Unveiling Hidden Story of Anaemia among Indian Muslim Women: A Comprehensive Analysis from 2005 to 2021 for Implications on Well-being

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Abstract

Iron deficiency among women of reproductive age, driven by factors such as inadequate dietary intake, menstrual blood loss, and heightened iron demands during pregnancy, remains a global public health concern. This research scrutinizes the prevalence of nutritional anaemia among Muslim women in India over the years, with a particular focus on disparities and trends. Our findings reveal a concerning upward trajectory in severe anaemia prevalence, indicating a shift from 1.76% (2005-2006) to 2.66% (2019-2021) among women in the general population and from 2.44% to 2.53% among Muslim women in India. Additionally, the overall prevalence of anaemia has surged by 3.94%, with Muslim women experiencing a 4.62% increase. Geographically, the Eastern and Northeastern regions exhibit the highest anaemia prevalence rates, at 66.72% and 60.81%, respectively, followed closely by the Western region, with a prevalence of 57.73%. Furthermore, rural areas witness a strikingly higher anaemia prevalence among Muslim women, exceeding urban areas by over 7%. Educational attainment emerges as a crucial determinant, with 58.32% of Muslim women lacking formal education and 51.15% with higher education experiencing anaemia during 2019-2021. The analysis of caste-based disparities indicates that Scheduled Caste/Scheduled Tribe (SC/ST) populations consistently bear the highest anaemia burden, followed by Other Backward Classes (OBC) and others. The disparities in anaemia prevalence based on education levels have shown variation across three National Family Health Survey (NFHS) rounds, with the gap narrowing over time, yet persisting among women with no or primary education. Economic disparities are evident, as wealth quintiles display a clear gradient, with the poorest quintile consistently having the highest predicted probability of anaemia. Conversely, the richest quintile consistently exhibits the lowest anaemia prevalence. Notably, NFHS-5 reveals a significant decline in anaemia prevalence among the poorest quintile, a positive development compared to previous rounds. The Northern and Central regions continue to grapple with higher anaemia prevalence, while the Southern and Northeastern regions exhibit a more favourable situation. These trends underscore a persistent challenge in achieving the objectives of the National Iron Plus Initiative Programme (NIPI), 2011, and

illuminate the need for targeted interventions. Noteworthy is the reduction in anaemia prevalence in the North region during NFHS-5 compared to NFHS-4, suggesting localized progress. This comprehensive analysis sheds light on the evolving landscape of anaemia among women in India, emphasizing the critical need for tailored interventions addressing geographical, educational, and socio-economic disparities to effectively combat this pressing public health issue. The findings of this research shed light on the multifaceted nature of anaemia, emphasizing its association with various socioeconomic determinants and regional disparities to modify existing public policies and improve population health in the context of the most vulnerable sections in developing countries.

Keywords: Anaemia, Iron deficiency, Micronutrients, Iron supplements, Food Policy

Introduction

As per WHO, anaemia refers to a situation of adverse physiology because of insufficient oxygen-carrying capacity by the blood cells due to a decline in the proportion of red blood cells and an overall reduction in the haemoglobin level. A deficiency of haemoglobin causes a reduction in the number of red blood cells which are required for the growing tissues in an individual, which has reportedly led to increased morbidity and mortality among women of reproductive age over the years (Smith et al., 2019) which also impacts the economic growth negatively (Sharif et al., 2023). Anaemia is a health problem affecting around 25% of people around the world, shared unequally across genders, impacting women on a greater scale (World Health Organization, 2015a, 2015b, 2015c). One of the most basic causes of anaemia is undernutrition; therefore, by 2030, the WHO aimed to reduce the different forms of malnutrition among all age groups and anaemia levels by 50% among women of reproductive age at the 2nd International Conference on Nutrition (ICN2) (District Health Survey, 2019). Among women, a linkage of anaemia has been found to affect the physical body, growth, and mental health (Chauhan et al., 2022), and it also increases reproductive morbidities and mortalities among adolescents during womanhood (Osborn, et al., 2018; Shriraam et al., 2021). Studies have also shown that socio-economic factors such as low educational status (Lahiri, 2023), poor economic status (Sappani et al., 2023), housing conditions (Ghosh, 2009) and hygiene practices (Kumar & Mohanty, 2023) affect the risks of anaemia. The women of reproductive age are the most vulnerable section prone to iron deficiency (Toteja et al., 2006). Menstruation and pregnancy are also the reasons for the loss

of iron along with the reason of intake of insufficient diet (Gupta et al., 2019). In the third trimester of pregnancy, the demand for iron increases up to 9 times from 0.8 mg per day to 7.5 mg per day (Ansari et al., 2008). Generally, nutritional and perinatal deficiencies have been found to be a leading cause of increased morbidity and mortality among women of reproductive age in India (Bentley & Griffiths, 2003). There are adverse impacts and severe consequences on infants and growing adolescent children if the equilibrium between the demand and supply of iron from mother to child is disrupted (Harding et al., 2018). Increased morbidity and maternal death impact socioeconomic growth. Continuing the discussion on the interaction between nutritional status and socio-economically (and vulnerable) sections in the Indian context, the Sachar Committee (Sachar, 2006) reported that the socioeconomic condition of Muslims (the largest religious minority group in India) is deplorable and a vast majority of Muslims are unable to access the benefits of the fundamental and development rights guaranteed in the constitution adequately. There is a substantial amount of research done on the prevalence of anaemia in children and adolescents, but not much research is done on women of reproductive health belonging to backward socio-economic status, and there is no research done on the prevalence of anaemia among Muslim women in India.

Therefore, this study seeks to determine the prevalence of anaemia among Muslim women in India. The central question of the research serves as the foundation for the study and aims to provide a comprehensive understanding of anaemia's burden within this specific demographic group. The appropriate underlying theory is regarding the socioeconomic factors, including caste, place of residence, education, and wealth quintiles, that intersect with anaemia prevalence among Indian Muslim women. This study delves into the intricate relationship between socioeconomic variables and health outcomes, shedding light on the aspects of public policy and population health.

Data Analysis

Our study aims to understand the trends and disparities in the prevalence of severe and any anaemia among Muslim women across different castes, places of residence, education status, wealth status and regions. Hemoglobin levels are commonly used to measure anaemia among women in India and worldwide. Anaemia is typically defined as a condition where the haemoglobin levels in a woman’s blood fall below a certain threshold, which is 10.00-9.90 g/dl, 7.00-9.90 g/dl, and <7.00 g/dl in NFHS-3, 4, and 5. In this study, “severe” (haemoglobin <7.00 g/dl) and “any” categories are used for the analysis.

The “prevalence of anaemia” is the dependent variable, which has been transformed

into a binary variable coded as “1” if there is any kind of prevalence of anaemia and “0” otherwise. The trends and socio-economic variations have been examined along the dimensions of the area of residence, caste, education, economic status and different regions (which are considered independent variables) within the Muslim women community. To investigate hypertension prevalence among Indian Muslim women and its intricate interplay with socioeconomic and geographic factors, the chosen methodologies and approaches are thoughtfully designed to underscore the research's economic dimension and theoretical relevance. Systematic geographic stratification is instrumental in evaluating anaemia prevalence both at the national and regional levels, thereby emphasizing the critical role of regional economic dynamics in shaping health outcomes.

The utilization of the concentration index also underscores the theoretical significance of our research. Ranging from -1 to 1, this measure cogently elucidates socioeconomic disparities in anaemia prevalence. Negative values underscore the concentration of anaemia among the economically marginalized, while positive values highlight its prevalence among the economically advantaged. The proposition of disparity ratios further reinforces the theoretical underpinnings of this research. These ratios will provide a quantitative lens through which the disparities in anaemia prevalence can be assessed across various groups and regions. Our predictive analysis, rooted in socioeconomic categories such as caste, place of residence, education, wealth quintiles, and region, unveils the intricate economic determinants of anaemia prevalence among Indian Muslim women. In line with the research's theoretical thrust, the incorporation of a decomposition analysis of economic variables to assess the impact of hypertension on various economic variables related to Muslim women in India is also planned for further analysis. This analytical framework will dissect the specific contributions of various socioeconomic factors to the prevalence of anaemia among Muslim women. The crux of our analytical toolkit resides in the logistic regression model, affording a methodological avenue to model the prevalence of anaemia. By transforming the linear combination of predictor variables and coefficients into probabilities, the intricate relationship between socioeconomic factors—such as caste, place of residence, education, wealth quintiles, and region—and the probability of women experiencing anaemia has been be discerned. The logistic regression equation can be expressed as follows:

$$P(Y = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5)}}$$

Where:

$P(Y = 1)$ is the probability of the binary outcome of women suffering from anaemia.

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, and\ , \beta_5$ are the coefficients of the logistic regression model.
$X_1, X_2, X_3, X_4, and\ X_5$ are the values of the predictor variables depicting the caste, place of residence, education, wealth quintiles and regions, respectively.

The logistic function, represented by $\frac{1}{1+e^{-z}}$, transforms the linear combination of the predictor variables and their coefficients $z = (\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5)$ into a value between 0 and 1, which can be interpreted as a probability (Cox, 1958).
This model encapsulates the essence of our research, where theoretical constructs seamlessly integrate with empirical analysis. The geographical perspective is also planned for further analysis using Arc GIS software, which offers a framework to assess regional disparities and fortifies the theoretical significance of understanding how geography interacts with socioeconomic factors to impact health outcomes of anaemia. In summary, this research proposes to unfold a multidimensional endeavour where each facet of our methodology underscores both the economic contributions and theoretical significance of unravelling the prevalence of anaemia among Indian Muslim women.

Results and Preliminary findings

Based on the data from the National Family Health Surveys (NFHS) spanning from 1998 to 2021, our preliminary findings reveal notable trends and disparities in the prevalence of any and severe kinds of anaemia among Muslim women in India, aged 15-49, across various socioeconomic characteristics. One striking observation is the persistence of significant disparities in anaemia prevalence across different caste groups, education levels, and wealth quintiles. In all three NFHS rounds (NFHS-3, NFHS-4, and NFHS-5), Scheduled Castes and Scheduled Tribes (SC/ST) consistently exhibit higher rates of anaemia, both any kind and severe, compared to Other Backward Classes (OBC) and Others. This underscores the importance of targeted interventions to address anaemia among vulnerable populations, particularly within the SC/ST communities. Additionally, there is a clear association between educational attainment and anaemia prevalence. Women with no education consistently have the highest prevalence of anaemia, while those with higher education levels exhibit lower rates. Wealth status also plays a significant role, with the poorest quintile consistently experiencing higher anaemia prevalence, emphasizing the need for interventions that consider economic disparities.

Another noteworthy finding is the evolving trends in anaemia prevalence over time. Between NFHS-3 and NFHS-4, there was a significant reduction in anaemia prevalence across most socioeconomic characteristics, suggesting positive strides in combating anaemia in this population. However, the trend appears to have reversed in NFHS-5, with an increase in anaemia rates observed across several categories. Notably, there are regional variations in anaemia prevalence, with states in the North and North East regions consistently exhibiting higher rates, while the South and West regions generally have lower rates. The East region, on the other hand, showcases the lowest prevalence of anaemia in most categories, indicating the potential influence of regional factors. These preliminary findings underscore the dynamic nature of anaemia prevalence among Muslim women in India and emphasize the importance of continuous monitoring and targeted interventions to address this health issue, particularly within disadvantaged communities and regions experiencing high prevalence rates.

Table 1: Percentage Prevalence of Anaemia among Muslim women in India (aged 15-49) by Socio-Economic characteristics based on NFHS data (1998-2021)

	NFHS-3		NFHS-4		NFHS-5	
Socio-Economic characteristics	**Severe**	**Any**	**Severe**	**Any**	**Severe**	**Any**
Caste						
SC/ST	2.44	54.34	0.81	51.87	2.53	56.49
OBC	1.3	52.73	1.02	50.49	2.03	52.05
Others	1.28	55.77	0.8	50.6	2.02	58.62
Place of Residence						
Urban	1.29	50.39	0.87	48.86	1.92	50.82
Rural	1.33	57.34	0.93	52.05	2.13	58.83
Education						
No education	1.49	58.56	1.28	53.77	2.58	58.32
Primary	1.65	54.61	0.92	51.65	2.16	55.79
Secondary	0.95	50.44	0.69	48.86	1.86	54.97
Higher	0.89	41.72	0.61	45.66	1.4	51.15
Wealth Quintiles						
Poorest	1.1	63.91	1.08	55.63	2.37	62.36
Poorer	1.23	60.21	0.88	52.41	2.05	60.3
Middle	1.6	55.11	1.04	51.47	2.18	56.31
Richer	1.46	50.98	0.9	48.69	2.03	52.26
Richest	1.1	44.77	0.63	45.92	1.59	46.65
Region						
North	2.98	52.51	1.27	50.11	2.78	57.79
Central	1.27	50.84	1.24	51.82	1.84	50.51
East	0.68	63.57	0.57	55.95	1.71	64.67
West	1.15	47.71	0.71	48.95	2.4	51.76

South	1.39	49.27	0.99	45.2	2.42	44.77
North East	1.67	57.98	0.4	41.41	1.52	59.15

Source: *Author's calculation based on NFHS-3, NFHS-4 and NFHS-5 data.*

Note: *SC/ST=Scheduled castes and Scheduled Tribes; OBC=Other Backward Classes.*

One of the pivotal observations gleaned from the data pertains to the pronounced reduction in economic disparities in anaemia prevalence among Muslim women across the three NFHS phases. Specifically, for the categories of Scheduled Castes and Scheduled Tribes (SC/ST), Other Backward Classes (OBC), and Others, the Concentration Index consistently exhibits negative values, signifying a pro-poor distribution of anemia cases. The Concentration Index (CI) consistently shows negative values when analyzing anemia prevalence among different socio-economic groups. This negative value of the CI suggests that a larger proportion of anemia cases is concentrated among the lower socio-economic strata or economically disadvantaged individuals. In other words, it implies that individuals with lower socio-economic status are more likely to experience anaemia compared to those with higher socio-economic status. This negative value of the CI indicates that anaemia disproportionately affects the economically disadvantaged, often referred to as a "pro-poor distribution." The negative values of CI across all sociodemographic subgroups in each NFHS phase indicate that anaemia disproportionately affects economically disadvantaged individuals. Significantly, the absolute values of the CI have generally decreased over time, indicating a substantial reduction in economic disparities in anaemia prevalence among Muslim women from NFHS-3 to NFHS-5. This is further corroborated by the associated p-values, which are consistently highly significant ($p < 0.05$), reinforcing the robustness of these findings.

Moreover, regional disparities in anaemia prevalence emerge as a noteworthy aspect of our findings. While the negative values of CI persist across all regions, there are variations in the magnitude of economic disparities. The South and North regions consistently exhibit the most significant reductions in economic disparities over time, as evidenced by the considerable decline in the absolute values of CI. In contrast, the West region displays a mixed pattern, with a reduction in disparities from NFHS-3 to NFHS-4 but a slight increase in NFHS-5. Notably, the Northeast region exhibits relatively lower economic disparities in anaemia prevalence compared to other regions, as indicated by the consistently smaller absolute values of CI, although some increase is observed in NFHS-5. These regional contrasts underscore the importance of tailored interventions to address specific regional challenges related to

anaemia among Muslim women.

Table 2: Trends in economic disparities with respect to any anaemia among Muslim women using the Concentration Index

	NFHS-3			NFHS-4			NFHS-5		
	CI	**SE**	**p-value**	**CI**	**SE**	**p-value**	**CI**	**SE**	**p-value**
Caste									
SC/ST	-0.033	0.022	0.129	-0.046	0.006	0.000	-0.057	0.006	0.000
OBC	-0.065	0.008	0.000	-0.037	0.003	0.000	-0.052	0.003	0.000
Others	-0.068	0.005	0.000	-0.032	0.003	0.000	-0.049	0.002	0.000
Place of Residence									
Urban	-0.054	0.006	0.000	-0.035	0.003	0.000	-0.045	-0.045	0.000
Rural	-0.057	0.006	0.000	-0.024	0.002	0.000	-0.035	0.002	0.000
Education									
No education	-0.048	0.006	0.000	-0.021	0.003	0.000	-0.035	0.003	0.000
Primary	-0.051	0.011	0.000	-0.026	0.005	0.000	-0.058	0.005	0.000
Secondary	-0.054	0.007	0.000	-0.028	0.003	0.000	-0.059	0.002	0.000
Higher	-0.040	0.019	0.031	-0.022	0.007	0.002	-0.054	0.006	0.000
Region									
North	-0.043	0.009	0.000	-0.017	0.004	0.000	-0.054	0.003	0.000
Central	-0.037	0.011	0.000	-0.011	0.003	0.002	-0.030	0.004	0.000
East	-0.033	0.008	0.000	-0.037	0.004	0.000	-0.011	0.003	0.002
West	-0.036	0.014	0.014	-0.013	0.008	0.086	-0.006	0.006	0.380
South	-0.067	0.010	0.000	-0.032	0.006	0.000	-0.046	0.006	0.000
North East	-0.037	0.012	0.002	-0.027	0.006	0.000	-0.007	0.004	0.084

Source: Author's calculation based on NFHS-3, NFHS-4 and NFHS-5 data using STATA.
Note: (i) SC/ST=Scheduled castes and Scheduled Tribes; OBC=Other Backward Classes; CI refers to the Concentration Index, which measures the socioeconomic inequality in the prevalence of anaemia among women; SE=Standard Error; (ii) p-values in parentheses.

Table 3: Predicted probability of any anaemia among Muslim women in India

	NFHS-3		NFHS-4		NFHS-5	
	PP	**p-value**	**PP**	**p-value**	**PP**	**p-value**
Caste						
SC/ST	0.509	0.000	0.507	0.000	0.042	0.000
OBC	0.511	0.000	0.501	0.000	0.022	0.000
Others	0.516	0.000	0.504	0.000	0.025	0.000
Place of Residence						
Urban	0.526	0.000	0.491	0.000	0.022	0.000
Rural	0.501	0.000	0.511	0.000	0.027	0.000
Education						
No education	0.531	0.000	0.516	0.000	0.028	0.000
Primary	0.500	0.000	0.501	0.000	0.024	0.000
Secondary	0.507	0.000	0.497	0.000	0.025	0.000
Higher	0.479	0.000	0.481	0.000	0.024	0.000
Wealth						
Poorest	0.625	0.000	0.521	0.000	0.039	0.000
Poorer	0.576	0.000	0.510	0.000	0.030	0.000
Middle	0.525	0.000	0.504	0.000	0.025	0.000
Richer	0.494	0.000	0.499	0.000	0.021	0.000
Richest	0.453	0.000	0.484	0.000	0.017	0.000
Region						
North	0.507	0.000	0.523	0.000	0.043	0.000
Central	0.469	0.000	0.523	0.000	0.020	0.000
East	0.566	0.000	0.547	0.000	0.013	0.000
West	0.525	0.000	0.491	0.000	0.032	0.000
South	0.516	0.000	0.463	0.000	0.030	0.000
North East	0.503	0.000	0.395	0.000	0.013	0.000

Source: *Author's calculation based on NFHS-3, NFHS-4 and NFHS-5 data using STATA.*

Note: *SC/ST=Scheduled castes and Scheduled Tribes; OBC=Other Backward Classes; PP is the marginal value of Predicted Probability based on the different socio-economic factors against the prevalence of women's anaemia; SE=Standard Error*

Given the extensive scholarship (Bentley & Griffiths, 2003; Bharati et al., 2015; Sharif et al., 2023) on the effects of socioeconomic characteristics on anaemia among women of reproductive age, the present analysis will be incomplete without engaging with how individual socioeconomic characteristics are associated with the chances of being anaemic (or suffering with anaemia) in the case of Muslim women. Across all three NFHS rounds, there is a significant difference in the predicted probability of anaemia based on caste. SC/ST

populations consistently have the highest predicted probability of anaemia, followed by OBC and Others. Notably, in NFHS-5, there is a significant decrease in the predicted probability of anaemia among all caste groups compared to NFHS-3 and NFHS-4. Urban areas consistently show a lower predicted probability of anaemia compared to rural areas in all three NFHS rounds. While urban areas showed a decrease in the predicted probability of anaemia from NFHS-3 to NFHS-4, it increased slightly in NFHS-5. Women with higher levels of education tend to have a lower predicted probability of anaemia. The gap in anaemia prevalence between education levels is most pronounced in NFHS-3 and narrower in NFHS-4 and NFHS-5. Even in NFHS-5, women with no education or primary education still exhibit a higher predicted probability of anaemia compared to those with secondary or higher education. There is a clear gradient in anaemia prevalence across wealth quintiles, with the poorest quintile consistently having the highest predicted probability of anaemia. In all NFHS rounds, the richest quintile has the lowest predicted probability of anaemia. Notably, there is a significant decrease in anaemia prevalence among the poorest quintile in NFHS-5 compared to NFHS-3 and NFHS-4. Significant regional disparities exist in the predicted probability of anaemia across all three NFHS rounds. In NFHS-3, the North and East regions had the highest anaemia prevalence, while the South region had the lowest. In NFHS-4, the Central region had the highest anaemia prevalence, and the Northeast region had the lowest. In NFHS-5, the North and Central regions again show higher anaemia prevalence, while the South and Northeast regions exhibit lower prevalence. Notably, in NFHS-5, there is a significant decrease in anaemia prevalence in the North region compared to NFHS-4. These findings highlight the persistence of socioeconomic disparities in anaemia prevalence among Muslim women in India, with caste, education, wealth, place of residence, and region all playing significant roles. While there have been improvements in certain areas (e.g., decreased anaemia prevalence among the poorest quintile in NFHS-5), ongoing efforts are needed to address and further reduce anaemia rates, especially among vulnerable populations.

Conclusions and Discussion

India has progressed rapidly in terms of economic growth in the past three decades but still suffers from substantial socioeconomic (including religion and gender-based) inequalities in economic and non-economic (such as health) outcomes. Within health, hunger and undernutrition have been chronic problems and challenges in Indian society. Thereby causing more serious problems like anaemia. Our preliminary findings emphasize a commendable reduction in economic disparities in the prevalence of any kind of anaemia among Muslim

women in India across the three NFHS phases. This encouraging trend is underscored by the consistently negative values of the Concentration Index, significant p-values, and declining absolute values of CI over time. Nonetheless, regional disparities persist, necessitating region-specific strategies to further alleviate anaemia burdens. These findings hold vital implications for policymakers and healthcare providers, highlighting the need for sustained efforts to promote health equity and alleviate anaemia among economically disadvantaged populations. In conclusion, the present study has provided valuable insights into the prevalence and trends of anaemia among Muslim women in India, aged 15-49, drawing upon data from multiple rounds of the National Family Health Survey (NFHS) conducted between 2005-06 and 2019-21. One of the primary observations centers on the noteworthy reduction in economic disparities in anaemia prevalence among Muslim women over the three NFHS phases. This positive trend is discerned through the consistently negative values of the Concentration Index (CI) across different socio-economic subgroups, signifying a pro-poor distribution of anaemia cases. The declining absolute values of the CI over time underscore the substantial progress made in mitigating economic disparities in anaemia prevalence. These findings resonate with the broader objective of achieving health equity and reducing the burden of anaemia among economically disadvantaged populations. Nonetheless, the persistence of regional disparities in anaemia prevalence remains a salient concern. The North and Central regions consistently exhibit higher anaemia prevalence, while the South and Northeast regions generally display lower rates. The East region emerges as an exception, demonstrating the lowest prevalence of anaemia in most categories. These regional variations underscore the influence of geographical factors on anaemia prevalence and emphasize the need for tailored interventions addressing region-specific challenges. Furthermore, this research highlights the enduring impact of socio-economic characteristics on anaemia prevalence among Muslim women in India. Caste, education, wealth status, and place of residence all demonstrate significant associations with anaemia risk. Scheduled Castes and Scheduled Tribes (SC/ST) consistently exhibit higher anaemia rates, necessitating targeted interventions to address disparities within these communities. Educational attainment and wealth status exhibit a clear gradient, with higher levels of education and economic prosperity associated with lower anaemia prevalence. Urban areas generally fare better than rural areas, though a slight increase in anaemia prevalence in urban areas in the most recent NFHS-5 round warrants attention. Anaemia, characterized by reduced haemoglobin levels, remains a significant public health concern, particularly among women of reproductive age, with far-reaching health and socio-economic development implications (Elysium, 2011).

In light of these findings, it is imperative for policymakers and healthcare providers to prioritize sustained efforts aimed at promoting health equity and reducing anaemia prevalence among economically disadvantaged populations, particularly among Muslim women. Strategies should encompass region-specific initiatives to address regional disparities effectively. Overall, this research contributes to the broader discourse on public health and underscores the importance of continued vigilance and targeted interventions in the pursuit of improved health outcomes and reduced socio-economic disparities among women of reproductive age in India.

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