



<https://africanjournalofbiomedicalresearch.com/index.php/AJBR>

Afr. J. Biomed. Res. Vol. 27(6s) (December 2024); 1003-1005

Research Article

Prevalence And Determinants Of Anemia In Delhi Ncr: A Systematic Review

Rajesh Prasad Jayaswal^{1*}, Ranjay Kumar Choudhary²

¹Research Scholar, School of Paramedical, Sunrise University, Alwar, Rajasthan (India)

²*Supervisor, School of Paramedical, Sunrise University, Alwar, Rajasthan (India)

***Correspondence Author:** Rajesh Prasad Jayaswal¹

*r.choudharymt@gmail.com

Abstract

Anemia continues to pose a formidable public health challenge in India, particularly within urban conglomerates such as Delhi NCR. Despite high prevalence and the known adverse health implications, there is a paucity of consolidated research that captures the scope of anemia in this region using community-based data. This systematic review aims to bridge that gap by synthesizing existing evidence on the prevalence, determinants, and impact of anemia in Delhi NCR, with a particular focus on community screening.

This review underscores the significance of community-based screening strategies in evaluating the burden of anemia and shaping public health responses. Through the analysis of regional studies, the review identifies high-risk populations, diagnostic tools, and socio-economic correlates influencing anemia prevalence.

The findings advocate for stronger surveillance mechanisms, integration of digital diagnostics, and policy reforms targeting vulnerable populations. By contributing to the contextual body of knowledge on anemia in urban India, this review provides actionable insights for public health stakeholders, researchers, and policymakers.

Keywords: Anemia, Community Screening, Delhi NCR, Urban Health, Public Health, Prevalence, Determinants

***Author of correspondence: Email:** r.choudharymt@gmail.com

Received 02/12/2024

Acceptance 30/12/2024

DOI: <https://doi.org/10.53555/AJBR.v27i6S.7717>

© 2024 The Author(s).

This article has been published under the terms of Creative Commons Attribution-Noncommercial 4.0 International License (CC BY-NC 4.0), which permits noncommercial unrestricted use, distribution, and reproduction in any medium, provided that the following statement is provided. "This article has been published in the African Journal of Biomedical Research"

Introduction

Anemia, characterized by a decrease in hemoglobin concentration or red blood cell count, compromises oxygen delivery to bodily tissues and remains a pervasive public health issue globally. It is especially prevalent in low- and middle-income countries, including India, where nutritional deficiencies, infections, and socio-economic disparities exacerbate the condition (WHO, 2017).

According to the National Family Health Survey-5 (NFHS-5), India reports some of the world's highest anemia rates—impacting 53% of children under five,

56% of adolescent girls, and 50% of pregnant women (IIPS, 2021). Delhi NCR, a densely populated and rapidly urbanizing region, reflects these national trends while facing unique challenges such as healthcare disparities, dietary transitions, and socioeconomic inequalities (Kumar et al., 2018).

Community-based screening remains a vital strategy for early detection and management of anemia. Especially in urban slums and marginalized populations, it enables timely interventions and helps mitigate long-term consequences such as maternal

morbidity, stunting in children, and impaired cognitive development (Petry et al., 2016).

This systematic review aims to analyze existing literature to assess anemia prevalence in Delhi NCR, identify major determinants, evaluate the role of diagnostic tools, and recommend interventions tailored to the urban context.

Review of Literature

National Overview of Anemia Prevalence

NFHS-5 reports alarmingly high rates of anemia, particularly among vulnerable groups. Children under five show 53% prevalence, while adolescent girls and pregnant women reflect 56% and 50%, respectively (IIPS, 2021). These rates represent both nutritional anemia and anemia due to infections and chronic diseases.

Other studies affirm these trends. Yadav et al. (2020) reported a 48.2% anemia prevalence among pregnant women in North India, with breakdowns into mild (26.4%), moderate (20.0%), and severe (1.8%) cases. Kapil et al. (2019) observed an 81.6% prevalence among adolescent girls, with 32.7% presenting severe anemia.

Regional and State-Level Variations

High Prevalence States:

- **Jharkhand:** 72.05% among SC/ST women (IIPS & ICF, 2021).
- **West Bengal:** 76.14% among SC/ST women and 68.65% among general caste women (IIPS & ICF, 2021).
- **Assam & Bihar:** High anemia prevalence across all social groups (Kumar et al., 2020).
- **Gujarat:** Notably high among SC/ST and OBC women (Patel et al., 2019).

Low Prevalence States:

- **Kerala:** 30% among general population and 32.3% among SC/ST women (IIPS & ICF, 2021).
- **Manipur:** 22.99% among SC/ST and 28% among OBC women.
- **Punjab:** Comparatively low anemia levels among general women (Singh et al., 2020).

Regional Observations:

- **Western India:** Highest child anemia rates, with Gujarat leading at 75.7%.
- **Southern India:** Kerala shows the lowest child anemia rates at 38.4%.
- **Northeast:** Tripura records a high child anemia prevalence of 74% despite the region's overall lower average (NFHS-5).

Anemia in South and East Asia

Miller et al. (2021) provided a broader context with the following prevalence among women of reproductive age:

- **India:** 53.1% (IIPS & ICF, 2017)
- **Bangladesh:** 45.4% (NIPORT et al., 2016)
- **Nepal:** 41.1% (MOHP Nepal, 2017)
- **China:** 20.6% (Li et al., 2020)
- **Vietnam:** 11.6% (Miller et al., 2021)

These figures reflect regional disparities influenced by dietary patterns, access to healthcare, education, and sanitation.

Diagnostic Tools and Digital Hemoglobinometers

Digital hemoglobinometers have gained popularity for community-level anemia detection. Yadav et al. (2020) demonstrated high sensitivity (91.27%) and specificity (95.30%) for TrueHb and HemoCue 301, suggesting their effectiveness in urban field settings. However, Neogi et al. (2019) reported poor sensitivity (23.6%) and moderate specificity (61.8%) with the NBM 200 device, highlighting inconsistency among tools.

Determinants of Anemia

Numerous socio-economic, health-related, and demographic factors influence anemia prevalence:

- **Poor Nutrition:** Iron-deficient diets remain a leading cause (Kassebaum et al., 2021).
- **Chronic Illnesses:** Tuberculosis, CKD, and parasitic infections contribute to anemia (Kassebaum et al., 2021).
- **Maternal Education:** Lower maternal literacy increases anemia risk in children (Kumar et al., 2020).
- **Poverty and Inadequate Healthcare:** Strongly linked to undiagnosed and unmanaged anemia (Kumar et al., 2020).
- **Child Health Indicators:** Stunting, low birth weight, and poor dietary diversity heighten vulnerability (WHO, 2017).

Observational Insights on Anemia Prevalence

Gebremedhin et al. (2020) provided key predictors of anemia among displaced children:

- **Low dietary diversity** (AOR: 4.9; 95% CI: 2.0–11.7)
- **Extended camp stay** (>6 months) (AOR: 4.2)
- **Diarrhea and fever episodes** (AOR: 2.7 and 3.4 respectively)
- **Wasting and malnutrition** (AOR: 3.6)

Discussion

The data reveal a persistent, high prevalence of anemia in Delhi NCR, driven by socio-economic disparities, inadequate dietary intake, and insufficient healthcare outreach. Community-based screening emerges as a practical and scalable method to tackle this burden. Digital hemoglobinometers, while convenient, require quality control and standardization to ensure diagnostic reliability (Yadav et al., 2020; Neogi et al., 2019). Urban slums and marginalized communities should be prioritized for intervention, as they exhibit compounded risk factors. Education on nutrition, iron supplementation programs, and strengthened maternal and child health services can significantly reduce anemia prevalence.

Conclusion

Anemia in Delhi NCR remains a major yet under-addressed public health concern. This systematic review highlights the value of community screening and digital diagnostics in tackling the issue. However, disparities in diagnostic accuracy, regional prevalence,

and access to care call for more targeted, evidence-based interventions.

Public health policy must pivot toward integrated anemia control programs encompassing nutritional support, education, and improved screening infrastructure—especially for urban poor populations. Future research should focus on longitudinal data from Delhi NCR to develop more robust regional strategies.

References

1. IIPS & ICF. (2021). *National Family Health Survey (NFHS-5), India*. Mumbai: International Institute for Population Sciences.
2. Kumar, R., et al. (2018). Urban challenges in managing anemia. *Indian Journal of Public Health*, 62(3), 215–220.
3. Petry, N., et al. (2016). Micronutrient deficiencies and public health. *Nutrients*, 8(12), 747.
4. Yadav, R., et al. (2020). Diagnostic evaluation of hemoglobinometers. *Asian Journal of Medical Sciences*, 11(3), 95–101.
5. Miller, J. L., et al. (2021). Prevalence of anemia among South Asian women. *BMJ Open*, 11(6), e046263.
6. Li, M., et al. (2020). Iron deficiency among Chinese women. *Public Health Nutrition*, 23(8), 1395–1403.
7. Patel, M., et al. (2019). Nutritional anemia in Gujarat. *Indian Journal of Nutrition*, 6(2), 153–157.
8. Singh, A., et al. (2020). State-level comparison of anemia prevalence. *Journal of Epidemiology and Global Health*, 10(2), 133–140.
9. WHO. (2017). *Nutritional Anaemias: Tools for Effective Prevention and Control*. Geneva: World Health Organization.
10. Gebremedhin et al. (2020). Magnitude and determinants of anemia among internally displaced children in Ethiopia: A cross-sectional study. *BMC Pediatrics*.
11. International Institute for Population Sciences (IIPS). (2021). *National Family Health Survey (NFHS-5)*.
12. Kapil et al. (2019). Prevalence of anemia among adolescent girls in India: A systematic review. *Journal of Adolescent Health*.
13. Kassebaum, N. J., et al. (2014). A systematic analysis of global anemia burden from 1990 to 2010. *Blood*, 123(5), 615–624.
14. Kumar et al. (2018). Anemia among women in reproductive age group: A review of evidence from India. *Journal of Family Medicine and Primary Care*, 7(2), 273–278.
15. Kumar, P., et al. (2018). Anemia among women in reproductive age group: A review of evidence from India. *Journal of Family Medicine and Primary Care*, 7(2), 273–278.
16. Neogi et al. (2019). Diagnostic accuracy of non-invasive digital hemoglobinometer (NBM 200) in screening for anemia in pregnancy. *Journal of Clinical and Diagnostic Research*.
17. Petry et al. (2016). The proportion of anemia associated with iron deficiency in low- and middle-income countries: A systematic review and meta-analysis. *Nutrients*, 8(11), 693.
18. World Health Organization. (2017). *Nutritional anaemias: tools for effective prevention and control*.
19. Yadav et al. (2020). Digital Hemoglobinometers as Point-of-Care Testing Devices for Hemoglobin Estimation: A Validation Study from India. *Indian Journal of Community Medicine*.
20. International Institute for Population Sciences (IIPS) & ICF. *National Family Health Survey (NFHS-5)*, 2019–21. Mumbai: IIPS; 2021.
21. Kumar P, Singh A, Yadav R. Prevalence and determinants of anemia among women in reproductive age group in India: A systematic review. *J Family Med Prim Care*. 2020;9(2):273–278.
22. Patel S, Patel M, Prajapati A. Anemia prevalence and determinants among women in the reproductive age group in Gujarat. *J Clin Diagn Res*. 2019;13(9):OE01-OE05.
23. Singh A, Kumar P, Yadav R. Anemia among women in reproductive age group in Punjab. *Indian J Public Health*. 2020;64(2):147–153.
24. World Health Organization. *Nutritional anaemias: tools for effective prevention and control*. Geneva: WHO; 2017.
25. Miller JL, et al. The Proportion of Anemia Associated with Iron Deficiency in Low, Medium, and High Human Development Index Countries: A Systematic Analysis of National Surveys. *Nutrients*. 2021;13(11):3708. doi: 10.3390/nu13113708.
26. Kassebaum NJ, et al. Burden of anemia and its underlying causes in 204 countries and territories, 1990–2019: results from the Global Burden of Disease Study 2019. *Journal of Hematology & Oncology*. 2021;14(1):1–15. doi: 10.1186/s13045-021-01150-6.
27. Miller JL, et al. The Proportion of Anemia Associated with Iron Deficiency in Low, Medium, and High Human Development Index Countries: A Systematic Analysis of National Surveys. *Nutrients*. 2021;13(11):3708. doi: 10.3390/nu13113708.
28. International Institute for Population Sciences (IIPS) and ICF. *National Family Health Survey (NFHS-4)*, 2015–16. Mumbai: IIPS; 2017.
29. National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. *Bangladesh Demographic and Health Survey 2014*. Dhaka, Bangladesh, and Rockville, Maryland, USA: NIPORT, Mitra and Associates, and ICF International; 2016.
30. Ministry of Health and Population (MOHP) [Nepal], New ERA, and ICF International Inc. *Nepal Demographic and Health Survey 2016*. Kathmandu, Nepal: Ministry of Health and Population, New ERA, and ICF International; 2017.