“A Cross-Sectional Analytical Study on Prevalence of Anaemia at Reproductive Age-group in India: In Perspective of Sex and Region”

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By

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Declaration:

I, do hereby declare that the study report entitled "**A cross-sectional analytical Study on Prevalence of Anaemia at reproductive age-group in India: In Perspective of gender and region"** is a record of original and individual Research work undertaken by me as an intern of the Summer-Internship Programme under Ministry of Statistics and Programme Implementation (MOSPI) at All India Institute of Hygiene and Public Health(AIIH&PH), under the supervision of Dr, Shampa Mukherjee (Kundu) and our honourable Nodal Officer Shri. Rajib Priyadarshi (Department of Statistics-AIIH&PH),in 2025.

It is also to mention that the work presented for assessment in this report is my own, based on authorized information collected by myself from reliable sources. I hereby confirm the originality of the work and that my debts (for words, data, arguments, and ideas) have been appropriately acknowledged.

PLACE:- KOLKATA SIGNATURE OF CANDIDATE

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(UNDER MOSPI, at AIIH&PH)

Certification:

This is certify that this Research work submitted by Swati Mondal , entitled **"A Cross-Sectional Analytical Study on Prevalence of Anaemia at reproductive age-group in India: In Perspective of gender and region"** as a study report for Summer-Internship Scheme under the Ministry of Statistics and Programme Implementation(MOSPI) at All India Institute of Hygiene and Public Health(AIIH&PH, MOH&FW), is a record of original and individual work carried out by her during the session 2025-2026 under my supervision and guidance.

I hereby confirm the originality of the Research work and all help received by her from various authorized and reliable sources have been duly acknowledged at the end of this research paper.

She is permitted to place her report for presentation and submission at MOSPI.

PLACE:- KOLKATA

DATE: SIGNATURE OF NODAL OFFICER

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Abstract:

Anaemia is a widespread nutritional disorder that significantly affects individuals in the reproductive age group, particularly women. This study aims to assess the prevalence of anaemia among men and women aged 15–49 years in India using data from the National Family Health Survey (NFHS-5). The present study found that anemia prevalence in India is 57.0% among women (15–49 years) and 25.0% among men. Rural populations exhibit higher anemia rates than urban ones, with Ladakh recording the highest prevalence (women 92.8%, men 75.6%) and Lakshadweep the lowest (women 36.3%, men 5.6%). Non-pregnant women show higher prevalence than pregnant women in most states. Moderate anemia is most common, peaking at 30.1% in women aged 15–19, while mild anemia remains around 25–26% across age groups and severe anemia increases slightly with age. Socio-demographic factors such as education, income, and sanitation show strong associations with anemia, with higher literacy and better sanitation linked to lower prevalence. In West Bengal, anemia prevalence exceeds the national average across most groups, with rural areas (women 74.4%, men 42.5%) worse than urban (women 65.1%, men 31%). Non-pregnant women, especially in districts like Jalpaiguri and South 24 Parganas, face significantly higher anemia rates, emphasizing the need for targeted interventions.

Keywords: Anaemia, Reproductive Age, Gender Disparity, Regional Variation, NFHS-5, India, Public Health, Nutritional Deficiency

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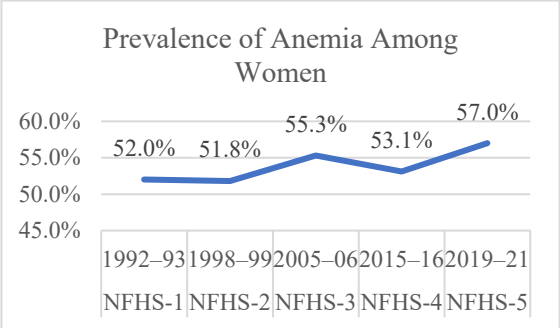
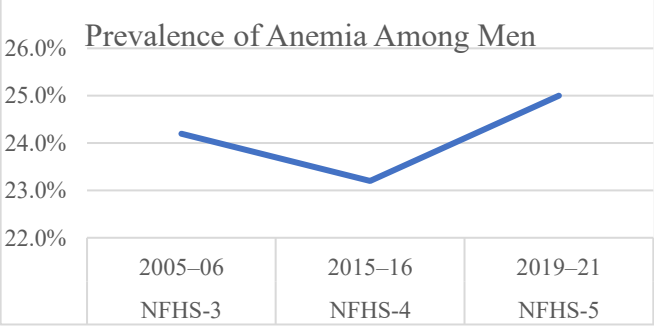
Introduction

Anemia is a condition in which the number of red blood cells or the hemoglobin concentration within them is lower than normal, leading to reduced oxygen-carrying capacity of the blood. It is one of the most widespread public health problems in India, particularly affecting **women of reproductive age**, **pregnant women**, and **children**.

According to the **National Family Health Survey (NFHS-4)** conducted in **2015-16**, anemia remained a major public health issue in India, affecting both men and women, though women were disproportionately impacted. Among **women aged 15–49 years**, about **53%** were found to be anemic, while **23.2%** of **men** in the same age group suffered from the condition. The situation was particularly concerning among **pregnant women**, where **50.3%** were anemic. Anemia was more prevalent in **rural areas** and among **poorer socio-economic groups**, and certain states like **Bihar, Jharkhand, Madhya Pradesh, and West Bengal** reported higher prevalence.
The major **reasons** for anemia include **iron deficiency**, **poor dietary intake**, **frequent pregnancies without adequate spacing**, **heavy menstrual bleeding**, **parasitic infections (like hookworm)**, and **lack of access to iron-rich food** or healthcare. In men, factors like **poor nutrition**, **chronic infections**, and **lifestyle choices** may contribute to anemia.

The prevalence of anemia among women aged 15–49 in India has remained persistently high across NFHS rounds, rising from **52.0% in NFHS-1** to **57.0% in NFHS-5**. Although there was a slight decline in NFHS-4, the overall trend is **increasing**. This indicates no progress in reducing anemia among women over the decades, even worsen.





From the available data (from NFHS-3 to 5), we can see that, **men aged 15–49** in India has remained relatively **stable but high**, with a slight decrease from **24.2% in NFHS-3** to **23.2% in NFHS-4**, followed by a **rise to 25.0% in NFHS-5**.

Every year in India, many anemic mothers give birth to anemic children, creating an intergenerational cycle of poor health. Maternal anemia during pregnancy is strongly linked to neonatal and childhood anemia as well as low birth weight. Evidence from a nationally representative survey confirms that maternal anemia significantly increases the risk of anemia in children (Kumar et al., 2024).

Rationale

Anemia remains a major public health issue in India over the decades, disproportionately affecting women and Men. Despite efforts like Anemia Mukt Bharat, NFHS-5 reports show rising anemia rates across the country. Over 57% of women and 25% of men are anemic, highlighting persistent gender inequalities. While many national level studies exist (e.g., Pasricha et al., 2020), few have explored district-level variation in depth. This project fills that gap by using NFHS-5 data to analyze regional and gender-specific patterns in India.

Objectives:

1. To find out the prevalence of anaemia among men and women at Reproductive age-group across different States, Regions and Area of Residence in India .
2. To assess sex-wise distribution of anaemia with respect to severity .
3. To identify the association, if any, among Prevalence of anaemia and different Socio demographic factors over the districts in India.
4. To analyse the district-level variability of Prevalence of Anaemia in West Bengal.

Literature Review:

1. IIPS & ICF (2021) – National Family Health Survey-5

The NFHS-5 (2019–21), conducted by IIPS and ICF, reveals a sharp rise in anemia: 57% of women (15–49) and 25% of men (15–54) in India are anemic. This marks a worrying increase from NFHS-4, especially among women. The data show higher prevalence in rural areas, less educated women, and marginalized communities. With district-level details, NFHS-5 aids in targeted policy planning and evaluating programs like Anemia Mukt Bharat. It also captures critical variables like diet, maternal health, and sanitation, making it essential for analyzing anemia's root causes. The survey strongly supports this project's regional focus, particularly in West Bengal.

2.Singh et al. (2020):

Singh et al. examined gender and regional disparities in anemia using data from NFHS-4 and found that anemia remains highly prevalent among Indian women (53%) and men (23%). The study linked anemia to low educational attainment, poor wealth status, and inadequate health service access. Regional variation showed that eastern and central states reported higher prevalence. The authors highlighted the role of social determinants in driving anemia rates. They argued for multi-sectoral policies addressing education, nutrition, and health infrastructure. Their analysis called for region-specific strategies to reduce anemia burden.

3.Gupta et al. (2019)

Gupta et al. (2019) reveal that anemia is not limited to poor households but is also common among wealthier groups due to poor dietary habits and lack of nutrition awareness. Their study shows that factors like vegetarian diets, tea/coffee consumption with meals, and limited food diversity contribute to anemia even in urban, affluent settings. This challenges the belief that income alone ensures good nutrition. The authors stress the need for universal nutrition education, including health literacy through mass media and community outreach. Their findings highlight the importance of behavioral factors in anemia, making it relevant for region-specific interventions**.**

4.Ministry of Health and Family Welfare (2018) – Anemia Mukt Bharat

Launched in 2018, Anemia Mukt Bharat (AMB) aimed to reduce anemia by 3% annually through a 6x6x6 strategy—covering six target groups, six interventions (like iron-folic acid supplementation, deworming), and six institutional mechanisms. Though well-designed, AMB faced challenges such as poor supply chains, low community awareness, and weak interdepartmental coordination. Evaluations showed mixed

outcomes, with states like West Bengal reporting coverage gaps and low compliance. Despite this, AMB marked a major shift in policy by addressing anemia through a life-cycle and multi-sectoral approach, supporting regional-level research and planning.

5.Kaur, Manchanda, and Bassi (2018)

Kaur, Manchanda, and Bassi (2018), using NFHS-4 data, found that women from SC/ST groups, rural areas, and low-income households faced higher anemia risks due to poor healthcare access, sanitation, and awareness. The study showed education was inversely related to anemia, highlighting the role of women's empowerment. Significant state-level disparities were linked to differences in infrastructure, public health delivery, and diet. While some states improved through strong maternal programs, others lagged with high anemia rates. The study criticized the uneven implementation of schemes like the Iron Plus Initiative. Its findings support this project's district-level analysis in West Bengal.

6.Yadav et al. (2018):

Yadav and colleagues focused on working adult men in rural Uttar Pradesh, finding that over 30% of men had mild to moderate anemia. The causes included poor dietary diversity, tobacco use, and physically demanding labor with insufficient nutritional intake. The study stressed that men are often overlooked in anemia programs. It recommended that workplace-based nutritional support and education could help address this gap. The authors emphasized integrating men into national anemia programs. Their work highlighted the need for gender-inclusive approaches in anemia control.

7.Rawat et al. (2017):

Rawat et al. analyzed anemia trends among pregnant and non-pregnant women in India and found consistently high anemia levels despite multiple national programs. The study identified iron deficiency, poor antenatal care, and low compliance with supplements as key issues. It noted that pregnant women in rural and low-income settings were most vulnerable. Rawat called for improved health system delivery, better counseling, and follow-up mechanisms. The research stressed that supplementation alone is insufficient without behavior change. This work contributed to evidence supporting more holistic intervention designs.

8. Pasricha et al. (2014)

Pasricha et al. (2014) highlighted iron deficiency as the leading cause of anemia in India, especially among children and women of reproductive age. They linked anemia to low dietary iron, frequent infections, and poor sanitation, emphasizing that

supplementation alone is insufficient. The study called for multi-pronged strategies, including dietary changes, deworming, and infection control. It criticized over-reliance on iron-folic acid tablets without strong community engagement. Low intervention uptake in rural and underserved areas was also noted. This biomedical perspective supports the need for localized, integrated approaches in projects like this one.

9. Bentley and Griffiths (2003)

Bentley and Griffiths (2003) emphasized that anemia among Indian women stems not just from nutrition, but from biological vulnerability and gender-based inequalities. Factors like menstruation, pregnancy, and socio-cultural norms limit women's access to iron-rich food. The study noted that household food distribution often favors men and children, leading to chronic undernutrition in women. It also highlighted poor access to maternal health services, especially in rural areas. Their work shifted focus from clinical to gender-sensitive approaches, stressing the need for holistic, equity-based anemia interventions. This perspective remains vital for guiding this project.

Methodology:

1.Study population:

The study population comprises adolescents and adults aged 15–49 years, as defined by the NFHS-5 (2019–21) **)** conducted by the **Ministry of Health and Family Welfare, Government of India**. Both men and women within this reproductive age group were included. For women, the analysis considered both pregnant &non-pregnant.

2. **Study sample:**

The study sample is based on NFHS-5 (2019–21), which covered all 36 states/UTs and 707 districts across India. For this project, data were analyzed from both national and state levels, with a focus on West Bengal comprising 23 districts. The sample includes men and women aged 15–49 years to assess the prevalence of anemia. In NFHS-5, a total of **724,115 women (15–49 years)** were surveyed, of whom **690,153** were included in anemia analyses, hile among men **101,839 (15–54 years)** were assessed for hemoglobin levels.

3. **Data and variables:**

The study is based on the National Family Health Survey-5 (NFHS-5), conducted during 2019–21 by the Ministry of Health and Family Welfare, Government of India. Key variables analyzed include anemia status (based on hemoglobin levels), age, sex,pregnancy status, BMI, literacy, years of schooling, family planning methods, access to improved drinking water, and sanitation facilities. The NFHS-5 dataset is publicly available at: https://dhsprogram.com/data/dataset/India_Standard-DHS_2020.cfm?flag=1.

4.Definition:

- **Anemia**: According to the National Family Health Survey-5 (NFHS-5, 2019–21), **anemia** is defined as a condition in which an individual has **lower-than-normal levels of hemoglobin** in the blood, affecting the oxygen-carrying capacity hemoglobin values are **adjusted for altitude and smoking status** to ensure accuracy. According to NFHS-5, classification of Anemia is given below:
  Table-1: Acorrding to NFHS-5 , classification of Anemia

Group	Mild Anemia (g/dL)	Moderate Anemia (g/dL)	Severe Anemia (g/dL)
Non-pregnant women	11.0 – 11.9	8.0 – 10.9	< 8.0
Pregnant women	10.0 – 10.9	7.0 – 9.9	< 7.0
Men	11.0 – 12.9	8.0 – 10.9	< 8.0

- **BMI (Below Normal):** In NFHS-5, BMI below normal refers to adults with a Body Mass Index less than 18.5 kg/m², indicating they are underweight. This suggests inadequate nutrition or low body fat and muscle mass.
- **BMI (Above Normal):** BMI above normal refers to adults with a Body Mass Index of 25 kg/m² or higher, indicating overweight or obesity. This reflects excess body fat, which may increase the risk of lifestyle-related diseases.
- **Wealth quantile**: In NFHS-5 (2019–21), wealth quintiles are used to classify households into five socio-economic groups based on their standard of living. This is not based on income or expenditure but on a wealth index calculated using household assets and living conditions.
  Once the wealth index score is computed, all households are ranked and divided into five equal groups (each representing 20% of the population)
  Table 2: Acorrding to NFHS-5, classification of Wealth Quintile

Wealth Quintile	Description
Lowest (Poorest)	Bottom 20% of households
Second	Next 20% of households
Middle	Middle 20% of households
Fourth	Next 20% of households
Highest (Richest)	Top 20% of households

- **Improved Drinking Water:** In NFHS-5, this refers to water from sources protected from outside contamination, such as piped water, public taps, tube wells, boreholes, protected wells, protected springs, and rainwater.
- **Improved Sanitation Facility:** This refers to sanitation systems that hygienically separate human waste from contact, such as flush/pour flush toilets connected to sewer systems, septic tanks, or pit latrines, and ventilated improved pit latrines.

5.**Study type:**

This study is a cross-sectional analytical study using secondary data from NFHS-5 (2019–21).

Data Preparation and Tools Used:

- Raw data on anemia prevalence by gender and state/UT was extracted from NFHS-5 factsheets and organized in Microsoft Excel. Regional classifications (North, South, East, West, Central, Northeast) were added.
- The data was cleaned by filtering relevant variables including gender, anemia status (mild/moderate/severe), and socioeconomic factors such as wealth index, education, marital status, and residence (urban/rural).

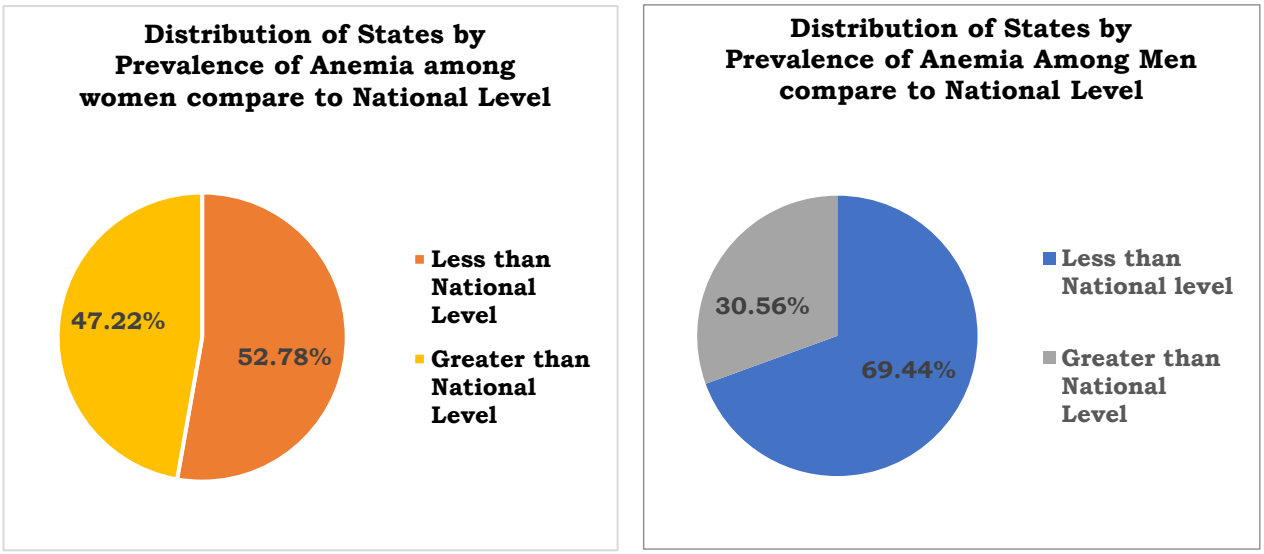
- Visual analysis was performed using **Excel and R software.** Multiple bar diagrams were created to show region-wise and urban–rural-wise anemia prevalence. A population pyramid illustrated gender-wise distribution, while a comparative chart highlighted differences in anemia prevalence between pregnant and non-pregnant women.
- **R software** was used to carry out chi-square tests to examine associations between anemia and variables like wealth quintile, education, residence, marital status, age-group, smoking status, caste, and religion. These tests helped determine significant relationships between sociodemographic indicators and anemia prevalence.
- **Jamovi** software was additionally used for performing descriptive statistics and generating basic summary tables. It provided an accessible platform for exploring variable distributions, cross-tabulations, and supporting the interpretation of findings obtained from R and Excel analyses.

Results and Findings:

According to NFHS-5 (2019–21), the prevalence of anemia among women (15–49 years) in India is 57.0%, while among men (15–49 years) it is 25.0%. Among women, 19 states (52.78%) had anemia prevalence below the National Level, while 17 states (47.22%) were above it. For men, 25 states (69.44%) recorded anemia prevalence below the national level, and 11 states (30.56%) were above among 36 states. These patterns reveal that anemia among men is more evenly distributed across states, whereas for women, a greater number of states are performing better than the National Level. The NFHS-5 data shows that non-pregnant women have a higher prevalence of anemia compared to pregnant women, Possibly due to pregnant women are routinely provided **iron and folic acid (IFA) supplementation** under government programs such as the Anemia Mukt Bharat initiative, along with more frequent health checkups.

Graphical Representation:

Fig-1: Distribution of States by Prevalence of Anemia Compared to National Level (Men vs Women)



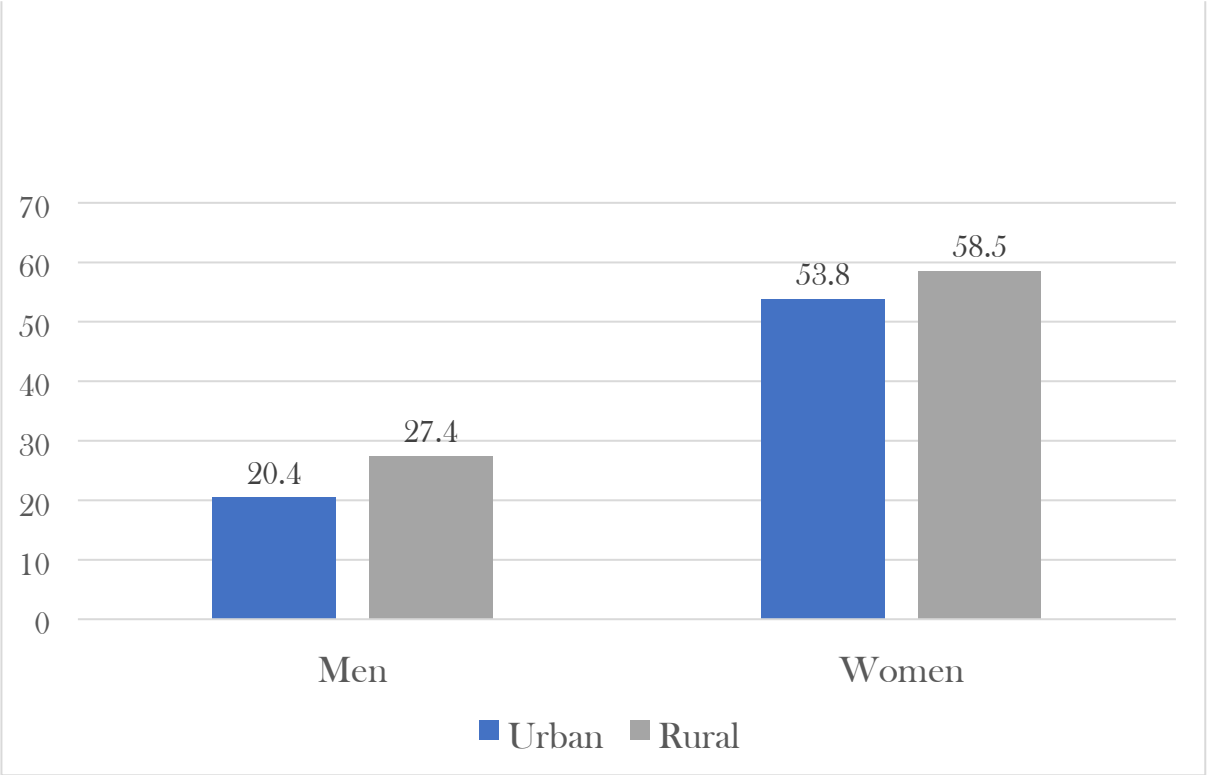
Interpretation:

The Pie charts shows that among **women (15–49 years)**, **52.78% of states and UTs** have prevalence of Anemia **below the national average (57.0%)**, while **47.22% are above** it. This suggests a near-even distribution, with slightly more than half performing better than the national benchmark.

In contrast, for **men (15–49 years)**, **69.44% of states and UTs** report Prevalence of Anemia **below the national average (25.0%)**, and only **30.56% are above**. This reflects a more favorable situation for men, with the majority of states showing relatively lower anemia prevalence.

Overall, anemia is more widespread and severe among women, and state-level disparities are more balanced in women than in men, where most states perform better than the national average.

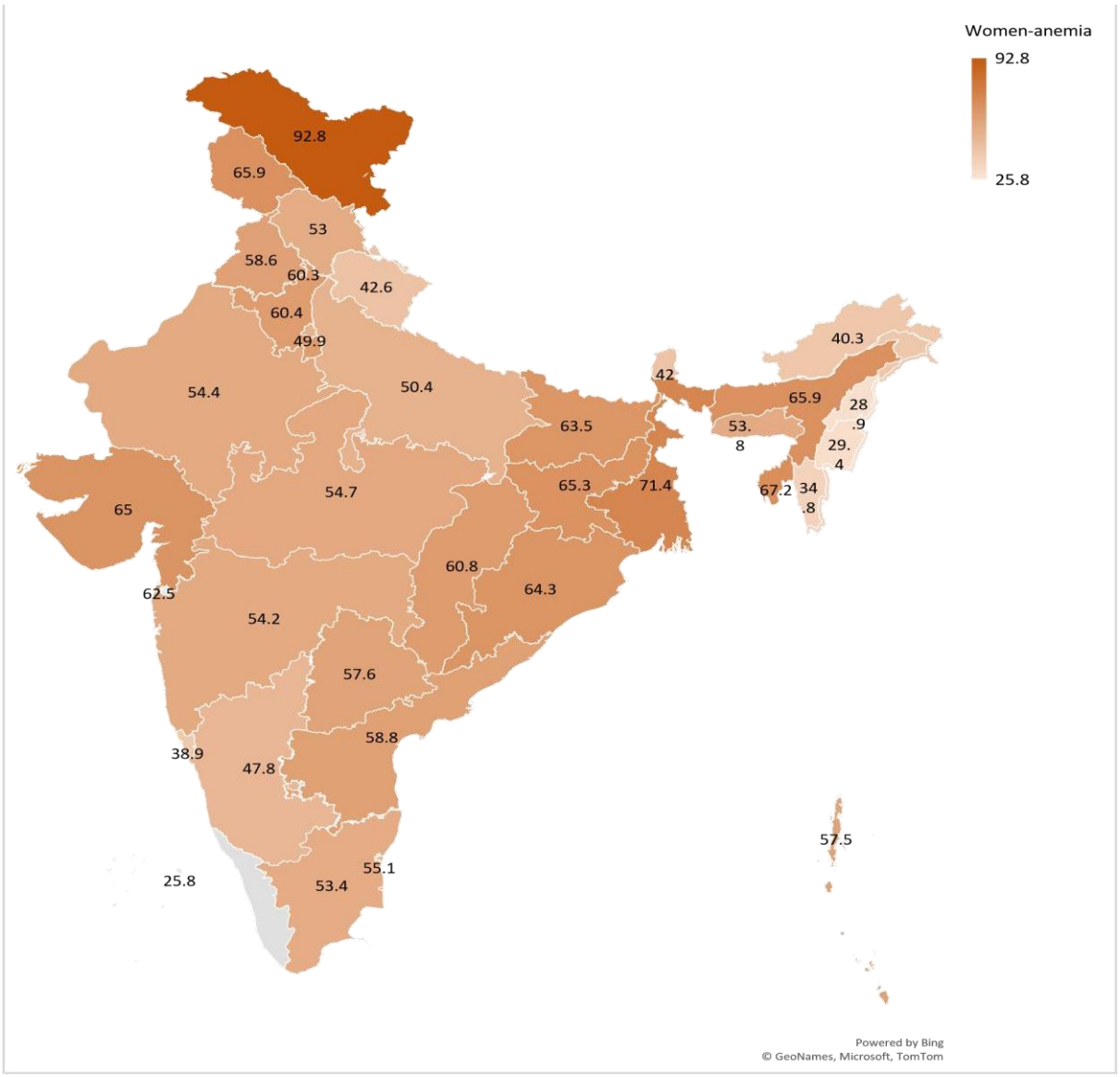
Fig2: Bar diagram showing Prevalence of Anemia by residence and gender in: India



Interpretation:

The chart illustrates the prevalence of anemia in India based on gender and place of residence. It clearly shows that anemia is more prevalent among **rural populations** compared to **urban populations**, for both men and women. Additionally, **women consistently show a higher burden of anemia than men**, regardless of their place of residence. Specifically, rural women have the highest prevalence (58.5%), followed by urban women (53.8%), rural men (27.4%), and urban men (20.4%). This highlights the dual impact of both **gender and rural disadvantage** in the anemia burden, indicating the need for targeted public health interventions in rural areas and among women to reduce this persistent health disparity.

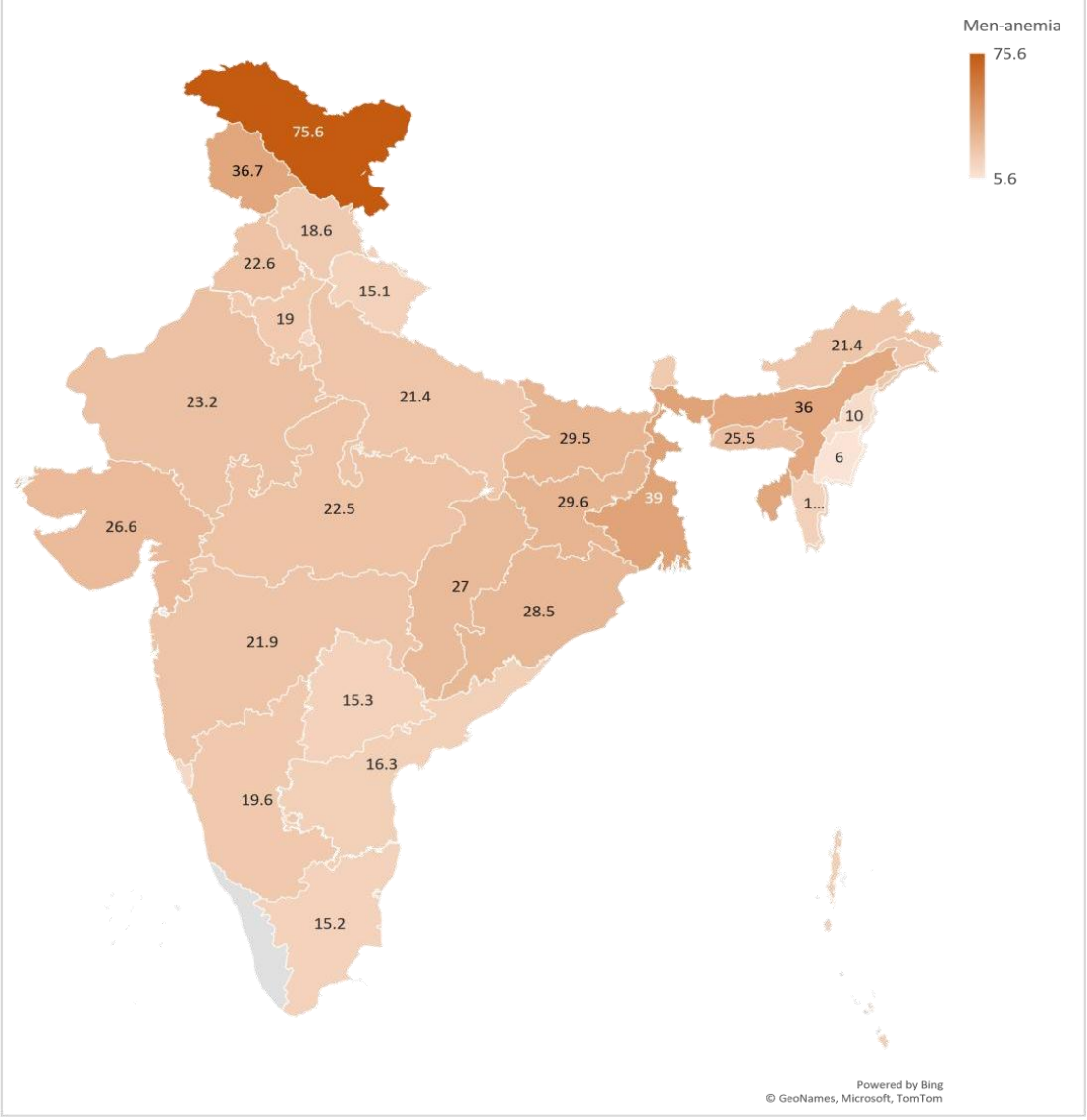
Fig-3: Spot chart showing Prevalence of Anemia among Women In India



Interpretation:

The map depicts the state-wise prevalence of anemia among women in India. A striking variation is observed across the country, with the highest burden reported in **Ladakh (92.8%)**, followed by **jammu&kasmir (65.9%)**, **West Bengal (71.4%)**, and **Tripura (65.9%)**. States like **Kerala (28%)**, **Mizoram (29.6%)**, **Manipur (34%)**, and **Nagaland (34.8%)** exhibit comparatively lower prevalence rates. Central and eastern states such as **Chhattisgarh (63.5%)**, **Jharkhand (60.4%)**, and **Odisha (64.3%)** also show high anemia levels, highlighting regional disparities. Overall, the map reveals a concerning pattern, with many northern, central, and eastern states showing anemia prevalence above 60%, pointing towards the urgent need for targeted public health interventions in these areas.

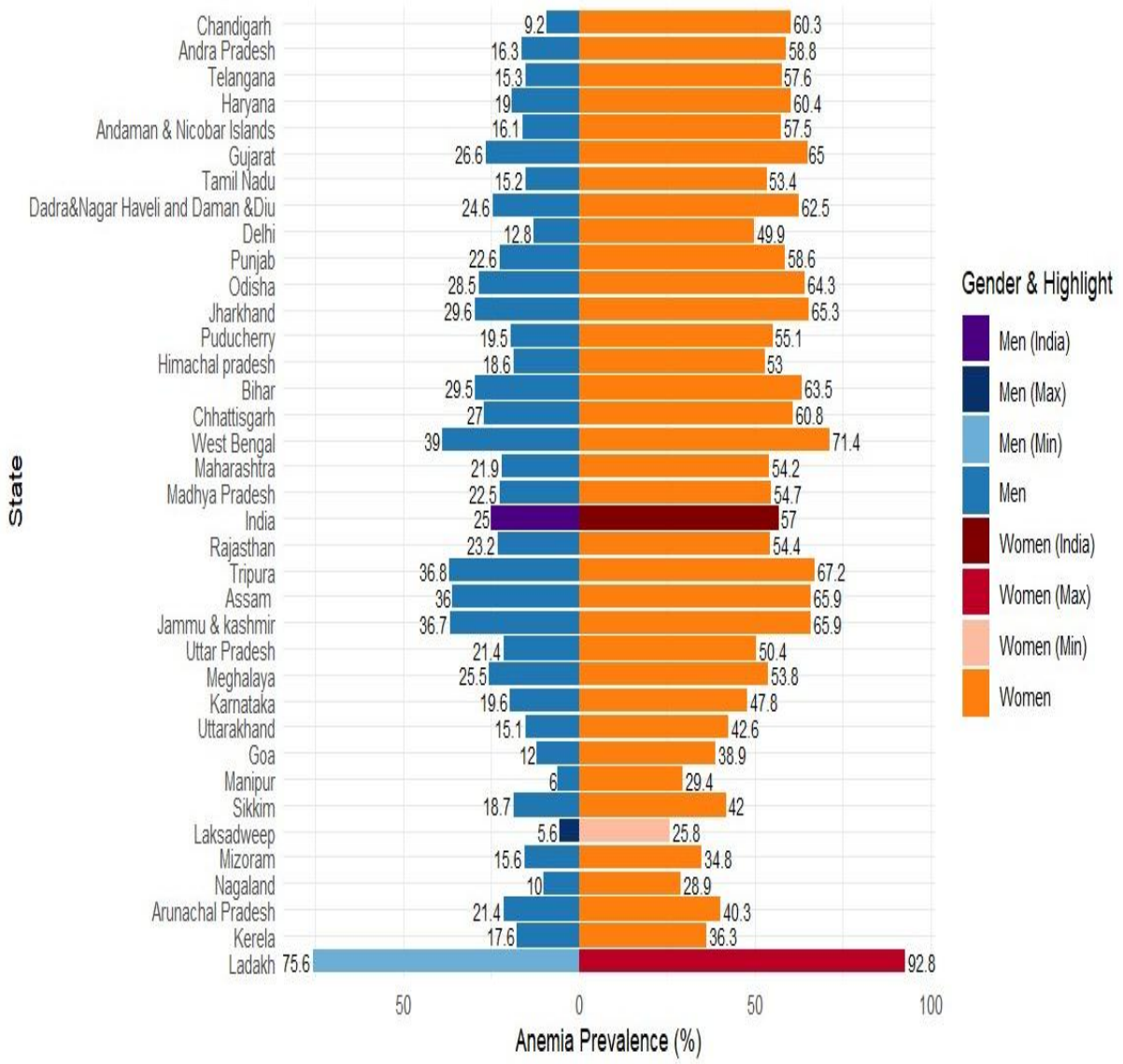
Fig-4: Spot chart showing Prevalence of Anemia among Men in India



Interpretation:

The map shows the geographical distribution of anaemia among men across Indian states, revealing notable regional disparities. **Ladakh** reports the highest prevalence at **75.6%**, which is significantly higher than all other states. In contrast, northeastern states like **Nagaland (6%)** and **Mizoram (10%)** have the lowest rates. Other high-prevalence states include **West**
Bengal (39%), **Assam (36%)**, and **Jammu & Kashmir (36.7%)**. Southern states such as **Kerala (15.2%)**, **Tamil Nadu (16.3%)**, and **Telangana (15.3%)** show relatively low anaemia prevalence. Overall, anaemia among men is generally lower compared to women, but regions like Ladakh and parts of the East and Northeast show significant vulnerability among men.

Fig-5: Population Pyramid showing Prevalence of Anemia by States across India



Interpretation:

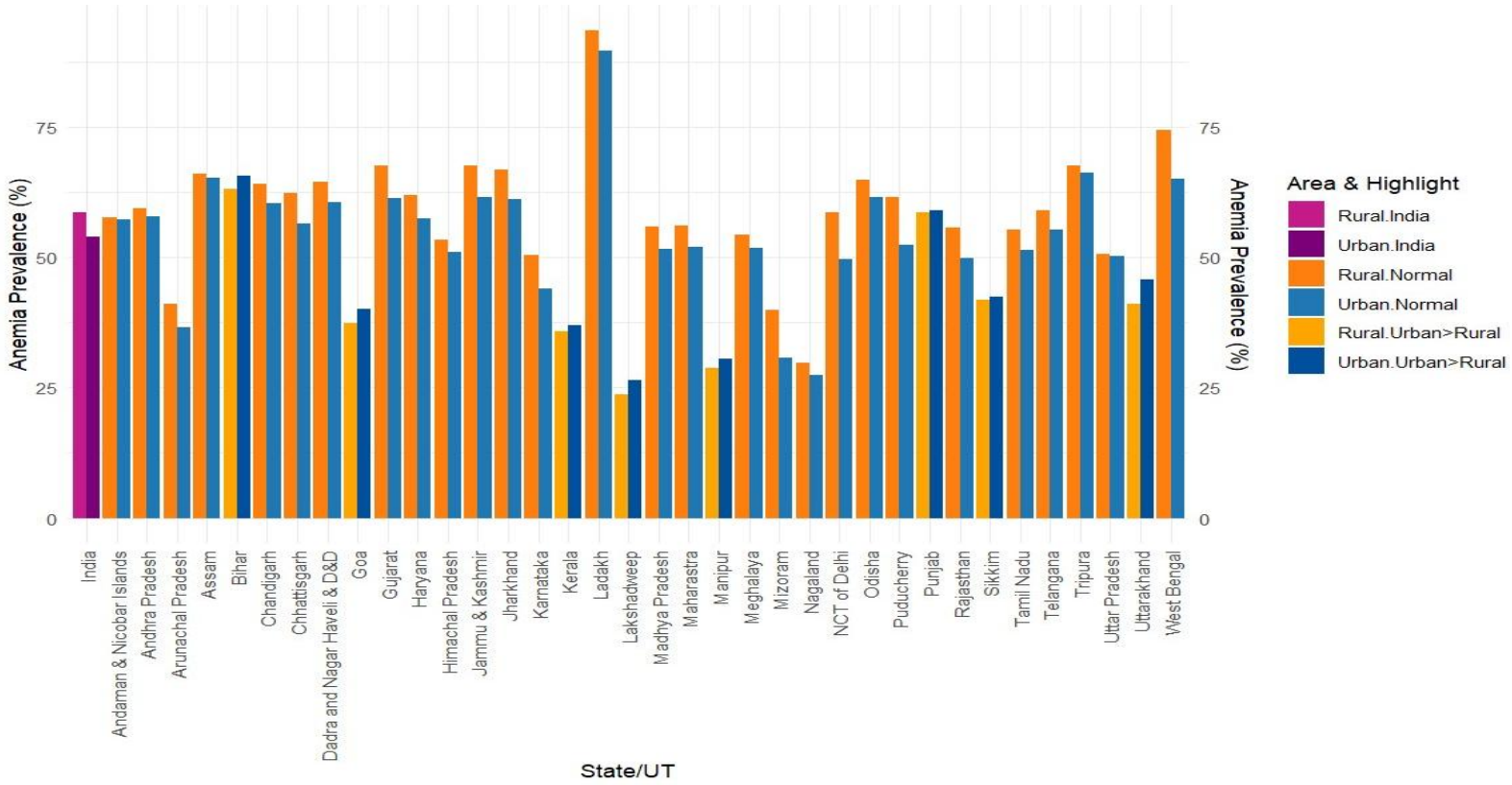
population pyramid chart presents a comprehensive view of anemia prevalence among men and women across different Indian states. It clearly reflects a significant gender disparity, with women consistently exhibiting higher anemia prevalence than men in every state. The national average for women stands at 57%, while for men it is much lower at 25%, underlining the disproportionate burden borne by women.

Among the states, Ladakh displays an exceptionally high anemia prevalence for both genders, with women at 92.8%—the highest in the country—and men at 75.6%, also the highest among males. In stark contrast, Lakshadweep has the lowest prevalence among women at 36.3%, and Lakshadweep reports the lowest among men at just 5.6%,

indicating regional variations that could stem from differences in diet, health services, education, and socio-economic conditions.

Several other states like Bihar, Jharkhand, and West Bengal also show very high anemia levels in women, all exceeding 60%. Meanwhile, states such as Delhi, Chandigarh, and Goa report relatively low anemia prevalence among both men and women. Interestingly, even in states where male anemia rates are relatively low, female rates remain substantially higher, suggesting systemic nutritional and health access issues affecting women more s

Fig-6: Prevalence of Anemia Among Women by area of residence across India



Interpretation:

The bar chart displays the prevalence of anemia among women across Indian states and union territories, disaggregated by area of residence (Urban vs Rural). The color-coded bars help highlight differences in anemia prevalence between urban and rural areas in each state, along with national averages for both rural and urban India.

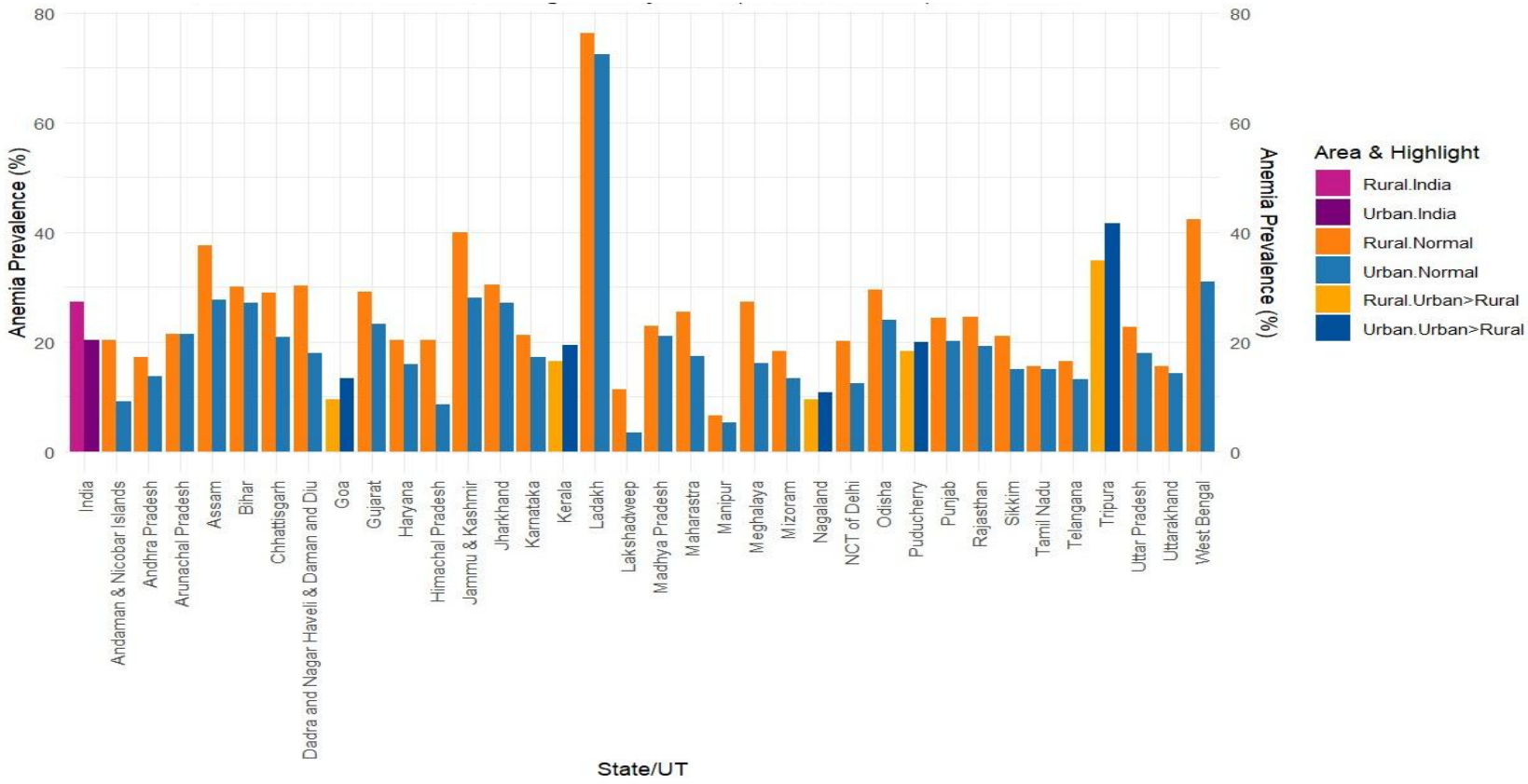
The overall prevalence of anemia is higher in rural India (highlighted in purple) than in urban India (orange), consistent with broader health and nutrition disparities between rural and urban regions. Among the states, Ladakh stands out with the highest prevalence of anemia among both rural and urban women, exceeding 80%. This signals a severe public health concern in the region and indicates the need for targeted nutritional and health support. West Bengal also reports very high anemia rates, particularly in rural areas where it exceeds 75%, placing it among the highest in the country. These figures emphasize the urgent need for interventions in such regions.

In contrast, Lakshadweep, Kerala and Manipur report the lowest levels of anemia prevalence among women, with both rural and urban rates well below 40%. These relatively low rates suggest better nutritional practices, healthcare access, and awareness in these regions. Goa also demonstrates lower prevalence, especially among urban women, indicating effective urban healthcare services and better living standards.
In terms of urban-rural disparity, most states show that rural women have a higher anemia prevalence than urban women, as indicated by the orange bars being taller than the blue ones. This disparity underscores the challenges faced by rural populations in terms of diet, healthcare access, and education.

However, in some states such as Uttarakhand, Sikkim, Punjab, and Manipur, Lakshadweep, kerala, Goa, Bihar urban women have slightly higher prevalence compared to their rural counterparts. These cases, highlighted in dark blue, may reflect the influence of urban lifestyle factors such as processed food consumption, sedentary habits, or stress, and might also point to differences in reporting or healthcare-seeking behavior.
A few states like Sikkim, Manipur and Nagaland show smaller differences between rural and urban anemia levels, suggesting more uniform access to resources and possibly stronger health infrastructure across both areas.

Overall, the chart underscores that anemia among women remains a critical issue across India, with significant regional and area-based variation. Rural women, in general, are more affected than urban women. The data calls for region-specific and context-sensitive interventions, especially in highburden states like Ladakh, West Bengal, Tripura and Bihar. Moreover, the persistent urban-rural gaps in anemia prevalence highlight the need for inclusive public health policies that address both infrastructural and behavioral determinants of women's health and nutrition across the country.

Fig-7: Prevalence of Anemia Among Men by area of residence across India



Interpretation:

The bar chart illustrates the prevalence of anemia among men across various Indian states and union territories, with data categorized by area of residence— urban and rural. Each state displays two bars: orange for rural and blue for urban populations. The chart also includes national averages for both rural and urban India, represented by distinct purple and dark pink bars at the left.

Overall, the national trend shows that anemia prevalence among rural men is slightly higher than among urban men, mirroring the disparity observed among women. This reflects the persistent inequalities in nutritional intake and healthcare access between rural and urban populations in India. In most states, rural men have a higher anemia prevalence, though the urban-rural gap is often smaller than that observed in women.

Ladakh exhibits the highest anemia prevalence among both urban and rural men, with rural rates nearing or exceeding 75% and urban rates also alarmingly high. This suggests a critical public health concern in the region, potentially driven by high-altitude living conditions, dietary limitations, and healthcare inaccessibility. Kerala also shows a surprisingly high prevalence among urban men, which is somewhat inconsistent with its relatively better health indicators, hinting towards localized nutritional deficiencies or lifestyle factors.

On the other end of the spectrum, states like Manipur, Lakshadweep and Nagaland report the lowest anemia prevalence among men, with both rural and urban rates under 20%. These low figures indicate relatively better male health outcomes in terms of anemia and may reflect higher dietary iron intake through traditional diets or better access to health services in those regions

Interestingly, in some states such as Kerala, Tripura, and Puducherry, Nagaland, Goa urban men show a higher prevalence of anemia compared to rural men. This reverse trend, highlighted in dark blue bars, may reflect changing urban lifestyles, increased consumption of processed foods, and potential neglect of iron-rich diets. Meanwhile, in states like Bihar, Jharkhand, and Odisha, rural men continue to show significantly higher anemia rates, underscoring the nutritional vulnerability of rural populations.

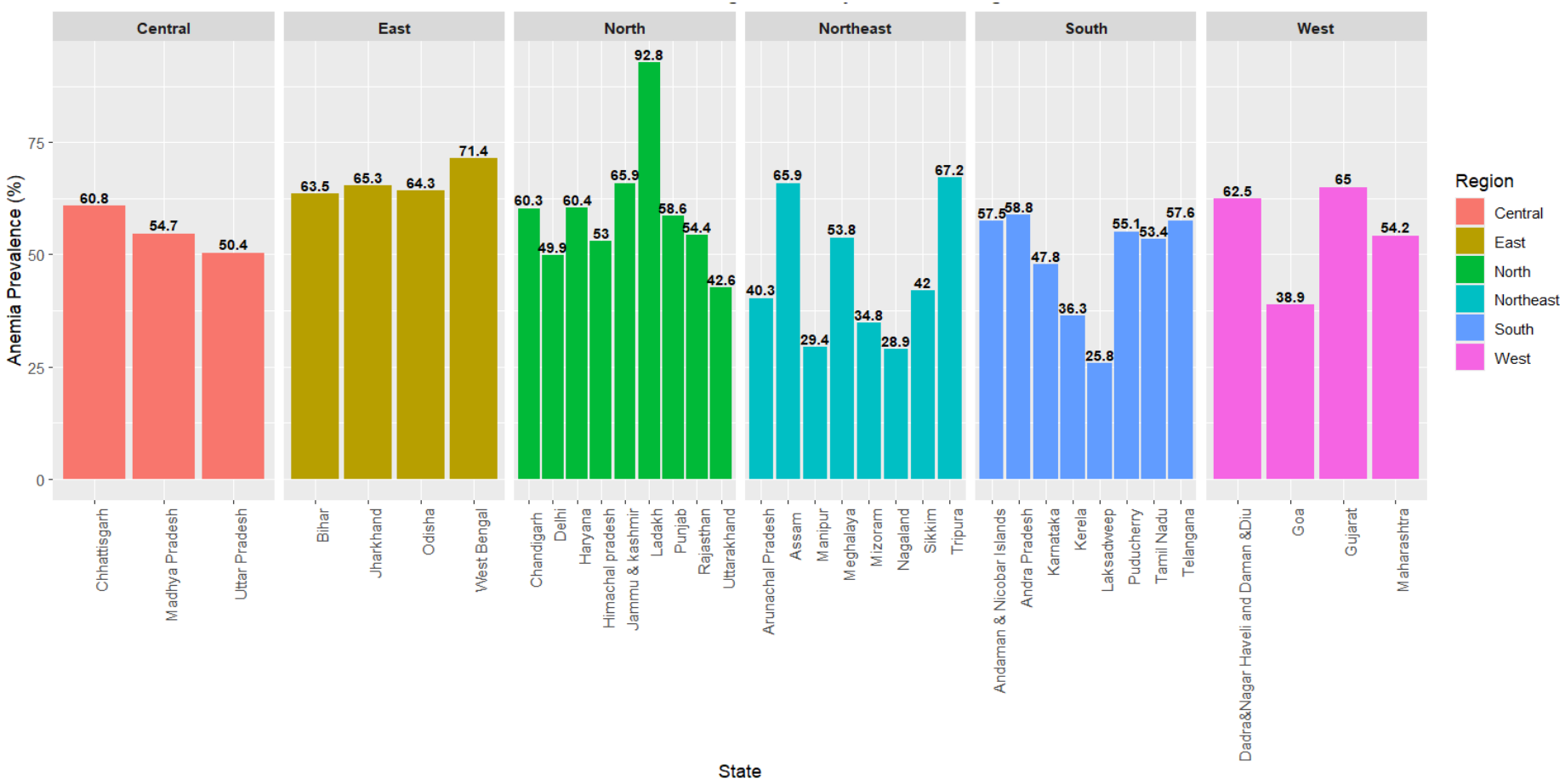
Some states such as Arunachal Pradesh, Madhya Pradesh, Uttarakhand demonstrate minimal urban-rural differences, indicating more equitable distribution of health determinants or similar dietary patterns across both settings. These balanced trends might also be reflective of effective public health outreach programs that cover both urban and rural areas without disparity.

Previously, we examined the prevalence of anemia across states in India and compared the burden between urban and rural populations. The findings showed that rural women often experience higher prevalence than urban women, and some states report levels much higher than the national average. While this provided a detailed picture at the state and area level, the results remained somewhat fragmented. To gain a broader and more comprehensive understanding, we now focus on the regional spread of anemia. For this purpose, the country has been divided into six regions according to NFHS-5: **North, South, East, West, Central, and Northeast**, which helps to present the geographical distribution more clearly.

Table-3: Classification of States according to region

Region	States/UTs
North	Jammu & Kashmir, Himachal Pradesh, Punjab, Chandigarh, Uttarakhand, Haryana, Delhi, Rajasthan
South	Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, Puducherry, Lakshadweep
East	Bihar, Jharkhand, Odisha, West Bengal
West	Gujarat, Maharashtra, Goa, Dadra & Nagar Haveli and Daman & Diu
Central	Madhya Pradesh, Chhattisgarh, Uttar Pradesh
Northeast	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura

Fig-8: Prevalence of Anemia among Women by States and Region : India



Interpretation:

The chart ***"Prevalence of Anemia among Women by State and Region"*** presents the percentage of women affected by anemia across various Indian states, categorized into six geographic regions: Central, East, North, Northeast, South, and West. This visual representation highlights the regional disparities in the burden of anemia among women across the country.

From the chart, it is evident that the prevalence of anemia is particularly high in the East and North regions. States like Bihar and Jharkhand in the East report anemia rates above 60%, with West Bengal reaching as high as 71.4%. In the North, the situation is more severe in some places, especially in Ladakh, which records the highest prevalence at 92.8%, indicating a critical public health concern. Other northern states such as Haryana, Himachal Pradesh, and Jammu & Kashmir also show prevalence rates exceeding 60%.

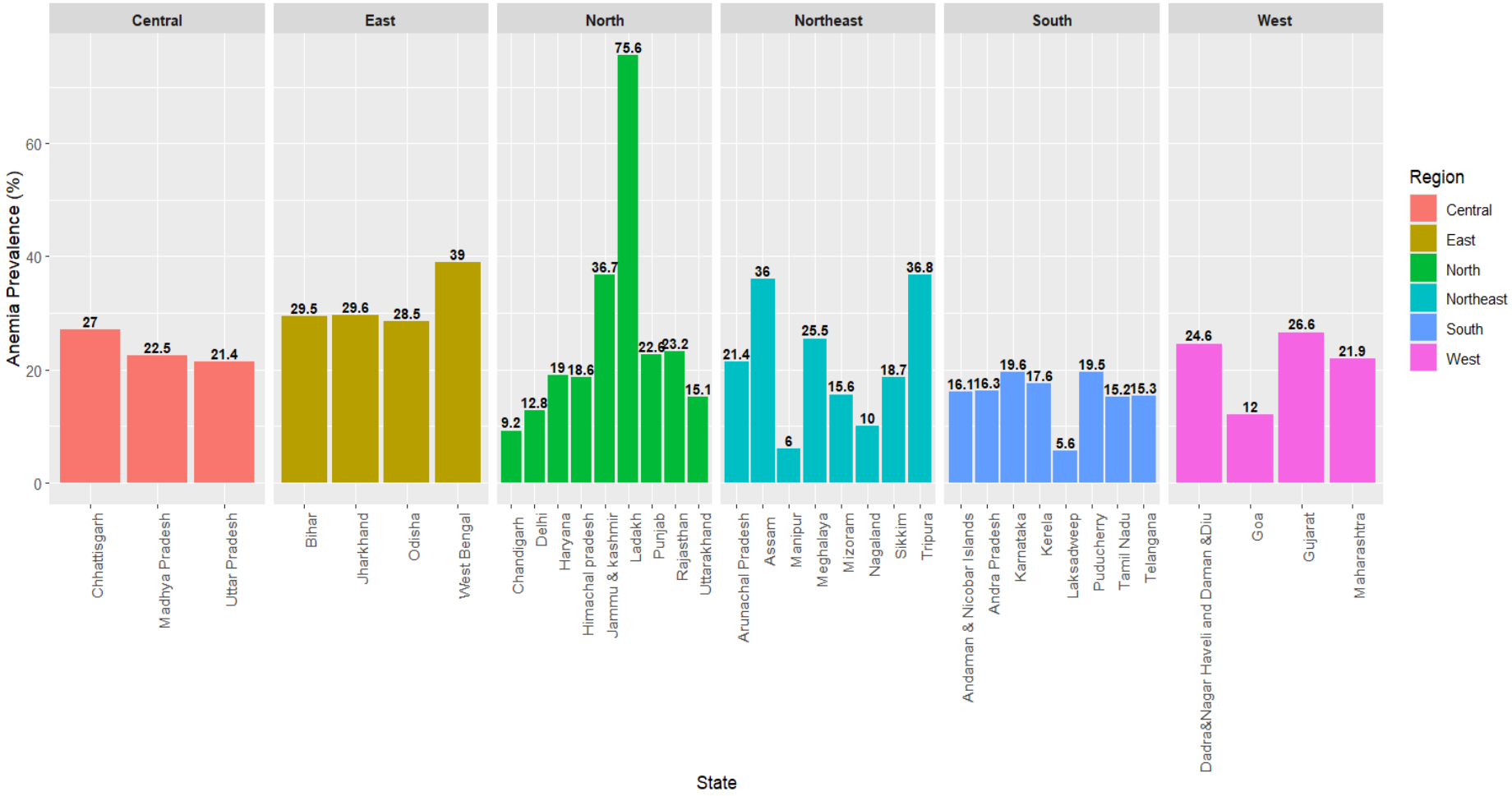
On the other hand, the South region demonstrates relatively lower anemia rates among women. Lakshadweep stands out with the lowest prevalence of just 25.8%, suggesting more effective nutrition and health interventions. Similarly, states like Kerela show anemia levels under 50%, indicating comparatively better conditions for women's health.

The Northeast region presents a mixed picture. While Tripura shows a high prevalence of 67.2%, states like Manipur and Nagaland show significantly lower rates, below 30%. This suggests that even within a single region, there can be vast differences due to local health infrastructure, dietary patterns, and socio-economic conditions.

The Central region, consisting of Chhattisgarh, Madhya Pradesh, and Uttar Pradesh, shows moderate anemia prevalence ranging between 50.4% and 60.8%. Meanwhile, the West region also displays variation, with Goa having one of the lowest prevalence rates at 38.9%, while Gujarat reports a significantly higher rate of 65%.

Overall, the chart reveals a concerning level of anemia among women in many parts of India, particularly in northern and eastern states. It underscores the need for targeted health policies, improved nutritional programs, and public awareness campaigns, especially in the high-burden regions, to reduce the prevalence of anemia and improve women's health outcomes.

Fig-9: Prevalence of Anemia among Men by States and Region : India



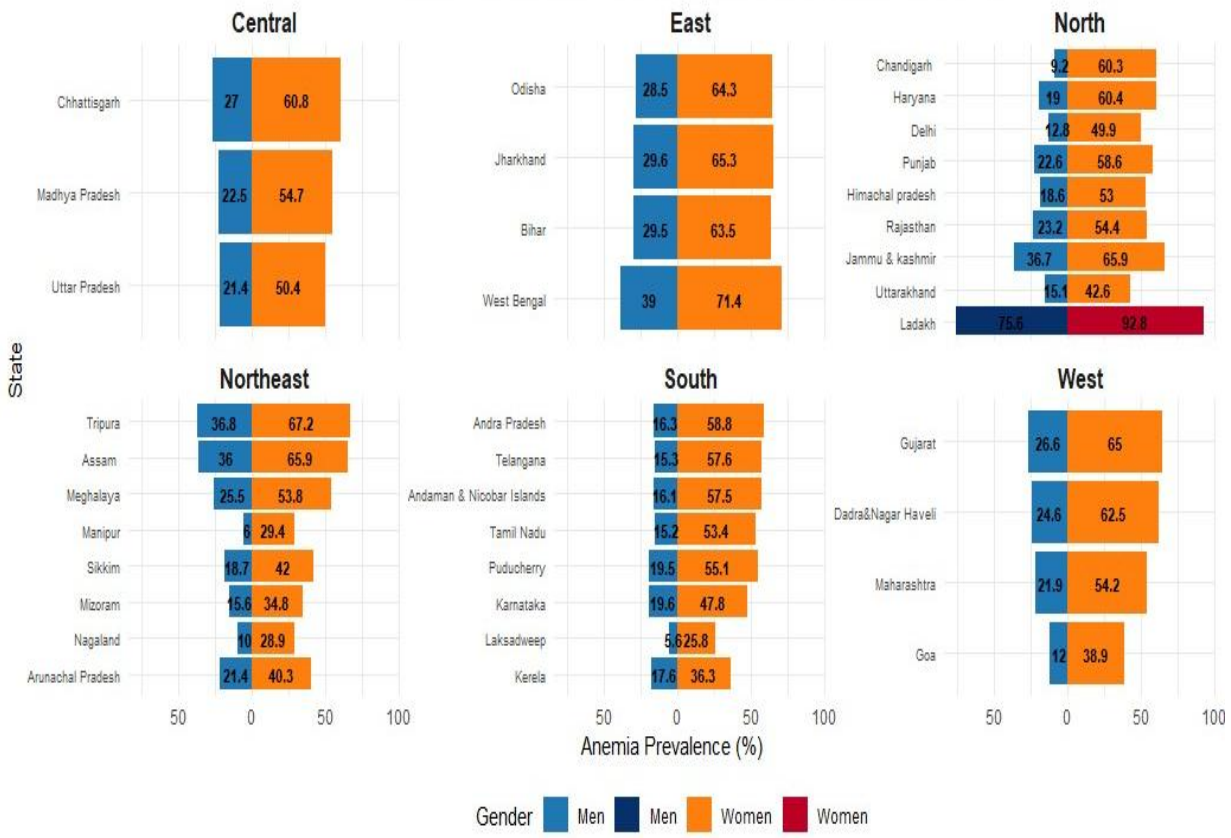
Interpretation:

The chart ***"Prevalence of Anemia among Men by State and Region"*** illustrates the percentage of men suffering from anemia across various Indian states, grouped under six regions: Central, East, North, Northeast, South, and West. It provides a comparative look at how anemia among men varies geographically in India.

From the chart, it is clear that the overall prevalence of anemia among men is significantly lower than that among women, as seen in the previous chart. However, there are still some regions and states where the burden is concerning. The most striking observation is from **Ladakh**, located in the **North region**, which reports an extremely high prevalence rate of **75.6%**, far exceeding all other states and regions. This figure suggests a serious public health issue that may be linked to dietary habits, altitude-related
health conditions, or healthcare access. Other states in the North, such as **Jammu & Kashmir (36.7%)**, also report higher anemia prevalence among men compared to the national average. In contrast, states like **Delhi (12.8%)** and **Chandigarh (9.2%)** show some of the lowest prevalence rates in the region. The **East region** shows moderate levels of anemia prevalence among men, with **West Bengal** reporting the highest at **39%**, followed by Bihar and Jharkhand with rates around 29%. These numbers are significant and suggest that eastern states face challenges with male nutrition and health as well. In the **Northeast**, the pattern is varied. While **Tripura** shows a high prevalence of **36.8%**, states like **Nagaland(10%)** and **Manipur(6%)** display relatively lower rates. Such variation within a single region indicates the influence of localized factors such as food security, tribal health disparities, and public health services. The **South region** shows generally low anemia prevalence among men. **Lakshadweep (5.6%)** has the lowest among all the Indian states, suggesting strong healthcare and nutrition systems. Other southern states, including Tamil Nadu, Telangana, and Andhra Pradesh, also report anemia levels below 20%, reinforcing the region's relative advantage in public health outcomes. The **West region** presents mixed results. While **Goa** shows a low prevalence of **12%**, **Gujarat** and **Dadra & Nagar Haveli and Daman & Diu** have higher rates, around 26%, which may point to regional disparities in male health indicators within the western belt.

In conclusion, while anemia among men is not as widespread or severe as it is among women, the chart shows that it remains a significant health concern in certain states—particularly Ladakh, West Bengal, Tripura, and parts of North India.

Fig-10: Population Pyramid showing Prevalence of Anemia by States and Region: India



Interpretation:

The chart provides a comprehensive regional overview of anemia prevalence among men and women across Indian states. It clearly shows that in every region—Central, East, North, Northeast, South, and West—women consistently exhibit higher anemia rates than men, reflecting a persistent gender gap in health and nutrition outcomes.

In the Central region, the highest prevalence among women is observed in Chhattisgarh (60.8%), while the lowest is in Uttar Pradesh (50.4%). For men also, Chhattisgarh (27%) records the highest rate, and Uttar Pradesh (21.4%) the lowest.

In the East, West Bengal (71.4%) shows the highest prevalence among women, whereas Bihar(63.5%) has the lowest. Among men, West Bengal (39%) has the highest, and Odisha (28.5%) the lowest.

In the North region, Ladakh (92.8%) has the highest female anemia prevalence in the country, while Uttarakhand (42.6%) records the lowest in the region. For men, again Ladakh (75.6%) is the highest, and Chandigarh (9.2%) is the lowest.

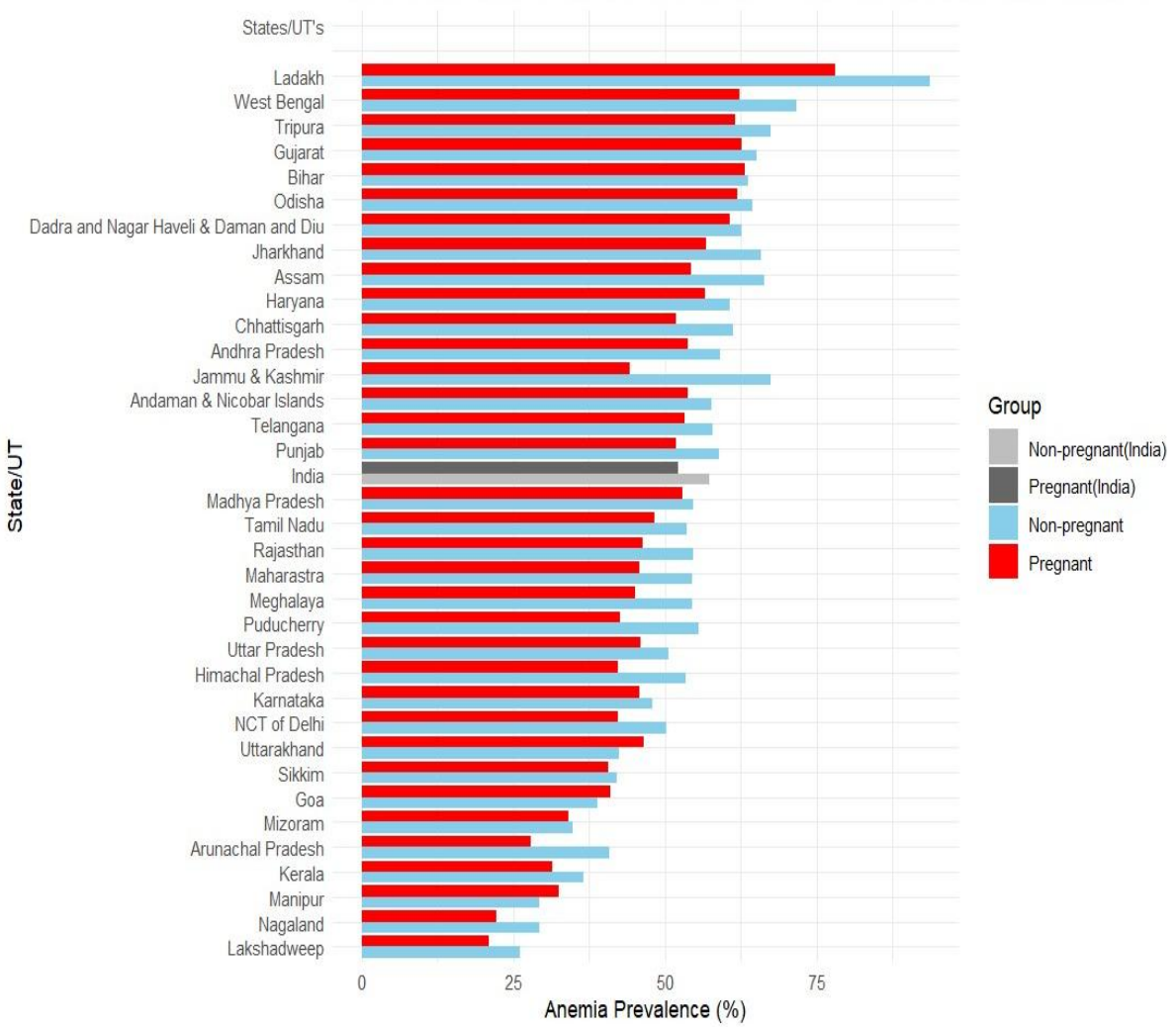
The Northeast region shows considerable internal variation. Tripura (67.2%) has the highest female anemia rate, while Nagaland (28.9%) has the lowest. For men, Tripura (36.8%) are highest, while Manipur (6%) is the lowest.

In the South, Andra Pradesh (58.8%) has the highest female anemia prevalence, and Lakshadweep (25.8%) the lowest. Among men, Karnataka(19.6%) is highest, and Lakshadweep (5.6%) is the lowest.

In the West region, Gujarat (65%) records the highest among women, and Goa (38.9%) the lowest. For men, Gujarat (26.6%) is the highest, while Goa (12%) is the lowest.

Overall, the data reveal that women across all regions are significantly more affected by anemia than men, with the highest female prevalence observed in Ladakh and the lowest in Kerala. For men, Ladakh also shows the highest prevalence, while Lakshadweep reflect the lowest rates. These disparities highlight the urgent need for region-specific, gender-sensitive policies and programs to address the root causes of anemia, particularly for women and vulnerable populations in high-burden areas.

Fig-11: Bar diagram showing Prevalence of Anemia among Pregnant and Non Pregnant Women :India



Interpretation:

The bar chart depicts the prevalence of anemia among pregnant and nonpregnant women aged 15–49 years across Indian states and union territories. The data is visually represented with red bars indicating pregnant women and light blue bars for non-pregnant women. National averages for both categories are also included, represented in dark gray for pregnant women and light gray for non-pregnant women.

A clear pattern emerges where non-pregnant women exhibit consistently higher anemia prevalence than pregnant women across most states, including the national level. This trend may appear counterintuitive, as pregnancy is often associated with increased iron requirements and higher anemia risk. However, the lower reported prevalence among

pregnant women could be attributed to increased monitoring during antenatal care, iron supplementation programs, and focused interventions targeting maternal health.

Ladakh stands out as the state with the highest anemia prevalence among both pregnant and non-pregnant women, with figures exceeding 70%. This suggests a severe public health concern, possibly linked to nutritional deficiencies, geographic isolation, and healthcare delivery challenges in the high-altitude region. West Bengal and Tripura follow closely behind, also displaying high anemia rates in both groups, indicating persistent nutritional and healthcare gaps.

Several other states, including Gujarat, Bihar, Odisha, and Jharkhand, report alarmingly high prevalence among pregnant women, with values close to or exceeding 50%. These findings underline the need for enhanced maternal nutrition and health interventions in these regions. On the contrary, southern and northeastern states like Kerala, Manipur, Nagaland, and Lakshadweep report the lowest anemia prevalence, particularly among pregnant women. This may reflect better maternal care services, improved dietary practices, and greater health awareness in these areas.

Interestingly, in states like Jammu & Kashmir there is a notable difference between pregnant and non-pregnant women, with non-pregnant women showing significantly higher anemia prevalence. Such disparities could highlight differential access to iron-folic acid supplementation, greater adherence to antenatal care among pregnant women, or underreporting of anemia in pregnancy.

Despite these exceptions, the overall national trend confirms that anemia continues to be a widespread issue among Indian women of reproductive age, with non-pregnant women being more affected. This highlights the need to extend iron supplementation and nutritional programs beyond pregnancy, targeting all women throughout their reproductive lifespan. In conclusion, while some progress may have been made in addressing anemia during pregnancy, there remains an urgent need for comprehensive, region-specific public health strategies to address the rising burden of anemia among all women in India.

Hence there is a need to look into the severity of anaemia across different age group among both Women & Men.

Fig-12(i):Multiple bar diagram showing Prevalence of Anemia among Women by severity across age group in India.

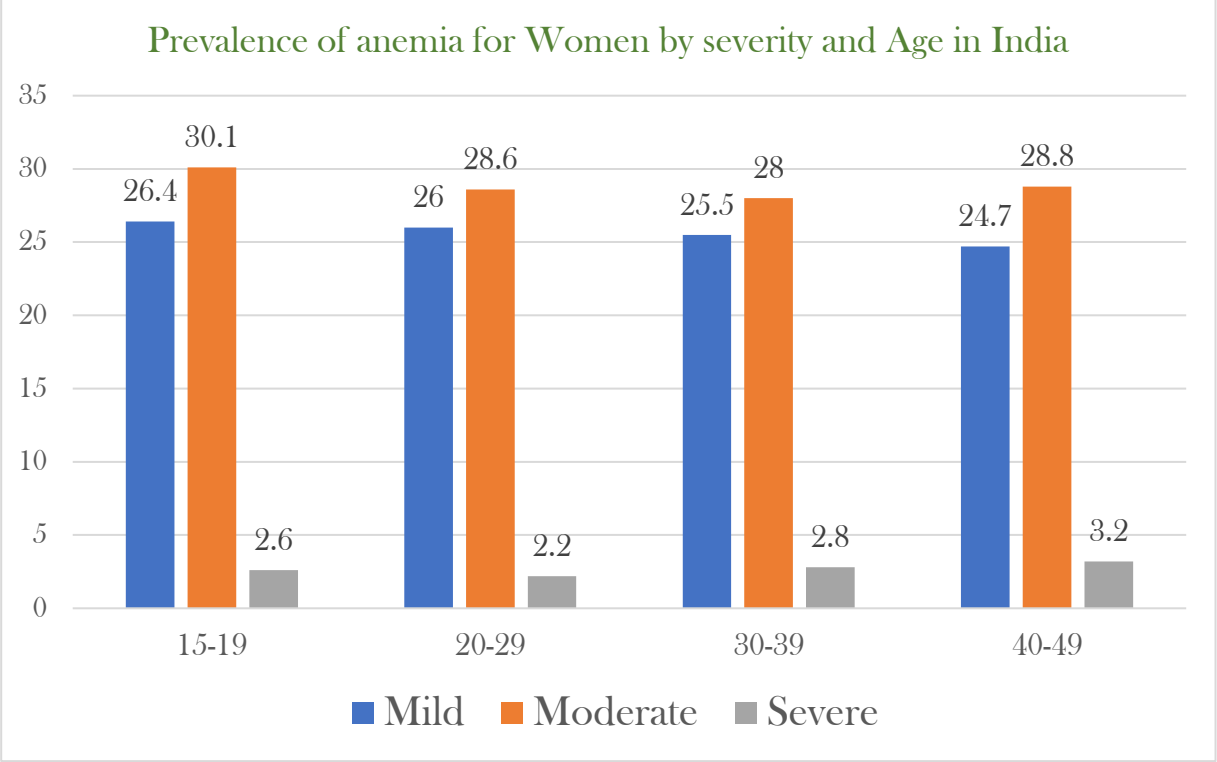
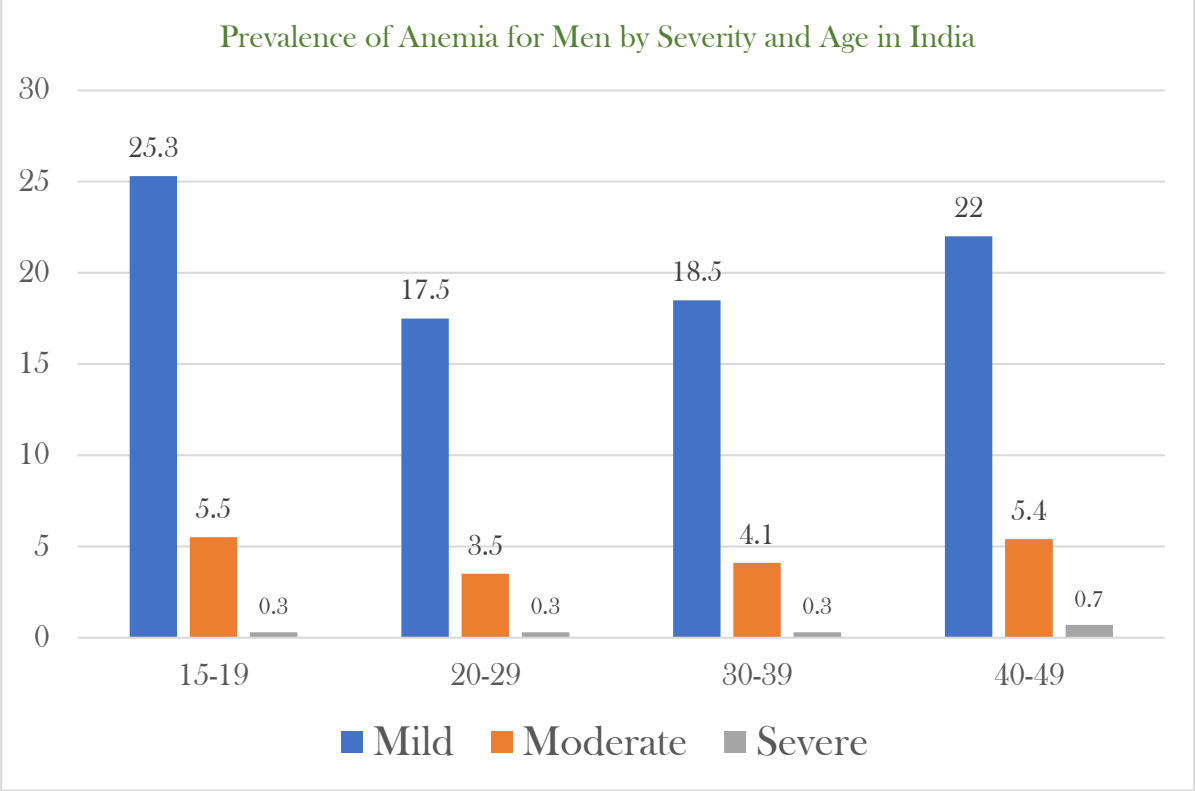


Fig-12(ii):Multiple bar diagram showing Prevalence of Anemia among Men by severity and across age-group in India.



Interpretation:

The two charts together provide a comparative overview of the **prevalence of anaemia by severity (mild, moderate, and severe) and age group among women and men in India**.

Among women, the prevalence of anaemia remains consistently high across all age groups. The **moderate form of anaemia** is the most common in every age category, peaking at **30.1% in the 15–19 age group**, followed closely by other age groups. Mild anaemia also shows a high and steady presence, Severe anaemia, although the least prevalent, still shows a noticeable presence, with a slightly increasing trend from **2.2% in the 20–29 group to 3.2% in the 40–49 group**. This indicates that anaemia, particularly in its moderate form, is a widespread and persistent issue for women regardless of age, with adolescents and young women being slightly more affected.

In contrast, among men, anaemia is significantly less prevalent across all age groups. **Mild anaemia** is the most dominant form, with the highest rate of **25.3% among adolescent males (15–19 years)**. This declines to **17.5% in the 20–29 group** and then rises slightly again in older age groups. Moderate anaemia in men remains low (ranging from 3.5% to 5.5%), while severe anaemia is almost negligible, never rising above **0.7%**.

In conclusion, these charts highlight a **stark gender disparity** in anaemia prevalence in India. Women, particularly adolescents and young adults, are significantly more affected by anaemia in all forms than men. Moderate anaemia is most prevalent among women, while mild anaemia dominates among men. The findings underscore the urgent need for **gender- and age specific interventions**, particularly focusing on improving nutrition and health education for adolescent girls and women of reproductive age to address this ongoing public health challenge.

…….. ……

The trend of prevalence needs more indepth analysis. Now, Let us focus the focus on finding the association between anemia and various socio-economic variables. This step aims to explore how factors such as education level, wealth quintile, place of residence, and access to basic facilities influence anemia prevalence. Understanding these relationships will help identify potential determinants and risk patterns. The analysis will be conducted using appropriate statistical techniques to ensure robust findings. These results will provide deeper insights beyond the descriptive trends observed earlier.

Statistical Analysis:

Table-4:Association Between Anaemia and different socio-demographic Factors among Women in India: A Chi-Square analysis:

Anaemia	Yes	No	Total	x^2 value	Df	P value	status
Age-group							
15-19	67743 (59.1%)	46881 (40.9%)	114624 (100%)	252.96	3	<0.01	Significant
20-29	126853 (56.8%)	96481 (43.2%)	223334 (100%)				
30-39	105346 (56.3%)	81770 (43.7%)	187116 (100%)				
40-49	88997 (56.7%)	67964 (43.3%)	156961 (100%)				
Total	3,88,939 (57%)	2,93,096 (43%)	6,82,035 (100%)				
Marital status							
Never Married	90334 (56.7%)	68985 (43.3%)	159319 (100%)	78.891	3	<0.01	Significant
Currently married	281484 (57%)	212347 (43%)	493831 (100%)				
Widowed	12729 (59.8%)	8557 (40.2%)	21286 (100%)				
Divorced/Separated	4430 (58.3%)	3169 (41.7%)	7599 (100%)				
Total	388977 (57%)	2,93,058 (43%)	6,82,035 (100%)				
Maternity Level							
Pregnant	13469 (52.2%)	12333 (47.8%)	25802 (100%)	787.39	2	<0.01	Significant
Breastfeeding	58265 (60.6%)	37882 (39.4%)	96147 (100%)				
Neither	317008 (56.6%)	243077 (43.4%)	560086 (100%)				

Total	388742 (57%)	2,93,293 (43%)	6,82,035 (100%)				
Birth Order							
0	116197 (56.1%)	90928 (43.9%)	207125 (100%)	149.5243	4	<0.01	Significant
1	55030 (56.6%)	42196 (43.4%)	97226 (100%)				
2-3	166205 (57.5%)	122847 (42.5%)	289052 (100%)				
4-5	41274 (58.1%)	29766 (41.9%)	71040 (100%)				
6 or more	10239 (58.2%)	7353 (41.8%)	17592 (100%)				
Total	388945 (57%)	293090 (43%)	682035 (100%)				
Residence							
Urban	115538 (53.8%)	99216 (46.2%)	214754 (100%)	1325.949	1	<0.01	Significant
Rural	273359 (58.5%)	193922 (41.5%)	467281 (100%)				
Total	388897 (57%)	293138 (43%)	682035 (100%)				
Schooling							
No-Schooling	91995 (59.4%)	62879 (40.6%)	154874 (100%)	2602.37	5	<0.01	Significant
<5 years complete	22025 (61.2%)	13964 (38.8%)	35989 (100%)				
5-7 years complete	53734 (58.4%)	38277 (41.6%)	92011 (100%)				
8-9 years complete	72353 (59%)	50279 (41%)	122632 (100%)				
10-11 years complete	58458 (56.5%)	45007 (43.5%)	103465 (100%)				
12 or more years complete	90166 (52.1%)	82897 (47.9%)	173063 (100%)				

Total	388731 (57%)	2,93,303 (43%)	6,82,035 (100%)				
Religion							
Hindu	320361 (57.4%)	237759 (42.6%)	558120 (100%)	498.0417	6	<0.01	Significant
Muslim	49813 (55.6%)	39778 (44.4%)	89591 (100%)				
Christian	8196 (51.1%)	7843 (48.9%)	16039 (100%)				
Sikh	5984 (58.8%)	4193 (41.2%)	10177 (100%)				
Buddhist	2435 (57.3%)	1815 (42.7%)	4250 (100%)				
Jain	580 (45.2%)	704 (54.8%)	1284 (100%)				
Other	1686 (65.5%)	888 (34.5%)	2574 (100%)				
Total	389055 (57%)	2,92,980 (43%)	6,82,035 (100%)				
Caste/Tribe							
Scheduled caste	89059 (59.2%)	61378 (40.8%)	150437 (100%)	2573.003	4	<0.01	Significant
Scheduled tribe	41685 (64.6%)	22843 (35.4%)	64528 (100%)				
Other background	159935 (54.6%)	132987 (45.4%)	292922 (100%)				
Other	95588 (56.4%)	73895 (43.6%)	169483 (100%)				
Don't Know	2879 (61.7%)	1787 (38.3%)	4666 (100%)				
Total	389147 (57%)	2,92,889 (43%)	6,82,035 (100%)				
Wealth quintile							
Lowest	81554 (63.7%)	46474 (36.3%)	128028 (100%)				
Second	82499 (59.5%)	56154 (40.5%)	138653 (100%)				

Middle	80704 (56.9%)	61130 (43.1%)	141834 (100%)	5023.349	4	<0.01	Significant
Fourth	77247 (54.4%)	64752 (45.6%)	141999 (100%)				
Highest	67076 (51%)	64446 (49%)	131522 (100%)				
Total	389080 (57%)	2,92,956 (43%)	6,82,035 (100%)				
Smoking Status							
Smokers	17769 (63.5%)	10214 (36.5%)	27983 (100%)	491.3477	1	<0.01	Significant
Does not Smoke	371501 (56.8%)	282550 (43.2%)	654052 (100%)				
Total	389270 (57%)	2,92,764 (43%)	6,82,035 (100%)				

Interpretation:

The chi-square test results reveal statistically significant associations (**p-value < 0.05**) between anemia prevalence and various demographic and socio-economic factors among women in **India**.

Starting with **age group** ($\chi^2 = 252.96$, df = 3), anemia is most prevalent among women aged **20–29 years** with **1,26,853** anemic cases, followed by those aged **30– 39 years** (**1,05,346**) and **40–49 years** (**88,997**). The **15–19 age group** also shows a substantial number (**67,743**), highlighting increased vulnerability during reproductive years.

Marital status also shows a significant association ($\chi^2 = 78.89$, df = 3). The highest number of anemic women are **currently married** (**2,81,484**), while **never married** women report **90,334** cases. Comparatively fewer but still notable cases are found among **widowed (12,729)** and **divorced/separated (4,430)** women. This pattern indicates a greater anemia burden among women with reproductive responsibilities.

Maternity status exhibits a strong association with anemia ($\chi^2 = 787.39$, df = 2). Anemia affects **13,469 pregnant** women and **58,265 breastfeeding** women. However, the highest burden is among women who are **neither pregnant nor breastfeeding**, totaling **3,17,008** anemic cases. This is reflective of a larger population share, as well as persistent anemia beyond the reproductive window.

Birth order is another significant variable ($\chi^2 = 149.52$, df = 4). The greatest anemia burden is found in women with **2–3 children** (**1,66,205**), followed by **nulliparous** women (**1,16,197**). Women with **4–5 children** (**41,274**) or **6+ children** (**10,239**) also show significant anemia prevalence, reflecting cumulative nutritional demands from repeated childbirths.

Residence strongly correlates with anemia status ($\chi^2 = 1325.95$, df = 1). Anemia is significantly higher in **rural areas**, where **2,73,359** women are anemic, compared to **1,15,538** in **urban** areas. This highlights rural-urban disparities in access to nutrition and healthcare.

Educational level ($\chi^2 = 2602.37$, df = 5) demonstrates a clear inverse relationship with anemia. Women with **no schooling** show the highest anemia prevalence (**91,995**), followed by those with **8–9 years** of schooling (**72,353**). Women with **12 or more years** of education report **90,166** cases—still substantial, but relatively lower in proportion, suggesting education improves health awareness and outcomes.

A significant association is also observed for **religion** ($\chi^2 = 498.04$, df = 6). The majority of anemic women are **Hindu** (**3,20,361**), followed by **Muslims** (**49,813**), **Christians** (**8,196**), and **Sikhs** (**5,984**). Smaller communities like **Buddhists**, **Jains**, and **Others** also show varying degrees of prevalence.

In terms of **caste/tribe** ($\chi^2 = 2573.00$, df = 4), women from **Scheduled Castes** (**89,059**) and **Scheduled Tribes** (**41,685**) face a disproportionately high anemia burden, followed by **Other backward groups** (**1,59,935**) and **general caste** women (**95,588**). These disparities may reflect structural inequalities in access to nutrition and healthcare.

Wealth quintile shows the strongest association ($\chi^2 = 5023.35$, df = 4). Women from the **lowest wealth quintile** account for **81,554** anemic cases, decreasing progressively to **67,076** in the **highest quintile**, underscoring the direct link between poverty and undernutrition.

Finally, **smoking status** ($\chi^2 = 491.35$, df = 1) reveals that **17,769** anemic women are **smokers**, whereas **3,71,501** are **non-smokers**. Although non-smokers are more in number due to their population size, smoking contributes significantly to nutritional deficiencies and health risks, thereby increasing susceptibility to anemia.

Table-5: Association Between Anaemia and Socio-Demographic Factors Among Men in India: A Chi-Square Analysis:-

Anaemia	Yes		Total	x^2	Df	P-value	status
Age-group							
15-19	4639 (31.1%)	10276 (68.9%)	14915 (100%)	642.34	3	<0.01	Significant
20-29	5508 (21.3%)	20353 (78.7%)	25861 (100%)				
30-39	5494 (22.9%)	18496 (77.1%)	23990 (100%)				
40-49	5635 (28.1%)	14420 (71.9%)	20055 (100%)				
Total	21276 (25%)	63545 (75%)	84821 (100%)				
Marital status							
Never Married	8282 (25.2%)	24585 (74.8%)	32867 (100%)	7.4454	3	0.05898	Not significant
Currently married	12720 (25%)	38159 (75%)	50878 (100%)				
Widowed	124 (30.8%)	279 (69.2%)	403 (100%)				
Divorced/Separated	172 (25.5%)	501 (74.5%)	673 (100%)				
Total	21298 (25%)	63523 (75%)	84821 (100%)				
Residence							
Urban	5849 (20.4%)	22821 (79.6%)	28670 (100%)	495.18	1	<0.01	Significant
Rural	15386 (27.4%)	40766 (72.6%)	56152 (100%)				
Total	21234 (25%)	63588 (75%)	84822 (100%)				
Schooling							
No-Schooling	2958 (32%)	6285 (68%)	9243 (100%)	1077.9	5	<0.01	Significant

<5 years complete	1676 (30.9%)	3749 (69.1%)	5425 (100%)				
5-7 years complete	3122 (27.8%)	8108 (72.2%)	11230 (100%)				
8-9 years complete	4917 (28.9%)	12096 (71.1%)	17013 (100%)				
10-11 years complete	3550 (23.3%)	11684 (76.7%)	15234 (100%)				
12 or more years complete	5042 (18.9%)	21635 (81.1%)	26677 (100%)				
Total	21264 (25%)	63558 (75%)	84822 (100%)				
Religion							
Hindu	16711 (24.8%)	50671 (75.2%)	67382 (100%)	114.24	6	<0.01	Significant
Muslim	3634 (27.8%)	9437 (72.2%)	13071 (100%)				
Christian	409 (18.3%)	1826 (71.1%)	2235 (100%)				
Sikh	166 (22.9%)	560 (76.7%)	726 (100%)				
Buddhist	235 (25.9%)	675 (74.1%)	911 (100%)				
Jain	44 (20.1%)	174 (79.9%)	218 (100%)				
Other	62 (23.8%)	197 (76.2%)	259 (100%)				
Total	21266 (25%)	63556 (75%)	84822 (100%)				
Caste/Tribe							
Scheduled caste	4556 (26.1%)	12899 (73.9%)	17455 (100%)	373.43	4	<0.01	Significant
Scheduled tribe	2585 (32.7%)	5319 (67.3%)	7904 (100%)				
Other background	8010 (22.6%)	27432 (77.4%)	35442 (100%)				
Other	6008 (25.5%)	17553 (74.5%)	23561 (100%)				
Don’t Know	127	334	461				

	(27.5%)	(72.5%)	(100%)				
Total	21286 (25%)	63537 (75%)	84823 (100%)				
Wealth quintile							
Lowest	5216 (35.9%)	9312 (64.1%)	14528 (100%)	1661.3	4	<0.01	Significant
Second	4910 (28.9%)	12259 (71.1%)	17169 (100%)				
Middle	4384 (23.9%)	13961 (76.1%)	18345 (100%)				
Fourth	3855 (20.6%)	14861 (79.4%)	18716 (100%)				
Highest	2892 (18%)	13172 (82%)	16064 (100%)				
Total	21257 (25%)	63565 (75%)	84822 (100%)				
Smoking Status							
Smokers	9396 (27.6%)	24649 (72.4%)	34045 (100%)	191.04	1	<0.01	Significant
Does not Smoke	11882 (23.4%)	38895 (76.6%)	50777 (100%)				
Total	21278 (25%)	63544 (75%)	84822 (100%)				

Interpretation:

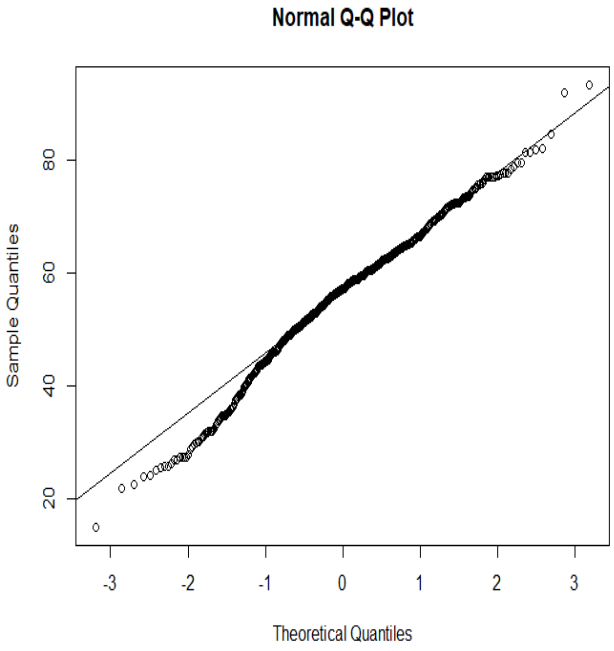
The chi-square test results provide a comprehensive understanding of the association between various socio-demographic factors and anemia status among men in India. Significant associations (p-value < 0.05) were found between anemia and the variables: **age group, place of residence, level of schooling, religion, caste/tribe, wealth quintile, and smoking status**, indicating that these factors play a critical role in the distribution of anemia. For instance, the age group analysis yielded a chi-square value of **642.34** with **3 degrees of freedom**, showing a significant variation in anemia prevalence across different age brackets. Similarly, residence (urban vs. rural) showed a strong association (χ^2 **= 495.18, df = 1**), with higher anemia prevalence reported in rural areas.

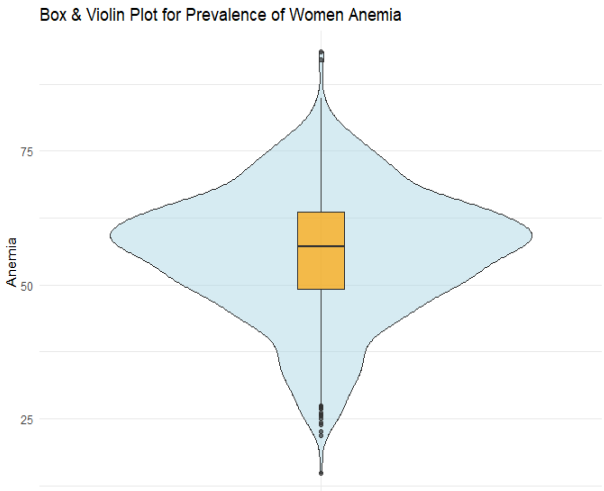
Schooling level demonstrated the strongest association (χ^2 **= 1077.9, df = 5**), suggesting that education significantly influences anemia risk, with lower education

levels correlating with higher anemia prevalence. Religion and caste/tribe also showed statistically significant differences in anemia rates (χ^2 = **114.24** and **373.43**, respectively), implying social and cultural influences on health outcomes. Economic status, captured through wealth quintiles, showed a clear gradient, with the lowest wealth group having the highest anemia prevalence (χ^2 = **1661.3**), highlighting socio-economic disparities in health. Finally, smoking status was also significantly associated (χ^2 = **191.04**), with smokers showing higher anemia rates than nonsmokers.

However, **marital status** did not show a statistically significant relationship with anemia (χ^2 = **7.45, p = 0.059**), indicating that marital condition may not have a major impact on anemia among men. These findings underscore the need for targeted public health interventions focused on vulnerable subgroups such as the uneducated, rural residents, lower socio-economic classes, and smokers, to effectively reduce anemia burden among Indian men.

Now, we want to examine the correlation between anemia and a set of socio-demographic and health-related factors. Socio-demographic variables such as age, sex, literacy, schooling, sanitation, and access to improved drinking water influence the risk of anemia. Nutritional status measured by BMI, whether below normal or above normal, also plays a crucial role.





From the Q-Q plot, we observe that most of the points lie close to the diagonal reference line, indicating that the data is approximately normally distributed with only minor deviations at the tails. The box and violin plot for prevalence of women

anemia shows that the distribution is fairly symmetric, with the median around the center and no extreme skewness, though a few outliers are present at the lower end. Together, these plots suggest that the dataset reasonably satisfies the normality assumption, making it appropriate to apply **Pearson correlation analysis** for further study.

Table-6: Pearson correlation : to find the correlation among anaemia Prevalence of Women and selected demographic and health-related variables:-

	Anaemia			
Variable	Correlation coefficient	Remarks	P-value	Remarks
Literacy rate	-0.3631547	Negative, moderate association	<0.01	Significant
Schooling(>=10 years)	-0.3692789	Negative, moderate association	<0.01	Significant
family planning(modern methods)	0.02404978	Very Low Positive	0.5232	Not Significant
BMI(below normal)	0.4280352	Positive, moderate association	<0.01	Significant
BMI(Overweight)	-0.2254999	Negative, low to moderate	<0.01	Significant
Improved sanitation facility	-0.4498432	Negative, moderate to high	<0.01	Significant
Improved drinking water	-0.0320403	Very Low Negative	0.3462	Not Significant

Interpretation:

The correlation analysis shows that anemia has a significant negative association with literacy rate (r = –0.36) and schooling (≥10 years) (r = –0.37), indicating that higher education levels are linked to lower anemia prevalence. Improved sanitation facilities also show a stronger negative association (r = –0.45), highlighting the role of hygiene and living conditions in reducing anemia. On the other hand, BMI below normal has a significant positive association (r = 0.43), suggesting that undernutrition is a major risk factor. Overweight BMI shows a weak negative association (r = –0.23), also significant.

However, family planning using modern methods (r = 0.02) and improved drinking water (r = –0.03) have very low correlations and are not statistically significant. Overall, the results emphasize that education, nutrition, and sanitation are critical determinants of anemia.

Table-7: Pearson correlation : to find the correlation among anaemia Prevalence of Men and selected demographic and health-related variables:-

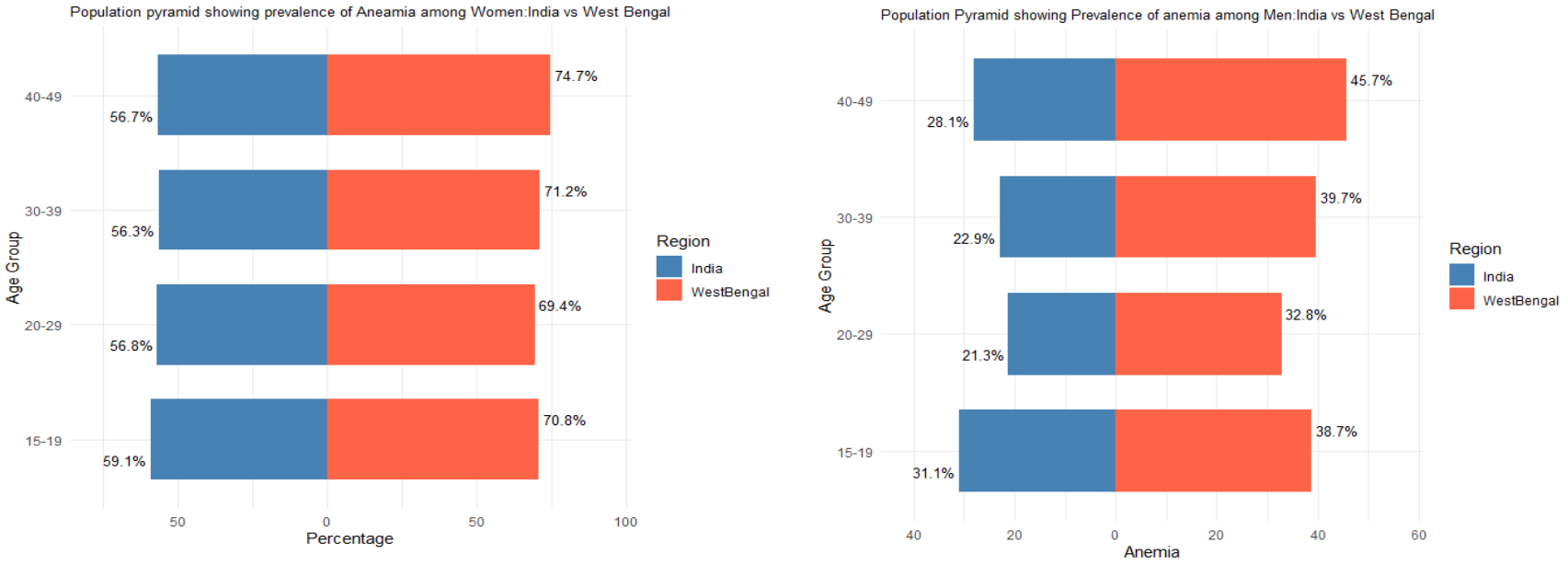
Anaemia				
Variable	Correlation coefficient	Remarks	P-value	Remarks
Literacy	-0.3170471	Negative, moderate association	0.04955	Significant
Schooling(>=10years)	-0.2444534	Negative, Low association	0.0408	Significant
BMI(below normal)	-0.05642397	Negative, very low	0.7438)	Not Significant
BMI(Overweight)	-0.2662484	Negative, Low association	0.1165	Not Significant

Interpretation:

The analysis shows that literacy has a moderate negative correlation (–0.317) with anaemia, and this association is statistically significant (p=0.04955), indicating that higher literacy levels are linked with lower anaemia prevalence. Similarly, schooling of ten years or more shows a low negative correlation (–0.244) with anaemia, which is also significant (p=0.0408), suggesting that longer years of education reduce the risk of anaemia. In contrast, BMI below normal has a very weak negative correlation (–0.056) with anaemia and is not statistically significant (p=0.7438), implying no meaningful relationship. Likewise, overweight BMI shows a low negative correlation (–0.266) with anaemia, but this is not significant (p=0.1165), suggesting that the relationship is not reliable. Overall, education appears to play a stronger and significant role in reducing anaemia compared to BMI factors.

We have completed the analysis of prevalence of Anemia in India, examining both regional and state-level variations. The study further explored associations between anemia and various socio-economic and demographic factors using Chi-square tests for categorical variables and correlation analysis for continuous or ranked variables. These analyses helped identify significant patterns and determinants at the national scale. Having established the overall picture, we now focus on West Bengal to assess its anemia prevalence in detail. This state-level analysis will help understand the local burden in comparison to national trends. The findings will also provide insights for region-specific interventions.

Fig-13: Comparative Analysis of prevalence of Anemia by age and gender among India and West Bengal



Interpretation:

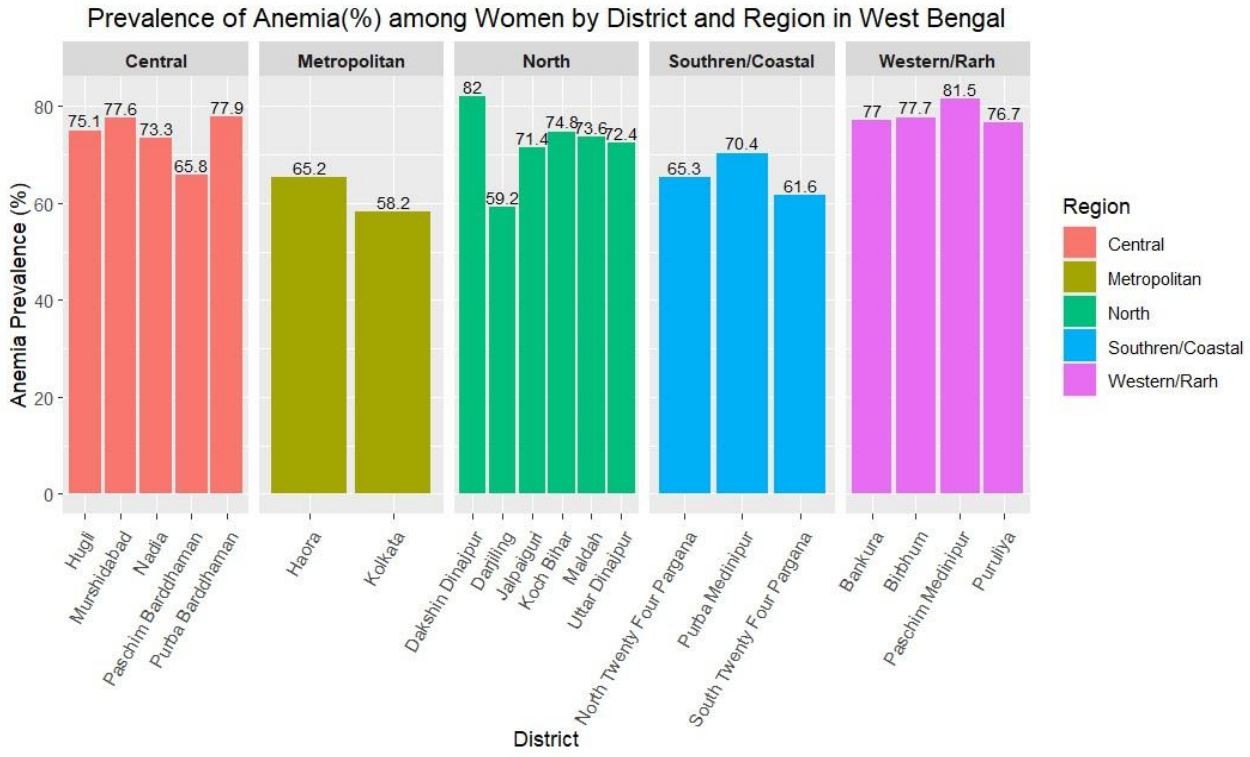
The comparison between the population pyramid charts of prevalence of anemia by age group and gender in India and West Bengal reveals several important insights. Firstly, anemia prevalence is consistently higher in West Bengal across all age groups and both genders compared to the national average. For instance, among women aged 40–49, the prevalence in West Bengal is 74.7%, significantly exceeding the national figure of 56.7%. Similarly, men in the same age group show a prevalence of 45.7% in West Bengal, compared to only 28.1% at the national level. This trend of higher prevalence persists in all other age brackets, indicating a greater anemia burden in the state.

Secondly, across both charts, women exhibit notably higher anemia rates than men in every age group, highlighting gender as a key determinant. However, the gender gap is even more pronounced in West Bengal, where women experience nearly a 30% higher prevalence than men. Notably, while the national data shows the highest anemia prevalence among adolescent girls aged 15–19 (59.1%), West Bengal displays a shift, with the highest rate among women aged 40–49 (74.7%), suggesting that the burden persists and even increases with age in this state.

In addition to the critical condition among women, the charts also emphasize that anemia among men is not negligible. In West Bengal, male anemia rates are significantly higher than the national average—almost double in some age groups— pointing to an overlooked public health issue. Furthermore, the uniformly high prevalence among women across all age groups in West Bengal, hovering around 69–75%, indicates a chronic and widespread issue requiring urgent attention.

Overall, these findings underscore the need for state-specific interventions in West Bengal, including improved nutrition, enhanced health awareness, and targeted screening for both women and men. The data clearly illustrates that while anemia is a national concern, its intensity and distribution in states like West Bengal demand more localized and aggressive public health strategies.

Fig-14: Prevalence of Anemia among women by district and region in west bengal



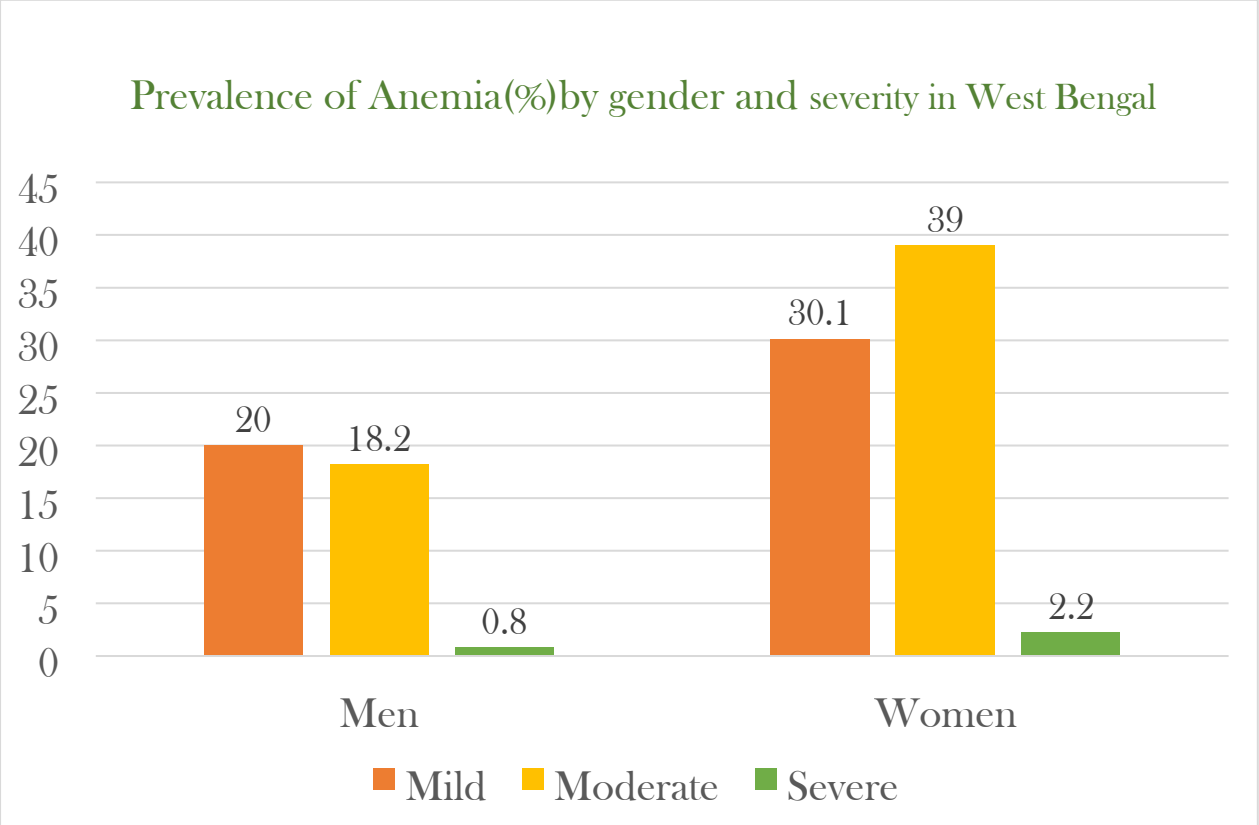
Interpretation:

The bar chart illustrates the prevalence of anemia among women across various districts in West Bengal, grouped by five distinct regions: Central, Metropolitan, North, Southern/Coastal, and Western/Rarh. Among all regions, the **North region** records the **highest district-level prevalence**, with **Dakshin Dinajpur** reaching a peak of **82%**, followed closely by **Koch Bihar(74.8%)** and **Malda (73.6%)**. This indicates a critical public health concern in northern districts.

In the **Western/Rarh region**, all four districts—**Bankura, Birbhum, Paschim Medinipur, and Puruliya**—show consistently high anemia levels, ranging from **76.7% to 81.5%**, with Paschim Medinipur (81.5%) recording the highest within the group. The **Central region** also reports high prevalence in districts like **Murshidabad (77.6%)** and **Purba Bardhaman (77.9%)**, although **Paschim Bardhaman** shows a comparatively lower rate of **65.8%**.
The **Southern/Coastal region** presents slightly better figures, with **South Twenty Four Pargana** having a relatively lower anemia prevalence of **61.6%**, while **Purba Medinipur** reports **70.4%**. The **Metropolitan region**, comprising **Kolkata (58.2%)** and **Howrah (65.2%)**, records the **lowest prevalence among all regions**, with Kolkata having the **lowest rate across the entire state**.

Overall, the chart reveals that anemia among women in West Bengal is widespread, but the burden is notably **higher in the North, Central, and Western regions**, whereas the **Metropolitan area shows relatively better outcomes**. This suggests that targeted regional interventions, particularly in rural and northern districts, are essential to effectively combat anemia and address regional disparities in women's health.

Fig-15: Prevalence of Anemia(%)by gender and severity in West Bengal



Interpretation:

The bar chart presents the prevalence of anemia among men and women in **West Bengal**, categorized by severity—mild, moderate, and severe. The data clearly highlights a **higher burden of anemia among women** compared to men across all levels of severity. Among women in West Bengal, **moderate anemia** is the most prevalent at **39%**, followed by **mild anemia at 30.1%**, and **severe anemia at 2.2%**.

In contrast, men in West Bengal show significantly lower rates. **Mild anemia** is the most common at **20%**, followed by **moderate anemia at 18.2%**, and **severe anemia at only 0.8%**. These figures reveal a stark gender disparity, with women facing a much greater burden of anemia than men. The pronounced gap in moderate anemia prevalence—**39% in women vs. 18.2% in men**—underscores

the urgent need for **gender-sensitive health interventions** and **targeted nutritional and awareness programs** across the state, particularly for women of reproductive age.

Fig-16: Prevalence of Anemia(%) by gender and residence: West Bengal

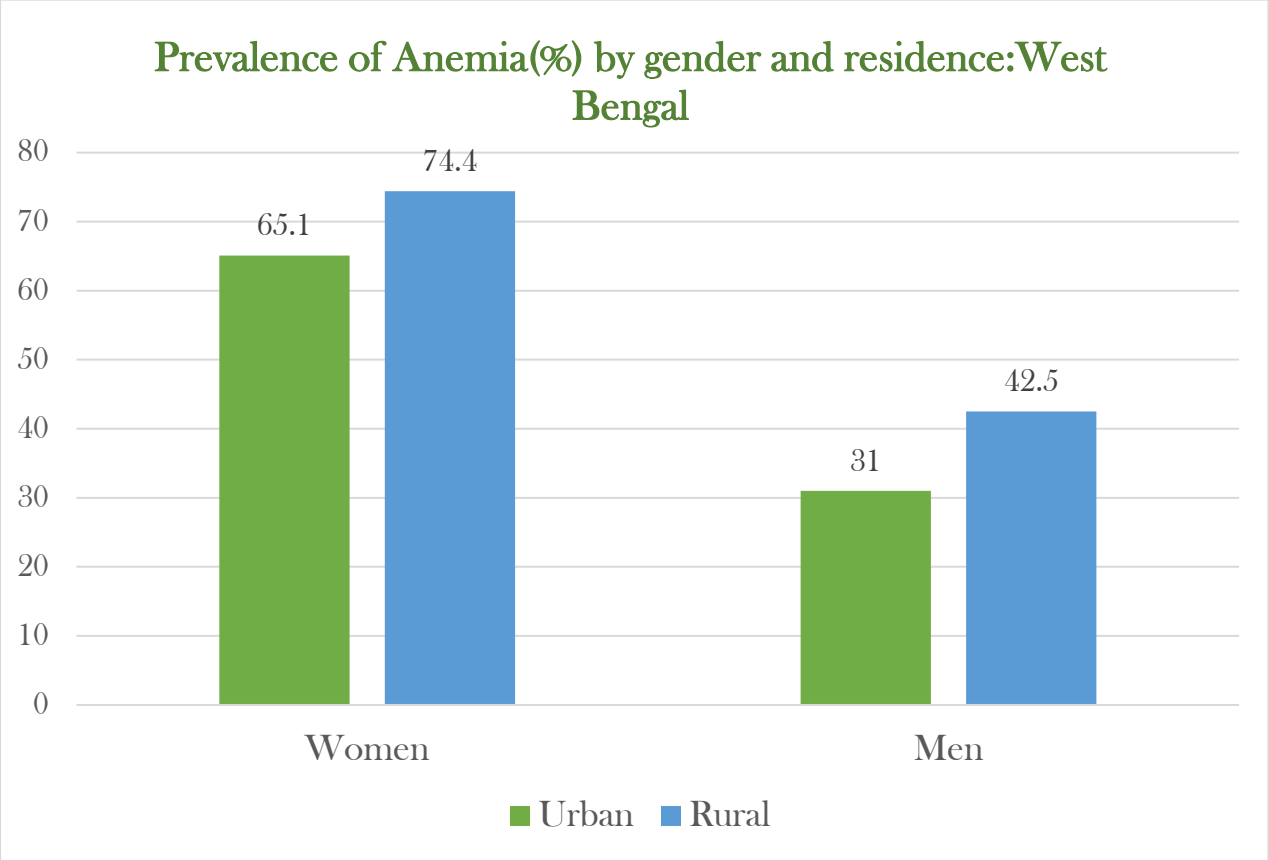


Fig-16: Prevalence of Anemia(%) by gender and residence: West Bengal

Interpretation:

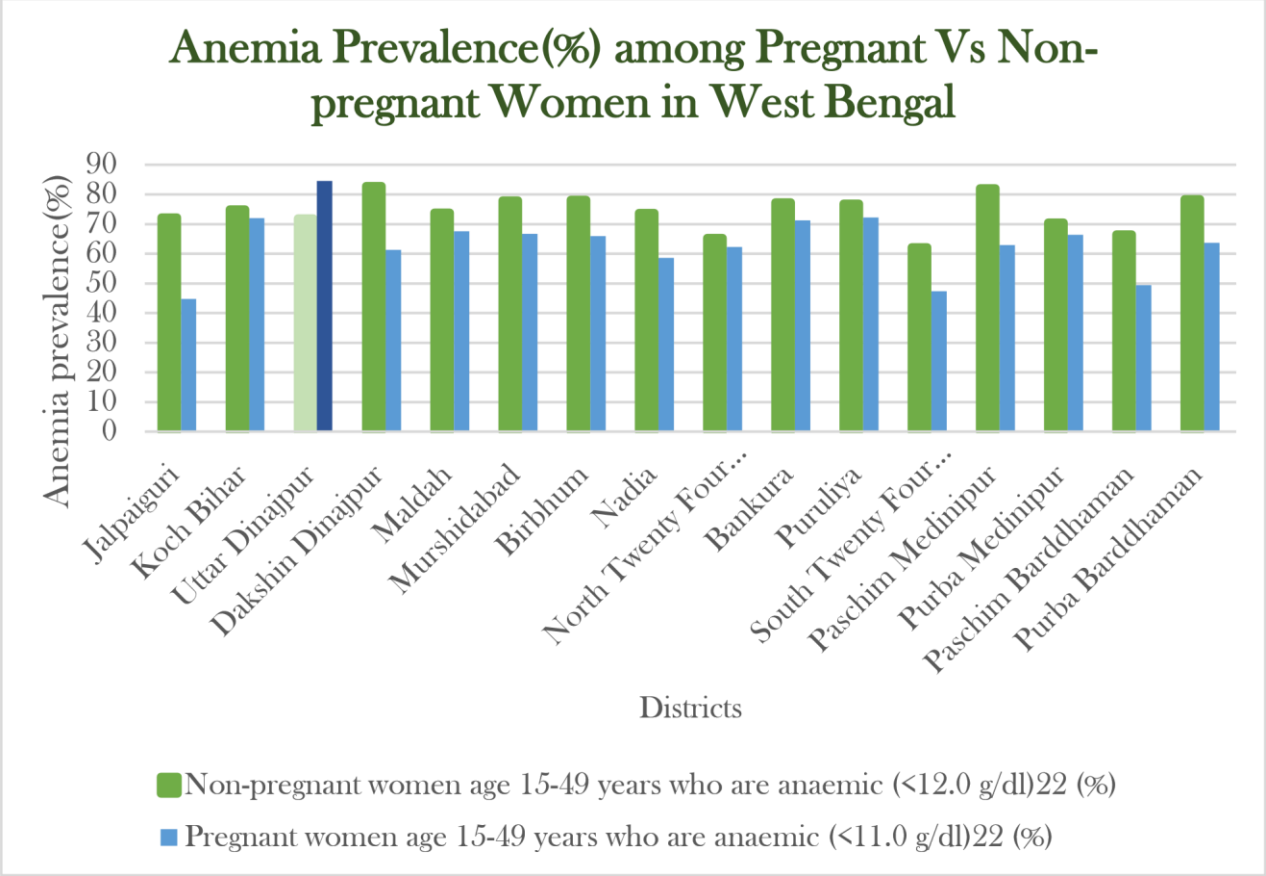
The bar chart illustrates the prevalence of anemia by gender and place of residence (urban vs. rural) in **West Bengal**. The data clearly shows that **rural populations are more affected by anemia** than their urban counterparts, with this pattern evident in both men and women. Among women, **74.4% in rural areas** are anemic compared to **65.1% in urban areas**, indicating a nearly **9 percentage point difference**. This suggests that rural women are at a significantly higher risk of anemia, likely due to limited access to nutrition, healthcare, and awareness.

Similarly, among men, **42.5% in rural areas** are anemic, compared to only **31% in urban areas**. While the overall anemia prevalence in men is lower than in

women, the urban–rural gap remains consistent, highlighting a persistent disparity in health outcomes based on residence.

These findings underscore the **critical need for region-specific health interventions** in rural areas of West Bengal. Improving nutritional programs, strengthening rural healthcare services, and increasing anemia awareness, especially among women, are essential steps to bridge this urban–rural health divide and reduce the overall anemia burden in the state.

Fig-17: Prevalence of Anemia among Pregnant and Non-Pregnant Women: West Bengal



N:B: Missing data for the districts of Darjeeling, Hooghly, Howrah, and Kolkata led to their exclusion from this analysis. The NFHS-5 dataset did not report anemia prevalence among pregnant women (15–49 years) for these areas.

Interpretation:

The bar chart presents the comparison of anemia prevalence between **pregnant and non-pregnant women aged 15–49 years** across various districts in **West Bengal**. Overall, the data reveals that **non-pregnant women tend to have a higher prevalence of anemia** than pregnant women in most districts. This trend may seem counterintuitive, but it is likely due to increased healthcare monitoring, supplementation, and nutritional interventions typically provided to pregnant women through maternal health programs.

For instance, in districts like **Jalpaiguri**, **South Twenty Four Parganas**, and **Paschim Bardhaman**, **Dakshin Dinajpur** Paschim Medinipur, where anemia among non-pregnant women is significantly higher than that of pregnant women—by more than **20 percentage points** in some cases. Similarly, in **Birbhum, Nadia** and **Murshidabad**, the non-pregnant group consistently shows a greater burden of anemia.

However, there are **exceptions** to this trend. Notably, in **Uttar Dinajpur** the prevalence of anemia is **slightly higher among pregnant women**, suggesting potential gaps in antenatal care or dietary intake in those areas. Some districts, such as **Purba Medinipur, North 24 Pargana, Koch bihar**, show more balanced levels of anemia between the two groups, though the overall prevalence still remains high.

The chart underscores the need to **extend anemia prevention strategies beyond pregnancy-focused interventions** and include non-pregnant women of reproductive age in nutritional programs. Given that non-pregnant women are not always the focus of public health efforts, these findings highlight a **critical gap** in anemia control that must be addressed to improve the overall health and well-being of women in West Bengal.

Discussion..

- **Kaur (2014)** found anemia prevalence among Indian women in the **55–65%** range, almost identical to my study **57% national** figure. They identify low dietary iron intake, poverty, and lack of awareness as major contributors, which your socio-economic analysis supports. My study adds new NFHS-5 evidence showing that education (literacy correlation **-0.33**) and sanitation (correlation **-0.42**) strongly influence anemia risk—factors only broadly mentioned in Kaur's review.
- **Pasricha et al. (2021)**paper reports national anemia prevalence of **57%** in women and stresses integrating anemia control with maternal and child health programs. In my study national figure matches closely, but My West Bengal results (**74.4% rural women**) are much higher. Both highlight insufficient progress toward national reduction targets. My analysis on non-pregnant women being more affected complements Pasricha's call for broader targeting beyond pregnancy-focused programs.
- **Finkelstein et al. (2019)**report **53%** anemia prevalence among Indian women, slightly lower than my study **57% national** result. This gap could reflect temporal differences, as your study uses NFHS-5 data. Both identify iron deficiency as the main cause, but your work provides a richer breakdown by age group, showing moderate anemia peaking at **30.1%** in ages 15–19. This age-specific insight is missing from Finkelstein's national averages.
- **MoHFW – I-NIPI Guidelines (2018, referenced in 2021 reports)** target to reduce anemia prevalence to **40%** by 2025, far below my measured **57% national** and **74.4% rural WB** levels. Both recognize supplementation, deworming, and health education as crucial. However, my results imply serious implementation challenges, particularly in rural and low-literacy populations. The persistence of high prevalence in states above the national average aligns with concerns in I-NIPI evaluations.
- **Balarajan et al. (2011)**Although older, this multi-country study reported **55%** prevalence among Indian women, which is close to national result but lower than My state-level peaks. Both studies emphasize socio-economic inequality and rural disadvantage. My findings confirm that these inequalities persist, with rural women in West Bengal facing anemia rates **over 9 percentage points higher** than urban women.
- **Sahu et al. (2007)** found anemia in **56%** of adolescent girls and **30%** of boys, showing a gender gap similar to my results for reproductive-age women (**57%**) and men (**25%**). My study extends these patterns into adulthood and provides updated evidence that rural–urban and pregnant–non-pregnant disparities remain.

Conclusion

From these study we can see that the prevalence of anemia among women (15–49 years) in India is 57.0%, while among men (15–49 years) it is 25.0%. Among women, 19 states (52.78%) had anemia prevalence below the national average, while 17 states (47.22%) were above it. For men, 25 states (69.44%) recorded anemia prevalence below the nationallevel, and 11 states (30.56%) were above among 36 states.

Anemia is more prevalent among rural populations compared to urban populations, for both men and women. Among the states, Ladakh displays an exceptionally high anemia prevalence for both genders, with women at 92.8%—the highest in the country—and men at 75.6%, also the highest among males. In stark contrast, Lakshadweep has the lowest prevalence among women at 36.3%, and Lakshadweep reports the lowest among men at just 5.6%. Non-pregnant women exhibit consistently higher anemia prevalence than pregnant women across most states, including the national level.

Among women, the prevalence of anemia remains consistently high across all age groups. The moderate form of anemia is the most common in every age category, peaking at 30.1% in the 15–19 age group, followed closely by other age groups. Mild anemia also shows a high and steady presence, hovering around 25–26% across the age groups. Severe anemia, although the least prevalent, still shows a noticeable presence, with a slightly increasing trend from 2.2% in the 20–29 group to 3.2% in the 40–49 group. Among men, anaemia is much less prevalent across all age groups, with mild anaemia being the most common. It peaks at 25.3% in adolescents (15–19 years), declines to 17.5% in the 20–29 group, and rises slightly in older ages. Moderate anaemia remains low (3.5%–5.5%), while severe anaemia is negligible, never exceeding 0.7%.

The chi-square test results indicate that several demographic and socio-economic factors are significantly associated with anemia among women in India (p-value < 0.05). These include age group, marital status, maternity status, birth order, and place of residence, with higher anemia prevalence observed among women in the reproductive age group, currently married, and those residing in rural areas. Educational level, religion, and caste/tribe also show significant associations, highlighting the role of social determinants in influencing anemia. Additionally, wealth quintile and smoking status are significantly linked, with higher anemia rates among women from lower-income groups and those who smoke. However, among men, all these factors except marital status show a statistically significant association with anemia.

The correlation analysis shows that literacy (-0.33) and schooling (-0.36) are significantly negatively correlated with anemia ($p < 0.01$), indicating lower anemia

rates with higher education. Undernutrition (low BMI) has a positive correlation (0.39), while overweight status shows a negative one (-0.26), both significant. Improved sanitation is also significantly linked to reduced anemia ($r = -0.42$, $p < 0.01$), whereas improved drinking water and family planning show no meaningful association. Overall, education, nutrition, and sanitation are key factors associated with anemia prevalence.

Anemia prevalence shows significant negative correlations with literacy, schooling, sanitation, and overweight BMI, while low BMI has a positive correlation. Family planning and improved drinking water show no significant association with anemia.

Anemia prevalence is consistently higher in West Bengal across all age groups and both genders compared to the national average. For instance, among women aged 40–49, the prevalence in West Bengal is 74.7%, significantly exceeding the national figure of 56.7%. Similarly, men in the same age group show a prevalence of 45.7% in West Bengal, compared to only 28.1% at the national level.

Anemia among women in West Bengal is widespread, but the burden is notably **higher in the North, Central, and Western regions**, whereas the **Metropolitan area shows relatively better outcomes.**

Prevalence of Anemia in rural areas than urban areas for both genders in West Bengal. Among women, 74.4% in rural areas are anemic compared to 65.1% in urban areas. For men, the rural prevalence is 42.5% versus 31% in urban areas. This highlights a consistent urban–rural disparity in anemia, with rural populations more affected.

Prevalence of Anemia between pregnant and non-pregnant women (15–49 years) across districts in West Bengal, showing higher anemia rates among non-pregnant women in most areas. This may be due to better healthcare and supplementation for pregnant women. Districts like Jalpaiguri and South 24 Parganas show a difference of over 20 percentage points. The findings highlight the need to target non-pregnant women in anemia prevention programs.

Limitation:

The analysis is restricted to variables available in the NFHS-5 dataset, potentially excluding other important determinants of anemia. Hemoglobin levels may be influenced by temporary health conditions or minor measurement errors, which could affect the classification of anemia in this study. Furthermore, regional variations in healthcare access, dietary habits, and cultural practices may contribute to differences in anemia prevalence, but these factors were not fully explored in the present analysis.

Recommendations:

- Although the government provides iron and folic acid supplements through schools and national programs, the prevalence of anaemia remains persistently high, particularly among women. There is a need to ensure timely supply, regular intake monitoring, and improved coverage of iron and folic acid supplements.
- Health workers should place greater focus and care on ensuring that nutritional interventions and antenatal care services reach all eligible women, especially those in rural and underserved areas.
- Iron supplementation programs should not be limited to government schools and facilities but should also be implemented in private schools, as anaemia prevalence is also high among adolescents.
- Community-level awareness programs should promote balanced diets rich in iron and educate about the role of sanitation and hygiene in preventing anaemia, particularly in rural and tribal regions.
- More more campaigns should be arranged of the community level to make aware of the current scenario and emphasize on the hidden risk for the future generation to come.

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Annexture:

Table 10.23.1 Prevalence of anaemia in women

Percentage of women age 15-49 with anaemia by background characteristics, India, 2019-21, and total for NFHS-4

Background characteristic	Women				
	Mild (11.0-11.9 g/dl)[1]	Moderate (8.0-10.9 g/dl)[2]	Severe (<8.0 g/dl)[3]	Any anaemia (<12.0 g/dl)[4]	Number of women
Age					
15-19	26.4	30.1	2.6	59.1	114,624
20-29	26.0	28.6	2.2	56.8	223,334
30-39	25.5	28.0	2.8	56.3	187,116
40-49	24.7	28.8	3.2	56.7	156,961
Marital status					
Never married	25.9	28.2	2.6	56.7	159,319
Currently married	25.6	28.8	2.6	57.0	493,831
Widowed	24.7	31.0	4.1	59.8	21,286
Divorced/separated/deserted	24.6	29.4	4.4	58.3	7,599
Maternity status					
Pregnant	24.4	26.3	1.4	52.2	25,802
Breastfeeding	27.1	31.5	2.0	60.6	96,147
Neither	25.4	28.4	2.8	56.6	560,086
Number of children ever born					
0	25.7	27.9	2.6	56.1	207,125
1	26.4	28.2	2.0	56.6	97,226
2-3	25.4	29.2	2.9	57.5	289,052
4-5	25.4	29.9	2.8	58.1	71,040
6 or more	25.6	29.6	3.0	58.2	17,592
Residence					
Urban	25.2	26.2	2.4	53.8	214,754
Rural	25.8	29.9	2.8	58.5	467,281
Schooling					
No schooling	25.5	30.8	3.1	59.4	154,874
<5 years complete	26.5	31.5	3.3	61.2	35,989
5-7 years complete	25.5	29.9	3.1	58.4	92,011
8-9 years complete	26.3	30.1	2.6	59.0	122,632
10-11 years complete	25.7	28.2	2.6	56.5	103,465
12 or more years complete	25.1	25.1	2.0	52.1	173,063
Religion					
Hindu	25.7	29.0	2.7	57.4	558,120
Muslim	26.0	27.5	2.0	55.6	89,591
Christian	23.7	24.6	2.8	51.1	16,039
Sikh	24.9	30.7	3.2	58.8	10,177
Buddhist/Neo-Buddhist	24.8	29.4	3.0	57.3	4,250
Jain	23.3	21.1	0.8	45.2	1,284
Other	28.4	34.8	2.2	65.5	2,574

Caste/tribe					
Scheduled caste	25.5	30.5	3.2	59.2	150,437
Scheduled tribe	26.4	35.2	3.0	64.6	64,528
Other backward class	25.3	26.8	2.5	54.6	292,922
Other	26.1	27.9	2.3	56.4	169,483
Don't know	26.7	32.0	2.9	61.7	4,666

Continued...

Table 10.23.1 Prevalence of anaemia in women—*Continued*

Percentage of women age 15-49 with anaemia by background characteristics, India, 2019-21, and total for NFHS-4

	Women				
Background characteristic	Mild (11.0-11.9 g/dl)[1]	Moderate (8.0-10.9 g/dl)[2]	Severe (<8.0 g/dl)[3]	Any anaemia (<12.0 g/dl)[4]	Number of women
Wealth quintile					
Lowest	27.2	33.7	2.8	63.7	128,028
Second	26.4	30.3	2.9	59.5	138,653
Middle	25.4	28.5	3.0	56.9	141,834
Fourth	24.8	26.9	2.6	54.4	141,999
Highest	24.5	24.5	2.0	51.0	131,522
Smoking status					
Smokes cigarettes/tobacco	24.8	34.2	4.5	63.5	27,983
Does not smoke	25.7	28.5	2.6	56.8	654,052
Total	25.6	28.7	2.7	57.0	682,035
NFHS-4 (2015-16)	24.7	26.0	2.4	53.1	679,445

Note: Table is based on women who stayed in the household the night before the interview. Prevalence is adjusted for altitude and for smoking status, if known, using the CDC formulas (Centers for Disease Control (CDC). 1998. Recommendations to prevent and control iron deficiency in the United States. Morbidity and Mortality Weekly Report 47 (RR-3): 1-29). Haemoglobin levels are shown in grams per decilitre (g/dl).

[1] For pregnant women, the value is 10.0-10.9 g/dl

[2] For pregnant women, the value is 7.0-9.9 g/dl

[3] For pregnant women, the value is <7.0 g/dl

[4] For pregnant women, the value is <11.0 g/dl

Table 10.23.2 Prevalence of anaemia in men

Percentage of men age 15-49 with anaemia by background characteristics, India, 2019-21

Background characteristic	Men				
	Mild (12.0-12.9 g/dl)	Moderate (9.0-11.9 g/dl)	Severe (<9.0 g/dl)	Any anaemia (<13.0 g/dl)	Number of men
Age					
15-19	25.3	5.5	0.3	31.1	14,915
20-29	17.5	3.5	0.3	21.3	25,861
30-39	18.5	4.1	0.3	22.9	23,990
40-49	22.0	5.4	0.7	28.1	20,055
Marital status					
Never married	20.5	4.3	0.3	25.2	32,867
Currently married	20.0	4.5	0.4	25.0	50,878
Widowed	23.2	7.2	0.3	30.8	403
Divorced/separated/deserted	21.0	3.6	0.9	25.5	673
Residence					
Urban	16.8	3.5	0.2	20.4	28,670
Rural	22.0	5.0	0.5	27.4	56,152
Schooling					
No schooling	25.3	6.1	0.6	32.0	9,243
<5 years complete	24.5	5.8	0.6	30.9	5,425
5-7 years complete	22.2	4.8	0.8	27.8	11,230
8-9 years complete	23.2	5.4	0.3	28.9	17,013
10-11 years complete	18.7	4.3	0.3	23.3	15,234
12 or more years complete	15.7	3.0	0.2	18.9	26,677
Religion					
Hindu	20.0	4.4	0.4	24.8	67,382
Muslim	22.6	4.9	0.2	27.8	13,071
Christian	15.5	2.5	0.3	18.3	2,235
Sikh	18.2	4.2	0.5	22.9	726
Buddhist/Neo-Buddhist	17.6	7.7	0.5	25.9	931
Jain	19.0	1.2	0.0	20.1	218
Other	22.0	1.5	0.3	23.8	259
Caste/tribe					
Scheduled caste	20.9	4.8	0.4	26.1	17,455
Scheduled tribe	26.3	5.9	0.5	32.7	7,904
Other backward class	18.2	4.0	0.4	22.6	35,442
Other	20.6	4.5	0.4	25.5	23,561
Don't know	24.1	3.1	0.2	27.5	461

Continued...

Table 10.23.2 Prevalence of anaemia in men—*Continued*

Percentage of men age 15-49 with anaemia by background characteristics, India, 2019-21

Background characteristic	Men				Number of men
	Mild (12.0-12.9 g/dl)	Moderate (9.0-11.9 g/dl)	Severe (<9.0 g/dl)	Any anaemia (<13.0 g/dl)	
Wealth quintile					
Lowest	28.7	6.5	0.7	35.9	14,528
Second	22.7	5.3	0.5	28.6	17,169
Middle	19.3	4.2	0.4	23.9	18,345
Fourth	16.8	3.6	0.2	20.6	18,716
Highest	14.9	3.0	0.1	18.0	16,064
Smoking status					
Smokes cigarettes/tobacco	21.8	5.2	0.6	27.6	34,045
Does not smoke	19.2	4.0	0.3	23.4	50,777
Total age 15-49	20.2	4.5	0.4	25.1	84,822
Age 50-54	24.0	7.2	0.9	32.1	7,998
Total age 15-54	20.5	4.7	0.4	25.7	92,820

Note: Table is based on men who stayed in the household the night before the interview. Prevalence is adjusted for altitude and for smoking status, if known, using the CDC formulas (Centers for Disease Control (CDC). 1998. Recommendations to prevent and control iron deficiency in the United States. Morbidity and Mortality Weekly Report 47 (RR-3): 1-29). Haemoglobin levels are shown in grams per decilitre (g/dl).