

CAN THE NEW DIET AND BIOMARKER SURVEY TRACE THE ROOTS OF INDIA'S ANAEMIA PROBLEM?

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The Union Health Ministry is rethinking how it takes stock of anaemia across the country. Questions will no longer be included in the National Family Health Survey (NFHS), the sixth round of which is scheduled to begin on July 1, due to concerns about “faulty” methodology. Instead, anaemia’s prevalence will be tracked using the new Diet and Biomarkers Survey (DABS), launched in December last year by the National Institute of Nutrition, which will “map the diet, nutrition and health status and provide a correct estimate of anaemia among urban and rural population using state-of-the-art techniques”, officials said last year.

The NFHS is a nationally representative survey providing granular data at the State and district levels. NFHS-5 conducted between 2019-21 showed an “inexplicable” jump in anaemia levels across all age groups: more Indians were anaemic than ever before, with [at least 67% of children having anaemia as compared to 58.6%](#) in the last survey conducted in 2015-16. [World Bank data](#) shows one in two Indian women is anaemic, 20% higher than the world average.

If anaemia were a puzzle, both DABS and NFHS form corner pieces, rich with information that helps make sense of the larger anaemia burden. But experts worry DABS may still not provide what India needs — which is to monitor district-level data closely, identify causes of anaemia outside of iron deficiency and use this data to inform anaemia-focused health interventions at the primary level of care. By dropping anaemia from the scope of NFHS, Dr. Shivangi Shankar, a public health expert, worries “one is taking away a dataset”.

India has recognised anaemia as a public health challenge, launching the [Anaemia Mukh Bharat \(AMB\) strategy](#) in 2018, aiming to provide supplementation to the last mile, raise awareness levels and improve diagnostics. In the Union Budget 2023, Finance Minister Nirmala Sitharaman announced plans to create [awareness of sickle cell anaemia](#), with universal screening of seven crore people in the age group of 0-40 years in affected tribal areas. Other government schemes, including the Integrated Child Development Services (ICDS), National Nutritional Anaemia Prophylaxis Programme (NNAPP) and Pradhan Mantri Surakshit Matritva Abhiyan, also list addressing anaemia as a challenge.

[Evidence](#) shows India has increased the iron and folic acid (ICA) supplement coverage for all age groups steadily. However, challenges run parallel to these initiatives: including a lack of

awareness about anaemia causes, undernourishment since birth, resistance to and information gap around iron-folic acid (ICA) tablets, cultural biases that fuel a lack of agency, and deficient health interventions that don't reach the last mile.

Good data forms the backbone of these interventions. The NFHS covered 6.1 lakh sample households across the country, taking blood samples from women and men aged 18-49 years, and children (between 8-59 months). To show anaemia's prevalence, authorities look at a haemoglobin diagnostic cut-off, set at 14 gm/decilitre for men, 12 gm/decilitre for women and between 11 and 12 gm/decilitre at different ages for boys and girls, as per the World Health Organisation (WHO) standard.

The WHO standard was released in 1968 based on smaller studies of European, Canadian and U.S. populations. Evaluation of haemoglobin cut-offs is an active contention point for decades, but WHO standards have remained the norm for conducting India's NFHS, Dr. Shankar notes.

A team of Indian researchers in 2021 published a [study](#) in *Lancet Global Health*, showing that anaemia's case numbers were an overestimation due to a higher haemoglobin diagnostic cut-off set by WHO. One of the authors, Prof. Anura V. Kurpad, [told The Hindu](#) that "normal haemoglobin levels vary across different parts of the world, and diagnostic cut-offs need to be defined in more region-specific ways". If it is an overestimation, the researchers argued that the true prevalence of anaemia in children would fall from 35% (using WHO's standards) to 11%.

The researchers cited data from the novel Comprehensive National Nutrition Survey (CNNS), conducted between 2016 and 2018. While both NFHS and CNNS measure micro nutritional deficiencies, CNNS collected data on non-communicable diseases among children (such as diabetes) and increased the sample size to include even school-going children between the age of 5 and 19 years. Researchers also noted a difference in the way blood was drawn: NFHS uses a drop of capillary blood from a finger prick, while CNNS opted for venous blood sampling (when blood is taken directly from the vein). In the former case, blood is diluted resulting in a "falsely lower value" of haemoglobin, the researchers said. However, [other studies](#) have observed that capillary blood tests may instead give a higher value of haemoglobin.

Health experts Sylvia Karpagam, Veena Shatrugna and Siddharth K. Joshi [in an article](#) argued the CNNS "is neither a healthy nor a representative population and therefore unsuitable for devising cut-offs". Anaemia cut-offs are arrived at using haemoglobin levels of a 'healthy' populations with no social, economic or nutritional constraints, but the dataset used by the present researchers comprises of 'the most vulnerable, poorest and least educated groups'.

Regardless, Dr. Shankar explains that "when you're doing a large scale study, you don't look for accuracy as much — [data] is an indicator of trends on a large scale." None of the data is *exactly* accurate, but it shows a trend that helps to define the contours of health interventions. The [footnote to NFHS reads](#): "As NFHS uses the capillary blood for estimation of anaemia, the results of NFHS-5 need not be compared with other surveys using venous blood."

Moreover, experts agree that clinically, one would be okay with false positives and aim to eliminate false negatives instead. "In the case of anaemia, clinically it would be okay to over-diagnose anaemia than miss out on someone who actually does have anaemia," say Ms. Karpagam, Ms. Shatrugna and Mr. Joshi. "This presents the real risk of missing out on those women who have mild or moderate anaemia and thus delaying or denying them preventive and primary care."

The [Diet and Biomarkers Survey-I](#), for which the questionnaire is available online, will be conducted by the National Institution of Nutrition along with the Indian Council of Medical

Research (ICMR). It will be the first reflection of “nutrient-composition data” on cooked and uncooked food across India, which can help develop interventions to tackle public health issues like obesity, said Dr. Rajiv Bahl, director general of ICMR last year.

DABS is more in line with what CNNS achieved and may offer more accurate, macro-level figures since it uses the venous blood sampling method. Venous blood sampling is considered the “gold standard” for anaemia diagnosis. A biomarker survey overcomes the limitations of questionnaires that rely on self-reported dietary intake measurements, which can often be biased, and instead more precisely “identify persons with specific dietary deficiency” in support of medical treatment, [evidence shows](#). A biomarker test for anaemia can be used to analyse levels of folate, iron, vitamin B12, copper and zinc in the body, helping trace the cause of anaemia.

Moreover, DABS also links a person’s nutrition profile with anaemia, providing a more comprehensive picture, Dr. Shankar says. The survey form reviewed by *The Hindu* includes questions at the household level, about the food and groceries, type of drinking water, cooking fuel, education status, religion and community details.

What is unclear as of now is the list of biomarkers that will be assessed or how the data will be disaggregated and used for health interventions.

However, the sample size for DABS is restricted to 1.8 lakh people (as opposed to NFHS’s 6.1 lakh). Venous blood testing requires trained personnel who are equipped to draw blood, which restricts the scale of the survey. [Studies show](#) “most populationbased surveys use pointofcare diagnostics and capillary blood” because it allows for testing more people.

“No macro data set can give you that much accuracy... but because there is no [district-level] information, one has no way of making the right intervention or changing an existing policy.” Dr. Shivangi Shankar

Moreover, since this is nationally representative data, it will shift district-specific data to a blind spot. NFHS currently provides a breakdown of anaemia prevalence at the district level. The latest data shows Gujarat has 4,332,282 anaemic children, with Surat (4,31,131) and Ahmedabad (4,23,087) contributing the highest numbers. A local data paucity impedes action that traces variations in a demographi or gauge how people’s health is responding to a universal intervention.

Sickle cell anaemia, for instance, is concentrated in tribal belts and areas that historically have a high malaria burden. Central government-funded schemes such as the public distribution system (PDS) or PM-Poshan (mid-day meals), focusing on iron supplementation, can cause adverse health issues among these communities, [activists warned last year](#).

Experts argue for filling more data gaps in the clinical and social understanding of anaemia. Both DABS and NFHS link anaemia to a haemoglobin deficiency, but assessment should ideally go beyond haemoglobin cut-offs and iron deficiencies, Dr. Shankar notes.

Diverse causes of anaemia, including hemoglobinopathy, inherited genetic disorders and vitamin deficiencies, are often overlooked but still require district-level screening and diagnosis. This skews health interventions — whether through tablets or iron fortification, “all of our interventions towards anaemia currently are focused on pumping iron.”

Moreover, since anaemia affects more women globally, a gendered lens to disease mapping is needed for targeted interventions. It is known that inequitable gender norms exacerbate

anaemia cases among women — systemic disregard for women's health, unequal food allocation or lack of financial autonomy to seek healthcare shape a district's anaemia profile. One [BMJ study](#) published in 2018 showed educating women about anaemia could help reduce India's anaemia burden, outside of nutrition measures.

A comprehensive dataset can map other common causes of anaemia (beyond iron deficiency), and demographic- and region-specific burden, which can help calibrate targeted interventions that account for gender, caste, class and other socio-economic markers.

Dr. Shankar notes that DABS too looks at nutritional profiles and biomarkers, and again puts “anaemia back to the dietary deficiency position, which is not always the case”.

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