



# Regional Variations and Trends in Anaemia Prevalence among Men in India: Insights from National Family Health Survey 2015-16 and 2019-21

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## KEYWORDS

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## ABSTRACT:

**Introduction-** Anaemia emerges as a critical public health issue across the globe, affecting nations both advanced and developing. Its hallmark is a deficiency in haemoglobin or red blood cells. Notably, while the spotlight often shines on anaemia in women and children, the condition's impact on men, particularly within India, has garnered less focus.

**Aim-** This detailed study endeavours to shed light on the regional differences and evolving patterns of anaemia prevalence among men aged 15-49 years across India's diverse states and union territories, drawing upon data from the National Family Health Survey (NFHS-4 and NFHS-5).

**Material and method-** To investigate the regional variations and trends in anaemia prevalence among men aged 15-49 years across India, leveraging data from the National Family Health Survey (NFHS) rounds 4 (2015-16) and 5 (2019-21). The study's used the approach to provide a nuanced understanding of anaemia's impact on this demographic, with a particular focus on identifying geographic disparities and shifts over time.

**Results-** The paper highlights the regions with persistently high or low prevalence rates and identifies areas that have experienced significant changes in anaemia prevalence among men between the two surveys. Additionally, it explores the observed variations and discusses the implications for public health policies and interventions.

**Conclusion-** The findings underscore the need for targeted, regionally tailored approaches to combat the anaemia challenge in Indian men is starkly highlighted.

## Introduction:

Anaemia, a condition represented by a deficiency in haemoglobin or red blood cells, is a substantial public health apprehension worldwide, affecting both developed and developing countries (WHO, Worldwide prevalence of anaemia 1993-2005, 2005). In India, the prevalence of anaemia is highly concentrated across

multiple subdivisions of the populations including women, children, adolescents and men (Bharati, Pal, & Bharati, 2019) (Saxena & Singh, 2023). While anaemia among women, adolescents and children has received extensive attention, the prevalence of anaemia among men in India has been relatively understudied and often overlooked (Didzun, et al., 2019)



The recent findings of India's largest National Family Health Survey (NFHS) highlights the prevalence of anaemia among men aged 15-49 years in India. According to NFHS-5 (2019-21), 25.0% of men in aged 15-49 years were found to be anaemic (<13.0 g/dl), a significant increase from 22.7% and 24.3% reported in NFHS-4 (2015-16) and NFHS-3 (2005-06) respectively (International Institute for Population Science (IIPS) and Macro International, 2005-06), (International Institute for Population Science (IIPS) & ICF, 2021). According to the data, approximately one in every fourth men in India suffering from anaemia, which can have detrimental effects on their health, physical and cognitive performance, productivity, and overall quality of life (Viteri & Gonzalez, 2002) (Haas & Brownlie, 2001) (Abbaspour, Hurrell, & Kelishadi, 2014).

This research paper aims to provide a comprehensive analysis of the regional variations and trends in anaemia prevalence among men aged 15-49 years in different States/UTs in India, using the available data from NFHS-4 and NFHS-5. The paper will explore potential factors contributing to the observed variations, discuss the implications for public health policies and interventions, and suggest region-specific strategies to address the anaemia burden among men in India effectively.

**Methodology:** This study utilizes data from the National Family Health Survey (NFHS-3) NFHS-4 and NFHS-5, a large-scale, multi-round survey conducted in a representative sample of households throughout India. The NFHS provides reliable estimates of key population, health, and nutrition indicators at the national, state, and district levels. Specifically, this research paper analyzes data from NFHS-4 (2015-16) and NFHS-5 (2019-21) for men aged 15-49 years across different states and UTs in India. The information of anaemia prevalence among men is based on haemoglobin levels (haemoglobin concentration below 13.0 g/dl) (WHO, Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity, 2011). Haemoglobin measurement in NFHS-5 was performed using the HemoCue photometer (Hb 201+). This method is used to measure the Hb concentration by a drop of blood (International Institute for Population Sciences (IIPS), 2019).

The analysis focuses on comparing the prevalence rates of anaemia among men between NFHS-4 and NFHS-5,

identifying regions with persistently high or low prevalence rates, and highlighting areas that have experienced significant changes in anaemia prevalence during this period. Descriptive statistics representations are used to present the findings and facilitate data interpretation.

## Results

Table 1 presents the state/UT-wise prevalence of anaemia among men aged 15-49 years in India, as per NFHS-4 and NFHS-5, along with the difference in prevalence rates between the two surveys.

Table 1: Men aged 15-49 years who are anaemic (NFHS-4 and NFHS-5)

The data from the fourth (2015-16) and fifth (2019-21) rounds of the National Family Health Survey (NFHS) clearly indicate that the analysis of the prevalence of anaemia among 15-49-year-old men reflects a mixed trend across various states and union territories in India. Anaemia went up to 25% from 22.7% in NFHS-4 to NFHS-5, where anaemia was defined as having a haemoglobin of fewer than 13.0 g/dl.

The State/UT wise data of anaemia prevalence reveals significant regional variations among men across India. In NFHS-4, a total of 14 States/UTs reported higher anaemia than National average (22.7%) where the number of States/UTs notably decreased where 11 States reported higher prevalence of anaemia in NFHS-5. Interestingly, the number of State/UTs having the higher anaemia prevalence compared to national average decreased by 3 State/UTs but the prevalence of anaemia reported increased by 2.3% in NFHS-5. In NFHS-5, the State/UTs with the highest prevalence of anaemia among men aged 15-49 years included Ladakh (UT) (75.6%), West Bengal (38.9%), Tripura (36.9%), Jammu & Kashmir (36.7%), Assam (36.0%), Jharkhand (29.6%), Bihar (29.5%), Odisha (28.5%), Chhattisgarh (27%), Gujarat (26.6%) and Meghalaya (25.5%) reported higher rates compared to the national average of anaemia (25%). Contrarywise, some states/UTs like NCT of Delhi, Andhra Pradesh, Andaman & Nicobar, and Chandigarh experienced higher decrease in the prevalence of anaemia among men between NFHS-4 and NFHS-5.

While critically looking into the prevalence rates between NFHS-4 and NFHS-5, 18 States/UTs experienced significant decreases, 17 State/UTs



increased, and Telangana reported neutral with no difference in the anaemia burden among men. State/UTs that showed a notable increase in anaemia prevalence among men included Ladakh (UT) (34.4%), Jammu & Kashmir (16.3%), Tripura (12.2%), Assam (10.6%), West Bengal (8.6%), Rajasthan and Kerala (6%). On the contrary, the State/UTs like Andaman & Nikobar (14.7%), Chandigarh (11.2%), Andhra Pradesh (10.8%), Delhi (9.1%), Meghalaya (6.9%), Lakshadweep (5.7%), Tamil Nadu (5.2%), Manipur (3.5%) reported a decline in the prevalence of anaemia among men between the two surveys. There is enormous unevenness among states in NFHS-5 compared to NFHS-4, demonstrating growing regional disparities. It is observed an increase in the mean anaemia prevalence from 22.13% in NFHS-4 to 24.28% in NFHS-5, this increase is not statistically significant. This suggests that it cannot be concluded with confidence that there has been a real change in anaemia prevalence at the national level between the two surveys.

The figures reflect outstanding differences within the regions: in Ladakh, West Bengal, and Assam, they denote high rates of prevalence, whereas in Lakshadweep, Manipur, and Chandigarh, the rates have been relatively low. The high prevalence rates of anaemia among men across both NFHS-4 and NFHS-5, suggesting persistent challenges in addressing this public health issue in these regions. The state-wise prevalences of anaemia among men is not significantly different from the national averages in both surveys.

**Discussion:** The findings from this study highlight the significant regional variations in the prevalence of anaemia among men aged 15-49 years across different states and UTs in India. The observed variations could be attributed to a multitude of factors, including socioeconomic status, dietary habits, access to healthcare, and the prevalence of specific health conditions or genetic disorders, geographic challenges that contribute to anaemia. However, some chronic comorbidities conditions such as renal, liver, bone marrow disorders, malignancies, rectal bleeding, ageing with probability of anaemia getting higher with advancing years (Saxena & Singh, 2023). A study revealed that wealth quintile explained a significant portion of socioeconomic status-related inequality in anaemia, followed by geographical regions, body mass index, and educational attainment. Anaemia prevalence

was concentrated among men from low socioeconomic status, particularly in the north-eastern, eastern, and western regions of India. Poverty and malnutrition are interrelated, with poverty restricting access to adequate food, leading to malnutrition and perpetuating poverty. Education plays a crucial role in addressing anaemia, as men with no education were more likely to be anaemic. Awareness about anaemia and its treatment is also important, as there is a misconception that iron tablets are only provided to pregnant women (Kumar, Sharma, & Sinha, Socio-economic inequality in anaemia among men in India: a study based on cross-sectional data, 2021).

States/UTs with a high prevalence of anaemia among men, such as Ladakh, Jammu & Kashmir, Assam, and Tripura, may face unique challenges in addressing this issue. These challenges could include limited access to nutritious diets, inadequate fortification of staple foods with essential micronutrients, and poor screening and treatment of underlying conditions contributing to anaemia (Pasricha, et al., 2008) (Bharati, Pal, & Bharati, 2019). Additionally, socioeconomic factors, cultural practices, and geographic barriers may further exacerbate the problem in these regions.

Conversely, the states/UTs that have shown a decrease in the prevalence of anaemia among men in large states, such as Andhra Pradesh, Meghalaya, Tamil Nadu, Madhya Pradesh, Bihar and Uttar Pradesh could provide valuable insights into effective strategies and interventions that have been implemented. As the Indian Government initiated enough interventions and policies aimed to reduce the burden of anaemia in the country, but these program primarily targets women of reproductive age and children. These may include The National Nutritional Anaemia Control Program (NNACP-1970), the 12-by-12 initiative (2007), National Iron Plus Initiative (2013), Weekly Iron Folic Acid Supplementation (2013), Anaemia Mukht Bharat (2018), targeted nutrition education programs, improved access to healthcare services, and the successful implementation of food fortification initiatives (Nguyen, et al., 2014) (Singh, Singh, Ram, & Tripathi, 2022).

The implications of the observed regional variations and trends in anaemia prevalence among men are multifaceted. From a public health perspective, anaemia can have detrimental effects on men's physical and



cognitive performance, productivity, and overall quality of life (Balarajan, Ramakrishnan, Özaltın, Shankar, & Subramanian, 2011) (Haas & Brownlie, 2001). Additionally, anaemia may exacerbate the risk of developing other health conditions, such as cardiovascular diseases and cognitive impairment, fatigue, lethargy which are not high probable to fatal but also thought to decrease and affect the productivity (Viteri & Gonzalez, 2002) (Singh, Singh, Ram, & Tripathi, 2022).

Furthermore, the economic consequences of anaemia among men should not be overlooked. Reduced productivity and economic output due to anaemia can hinder socioeconomic development and progress (Balarajan, Ramakrishnan, Özaltın, Shankar, & Subramanian, 2011). Therefore, addressing the anaemia burden among men in India should be a priority from both a public health and economic standpoint.

**Recommendations:** After critically analysing the data extracted from NFHS-4 and NFHS-5 and insights from relevant literature, the following recommendations are proposed to address the regional variations and trends in anaemia prevalence among men in India:

Developing targeted interventions for regions with high anaemia prevalence among men is crucial. States and Union Territories such as Ladakh, West Bengal, Tripura, Jammu & Kashmir, Assam, Jharkhand, Bihar, Odisha, Chhattisgarh, and Gujarat have anaemia rates higher than the national average of 25% (International Institute for Population Science (IIPS) & ICF, 2021). It's essential to create region-specific strategies considering local dietary habits, cultural norms, socioeconomic factors, and geographical conditions. Collaboration with local communities, healthcare providers, and stakeholders is necessary to design and implement tailored interventions addressing the unique challenges in these areas.

Promoting the consumption of iron-rich and vitamin C-rich foods is vital. This can be done through awareness campaigns and nutrition education programs. Large-scale food fortification programs should also be implemented, focusing on fortifying staple foods like wheat flour, rice, and salt with essential micronutrients such as iron, folic acid, and vitamin B12 (Nguyen, et al., 2014) (Pasricha, et al., 2008). Extending government programs to include men in these efforts is crucial (Kumar, Sharma, & Sinha, Socio-economic inequality in

anaemia among men in India: a study based on cross-sectional data, 2021).

Establishing screening programs to identify individuals at high risk for anaemia, such as those with chronic diseases, genetic disorders, or specific dietary patterns, is necessary. Providing iron and other micronutrient supplements to high-risk groups, along with proper monitoring and compliance support, is essential. Strengthening primary healthcare systems will ensure early detection and treatment of anaemia among men, particularly in regions with high prevalence rates (Singh, et al., 2024). Integrating anaemia screening and management into existing healthcare programs and services targeting men, such as workplace health initiatives or community outreach programs, is beneficial.

Intersectoral collaboration is key to addressing the multifaceted nature of anaemia. Collaboration between different sectors, such as healthcare, agriculture, education, and social welfare, is necessary. Developing evidence-based policies and allocating adequate resources to support the implementation of comprehensive anaemia prevention and control programs targeting men is crucial.

**Conclusion:** This research paper has provided a comprehensive critical analysis of the regional variations and trends in anaemia prevalence among men aged 15-49 years across different states and UTs in India, using data from NFHS-4 and NFHS-5. The findings highlight the significant disparities in anaemia burden among men across different regions, with some states/UTs consistently exhibiting high prevalence rates, while others have experienced notable increases or decreases in anaemia prevalence between the two surveys.

The observed variations and trends underscore the need for targeted, region-specific interventions and strategies to address the anaemia burden among men in India effectively. Potential factors contributing to these variations, such as socioeconomic status, dietary habits, access to healthcare, and underlying health conditions, must be considered when developing and implementing interventions.

Addressing the anaemia burden among men in India is crucial not only from a public health perspective but also for economic development and progress. Anaemia can



have far-reaching consequences on men's physical and cognitive performance, productivity, and overall quality of life, potentially hindering socioeconomic development.

To combat this issue, a comprehensive, multi-pronged approach is required, involving dietary interventions, food fortification, targeted supplementation, improved healthcare access, management of underlying conditions, research and surveillance, intersectoral collaboration, and awareness campaigns. Additionally, continued monitoring and evaluation of interventions are essential to track progress and refine strategies based on evolving needs and challenges.

By addressing the regional variations and trends in anaemia prevalence among men in India, policymakers and stakeholders can develop evidence-based policies and allocate resources more effectively, ultimately contributing to improved public health outcomes and overall well-being of the population.

**Ethical Approval:** "This article used the data available in Public domain (NFHS-4 and NFHS-5) did not require ethical approval as it did not involve direct research on human subjects or sensitive data. The review process adhered to ethical guidelines, ensuring the proper citation and analysis of relevant literature."

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**Table 1: Men aged 15-49 years who are anaemic (NFHS-4 and NFHS-5): Men age 15-49 years who are anaemic (<13.0 g/dl)<sup>22</sup> (%)**

Name of State/Uts	NFHS-4	NFHS-5
Andaman & Nicobar Island (UT)	30.8	16.1
Andhra Pradesh	27	16.2
Arunachal Pradesh	18.7	21.4
Assam	25.4	36
Bihar	32.3	29.5
Chandigarh (UT)	19.3	8.1
Chhatisgarh	22.1	27
D&NH and D&D (UT)	27.6	24.6
Goa	11	12
Gujarat	21.6	26.6
Haryana	20.9	18.9
Himachal Pradesh	20.1	18.6
Jammu & Kashmir (UT)	20.4	36.7
Jharkhand	29.8	29.6
Karnataka	18.3	19.6
Kerala	11.8	17.8
Ladakh (UT)	41.2	75.6
Lakshadweep (UT)	11.4	5.6
Madhya Pradesh	25.5	22.4
Maharashtra	17.7	21.9
Manipur	9.5	6
Meghalaya	32.4	25.5
Mizoram	12.1	15.6
Nagaland	11.7	10
NCT of Delhi (UT)	21.7	12.6
Odisha	28.3	28.5
Puducherry (UT)	15.9	19.5
Punjab	25.9	22.6
Rajasthan	17.2	23.2
Sikkim	15.8	18.7
Tamil Nadu	20.4	15.2



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Telangana	15.3	15.3
Tripura	24.7	36.9
Uttar Pradesh	23.7	21.5
Uttarakhand	15.6	15.1
West Bengal	30.3	38.9

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*\*In rural Chandigarh and rural NCT of Delhi- % of rural data not given based on the fewer than 25 unweighted cases.*