Understanding the Prevalence of Anemia among Indian Women: Analyzing the National Family Health Survey 3, 4, and 5

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Anemia has been a public health concern in women that reach the reproductive age in India. While the National Family Health Survey (NFHS) data provides important information on the spread of anemia, comparisons across survey rounds and demographic groups remain very less. This study examines already published data estimates from NFHS-3 (2005-06), NFHS-4 (2015-16), and NFHS-5 (2019-21) in Indian women aged 15-49 years. Patterns were studied across various age groups, religion, wealth quintiles, and geographic regions using in depth analyses of already obtained prevalence estimates. The findings indicate a great amount of variation in anemia across demographic and socioeconomic groups and a lot of geographic heterogeneity across Indian states and regions. Much greater prevalence was observed among younger women, economically disadvantaged groups, and several eastern, central, and northeastern states. Because anemia based data differed between NFHS-3/NFHS-4 and NFHS-5, severity-specific comparisons should be studied carefully in the future. The study points out multiple and repeated inequalities in anemia burden and stresses the importance of continued surveillance using nationally representative data. These findings may help develop nutrition and public health strategies for the future which will be aimed at reducing anemia among Indian women.

Keywords: anemia, India, national family health survey, women, public health

Introduction

India has the maximum number of people affected by anemia in the world, and its growing existence is concerning to the public health system. In spite of many efforts undertaken, the national burden remains high, with 57% of women affected according to NFHS-5, nearly double the global average[1]. Although anemia spread is highest in Africa and lowest in Europe and the United States, India still continues to report higher rates than several lower-income countries[2]. These differences in interpretation suggest that a closer examination of nationally representative data is necessary to better understand the epidemiological gaps.

Impacts of Anemia

Anemia has a large number of impacts: physical and neurological complications[3], adverse maternal and perinatal outcomes[4], and increased morbidity and mortality[5] to name a few. These eventually impact several Sustainable Development Goals (SDGs), as well as healthcare expenditure, educational outcomes, gender equality, and labor productivity[6–8]. As a result if the national burden is reduced it can produce many cross-sectional benefits beyond public health alone. Anemia also affects maternal health, and is associated with 16,800 to 28,000 deaths annually among reproductive-age women[9]. One form of anemia is Iron deficiency, or Iron-deficiency Anemia (IDA). It is the major cause of anemia around the world. Common causes of IDA are inadequate dietary iron intake, menstrual blood loss, gastrointestinal bleeding, and decreased iron absorption[10]. Other forms of anemia may also include Vitamin B12-Deficiency Anemia, Folate-Deficiency Anemia, Aplastic Anemia, Hemolytic Anemia, Sickle Cell Anemia, and Thalassemia.

Clinically the presentation of anemia differs according to level of severity. Mild anemia does not show any symptoms whereas moderate to severe anemia typically is associated with fatigue, weakness, shortness of breath, and palpitations[10]. Anemia is typically analysed using the measurements of hemoglobin concentration. The anemia severity is classified by the NFHS survey on the basis of established hemoglobin thresholds, helping in population-level monitoring across demographic groups.

Factors Affecting Anemia

Age is a very important demographic factor associated with spread of anemia, although the way it affects depends on population and reproductive status. A study examining women

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from 15 low- and middle-income countries found a large amount of difference in anemia frequency of occurrence and trends across countries between 2000 and 2018. In India, research using NFHS data has found out multiple times adolescents and younger women as groups with higher reported prevalence numbers. A study of young married women found anemia prevalence of 55.3% among younger women, compared with lower prevalence in older age groups [11].

Religion has been found to be a sociodemographic factor associated with anemia prevalence. However, evidence has not been able to establish religious association as a cause for the disease. Differences between religious communities show many intersecting socioeconomic conditions, dietary practices, educational attainment, geographical residence, and healthcare access. A 2025 analysis conducted on Muslim women in India, using four NFHS rounds from 1998 to 2021, showed an increase in anemia prevalence from 48.77% to approximately 55.6%. The study also found inconsistencies according to age, wealth, education, and geographical region [12].

Household wealth is another factor that acts like a socioeconomic determinant of anemia. Women living in poverty get less access to iron-rich and nutritious foods, healthcare services, sanitation, and timely diagnosis and treatment. A multicountry analysis of more than one million women from 15 low- and middle-income countries identified socioeconomic and nutritional factors as important factors that led to differences in the existence of anemia. More detailed evidence also indicated that positive changes in household wealth, education, sanitation, and access to nutritive foods can lead to reductions in anemia, although the importance of individual factors differs between settings [13].

Geographical variation in spread or existence of anemia is strongly visible both internationally and within individual countries. The World Health Organization estimated that 29.9% of women aged 15–49 years worldwide were affected by anemia in 2019, with massive variation across countries and population groups [14].

Overall, the findings have strongly shown the importance of demographic, socioeconomic, and geographical inequalities in the spread of anemia among Indian women. Planned nutritional support, readily available screening, appropriate treatment, and public health strategies specific to regions may help address the unequal burden. However, differences in how surveys were conducted , missing observations, and the transitional nature of NFHS data should be considered before making conclusions about causes or long-term changes.

Reason for Research and Review

Although the NFHS reports give information of anemia spread in India, comparisons between many survey rounds and demographic subgroups have not been presented in a single descriptive framework. This study talks about that gap by analyzing published prevalence estimates from NFHS-3, NFHS-4, and NFHS-5 among women aged 15-49 years [15]. The objectives of the study were:

1. To describe the prevalence of anemia across three NFHS survey rounds,
2. To compare the spread of anemia across age groups, religions, wealth quintiles, and geographic regions,
3. To identify demographic and geographic patterns as observed through reports in estimates that exist.

The study is very detailed and does not try to establish causal relationships or determine independent risk factors for anemia. This study in fact provides a comparative overview of patterns observed across survey rounds and population groups.

Methods

Research Design and Data Characteristics

This study looks at the occurrence of anemia among Indian women aged 15–49 years using data from NFHS-3 (2005–06), NFHS-4 (2015–16), and NFHS-5 (2019–21). The analysis looks at data across age groups, religious communities, household wealth quintiles, and geographical regions, including states and union territories. The study also uses detailed comparisons and graphical representations to examine differences across survey rounds and demographic groups. The way anemia was classified needs immediate attention because the haemoglobin concentration thresholds used for non-pregnant women were different between NFHS-3/NFHS-4 and NFHS-5. Under the earlier classification, mild anaemia was defined as 10.0–11.9 g/dL, moderate anaemia as 7.0–9.9 g/dL, and severe anaemia as below 7.0 g/dL. Under the revised NFHS-5 classification, mild anaemia was defined as 11.0–11.9 g/dL, moderate anaemia as 8.0–10.9 g/dL, and severe anaemia as below 8.0 g/dL. These differences have reduced the direct comparability of severity-specific estimates across survey rounds. Because this study relied on published prevalence estimates from NFHS reports, recalculation using harmonized severity thresholds was not done. Therefore, comparisons of moderate and severe anemia across survey rounds are presented in detail and analysed with utmost attention.

Data Analysis

Data extracted from NFHS-3, NFHS-4, and NFHS-5 reports was arranged according to age group, religion, wealth quintile, and geographic region. Furthermore, the analyses consisted of descriptive comparisons of published prevalence estimates across survey rounds. In this study, results are presented

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through graphs. The summary descriptions have been used to show differences between demographic groups and temporal patterns across survey rounds. No survey-weighted regression analyses or inferential statistical tests were conducted because the study was dependent on published aggregate prevalence estimates rather than individual-level NFHS microdata. At the same time, findings should be interpreted as descriptive rather than causal.

Results

The figures below summarize reported prevalence estimates of moderate and severe anemia among women aged 15-49 years across NFHS-3, NFHS-4, and NFHS-5. Results are presented according to age, religion, wealth quintile, and geographic region.

Because anemia severity thresholds differ between NFHS-3/NFHS-4 and NFHS-5, direct comparisons of moderate and severe anemia prevalence across survey rounds have to be analyzed carefully . The differences that were observed reflect both underlying population changes and modifications in classification criteria. Therefore, severity-specific findings should be considered as detailed observations rather than evidence of a specific temporal change in anemia severity.

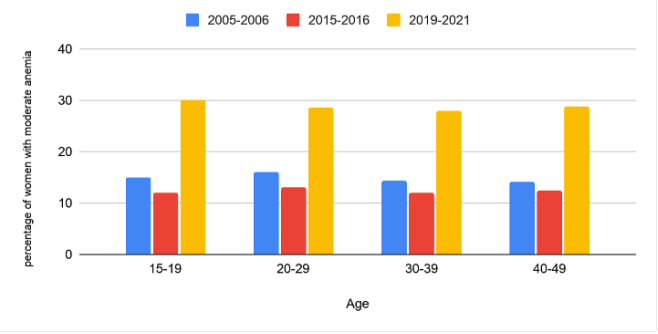

Figure. 1 Existence of anemia in women aged 15-49 years by age group in NFHS-3, NFHS-4, and NFHS-5. Values represent the reported estimates from each survey round. Direct comparison of moderate and severe anemia existence across NFHS-3, NFHS-4, and NFHS-5 should be interpreted with care because anemia severity classifications are different across survey rounds. Therefore, severity-specific findings are presented primarily as descriptive comparisons.

Figure 1 shows that NFHS-5 showed the highest rates, with a little decline observed with increasing age, from approximately 30% to 28% between lower to higher age brackets. On the other hand, anemia rates were very low in NFHS-4, and the highest values concentrated within the 20–29 age group (13%). Similarly, in NFHS-3, the highest prevalent data was concentrated within the 20–29 age group (16%), although it was a little bit higher than NFHS-4.

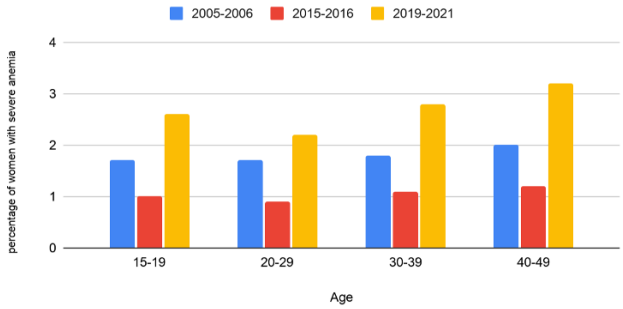

Figure. 2 Comparison of anemia prevalence across age groups among women aged 15-49 years. Differences should be interpreted as descriptive comparisons of reported survey estimates.

Figure 2 shows that severe anemia is highest among the 40–49 age group, reaching 3.2% in NFHS-5. Severe anemia prevalence estimates were generally lower in NFHS-4 than in NFHS-3 and NFHS-5 across most age groups. Values reported in Figure 2 should be interpreted directly from the survey estimates presented in the figure.

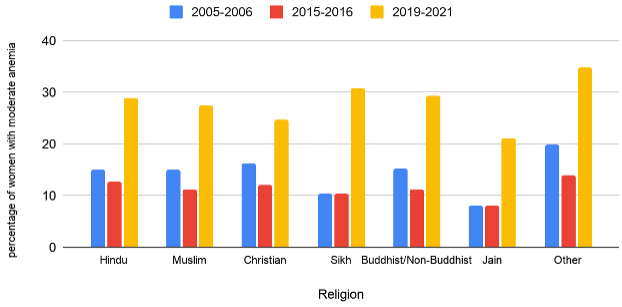

Figure. 3 Graphical representation of prevalence of moderate anemia among different religious groups in NFHS-3, NFHS-4, and NFHS-5.

Figure 3 shows an increase as the time increases, highest in NFHS-5 and lowest in NFHS-4. Variation in the data was seen in many religious groups. In NFHS-5, the category named 'Other' showed the highest prevalence numbers in the categories represented. However, the women classified under 'other' religions contribute significant share across all survey periods. In contrast, the least existence of anemia cases was reported among Jain women, with consistently low rates in NFHS-3 and NFHS-4 (approximately 8%), but sharply rising in NFHS-5 (21.1%).

Figure 4 indicates that most of the religious groups showed higher prevalence estimates in NFHS-5 than in earlier survey rounds, although patterns were not uniform across all categories. Highest severe anemia prevalence was recorded in

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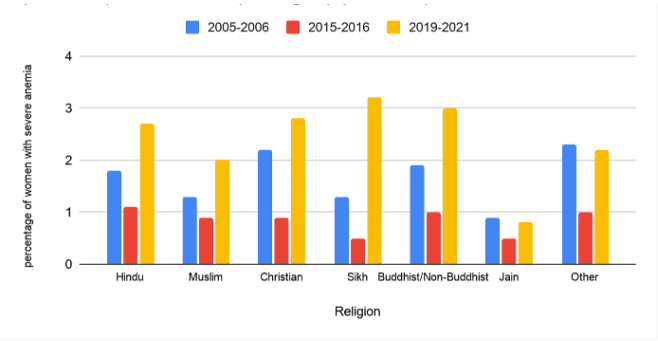

Figure. 4 Graphical representation of presence of severe anemia in different religious groups in NFHS-3, NFHS-4, and NFHS-5.

NFHS-5 and lowest in NFHS-4. Sikh women showed the maximum prevalence in NFHS-5. But, Christian, Hindu, and Buddhist women in total showed prevalence in NFHS-3, NFHS-4, and NFHS-5 which was very high. On the other hand, Jains showed the lowest anemic rates: which were under 1% between all three survey periods.

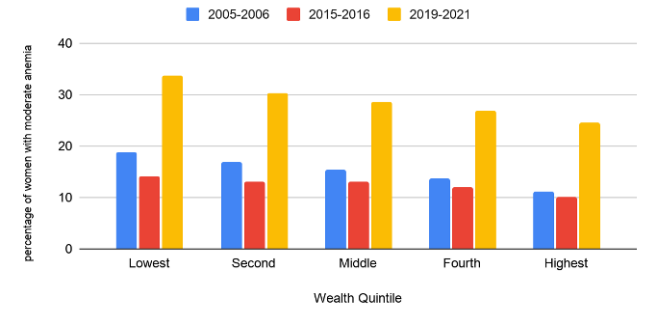

Figure. 5 Graphical representation of prevalence of moderate anemia among women from different wealth quintiles in NFHS-3, NFHS-4, and NFHS-5.

Figure 5 Lower wealth quintiles generally reported higher prevalence estimates than higher wealth quintiles across survey rounds. Moderate anemia prevalence across wealth quintiles has increased in recent years, with its lowest point recorded in NFHS-4 but peaking in NFHS-5. The lowest wealth quintile recorded the highest reported prevalence estimates across survey rounds.

Direct comparisons of moderate and severe anemia prevalence are limited by differences in anemia classification criteria between NFHS-3/NFHS-4 and NFHS-5.

Figure 6 shows a rise across the wealth quintile, with lowest prevalence in NFHS-4, and marginal declines across the wealth quintiles, before peaking in NFHS-5. NFHS-5 reported higher prevalence estimates for moderate anemia than previous survey rounds across several wealth categories. However,

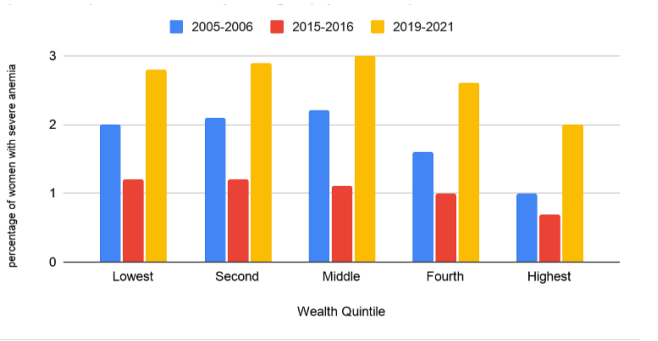

Figure. 6 Reported prevalence of moderate and severe anemia across household wealth quintiles in NFHS-3, NFHS-4, and NFHS-5. Comparisons of severity-specific prevalence should be interpreted with caution because anemia severity classifications differed across survey rounds.

direct severity-specific comparisons should be interpreted cautiously because anemia classification criteria differed across NFHS rounds.The middle wealth quintile records the highest severe anemia rate collectively, reaching 3% in NFHS-5. NFHS-5 reported higher prevalence estimates than NFHS-4 across several wealth categories; however, differences in severity classifications between survey rounds limit direct comparisons

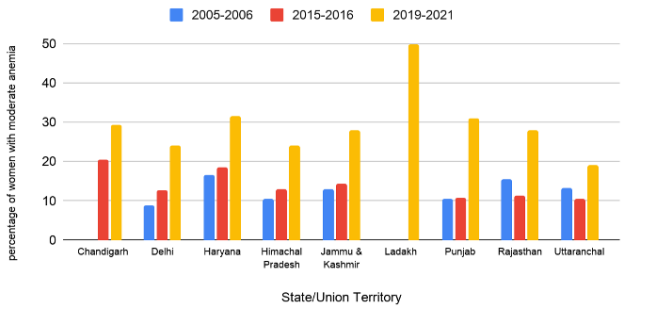

Figure. 7 State - and union territory-level variation in reported anemia prevalence among women aged 15–49 years across NFHS survey rounds. The figure presents descriptive comparisons of reported prevalence estimates across survey rounds.

Figure 7 Regional variation in anemia prevalence was observed across all survey rounds. Because anemia severity classifications differed between NFHS-3, NFHS-4, and NFHS-5, differences in moderate and severe anemia prevalence should be interpreted as descriptive comparisons rather than evidence of descriptive patterns.

Figure 8 shows that severe anemia prevalence increased between NFHS-3 and NFHS-5. Increases were seen in Haryana (1.7% to 4%), Delhi (1% to 3%), and Punjab (1.5% to 3.5%). Ladakh reported markedly higher prevalence estimates than

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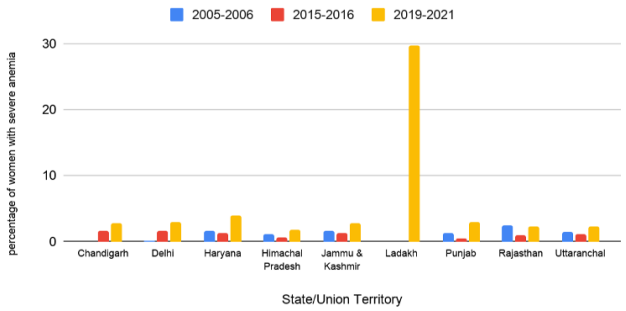

Figure. 8 Graphical representation of severe anemia among women who reside in northern states of India in NFHS-3, NFHS-4, and NFHS-5.

other jurisdictions in NFHS-5, although comparisons with earlier survey rounds are limited due to unavailable historical data.

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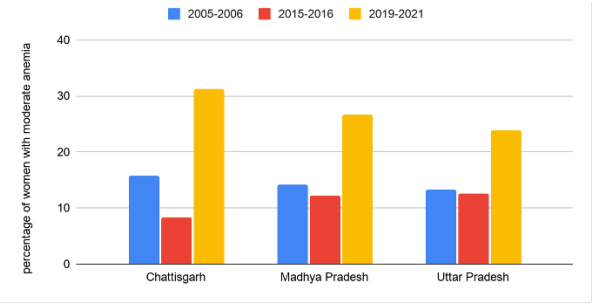

Figure. 9 Graphical representation of moderate anemia among women in central states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 9 shows a sharp increase across all three Central Indian states. Chhattisgarh stands apart due to a pronounced mid-period decline compared to the other two states. However, despite a dip to 8.4% in NFHS-4, Chhattisgarh reported the steepest rise between NFHS-3 and NFHS-5 (15.6% to 31.3%). Madhya Pradesh and Uttar Pradesh follow a steadier upward path without a notable mid-period decline, rising from 14% and 13% in NFHS-3 to 26.5% and 23.7% in NFHS-5 respectively.

Figure 10 Regional variation was observed across the survey rounds. Because anemia severity classifications differed between NFHS-3, NFHS-4, and NFHS-5, differences in moderate and severe anemia prevalence should be interpreted as descriptive comparisons rather than evidence of changing patterns.

Figure 11 shows sharp overall increases. West Bengal noted the highest prevalence in NFHS-5 (39%). The increase

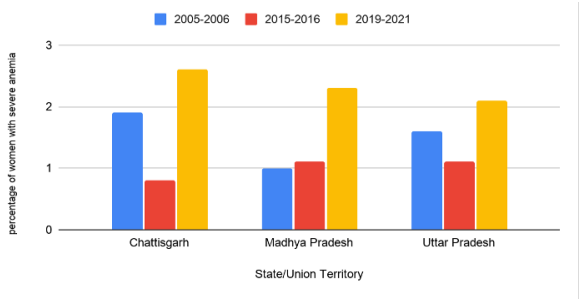

Figure. 10 Distribution of moderate and severe anemia prevalence estimates across geographic regions in NFHS survey rounds. Findings should be interpreted as descriptive comparisons because anemia severity classifications differed between survey rounds. Differences observed across survey rounds may reflect both variation in population prevalence and changes in severity classification criteria.

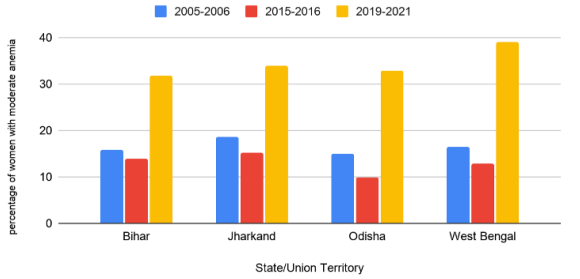

Figure. 11 Graphical representation of prevalence of moderate anemia among women residing in eastern states of India in NFHS-3, NFHS-4, and NFHS-5.

between NFHS-4 and NFHS-5 was most pronounced in West Bengal and Odisha, whereas Bihar and Jharkhand experienced substantial increases but to a slightly lesser extent.

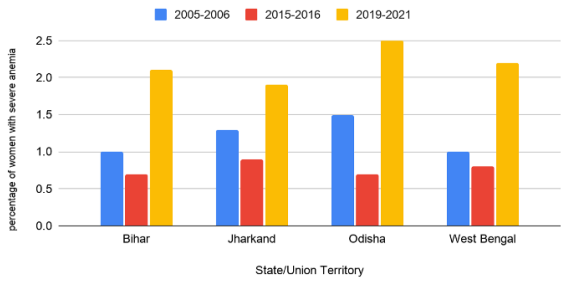

Figure. 12 Graphical representation of severe anemia among women residing in eastern states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 12 shows a consistent higher prevalence estimate. In contrast to the pattern observed for moderate anemia, Odisha recorded the highest overall prevalence of severe anemia in

NFHS-5 (2.5%) despite recording the lowest prevalence in the region during NFHS-4 (0.7%). West Bengal and Bihar also report high severe anemia prevalence, exceeding 2% in NFHS-5.

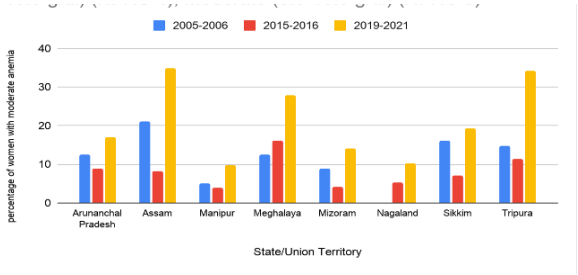

Figure. 13 Graphical representation of moderate anemia among women in north-eastern states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 13 shows moderate anemia across Northeast India climbing steeply in NFHS-5, with Assam and Tripura, despite both dipping to around 8% and 11% in NFHS-4, recording the largest jump in NFHS-5: 35% and 34% respectively. Meghalaya shows a steadier rise, from 12.5% in NFHS-3 to nearly 28% NFHS-5, and is the only state where the NFHS-4 figure exceeds NFHS-3. Simply put, it is the only state without a mid-point dip. Nagaland has no recorded data for NFHS-3, but prevalence more than doubles between the later two rounds (4.9% to 10.3%). Despite this shared upward observed pattern, the Northeast's overall moderate anemia burden is somewhat lower than Central or South India, and in most states—Assam and Tripura being the exceptions—prevalence ranged between 10%–20% even at their highest in NFHS-5.

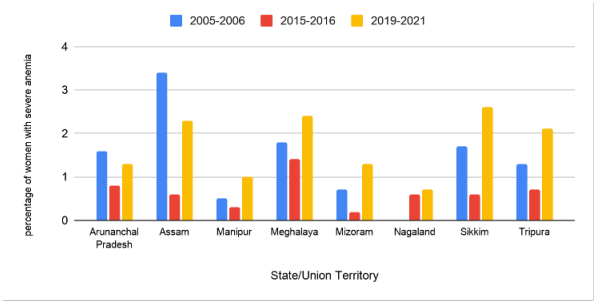

Figure. 14 Graphical representation of severe anemia among women in north-eastern states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 14 shows that trends across Northeast India differ from other regions. While Assam experienced the sharpest decline between NFHS-3 and NFHS-5 (3.4% to 2.3%), the mid-period drop in NFHS-4 was still substantially lower (0.6%). Sikkim and Meghalaya, by contrast, report rising prevalence across all three rounds, peaking at 2.6% and 2.4% in NFHS-5 respectively. Nagaland has no recorded figure for NFHS-3, though prevalence rose modestly (0.6% to 0.8%). Unlike North Indian states, Northeast India does not follow a uniform observed pattern, with several states like Assam and Manipur, recording lower or comparable severe anemia rates in NFHS-5 relative to NFHS-3.

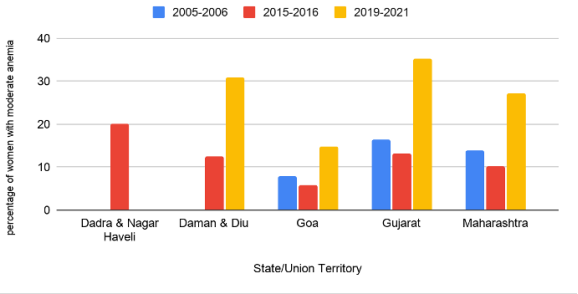

Figure. 15 Graphical representation of moderate anemia among women in western states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 15 shows an upward pattern across West India. Gujarat leads with the highest prevalence of moderate anemia, rising from 16.5% to 35.2% between NFHS-3 and NFHS-5. Dadra and Nagar Haveli follow with a high prevalence rate in NFHS-4 (20%), however there is no available data of previous or later years for comparison. Goa consistently reported the lowest prevalence: 7.8%, 5.8%, and 14.8% in NFHS-3, NFHS-4, and NFHS-5 respectively.

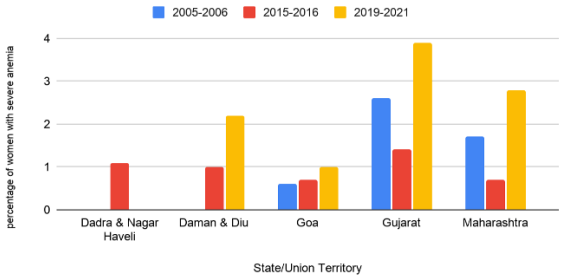

Figure. 16 Graphical representation of severe anemia among women in western states of India in NFHS-3, NFHS-4, and NFHS-5.

Figure 16 shows Gujarat again and again recording the highest rates, rising from 2.6% in NFHS-3 to nearly 3.9% in NFHS-5, in spite of a drop to 1.4% in NFHS-4. Maharashtra follows a similar dip-and-rise pattern, peaking at 2.8% in NFHS-5. Goa continued to be the most stable state, with prevalence between 0.6–1.0% throughout survey times. Daman and Diu recorded the sharpest proportional increase, doubling to 2.2% in NFHS-5. This dip-and-rebound pattern establishes Western India being much different from other re-

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gions, where increases are more linear.

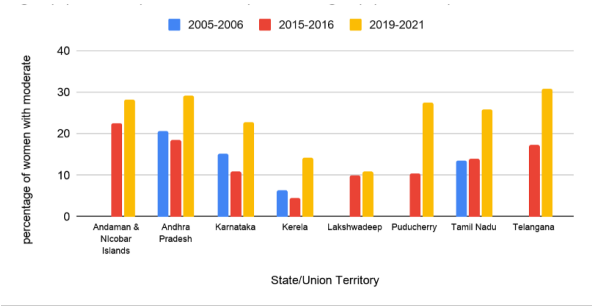

Figure. 17 Graphical representation of moderate anemia among women in southern states of India in NFHS-3, NFHS-4, and NFHS-5. Regional comparison of reported anemia prevalence estimates across NFHS survey rounds. Observed differences show descriptive patterns in the survey data that is already available.

Figure 17 climbs sharply in NFHS-5, mirroring the broader national pattern. Andhra Pradesh and Telangana post the steepest rises, at approximately 29% and 31% respectively. Tamil Nadu and Puducherry show very close values at 26% and 27%. Karnataka increased its prevalence rate, from 11% to 23% between NFHS-4 and NFHS-5, while Kerala without any change reported the lowest prevalence across all three rounds, but had an observable massive rise in the latest round: from just 4% in NFHS-4 to 14% in NFHS-5. Comparisons involving some states and union territories should be interpreted carefully because administrative boundary changes and reporting differences may change the comparability across survey rounds. In total, nearly every state and union territory showed the highest moderate anemia existence in the most recent survey round.

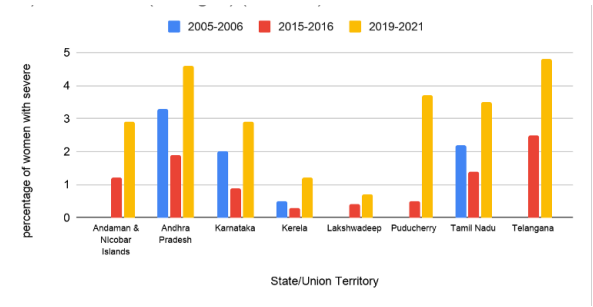

Figure. 18 Summary comparison of anemia prevalence estimates across regions and NFHS survey rounds. Higher reported prevalence estimates in some regions during NFHS-5 should be interpreted within the context of survey and classification differences across rounds.

Figure 18 indicates generally higher reported prevalence estimates in NFHS-5 relative to earlier survey rounds. Telangana records the highest prevalence in NFHS-5 (4.8%), while prevalence in Andhra Pradesh rose from 3.3% to 4.6% from NFHS-3 to NFHS-5. Kerala consistently reports the region's lowest prevalence rates, not exceeding 1.2% even in the latest round.

The interpretation of changes in moderate and severe anaemia across the three NFHS rounds requires consideration of the differences in classification thresholds. In NFHS-5, the haemoglobin concentration levels for moderate and severe anaemia throughout non-pregnant women were changed or worked upon again in comparison with those used in NFHS-3 and NFHS-4. Consequently, some women classified as mildly anaemic under the earlier classification may be classified as moderately anaemic under the NFHS-5 classification. These limits guide the comparisons of severity-specific prevalence estimates obtained from the original survey classifications. Therefore, any conclusions about increases or decreases in moderate or severe anaemia should be concluded on numbers that have been recalculated using consistent values across all three survey rounds.

Discussion

Three rounds of the National Family Health Survey, spanning 2005–06 to 2019–21, were looked into to analyze reported anaemia prevalence among Indian women aged 15–49 years. The results describe differences across survey rounds and demographic groups, including age, religion, household wealth quintile, and geographical region. However, the conclusive analysis of changes in moderate and severe anaemia needs attention because the classification thresholds for non-pregnant women changed in NFHS-5. Differences in severity-specific prevalence may show changes in classification as well as differences in the related haemoglobin distribution. The observations should not be assumed as showing a shift towards more severe anaemia unless the prevalence estimates have been recalculated using consistent thresholds across all three survey rounds. Several key patterns have been found. Firstly, a large amount of geographic variation was observed, with highest anemia prevalence distributed across states. Ladakh (North), Chhattisgarh (Central), West Bengal and Odisha (East), Assam and Tripura (Northeast), Gujarat (West), and Telangana and Andhra Pradesh (South), all reported high anemia levels during NFHS-5[16]. Das et al.[17] identifies several socioeconomic factors—poverty, caste, rural residence, lower educational levels, and poor nutritional status—asassociated overlapping determinants. As these unwanted changes are shared across geographically distinct states, they may account for the epidemiological dispersion.

Secondly, distinct age-related patterns were seen, anemia prevalence varied modestly across age groups, with NFHS-5 showing slightly higher prevalence estimates than NFHS-4 in all age categories. Higher iron requirements during adoles-

cence and reproductive years may relate to anemia dominance among younger women; however, the present study did not examine biological mechanisms directly [18,19].

These findings also support the research of Kumari [20] who identifies adolescent girls as a group with higher reported existence estimates for IDA. Very strong socioeconomic disparities were also noted. Moderate anemia was most prevalent among women in the lowest wealth quintile, whereas severe anemia was highest among those in the middle wealth quintile. This pattern is in line with previous studies, including Jha et al [21]. They identified socioeconomic variables, like low income, maternal illiteracy, and poor dietary diversity, as strong contributors to IDA among adolescent girls; Gore et al [22]. concluded that without improvements in literacy, employment, household income, and nutritional status, supplementation remains ineffective. At the population level, Ghosal et al [23]., further indicates that anemia is disproportionately concentrated among socially and economically disadvantaged groups, particularly tribal women.

Estimates for smaller religious groups should be interpreted with caution as they had smaller sample sizes.

Methodological factors and limitations should also be considered when looking at or analyzing these findings. Differences throughout many survey rounds, including changes in severity classifications, hemoglobin measurement protocols, analytical instruments, adjustment methods, and quality-control procedures, should be considered when interpreting differences in reported prevalence estimates. Ongoing surveys, including the Diet and Biomarkers Survey in India (DABS-1) based on venous blood sampling can provide more support for these relationships. Several national initiatives, including the National Iron Plus Initiative, Weekly Iron and Folic Acid Supplementation programme, Anemia Mukt Bharat, and food-fortification strategies, have helped to reduce the burden of anemia in India. The findings presented in this study provide detailed evidence that anemia remains a substantial public health concern among Indian women. However, the present analysis cannot determine the effectiveness of specific programmes because it relies on aggregated prevalence estimates from repeated cross-sectional surveys. Future studies using individual-level data and appropriate analytical methods are needed to evaluate the factors contributing to observed patterns and to assess the impact of public health interventions.

Limitations

This study has several limitations. First, all analyses and interpretations were based on aggregated prevalence estimates reported in NFHS publications rather than individual-level personal survey data. Consequently, the regression analyses and causal inference were not possible and could not be done. Second, anemia severity classifications differed between NFHS-3/NFHS-4 and NFHS-5, reducing the direct comparison of severity related data analysis that was done. Third, administrative boundary changes and reporting differences may affect comparison between some states and union territories throughout survey rounds. Finally, because NFHS surveys are a repeated set of cross section surveys, findings show or imply population-level studies rather than changes among individuals.

Conclusion

This study compared published anemia prevalence estimates among Indian women aged 15–49 years across NFHS-3, NFHS-4, and NFHS-5. Very strong variation was observed across age groups, socioeconomic strata, religious communities, and geographic regions. The analysis is based on published data and should be interpreted in detail. Differences in how severe anemia is throughout the survey, administrative boundary changes, and the repeated cross-sectional nature of the surveys limit direct comparison of severity-specific prevalence estimates and prevent cause related conclusions. Future research using aligned classifications and individual-level NFHS data may provide a more robust assessment of determinants and trends.

Several limitations should be considered when interpreting the results. First, the analysis relied on published aggregate estimates rather than individual-level survey data. Second, the statistics for anemia severity differed between NFHS-3/NFHS-4 and NFHS-5, limiting direct comparison of severity-specific prevalence estimates. Third, the administrative boundary changes and missing observations for some states and union territories have shown an effect on comparison across survey rounds. Finally, the study is mainly based on repeated cross-sectional surveys and so they cannot analyze individual-level changes over time or establish causal relationships.

Future research should use more defined anemia classifications and individual-level NFHS data to better understand demographic differences and evaluate determinants of anemia across India. These efforts would help the evidence base for targeted and effective anemia-control policies and programmes in the future.

Data Sources

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Supplementary information

The online version contains supplementary material available at https://nhsjs.com/?p=63875