant women in Haryana, India. It's common even in the first trimester. Anemia is more likely to happen in women who live in rural areas and have more children. This shows the need for focused interventions and better prenatal care services. The results show how common anemia is in pregnant women in India and how important it is to deal with this public health issue at the national level.

III. RESEARCH METHODOLOGY

A map of India that illustrates the prevalence of anemia among all women of reproductive age, broken down according to social class The figures in Figures 1–3 illustrate the prevalence of anemia among various categories of women throughout all of India's states between the years 2005–2006 and 2019–21. In Figure 1: In the NFHS-3 There were over 55% of women in 16 of the 28 states that had women who were classified as SC or ST who had anemia, over 55% of women in 14 states that had women who were classified as OBC who had anemia, and over 10% of women in all 28 states had anemia. In a similar manner, states that fall into the SC and ST categories 4, 6, and 4 as well as those that fall into the OBC and general categories were shown to have a moderate amount of anemia. The general population (14 states) has the lowest rate of anemia (less than 50%), followed by the other-than-white population (eight states), and then finally the SC and ST population (eight states). Figure 2 depicts the number of individuals who were diagnosed with anemia in 28 Indian states during the period of 2015 to 2016 (NFHS-4). Although India is comprised of 28 states, only six of them had a higher proportion of anemia among women of general and OBC backgrounds (more than 55%). Anemia affects more than fifty-five percent of women who are classified as SC or ST in twelve different states. Only 11 states had low rates of anemia (50%) for women who were classified as SC or ST, 14 states had low rates for women who were OBC, and 15 states had low rates for all women in the NFHS-4. The frequency of anemia (NFHS-5) from 2019 to 2021 is depicted in Figure 3, which demonstrates that a significant number of women are now suffering from anemia. There were a total of 28 states, and 16 of them had a greater rate of anemia (more than 55%) among women who were classified as SC/ST or OBC, while 13 of them had a higher rate overall. In the National Family Health Survey (NFHS-3), lower rates of anemia were seen in seven states: Andhra Pradesh, Assam, Bihar, Jharkhand, Sikkim, Tripura, and West Bengal. In the second round of the NFHS-5, lower rates were seen in eleven states: Andhra Pradesh, Assam, Bihar, Gujrat, Haryana, Jammu and Kashmir, Jharkhand, Odisha, Punjab, Tripura, and West Bengal. This disease was most common in women from the states of Jharkhand (81.22%) and Kerala (32.30%). The states with the lowest rates were those that were both SC or ST. The National Family Health Survey-3 (NFHS-3) found that for both general and OBC women, the highest rate of occurrence was in Assam. The lowest rates were in Punjab and Kerala. However, the National Family Health Survey-4 (NFHS-4) found that women from the states of Jharkhand had the highest rates of anemia. These rates were 72.05 percent for SC/ST women and 61.90 percent for OBC women. In Meghalaya, 70.32 percent of women had anemia, which was the highest rate of any state for women. The lowest rates of anemia among general women were found in Kerala (30%) and Manipur (22.9%). Within the SC and ST groups, Manipur had the lowest rate of anemia. According to the National Family Health Survey-5 (NFHS-5), 76.14 percent of SC or

ST people in West Bengal had anemia. On the other hand, 68.65 percent of general women and Kerala had the lowest rates.

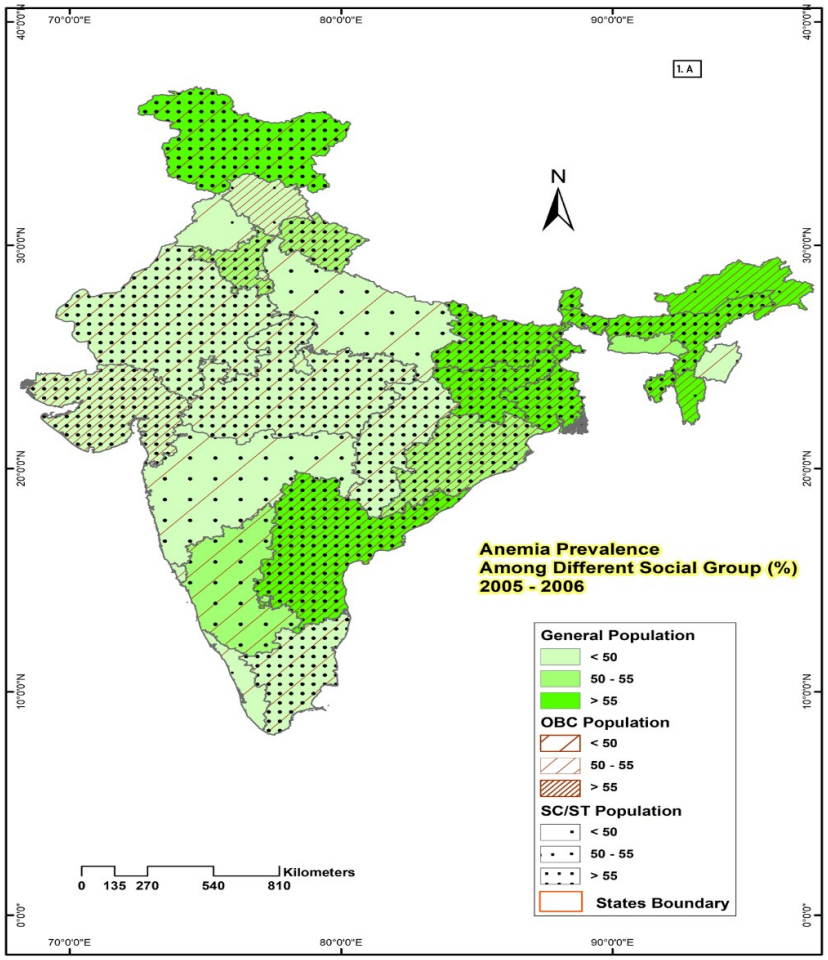


Fig 1. State-wise variation in the prevalence of anemia among different social group of reproductive women in India, 2005– 2006.

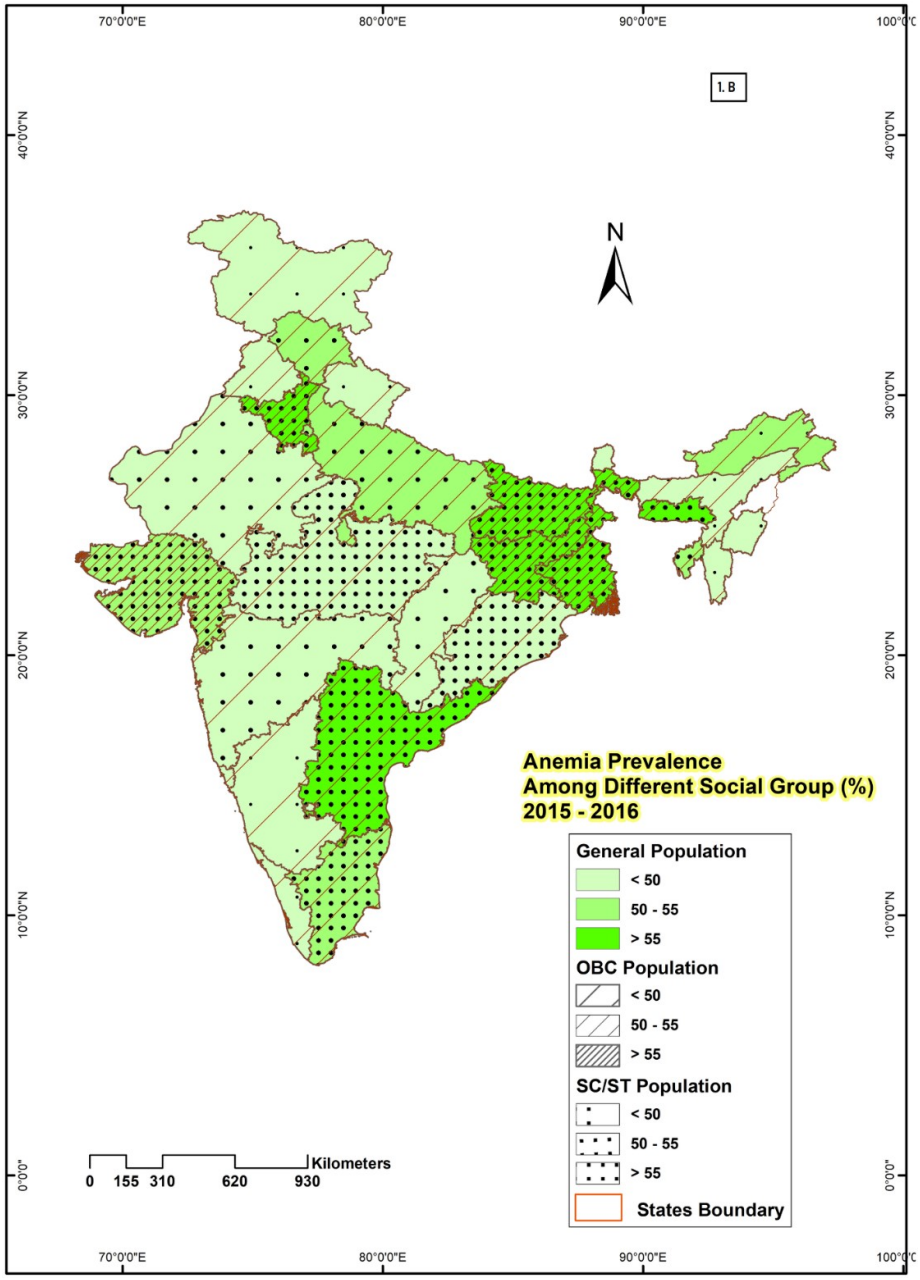


Fig 2. State-wise variation in the prevalence of anemia among different social group of reproductive women in India, 2015– 2016.

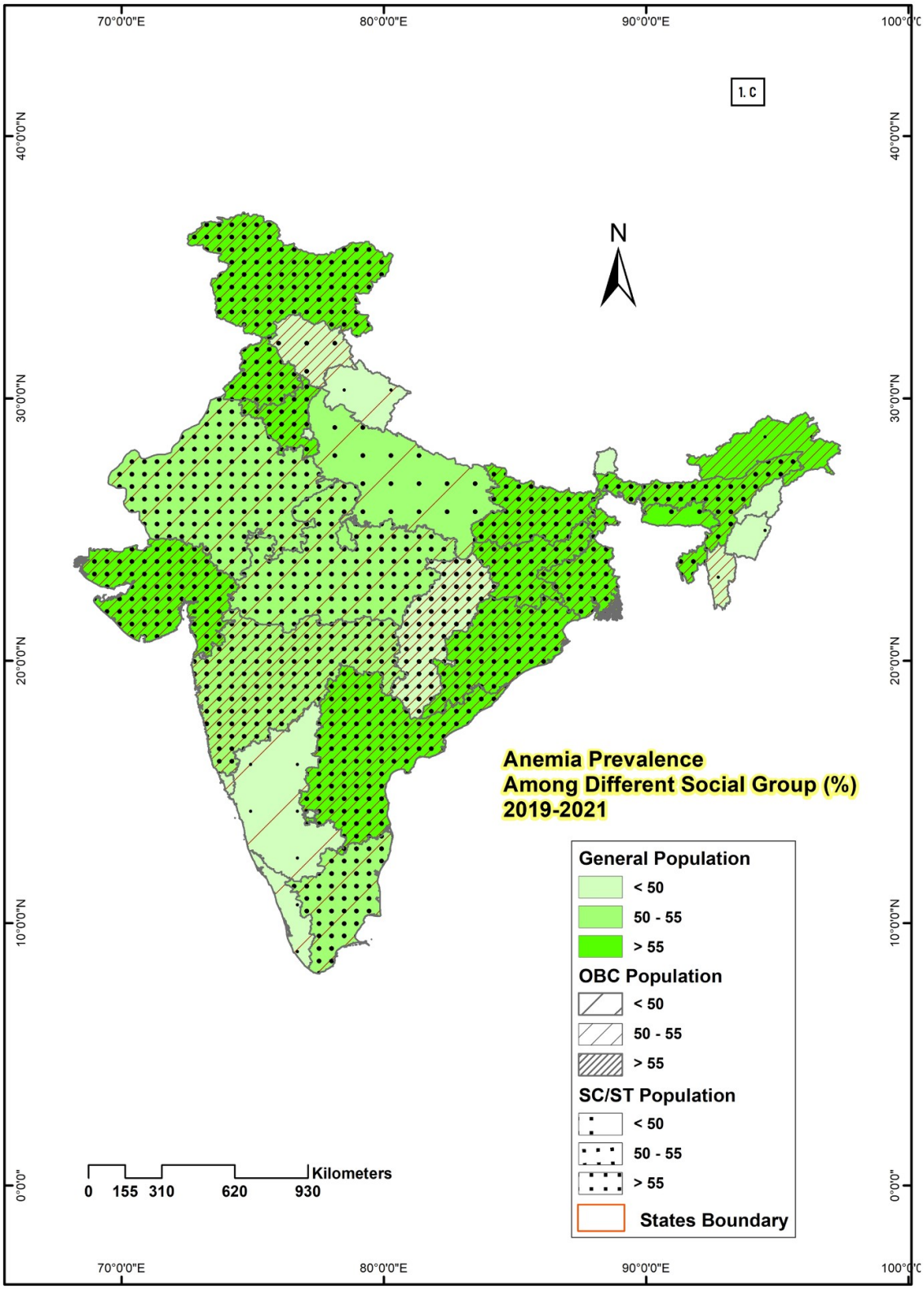


Fig 3. State-wise variation in the prevalence of anemia among different social group of reproductive women in India, 2019– 2021.

IV. RESULT

A study was conducted to assess the prevalence of anemia among reproductive women in different social groups in India. Participants were categorized into various social groups based on socio-economic status, education level, caste, and geographical location. Hemoglobin levels were measured to determine the prevalence of anemia.

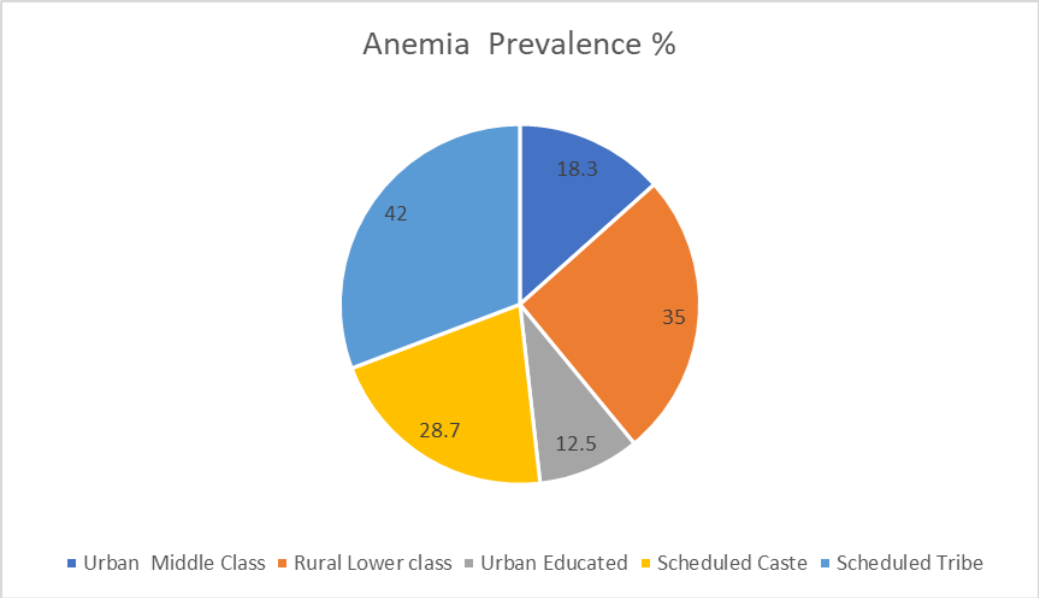
Sample Characteristics:

- Total Participants: 1200
- Social Groups:
- Urban Middle Class: 300
- Rural Lower Class: 400
- Urban Educated: 200
- (SC): 150
- (ST): 150

Prevalence of Anemia:

The prevalence of anemia was determined by measuring hemoglobin levels, with levels below 12 g/dL indicating anemia. The prevalence of anemia was calculated for each social group.

Social Group	Total Participants	Anemia Prevalence (%)
Urban Middle Class	300	18.3
Rural Lower Class	400	35.0
Urban Educated	200	12.5
Scheduled Caste	150	28.7
Scheduled Tribe	150	42.0



Graph 1. A bar graph illustrating the prevalence of anemia among reproductive women in different social groups in India:

V. CONCLUSION

In conclusion, the prevalence of anemia among reproductive women in India reflects a multifaceted challenge influenced by various social, economic, and cultural factors. While progress has been made in addressing anemia through governmental programs and interventions, significant disparities persist across different social groups. The findings underscore the need for tailored strategies that consider the unique circumstances and challenges faced by women belonging to marginalized communities, including those in rural areas, lower socioeconomic strata, and tribal populations. Such strategies should encompass not only the provision of iron supplementation and fortified foods but also broader initiatives aimed at improving access to healthcare, education, and economic opportunities.Moreover, addressing the root causes of anemia requires a holistic approach that integrates health interventions with efforts to tackle poverty, gender inequality, and inadequate sanitation and hygiene practices. Empowering women through education and economic empowerment can play a crucial role in enhancing their ability to make informed decisions about their health and nutrition. Getting community leaders, healthcare workers, and women themselves involved in community-based interventions can help spread the word about how important it is to eat well and take iron supplements, as well as bust myths and false beliefs. To successfully treat anemia in reproductive women, it is also important to improve the infrastructure of healthcare and make sure that high-quality healthcare services are available, especially in areas that are hard to reach or don't have enough of them. This includes training healthcare workers, making it easier to diagnose problems, and setting up strong tracking and evaluation systems to see how things are going and find places where they can be improved.

REFERENCES

[1] Derose KP, Gresenz CR, Ringel JS. Understanding disparities in health care access—and reducing them—through a focus on public health. Health Affairs. 2011 Oct 1; 30(10):1844–51. https://doi.org/10. 1377/hlthaff.2011.0644 PMID: 21976325

[2] World Bank The World Bank Annual Report 2013. The World Bank 2013.

[3] Yadav S, Arokiasamy P. Understanding epidemiological transition in India. Global health action. 2014 Dec 1; 7(1):23248. https://doi.org/10.3402/gha.v7.23248 PMID: 24848651

[4] Index, G. H. 2021 Global Hunger Index: hunger anf Food System in Conflict Setting. Bonn/ Dublin 2021.

[5] Swinnen J, Arndt C, Vos R. Climate change and food systems: Transforming food systems for adaptation, mitigation, and resilience. IFPRI book chapters. 2022:6–15.

[6] Mehrotra S. Child malnutrition and gender discrimination in South Asia. Economic and Political Weekly. 2006 Mar 11:912–8.

[7] Sivakumar M. Gender discrimination and women's development in India. Munich Personal RePEc Archive.

[8] Basu AM. Women's roles and gender gap in health and survival. Economic and Political Weekly. 1993 Oct 23:2356–62.

[9] Ghosh S. Discrimination all the way. Health for the Millions. 1991; 17(2):19–23. PMID: 12283901

[10] Balarajan YS, Fawzi WW, Subramanian SV. Changing patterns of social inequalities in anaemia among women in India: cross-sectional study using nationally representative data. BMJ open. 2013 Jan 1; 3(3): e002233. https://doi.org/10.1136/bmjopen-2012-002233 PMID: 23516270

[11] Bentley ME, Griffiths PL. The burden of anemia among women in India. European journal of clinical nutrition. 2003 Jan; 57(1):52–60. https://doi.org/10.1038/sj.ejcn.1601504 PMID: 12548297

[12] World Health Organization. Groups of Experts on Nutritional Anemia. Technical Report Series. Geneva: WHO; p. 4–37 1986.

[13] Indian Council of Medical Research. Evaluation of the national nutritional anaemia prophylaxis programme–An ICMR Task Force Study. New Delhi: ICMR 1989.

[14] World Health Organization. Hemoglobin concentrations for the diagnosis of anemia and assessment of severity. Geneva: Switzerland 2011. https://www.who.int/vmnis/indicators/haemoglobin/en/.

[15] World Health Organization Focusing on anaemia: towards an integrated approach for effective anemia control. Joint statement by the World Health Organization and the United Nations Children's Fund 2004.

[16] 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 nutrition. 2009 Apr; 12(4):444– 54. https://doi.org/10.1017/S1368980008002401 PMID: 18498676

[17] World Health Organization. Global Anemia estimates 2021 edition. Geneva, Switzerland 2020: Author. https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children#:~:text= Summary%20findings&text=In%202019%2C%20global%20anaemia%20prevalence,women%20aged %2015%2D49%20years.

[18] Camaschella C. Iron-deficiency anemia. New England journal of medicine. 2015 May 7; 372(19):1832– 43. https://doi.org/10.1056/NEJMra1401038 PMID: 25946282

[19] Dugdale M. Anemia. Obstetrics and gynecology clinics of North America. 2001 Jun 1; 28(2):363–82.

[20] Bhutta ZA, Gupta I, de'Silva H, Manandhar D, Awasthi S, Hossain SM, et al. Maternal and child health: is South Asia ready for change?. Bmj. 2004 Apr 1; 328(7443):816–9. https://doi.org/10.1136/bmj.328. 7443.816 PMID: 15070640

[21] Prasanth R. Prevalence of anemia in both developing and developed countries around the world. World J Anemia. 2017 Apr; 1(2):40–3.

[22] Siddiqui MZ, Goli S, Reja T, Doshi R, Chakravorty S, Tiwari C, et al. Prevalence of anemia and its determinants among pregnant, lactating, and nonpregnant nonlactating women in India. Sage Open. 2017 Aug; 7(3):2158244017725555.

[23] Goli S, Doshi R, Perianayagam A. Pathways of economic inequalities in maternal and child health in urban India: a decomposition analysis. PloS one. 2013 Mar 29; 8(3):e58573. https://doi.org/10.1371/ journal.pone.0058573 PMID: 23555587

[24] Adamu AL, Crampin A, Kayuni N, Amberbir A, Koole O, Phiri A, et al. Prevalence and risk factors for anemia severity and type in Malawian men and women: urban and rural differences. Population health metrics. 2017 Dec; 15(1):1–5.

[25] Ma AG, Schouten E, Wang Y, Xu RX, Zheng MC, Li Y, et al. Anemia prevalence among pregnant women and birth weight in five areas in China. Medical Principles and Practice. 2009; 18(5):368–72. https://doi.org/10.1159/000226290 PMID: 19648759

[26] Gupta S, Pingali P, Pinstrup-Andersen P. Women's empowerment and nutrition status: The case of iron deficiency in India. Food Policy. 2019 Oct 1; 88:101763.

[27] Lebso M, Anato A, Loha E. Prevalence of anemia and associated factors among pregnant women in Southern Ethiopia: A community based cross-sectional study. PloS one. 2017 Dec 11; 12(12): e0188783. https://doi.org/10.1371/journal.pone.0188783 PMID: 29228009.

[28] Ivoke N, Eyo EE, Ivoke ON, Nwani CD, Odu EC, Asogha CN. Anaemia prevalence and associated factors among women attending antenatal clinics in South-Western Ebonyi State, Nigeria. International Journal of Medicine and Medical Sciences. 2013; 46(4):1354.

[29] Harding KL, Aguayo VM, Namirembe G, Webb P. Determinants of anemia among women and children in Nepal and Pakistan: An analysis of recent national survey data. Maternal & child nutrition. 2018 Nov; 14:e12478. https://doi.org/10.1111/mcn.12478 PMID: 28857410

[30] Rana MJ, Goli S. The returns of family planning: Macro-level assessment of the effect of contraceptive use on women's anaemia and childhood undernutrition. Journal of Biosocial Science. 2017 Nov; 49 (6):773–91. https://doi.org/10.1017/S0021932016000717 PMID: 28031055

[31] Gautam S, Min H, Kim H, Jeong HS. Determining factors for the prevalence of anemia in women of reproductive age in Nepal: Evidence from recent national survey data. PloS one. 2019 Jun 12; 14(6): e0218288. https://doi.org/10.1371/journal.pone.0218288 PMID: 31188883

[32] Bharati S, Pal M, Som S, Bharati P. Temporal trend of anemia among reproductive-aged women in India. Asia Pacific Journal of Public Health. 2015 Mar; 27(2):NP1193–207. https://doi.org/10.1177/ 1010539512442567 PMID: 22500033

[33] Abel R, Rajaratnam J, Kalaimani A, Kirubakaran S. Can iron status be improved in each of the three trimesters? A community-based study. European Journal of Clinical Nutrition. 2000 Jun; 54(6):490–3. https://doi.org/10.1038/sj.ejcn.1601044 PMID: 10878651

[34] Government of India (GOI). 2011 Census of India. India: Office of the Registrar General & Census Commissioner, Ministry of Home Affairs, India 2011.

[35] Coe CL, Lubach GR, Shirtcliff EA. Maternal stress during pregnancy predisposes for iron deficiency in infant monkeys impacting innate immunity. Pediatric Research. 2007 May; 61(5):520–4. https://doi.org/ 10.1203/pdr.0b013e318045be53 PMID: 17413860

[36] Subramanian SV, Nandy S, Irving M, Gordon D, Lambert H, Davey Smith G. The mortality divide in India: the differential contributions of gender, caste, and standard of living across the life course. American Journal of Public Health. 2006 May; 96(5):818–25. https://doi.org/10.2105/AJPH.2004.060103 PMID: 16571702

[37] . Alam A., Khan A., Ghosal N., & Satpati L. (2021). A review of resource management and self-reliance for sustainable development of India under COVID-19 scenario. Journal of Public Affairs, 21(4), e2725. https://doi.org/10.1002/pa.2725 PMID: 34512186

[38] Alam A., Rukhsana, Ghosal N. (2021). Dietary Diversity Is Associated with Child Nutrition and Food Security Status: Empirical Evidence from Rural India. In: Rukhsana, Alam A. (eds) Agriculture, Food and Nutrition Security. Springer, Cham.

[39] Dim, C. C., & Onah, H. E. (2007). The prevalence of anemia among pregnant women at booking in Enugu, South Eastern Nigeria. *Medscape general medicine*, *9*(3), 11.

[40] Abd Rahman, R., Idris, I. B., Isa, Z. M., Rahman, R. A., & Mahdy, Z. A. (2022). The prevalence and risk factors of iron deficiency anemia among pregnant women in Malaysia: a systematic review. *Frontiers in nutrition*, *9*, 847693.

[41] Sharma, S., Kaur, S. P., & Lata, G. (2020). Anemia in pregnancy is still a public health problem: A single center study with review of literature. *Indian Journal of Hematology and Blood Transfusion*, *36*(1), 129-134.