

**COMPARATIVE ANALYSIS OF PREVALENCE OF ANAEMIA AMONG
WOMEN AND CHILDREN IN ODISHA USING STATE FACT SHEETS OF
NATIONAL FAMILY HEALTH SURVEY (NFHS) – 4 AND 5**

Dissertation Submitted to



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by

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2023

DECLARATION BY STUDENT

I hereby declare that this dissertation titled “*Comparative analysis of prevalence of anaemia among women and children in Odisha using state fact sheets of National Family Health Survey (NFHS) – 4 and 5*” is the Bonafede record of my original research work. I declare that it has not been submitted to any other university or institution for the award of my degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

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CERTIFICATE

This is to certify that **Glory Samal** in partial fulfilment of the requirements for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur has successfully completed her/his internship at **PATH, India** during February 20- May 19, 2023.

Place:

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Name of the organization

CERTIFICATE

This is to certify that dissertation titled “*Comparative analysis of prevalence of anaemia among women and children in Odisha using state fact sheets of National Family Health Survey (NFHS) – 4 and 5*” is a record of the research work undertaken by **Ms Glory Samal** in partial fulfillment of the requirement for the award of the degree of MBA Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

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ABSTRACT

Anaemia is a significant public health concern affecting women and children globally, particularly in developing countries. This study aims to conduct a comparative analysis of the prevalence of anaemia among women and children in the state of Odisha, India, using data from the State fact sheets of the National Family Health Survey (NFHS) – 4 and 5.

Objectives: The objective is to assess the changes in anaemia prevalence over time and identify potential factors contributing to its persistence.

1. Compare and find out the rate of reduction in the prevalence of anaemia in Odisha.
2. To find what all factors contribute to the prevalence of in the state.
3. Study the schemes introduced by state government to prevent the prevalence of anaemia.

Methodology: The descriptive study based on desk review uses secondary data from two NFHS conducted in Odisha: NFHS-4 (2015-16) and NFHS-5 (2019). -20). The NFHS is a large survey providing comprehensive data on a range of health indicators, including anaemia, by a representative sample of households in both approaches, blood samples were collected from women aged 15-49 years and in children aged 6-59 months to measure haemoglobin levels. Anaemia was defined based on World Health Organization (WHO) guidelines, where haemoglobin limits differed according to age and gender.

Results: The comparative study shows that anaemia in women and children is an important public health issue in Odisha. Among women, anaemia decreased from 55.9% in NFHS-4 to 50.3% in NFHS-5, showing little improvement. However, the prevalence remains high, emphasizing the need for further interventions. The prevalence of childhood anaemia in children remained alarmingly high, increasing slightly from 58.6% in NFHS-4 to 59.7% in NFHS-5. This finding highlights the ongoing challenge of childhood anaemia in the country.

Discussion: Several factors may contribute to the high prevalence of anaemia in Odisha. Poor dietary intake, limited access to a variety of nutritious foods, inadequate maternal and child health care, and exposure to common diseases, such as malaria and hookworm, are major research findings some of the past.

Conclusion: In conclusion, this study presents a comparative analysis of anaemia prevalence among women and children within Odisha using data from NFHS-4 and

NFHS-5. The findings highlight the high prevalence of anaemia, and the need for targeted interventions and programs. addressing anaemia requires comprehensive and integrated approaches involving multiple stakeholders to improve nutrition, improve health services and raise awareness of pathways reduce the prevention by implementing evidence-based interventions, Odisha can work to reduce the burden of anaemia and improve the overall health and well-being of women and children.

Keywords: anaemia, prevalence, women, children, Odisha, National Family Health Survey, NFHS-4, NFHS-5, comparative analysis

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TABLE OF CONTENTS

Sr. No.	Title	Page No.
1.	Introduction	12
1.1	Overview	12
1.2	Causes of anaemia	13
1.3	Symptoms of anaemia	13
1.4	Types of anaemia	14
1.5	Global Scenario	14
1.6	Anaemia in India	15
1.7	Odisha and prevalence of anaemia	16
2.	Review of Literature	18
3.	Methodology	21
3.1	Research Question	21
3.2	Aim	21
3.3	Objective	21
3.4	Study Methodology	21
4.	Results and Analysis	23
5.	Discussion	34
6.	Conclusion	40
7.	References	41

LIST OF FIGURES

Figure No.	Title	Page No.
Figure 1.1	WHO Global Anaemia estimates, 2021 edition	14
Figure 1.2	Prevalence of anaemia among women and children in India	16
Figure 4.1	Prevalence of anaemia (%) in Odisha population from NFHS 4 to NGHS 5	23
Figure 4.2	Comparison of prevalence of anaemia among adolescent men and women as per NFHS 4 & 5	24
Figure 4.3	Trend in increase of prevalence of anaemia in children aged 6-59 months from NFHS 4 to 5	25
Figure 4.4	Prevalence of anaemia among children aged 6-59 months as per NFHS 5	25
Figure 4.5	Comparative trend of prevalence of anaemia among children under five years age in the rural and urban areas of Odisha	26
Figure 4.6	Prevalence of anaemia among children under five years of Odisha (NFHS 4 vs NFHS 5)	27
Figure 4.7	The prevalence of breastfeeding among children in Odisha as per NFHS 4 and NFHS 5	28
Figure 4.8	Child health indicators related to anaemia in Odisha as per NFHS 4 and 5	29
Figure 4.9	Comparative analysis of prevalence of anaemia among women in Odisha vs India as per NFHS 5	29
Figure 4.10	Comparison of maternal health factors related to anaemia in pregnant women as reported in NFHS 4 and NFHS 5	31
Figure 4.11	Family planning factors related to anaemia prevalence among married women aged 15-49 years.	33

LIST OF TABLES

Table No.	Title	Page No.
Table 1.1	Cut-off values for public health significance by WHO (2008)	12
Table 1.2	NFHS classification of anaemia	15
Table 4.1	Comparative data on the prevalence of anaemia among different age and gender groups as per NFHS 4 and NFHS 5	23
Table 4.2	Prevalence of anaemia among children under the age of five years in different areas as per NFHS 4 and 5	26
Table 4.3	Comparative data on nutritional indicators of children under five years in NFHS 4 and NFHS 5	27
Table 4.4	Comparative data of NFHS 4 and 5 on vaccination indicators for children aged 12-23 months in Odisha.	28
Table 4.5	Comparative data of prevalence of anaemia among women in Odisha as per NFHS 4 and 5	29
Table 4.6	Maternal health factors related to anaemia as per NFHS 4 and 5	29
Table 4.7	Prevalence of anaemia among women in rural and urban areas of Odisha	32
Table 4.8	Comparative analysis of women nutritional status in rural and urban areas of Odisha as reported in NFHS 4 and 5	32

ABBREVIATIONS

WHO	World Health Organization
Hb	Haemoglobin
RBC	Red blood cell
WHA	World Health Assembly
HIV	Human immunodeficiency virus
AIDS	Acquired immunodeficiency syndrome
NFHS	National Family Health Survey
BMI	Body mass index
PSU	Primary sampling units
PPS	Population size
COVID -19	Coronavirus disease of 2019
DPT	Diphtheria, Tetanus, Pertussis
BCG	Bacille Calmette-Guerin
MCV	Measles-containing vaccine
IFA	Iron folic acid
ANC	Antenatal Care
AMB	Anaemia mukta bharat
AMLAN	Anaemia mukta lakhya abhiyan
JSY	Janani Suraksha Yojana
NHRM	National Rural Health Mission
JSSK	Janani Shisu Surakshya Karyakram
NHM	National Health Mission
VHSND	Village Health Sanitation & Nutrition Day
SUMAN	Surakshita Matritva Ashwasan
MCH	Maternal and Child Health
KMC	Kangaroo Mother Care
SNCU	Special newborn care unit
IDCM	Intensified diarrhoea control month
ORS	Oral rehydration solution
NNW	National newborn week
INAP	India Newborn Action Plan
AWC	Anganwadi centre
MSY	Mukhyamantri samproona pushti yojana
SOPAN	Strategy for Odisha's Pathway to Accelerated Nutrition
SAG	Scheme for Adolescent Girls
MAM	Moderate acute malnutrition

INTRODUCTION

1.1 Overview

Anaemia is a situation as a result of a deficiency of red blood cells inside the blood. It is a main health problem worldwide, especially among women and children. The occurrence of anaemia in the population has a substantial effect not just on a person's health, but additionally on the socioeconomic development of a country. Due to a lack of RBCs or a low amount of protein called haemoglobin, which carries oxygen anaemia occurs in the body. The causation of the disease can occur due to various factors such as inadequate RBC synthesis, increased RBC breakdown or excessive blood loss.

Anaemia adversely influences the overall health of a human. Anaemia has intense repercussions that can adversely affect an individual's normal fitness. A man or woman can experience symptoms consisting of weak points, shortness of breath, and tiredness due to a low concentration of RBC within the blood causing less delivery of oxygen throughout the body. Pale skin, disorientation, and abnormal heartbeats are some alternative signs related to anaemia. A variety of things, inclusive of hunger, continual ailments, genetic troubles, and certain drugs can cause anaemia. The underlying reason for anaemia has to be recognized to decide the handiest therapy. Dietary modifications, iron supplements, and blood transfusions are several remedy techniques.

“The World Health Organization defines anaemia as a haemoglobin (Hb) degree of 12 g/dl in ladies and 13 g/dl in men. The normal Hb distribution is not only influenced by gender but also takes into consideration ethnicity and physiological state” ^[1]. “WHO defines anaemia as a haemoglobin concentration below 110 g/dl above sea level for kids under five years of age and for pregnant girls, and haemoglobin concentration below 120 g/dl for non-pregnant girls” ^[2].

Table 1.1 Cut-off values for public health significance by WHO (2008)

Indicator	Prevalence cut-off values for public health significance	
Anaemia	< 5%	No public health problem
	5-19%	Mild public health problem
	20-39%	Moderate public health problem
	≥ 40%	Severe public health problem

1.2 Causes of Anaemia:

Anaemia happens due to a reduced level of RBC production, RBC breakdown, or excess RBC loss. RBCs include a protein called haemoglobin, which carries oxygen in the body. When the body no longer has sufficient RBCs or haemoglobin in the blood, the oxygen ranges decrease, causing signs which include weakness and weariness related to anaemia [3].

Anaemia can be caused by a variety of factors that may result in decreased RBC synthesis, RBC breakdown or blood loss. Iron deficiency anaemia is a regularly occurring reason. It occurs whilst the body does not have enough iron to provide haemoglobin, the protein used for transporting oxygen in the body. This might be because of inadequate nutritional iron intake, negative iron absorption, or continual blood loss through menstruation or other situations.

Another reason is diet deficiency anaemia, most because of diet B12 or folic acid deficiency. These nutrients are vital to supply red blood cells and their insufficiency can impair the synthesis of RBC cells.

Certain chronic diseases, like chronic kidney disease and cancer, can also cause anaemia. These disorders affect the body's capacity to synthesise red blood cells or shorten their lifespan. Sickle cell anaemia and thalassemia, which are inherited diseases, affect the structure and production of RBCs, resulting in anaemia.

Other causes include autoimmune disorder where the body's internal immune system attacks and destroys the RBCs, and certain drugs and toxic substances that can suppress bone marrow function or damage red blood cells.

1.3 Symptoms of Anaemia:

Symptoms of anaemia varies as per the cause and severity of the anaemia. Anaemia may be very mild and has no symptoms at first. However, symptoms often develop or worsen as the anaemia worsens. Anaemia can cause the following symptoms:[4]

- Weakness
- Breath shortness
- Yellowish skin
- Irregular heartbeat
- Light-headedness
- Headaches

1.4 Types of Anaemia:

Anaemia is divided into numerous forms and classes. The different types of anaemia are

- Iron Deficient Anaemia
- Pernicious Anaemia
- Haemolytic Anaemia
- Sickle Cell Anaemia
- Thalassaemia
- Aplastic Anaemia

1.5 Global Scenario:

Anaemia is a grave public health problem worldwide and contributes to the burden of disease. The WHO states that, nearly 500 Mn women aged 15-49 suffer from anaemia in 2019, resulting in anaemia prevalence of 30 % among women of fertile age worldwide. became. The prevalence of anaemia was found to be 30 % in non-pregnant women of fertile age and 36 % in pregnant women.

During 2019, 40% children under 5 years were found to be anaemic i.e., 269 M children suffering from anaemia. The African region were found to have the highest prevalence rate of anaemia at 60% [6].

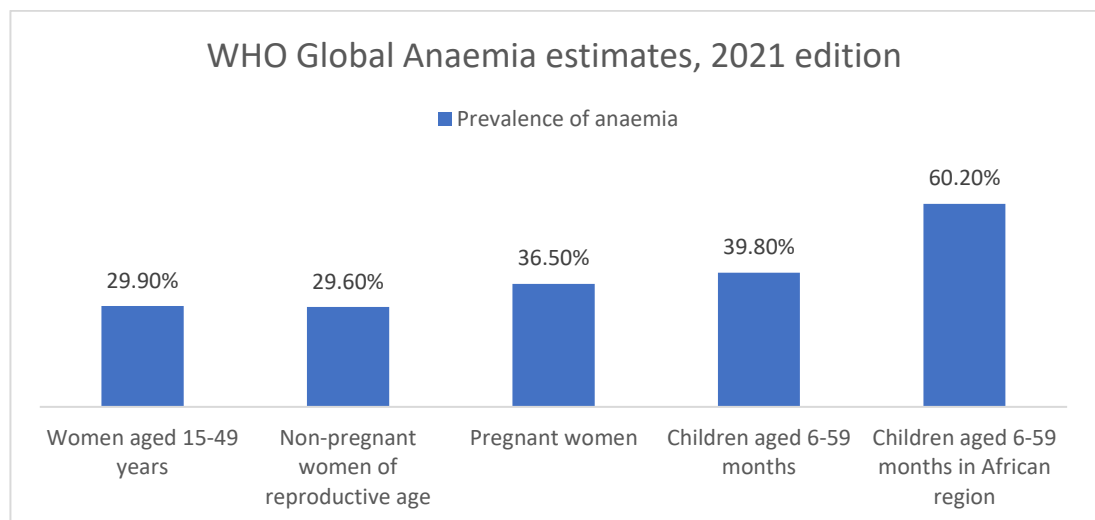


Figure 1.1: WHO Global Anaemia estimates, 2021 edition

The UN SDG Goals address the anaemia prevalence among women in age group 15 to 49 as indicator 2.2.3 of the SDG goal, and by 2030 the global goal of halving the nutrition target extended by 2025 as endorsed by the World Health Assembly (WHA). [7]

Anaemia is a worldwide problem that affects all nations. The spread of infectious diseases often disproportionately affects resource-poor countries. In some areas, anaemia is due to other sicknesses like malaria, HIV/AIDS, schistosomiasis, tuberculosis, hookworm infestations ^[2].

1.6 Anaemia in India:

Despite the most advanced period both in profitable openings and healthcare installations, India persists to be in the lowest rank of developing country with a population of 1.21 billion. “The last many decades have seen a stagnant enhancement in utmost health pointers of India which includes a reduction in child and maternal mortality rates, the poor status of nutritive status stays a concerning parameter.” ⁽⁸⁾ “India ranks 101 out of 116 countries with a score of 27.5 in the Global Hunger Index 2021. As per report on Global Food Policy Survey 2022 by the International Food Policy Research Institute reported by 2030, approximately 74 million Indians will suffer from hunger. The overall poor nutrition status of India adds to the high rate of the burden of the prevalence of anaemia among the population of India”. “As per the Global Nutrition Survey 2016, India ranks 170 out of 180 countries for the prevalence of anaemia among women”. ⁽⁹⁾ Anaemia Mukta Bharat Programme under POSHAN Abhiyaan (2018- 20) aims to reduce anaemia prevalence by three per cent points per time in children age group of 6- 59 months, adolescents’ group, and women of reproductive age group in India. ⁽¹⁰⁾ The National Family Health Surveys are country wide health check conducted in India to capture expansive information regarding essential health data. The most recent NFHS 5 check was done between 2019 and 2021, and it included 6.1 lakh sample houses from around the country. ^[11] The NFHS’s classification of anaemia is as follows:

Table 1.2: NFHS classification of anaemia

Classification	Normal	Mild	Moderate	Severe
Men	13g/dL & more	12-12.9g/dL	9 – 11.9 g/dL	<9 g/dL
Women (not pregnant)	12g/dL & more	10 – 11.9 g/dL	7 – 9.9 g/dL	<7 g/dL
Pregnant Women	11g/dL & more	10 – 10.9 g/dL	7 – 9.9 g/dL	<7 g/dL
Children	11g/dL & more	10 – 10.9 g/dL	7 – 9.9 g/dL	<7 g/dL

As per the NFHS- 5 data, anaemia prevalence in children and women have increased in Indian states. The anaemia prevalence among all women under the age group 15- 49 years witnessed an increase to 57 per cent in 2019 (NFHS- 5) as compared to 53 per cent in 2015- 26 (NFHS – 4).^[12]

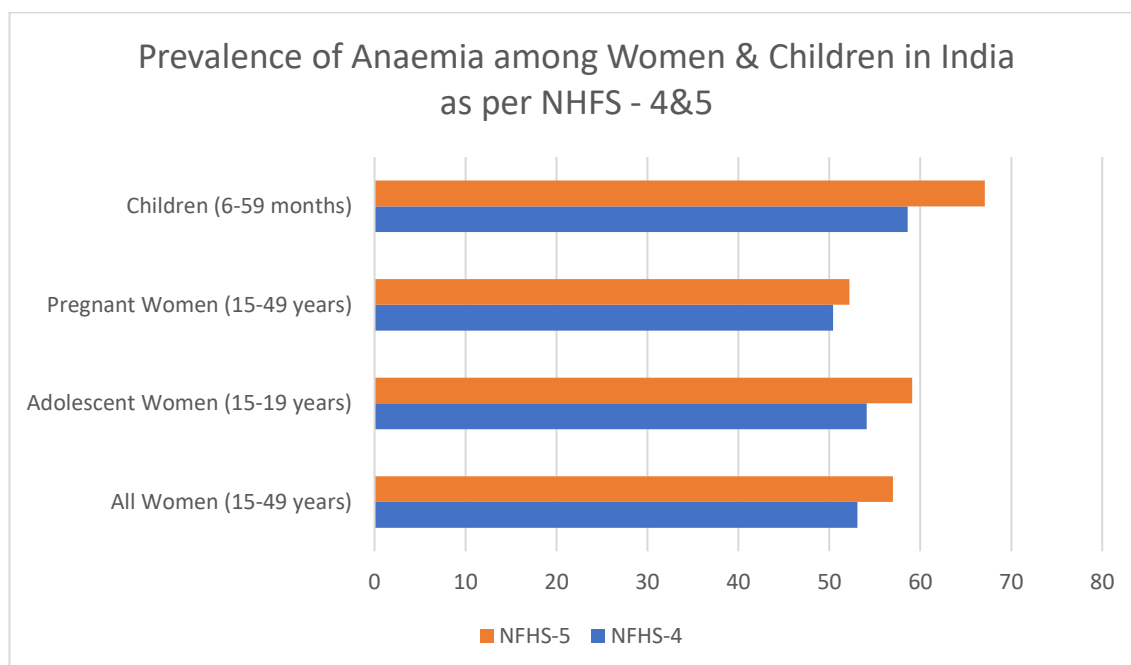


Figure 1.2 Prevalence of anaemia among women and children in India

1.7 Odisha and prevalence of anaemia:

Odisha, a state located in the eastern India, has been grappling with high prevalence of anaemia in the state population. Anaemia has been a concerning public health issue in the region. The prevalence of anaemia in Odisha has been alarmingly high particularly among women and children. According to NFHS – 5, approximately 55% of children under the age of five in Odisha are anaemic. This indicates a critical concern for child health and development in the state.

Moreover, the NFHS data also highlighted that around 50% of women in Odisha suffer from anaemia. This is a particularly worrisome statistic as it adversely affects the overall well – being of women, including their reproductive health and the health of their offspring.

Several factors contribute to the high prevalence of anaemia in Odisha. These include poor dietary intake, especially in terms of iron-rich foods, limited access to healthcare facilities, inadequate antenatal care, and a lack of awareness regarding anaemia prevention and treatment.

Recognizing the severity of the issue, the government of Odisha, along with various non-governmental organizations and healthcare providers, has implemented several interventions to combat anaemia. These efforts include the distribution of iron and folic acid supplements, nutritional counselling, and awareness campaigns to promote dietary diversification and proper nutrition.

REVIEW OF LITERATURE

Dr Dafodil Ghatak et al (2019) ^[13] performed a community-based study covering rural areas around Bhubaneswar, Odisha over a period of two years during November 2016 to October 2018 to assess the anaemia prevalence girls going to school in rural areas of Nayagarh district, Odisha. The study indicated that the prevalence of anaemia in schoolgirls as 62%, with the highest prevalence (71%) in age group 13-16 years. Through the study it was inferred that age was a significant factor associated with anaemia while other factors such as religion, marital status, diet pattern, occupation etc did not show much significance with anaemia. (*A Study of Prevalence of Anaemia in the School Going Girls of Rural Nayagarh District of Odisha*, 2019, JMSCR Volume 07)

According to the State Nutrition Profile: Odisha, Data Note, POSHAN ^[14], anaemia was found to be a public health concern with a major occurrence among children. The total number of children falling under 5 years of age suffering from anaemia was found to be 2.054.103 in all the thirty districts. The highest prevalence of anaemia among the children was found to be Ganjam district with 154,046 anaemic children followed by Mayurbhaj and Sundargarh. Further, it was found that 7,543,554 non-pregnant women and 359,038 pregnant women were anaemic. Ganjam district was found to be the highest-burden district for both categories. (*State Nutrition Profile: Odisha*, 2022, POSHAN Data Note 79)

The study, titled “How gender norms affect anaemia in select villages in rural Odisha, India: A qualitative study,” ^[15] looks at the association of gender norms influencing anaemia prevalence among rural Indian women. Various themes were depicted from the study which explained how inequitable gender norms were associate with anaemia in women from diverse castes. According to the study, the entire social environment must be analysed to understand the successfully boosting iron supplements usage and intake of iron-rich diet.

Behera and Bulliyya (2016) ^[16] conducted a study on the "Magnitude of Anaemia and Haematological Predictors among Children Under 12 Years in Odisha, India". Using standard methods various haematological indices such as RBC, WBC, and plasma ferritin were measured. Their haemoglobin level was 10.43 3.33 g/dL on average. Sixty-two per cent of the population had anaemia. Boys had lower mean haemoglobin levels than girls. School-aged children exhibited higher levels of anaemia overall than pre-schoolers. School-aged boys had higher mean plasma ferritin levels than girls.

Field research was conducted in four designated slum areas under the Municipal Corporation, Cuttack in Odisha to investigate the incidence of anaemia due to nutritional status in pregnant women. To lower the degree of nutritional anaemia, the study proposes including proper understanding about the origin and eradication of anaemia, acceptable eating patterns during pregnancy among slum women. ^[17]

Another paper ^[18] discusses the nutritional properties of eight wild edible fruits consumed by rural people and tribals of Odisha, India. The authors evaluated the total carbohydrate, total sugar, protein, and mineral content of these fruits and compared them with popular cultivated fruits like mango, pomegranate, grapes, apple, pineapple, banana, and guava. The study found that *Dillenia pentagona*, *Streblus asper*, *Melastoma malabathricum*, and *Calamus guru* were promising species for domestication and could be considered as good alternatives for many cultivated fruits. The paper also highlights the neglect of wild edible fruits in most food composition surveys and the need to popularize and domesticate them as an alternative source of food nutrition. (*“Analysis of some nutritional properties in eight wild edible fruits of Odisha, India, 2015, Current Science Journal”*)

Mohapatra S (2014) ^[19] studied the anaemia prevalence in school children (aged 12) in Bhubaneswar, Odisha, in selected slum schools. With 385 participants, the study used a non-experimental descriptive design/survey technique. Demographic data was collected using a systematic questionnaire, and haemoglobin levels were collected using Sahli's method. As per the findings, 58% of the sample size was anaemic, and a pamphlet was created to explain how to raise haemoglobin levels by supplementing a balanced diet. The study emphasises the significance of nutrition in preventing and treating iron deficiency, and the mix of suitable meals has an important role in boosting iron absorption in children.

Pattnaik S (2013) ^[20] is focused on finding out the prevalence of anaemia in rural Odisha among adolescent females, as well as the factors that contribute to it. The study comprised 151 adolescent girls, and their height and weight were evaluated using standard scales. Anaemia was found in 89.4% of the girls, with a higher frequency in the early teenage age group. The study also discovered a link between anaemia and low socioeconomic position, poor food habits, and menstruation issues. (*“Prevalence of anaemia among adolescent girls in a rural area of Odisha and its epidemiological correlates, 2013, Indian Journal of Maternal and Child Health, vol. 15”*)

Another research ^[21] states that anaemia as a serious public health issue particularly affecting women of reproductive age in Odisha, India. It is necessary for pregnant women

to take iron folic acid supplements regularly, while adolescents and women of reproductive age must consume iron supplements once a week. Despite evidence, the practice of consumption of supplements and routine following by women remains poor and ignored. According to the data, there are several barriers to iron supplement usage in existing, interpersonal, community, and policy contexts. Interventions should be customized as per the women's reproductive cycle as the accessibility of services differs among sub populations. (*“Moving beyond individual barriers and identifying multi-level strategies to reduce anaemia in Odisha India, 2020, BMC Public Health”*)

METHODOLOGY

3.1 Research Question/s:

1. What is the prevalence of anaemia in the state of Odisha as per NFHS – 4 and 5?
2. What are the major determinants associated with the prevalence of anaemia in the state?

3.2 Aim:

To get the knowledge of Anaemia prevalence in the state of Odisha, India through the factsheets of NFHS 4 and NFHS 5.

3.3 Objective/s:

1. Compare and find out the rate of reduction in the prevalence of anaemia in Odisha.
2. Find what all factors contribute to the prevalence of in the state.
3. Study the schemes introduced by state government to prevent the prevalence of anaemia.

3.4 Study Methodology

To study trends in anaemia prevalence in Odisha among women and children reported in the NFHS – 4 & 5 survey reports. The reports are thoroughly examined, along with data on anaemia prevalence in different age groups, categories, and other key indicators tabulated and analysed in Microsoft Excel Software.

- a) Type of study: Secondary Research
- b) Study Design: Descriptive Analysis
- c) Source of Data: The data has been taken from Odisha's factsheets - NFHS 4 and NFHS 5

The study design used for NFHS 4 & 5 factsheets.

NFHS 4: The National Family Health study 4 was a large-scale study undertaken in India. A cross sectional research design was employed for NFHS 4. In the case of NFHS 4, data was gathered from a representative sample of Indian homes. To guarantee that the sample was representative of the entire country, the survey used a multistage, stratified sampling procedure. A systematic sample of homes was chosen within each PSU. NFHS-4 used a cross-sectional design to offer trustworthy and up-to-date information on critical health indicators, as well as to aid policymakers in developing evidence-based policies for improving family health in India.

NFHS 5: The NFHS 5 design is cross sectional. Due to COVID-19 scenario, the NFHS 5 data collection was divided into two sections. NFHS 5's contents are comparable to NFHS-4's, with the inclusion of certain new themes such as preschool education, disability, access to lavatory installations, death enrolment, bathing practises throughout period and styles and grounds for revocation.

RESULTS AND ANALYSIS

Data from the NFHS-4 and 5 fact sheets (Odisha) on the prevalence of anaemia were compiled and shown in Fig. 4.1.

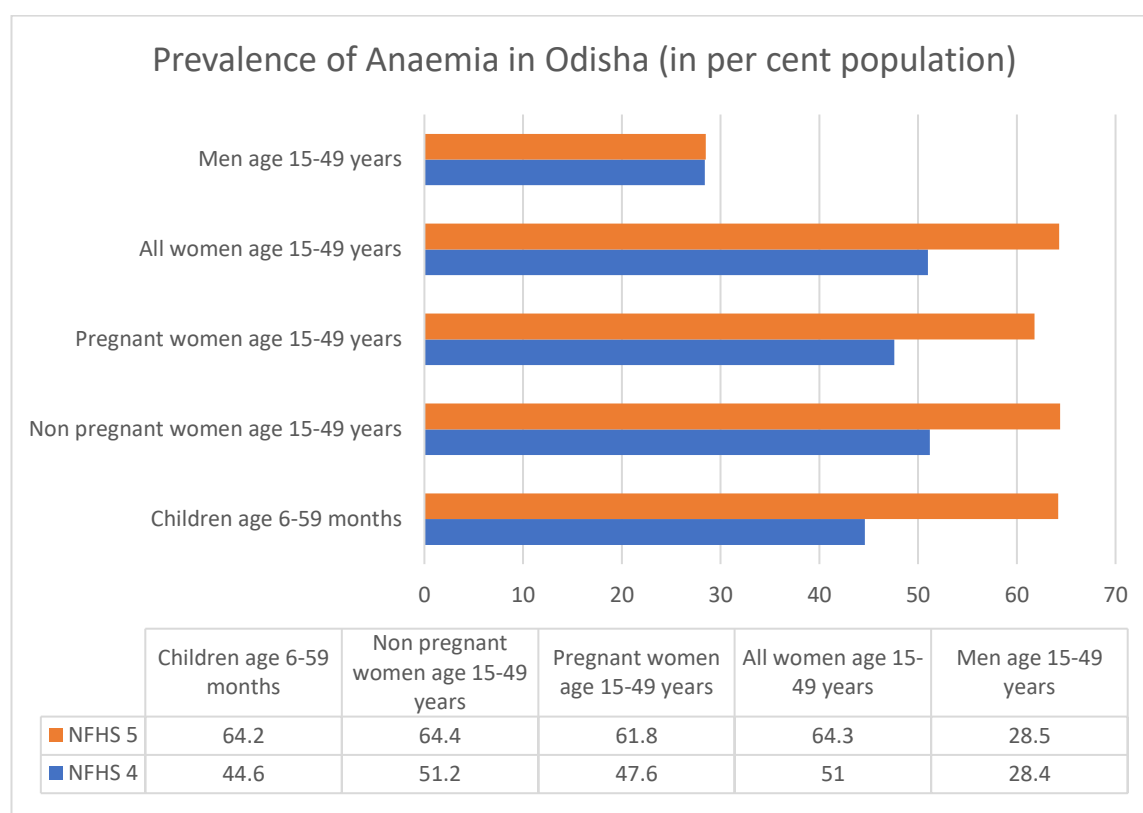


Figure 4.1: Prevalence of Anaemia (%) in Odisha Population from NFHS-4 to NFHS-5

Anaemia was shown to be prevalent in all age and gender categories, however women of reproductive age and children are the most at risk groups.

When comparing NFHS-5 and NFHS-4, there was a significant increase in anaemia prevalence. Children under the age of five were found to have the highest incidence of anaemia in the percent population, followed by pregnant women and non-pregnant women.

Table 4.1: Comparative data on the prevalence of anaemia among different age and gender groups as per NFHS 4 and NFHS 5

Prevalence of Anaemia Indicators (in %)	NFHS 4 (2015-16)	NFHS 5 (2019-21)
Among Children aged 6-59 months	44.6	64.2
Among non-pregnant women aged 15-49 years	51.2	64.4
Among pregnant women aged 15-49 years	47.6	61.8
Among women aged 15-49 years	51.0	64.3
Among women aged 15-19 years	51.0	65.5
Among men aged 15-49 years	28.3	28.5
Among men aged 15-19 years	30.3	30.0

Anaemia in adolescent men and women (15-19 years) were collected in both NFHS 4 and NFHS 5. There was not a sharp rise found in the prevalence of anaemia in adolescent men but in case of adolescent women the increase in prevalence of anaemia was by 14.5 percentage points from NFHS 4 (51.0%) to NFHS 5 (65.5) (Fig 4.2). It was also observed that in both NFHS 4 & 5, there was a higher prevalence of anaemia in adolescent women.

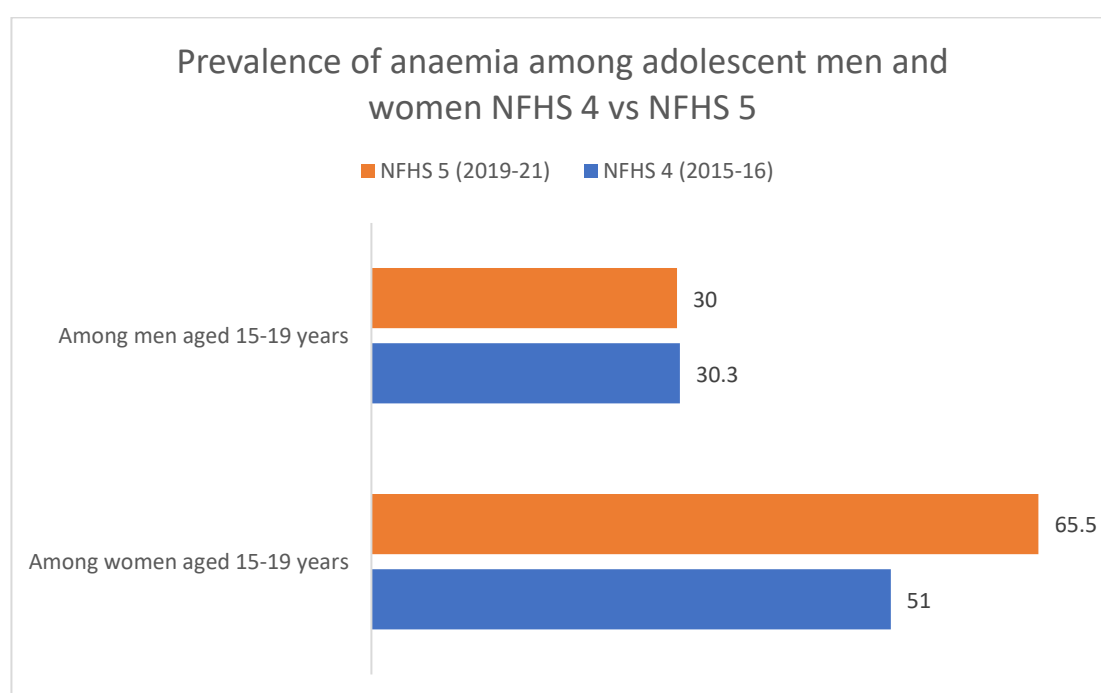


Figure 4.2: Comparison of prevalence of anaemia among adolescent men and women as per NFHS 4 & 5

Anaemia in Children (6-59 months):

According to WHO, the worldwide anaemia prevalence in children of age group 6-59 months in 2019 was 39.8%, resulting in 269 million anaemic children. Anaemia, also known as iron insufficiency, mostly affects children under the age of five due to an imbalance between fast development and inadequate iron requirement in the body. Anaemia in children can be caused by a variety of circumstances, including inadequate nutrition, infections, and genetic diseases. Furthermore, factors such as low birth weight, early beginning, and insufficient iron intake can all contribute to early-life anaemia.

In Odisha, the superiority of anaemia multiplied by way of 19.6 per cent factors among babies aged 6 to 59 months according to NFHS 5 (64%) as compared 45% in NFHS 4.

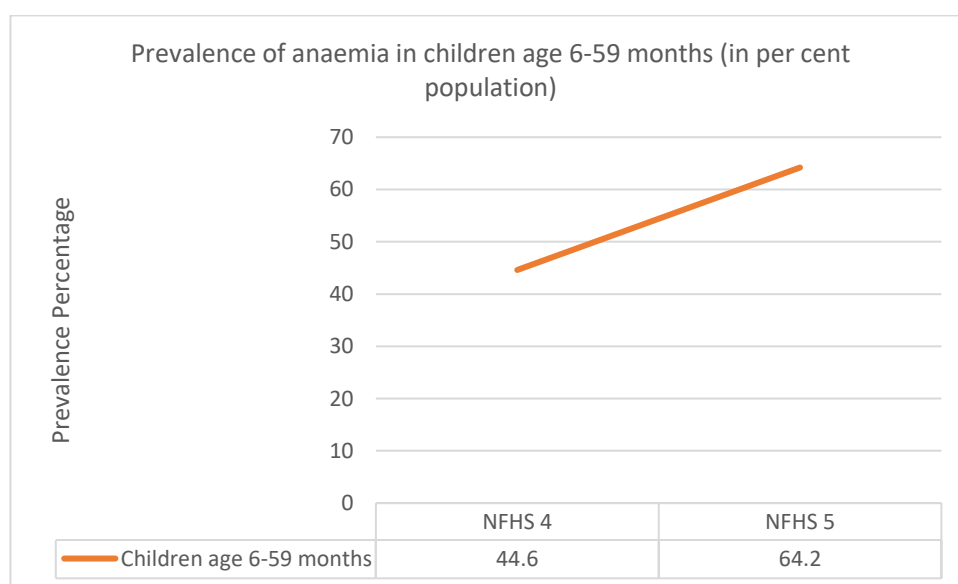


Figure 4.3. Trend in increase of prevalence of anaemia in children aged 6-59 months from NFHS 4 to 5

The per cent of anaemia occurrence in youngsters aged 6-59 months in Odisha (64.2%) was discovered to be equivalent to the countrywide incidence of 67.1%) (Fig 4.4).

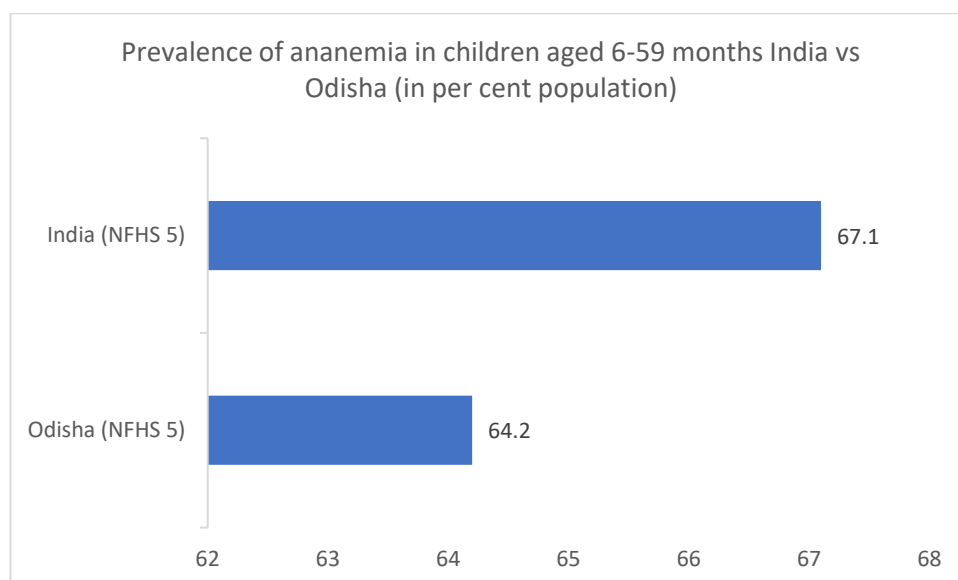


Figure 4.4: Prevalence of anaemia among children aged 6-59 months as per NFHS 5

According to the source of the record (NFHS 5), 65.6% of rural kids had been discovered to be anaemic, as compared to 56.2% of city youngsters. The occurrence of anaemia ranged from 9.4 per cent factors between Odisha's rural and urban districts.

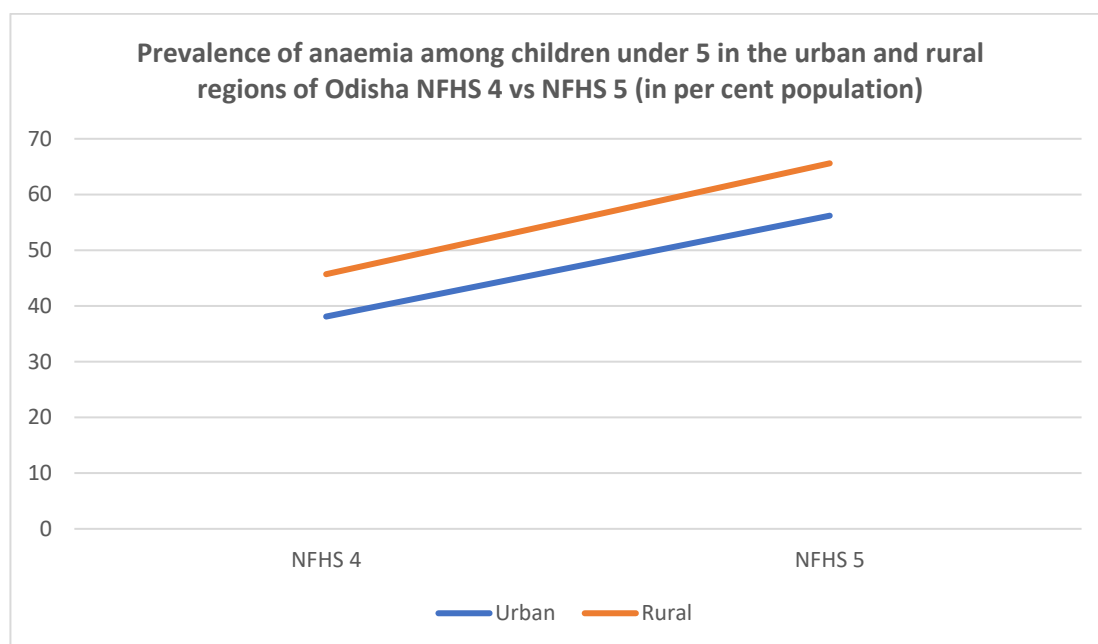


Figure 4.5 Comparative trend of prevalence of anaemia among children under five years age in the rural and urban areas of Odisha

When comparing the anaemia prevalence in both urban and rural regions from NFHS 4 to NFHS 5, the percentage points increased dramatically. The prevalence of anaemia has increased by 18.1 percentage points in urban areas, whereas it has increased by 19.9 percentage points in rural regions.

Table 4.2: Prevalence of anaemia among children under the age of five years in different areas as per NFHS 4 and 5

Prevalence of anaemia among children under five years age	NFHS 4	NFHS 5
Urban	38.1	56.2
Rural	45.7	65.6

Malnutrition is the leading cause of anaemia in children, particularly in pre-schoolers. Anaemia in children has been linked to malnutrition and breastfeeding. The nutritional condition of children under the age of five improved somewhat from NFHS 4 to NFHS 5, with a decrease in stunting, wasting, and being underweight among youngsters.

Table 4.3: Comparative data on nutritional indicators of children under five years in NFHS 4 and NFHS 5

Nutritional Indicators for children under five years (in %)	NFHS 4	NFHS 5	Percentage point difference
Stunting (height-for-age)	34.2	31.0	-3.2
Wasting (weight-for-height)	20.4	18.1	-2.3
Underweight (weight-for-age)	34.4	29.7	-4.7

Indicators for undernutrition slightly improved for stunting, wasting and underweight with decreased prevalence of stunting from 31.0 to 34.2 %, wasting from 18.1 to 20.4 % and underweight from 40.7 to 34.4% (Table 4.3).

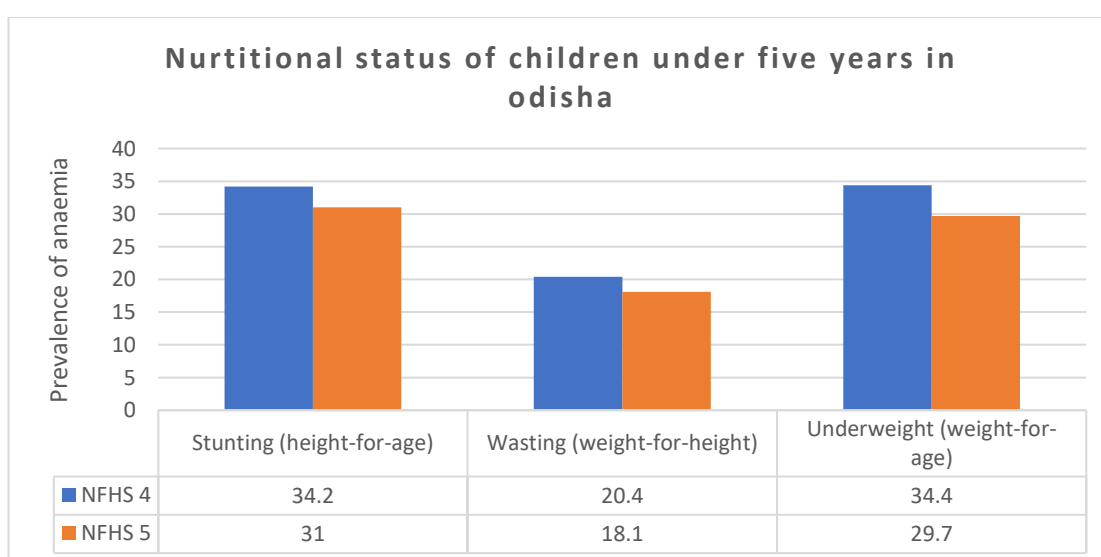


Figure 4.6: Prevalence of anaemia among children under five years of Odisha (NFHS 4 vs NFHS 5)

The rising incidence of exclusively breastfeeding in children within one hour of birth (under 3 years) indicates an improvement in Odisha's breastfeeding practises (Fig 4.7).

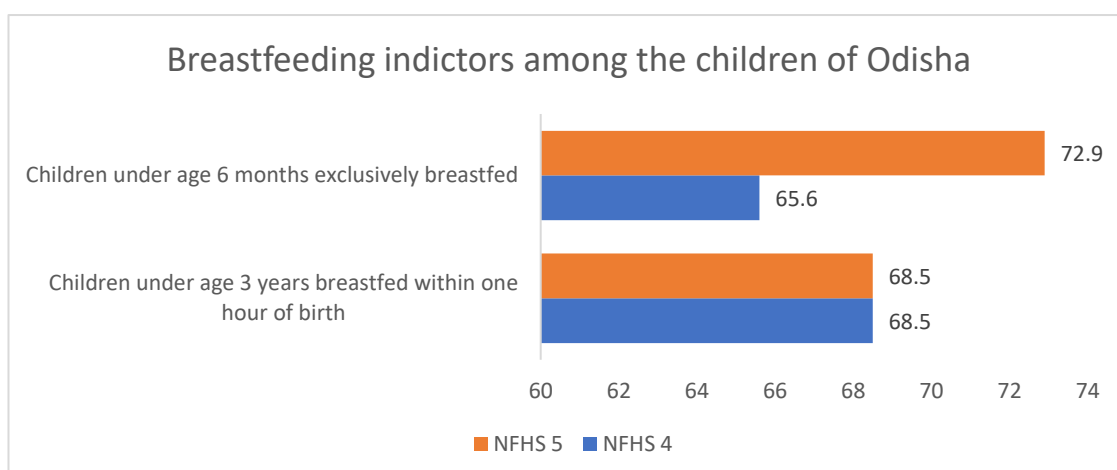


Figure 4.7: The prevalence of breastfeeding among children in Odisha as per NFHS 4 and NFHS 5

Regular immunisations boost children's immunity and capacity to resist infections and illnesses that cause anaemia. In NFHS 5, the prevalence of complete immunisation among children aged 12-23 months increased by a significant percentage point, rising from 78.6 to 90.5%. It is interesting to note that in Odisha, more than 90% of children under the age of five are fully immunised against several illnesses (BCG, Measles, Polio, and DPT or pentad vaccination).

Table 4.4: Comparative data of NFHS 4 and 5 on vaccination indicators for children aged 12-23 months in Odisha.

Vaccination indicators for children aged 12-23 months	NFHS 4	NFHS 5
Based on information from either vaccination card or mother's recall	78.6	90.5
Based on information from vaccination card only	89.8	90.7
Received BCG	94.1	97.3
Received three doses of polio vaccine	82.8	94.7
Received three doses of Penta or DPT vaccine	89.2	94.7
Received first dose of measles - containing vaccine (MCV)	87.9	95.9
Received three doses of rotavirus vaccine	NA	88.1
Received three doses of pentad or hepatitis B vaccine	83.2	94.4

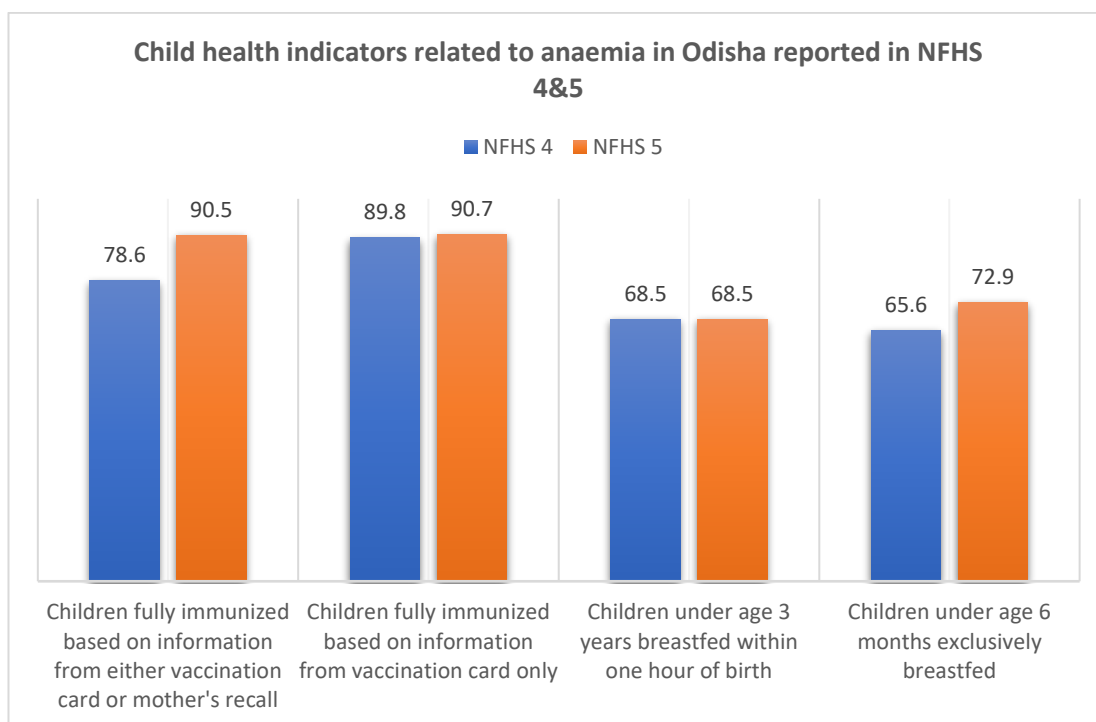


Figure 4.8: Child health indicators related to anaemia in Odisha as per NFHS 4 and 5

Anaemia in Women: Preventing anaemia among women of reproductive age is crucial to prevent pregnancy related complications like low birth weight of the neonatal, perinatal and maternal mortality, and disease prevalence. According to the NFHS-5 data, the anaemia prevalence among women of Odisha is higher than the national rate.

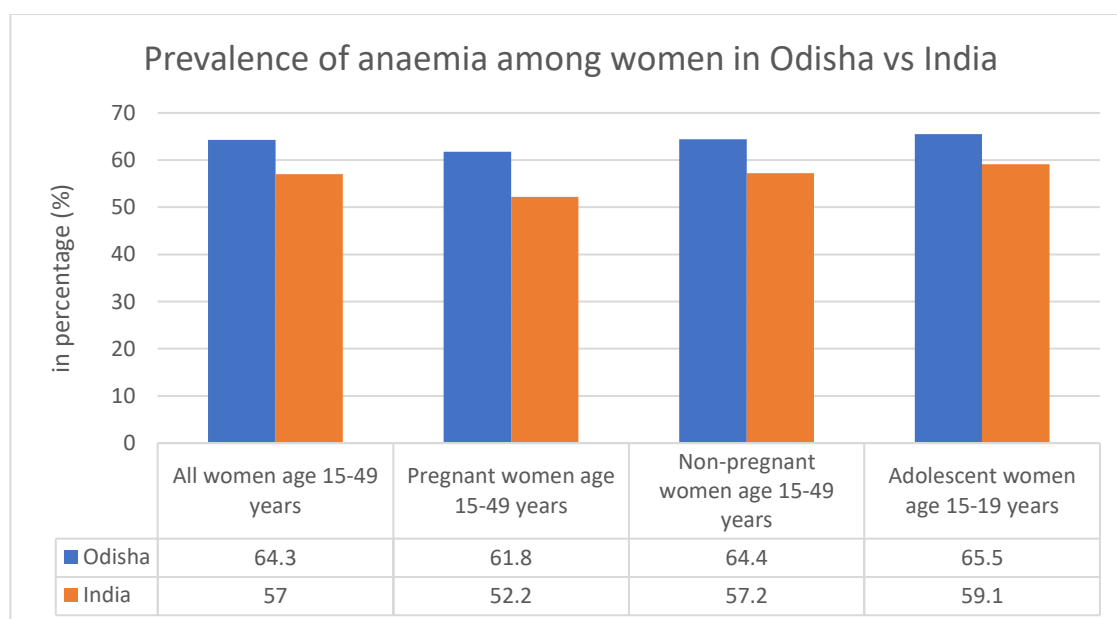


Figure 4.9: Comparative analysis of prevalence of anaemia among women in Odisha vs India as per NFHS 5

Table 4.5: Comparative data of prevalence of anaemia among women in Odisha as per NFHS 4 and 5

Prevalence of anaemia among women	NFHS 4	NFHS 5	Percentage point difference
All women aged 15-49 years	51	64.3	13.3
Pregnant women aged 15-49 years	47.6	61.8	14.2
Non-pregnant women aged 15-49 years	51.2	64.4	13.2
Adolescent women aged 15-19 years	51	65.5	14.5

The anaemia prevalence has increased among 15-49 years women in general, including pregnant women, non-pregnant women of age 15-49 years, and adolescent women of age 15-19 years.

Improved maternal health outcomes have the potential to boost not just women's health, but also the overall health and nutritional outcomes of their children, during early years of development.

Table 4.6: Maternal health factors related to anaemia as per NFHS 4 and 5

Maternal Health			
Indicators	NFHS 4	NFHS 5	Difference
Mothers who had an antenatal check up in the first trimester (%) (Early registration)	64.0	76.9	12.9
Mothers who had at least 4 ANC visits (%)	61.9	78.1	16.2
Consumed IFA for one hundred days or more when they were pregnant (%)	36.5	60.8	24.3
Consumed IFA for 180 days or more when they were pregnant (%)	4.2	34.4	30.2
Institutional births (%)	85.3	92.2	6.9
Average out of pocket expenditure per delivery in a public health facility (Rs)	4,226	4,139	-87
Pregnant women with anaemia	47.6	61.8	14.2

Maternal health factors related to anaemia showed positive growth in NFHS 5 as compared to NFHS 4 though the prevalence of anaemia among pregnant women was increased despite an increase in maternal health factors.

Consumption of IFA supplements for at least 100 days during pregnancy increased significantly from 24.3% in NFHS 4 to 60.8% in NFHS 5, however there was very little change for consumption of IFA supplements for at least 180 days during pregnancy (30.2 to 34.4%). Increased intake of IFA supplements has been a focus of government intervention programmes aimed at reducing anaemia among pregnant women and providing optimal iron reserves for new-borns through enhanced breastfeeding practises.

76.9% of pregnant women received ANC check-ups in the first trimester and 78.1% received 4 or more ANC check-ups as per NFHS 5 reports in Odisha. Both the parameters have shown an increase of 12.9 and 16.2 percentage points respectively. Institutional deliveries in the state show good progress ensuring proper care being taken during and after delivery of the pregnant women and new-born.

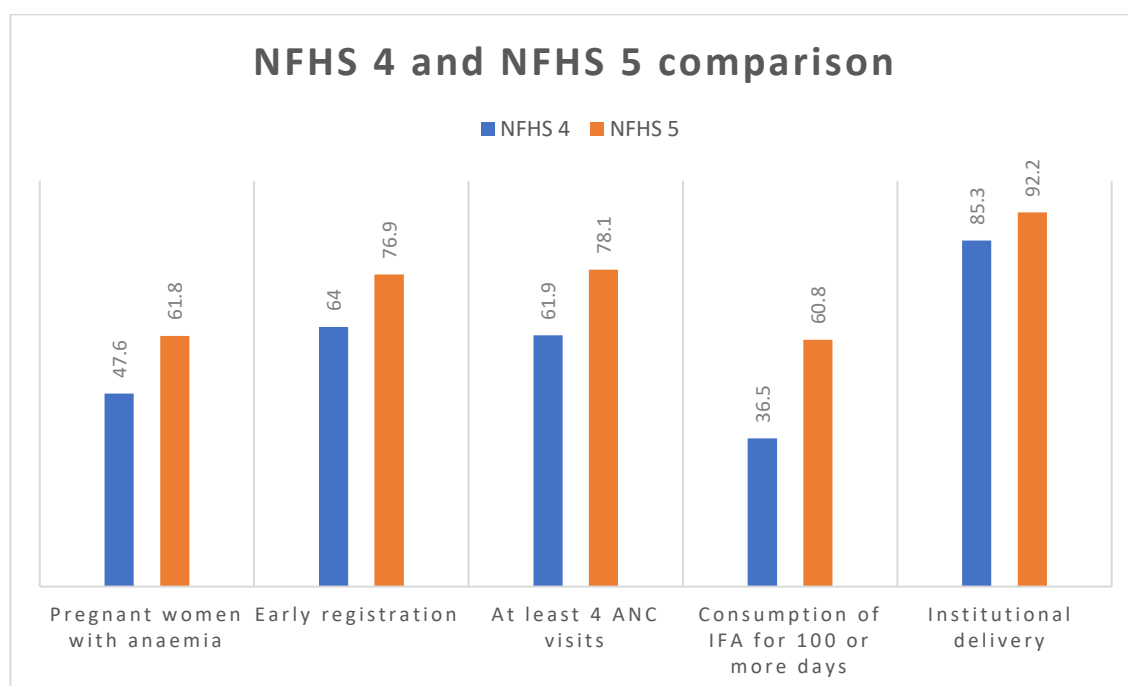


Figure 4.10: Comparison of maternal health factors related to anaemia in pregnant women as reported in NFHS 4 and NFHS 5

According to NFHS-5, the prevalence of anaemia in rural and urban Odisha is almost equal, however it is higher in rural regions than in urban ones. Rural teenage women aged 15-19 years had the greatest frequency of anaemia.

Table 4.7: Prevalence of anaemia among women in rural and urban areas of Odisha

Anaemia prevalence indicators (NFHS 5)	Rural	Urban
All women aged 15-49 years	64.9	61.5
Pregnant women aged 15-49 years	62.2	59.5
Non-pregnant women aged 15-49 years	65.0	61.6
Adolescent women aged 15-19 years	66.3	61.4

The nutritional status among women aged 15-49 years saw improvement as it decreased for underweight women from 26.5 to 20.8% from NFHS 4 to NFHS 5. Obesity or overweighting showed an increase from 19.2 to 23% among women aged 15-49 years in Odisha.

Odisha's rural areas had a significant reduction in the percentage of underweight women from 28.7 to 22.6% women in NFHS 5 whereas the overweighting women increase slightly from 13.2 to 19.2% women.

The urban areas of Odisha saw a similar pattern of increase in overweight women from 32 to 40.1% women and a decrease in underweight women from 15.8 to 12.6 % in NFHS 5.

Table 4.8: Comparative analysis of women nutritional status in rural and urban areas of Odisha as reported in NFHS 4 and 5

	NFHS 4			NFHS 5		
	Rural	Urban	Total	Rural	Urban	Total
BMI of women below normal	28.7	15.8	26.5	22.6	12.6	20.8
Overweight or obese women	13.2	32	16.5	19.2	40.1	23

A positive trend suggesting improvement in parameters related to family planning and child spacing would directly or indirectly benefit women in caring for their family's and themselves health and nutritional needs. Spacing between children helps women to restore and prepare their bodies for future healthy pregnancies, as well as provide sufficient post-natal care for the new-born.

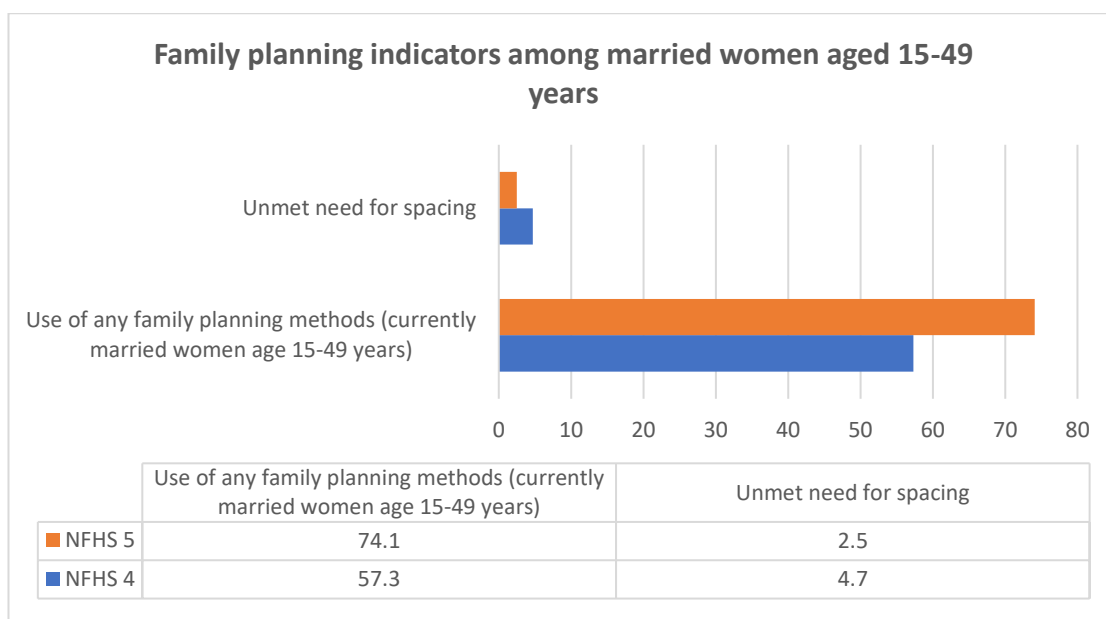


Figure 4.11: Family planning factors related to anaemia prevalence among married women aged 15-49 years.

DISCUSSION

Key Findings of NFHS 4, Odisha 2015-16

- In Odisha, 51% of women, 45% of children (6-59 months), and 28% of males were found to be anaemic.
- In the women's category, 51% of non-pregnant women, 51% of adolescent women (15-19 years), and 48% of pregnant women were found to be anaemic.
- ANC visits, IFA supplement consumption, lactation, and other maternal health factors are associated with the prevalence of anaemia in pregnant women. It was shown that 64% of pregnant women received an ANC check-up during their first trimester, 62% had at least 4 ANC checks, and 36% used IFA supplements for 100 days or more.
- 68% of infants under the age of three were nursed within one hour of birth, and 65% of children under the age of six months were exclusively breastfed.
- Women's dietary status impacts the prevalence of anaemia in the body. According to NFHS 4, 26% of women were underweight or had a BMI below normal, whereas 16% of women were fat or overweight.
- Spacing between children is an important practise for restoring iron reserves and replenishing women's bodies after a single birth. It was shown that 57% of married women aged 15-49 years used some kind of family planning, while just 5% had an unmet need for family planning.
- Children under the age of five are at a significant risk of anaemia owing to iron deficiency. Iron deficiency can arise in children as a result of inadequate diet, illnesses, or genetic diseases. Other risk factors include low birth weight, early birth, insufficient iron consumption, poor breastfeeding, and other socioeconomic situations.
- In Odisha, 45 percent of children aged 6-59 months were anaemic. 34% of children under the age of five were found to be stunted, 20% were wasted, and 34% were underweight. This graphic displays the nutritional condition of children under the age of five. 3% of the youngsters were overweight.
- 79 per cent of the children were fully vaccinated with vaccines such as BCG, Polio, Penta or DPT, MCV, Rotavirus etc.

Key Findings of NFHS 5, Odisha 2019-21

- 64% of the children (6-59 months), 64% of the women, and 28% of the males were determined to be anaemic. The frequency of anaemia has grown in children under the age of five and in women aged 15 to 49 years.
- According to NFHS 5, 64 percent of non-pregnant women, 62 percent of pregnant women, and 65 percent of teenage women in Odisha were anaemic. From NFHS 4 to 5, the prevalence of anaemia has increased in all groups of women.
- 77% of pregnant women received a prenatal check-up during their first trimester, 78% had at least four antenatal care visits, and 61% had eaten IFA for 100 days or more during their pregnancy. Since NFHS 4 to 5, maternal health indicators related to anaemia have steadily increased. Though intake of IFA for 180 or more days did not progress much as compared to NFHS 4.
- Since NFHS 4, the percentage of institutional delivery has grown. In NFHS 5, the percentage improved from 85% to 92%.
- There was a decrease in underweight women while there was an increase in overweight women. In NFHS 5, the proportion of underweight women decreased from 26% to 21%, while the proportion of overweight women increased from 16% to 23%.
- There has been an increase in the usage of any family planning technique among married women aged 15-49 years. In NFHS 5, the percentage climbed from 57% to 74%. In NFHS 5, the unmet demand for spacing was lowered from 5% to 2%.

Government schemes/programmes to tackle anaemia and improve related factors such as nutritional status, maternal and child health:

For Anaemia reduction

- A) Anaemia Mukta Bharat:** A government of India programme to eliminate anaemia among mothers and children throughout the country. It was introduced in 2018 as part of the larger National Nutritional Mission (POSHAN Abhiyan) to enhance the nutritional condition of mothers and children in India.
- B) AMLAN (Anaemia Mukta Lakhya Abhiyan):** The state government of Odisha has implemented the AMLAN initiative, a multi-pronged approach to eradicate anaemia in certain demographics. The goal of this effort is to reduce anaemia by 10% every year, starting with NFHS 5. Many ministries are working together to execute it, including Health and Family Welfare, Women and Child

Development, Mission Shakti, etc. The programme activities include increasing IFA supplementation, testing for haemoglobin, treating anaemic patients, enhancing service providers' ability, and communicating about social behaviour change.

C) Initiative for Anaemia Control:

1. IFA and calcium supplementation
2. The availability of injectable iron sucrose and blood transfusion services for pregnant women suffering from severe anaemia.
3. Once deworming for all pregnant women in their second trimester

For Maternal Health improvement

A) Janani Suraksha Yojana: The Janani Suraksha Yojana (JSY) is a government of India initiative to minimise maternal and child mortality through mandatory institutional delivery and financial aid to expectant women. The campaign, which is part of the larger National Rural Health Mission (NRHM), was inaugurated in 2005.

Under the Janani Suraksha Yojana, pregnant women in rural and urban areas are entitled to cash incentives to encourage them to deliver their babies in health facilities. The scheme specifically targets women from disadvantaged and economically weaker sections of society. The offered incentives cover the expenses associated with childbirth, including transportation, medical expenses and post-natal care.

B) Janani Shisu Surakshya Karyakram (JSSK): JSSK is a government of India's programmes which aims to provide essential maternal and child health services to pregnant women and newborns. It was established in the year 2011 and is a part of the National Health Mission. The programmes focus on reducing maternal and child mortality resulting in improved overall health of women and children.

C) Village Health Sanitation & Nutrition Day (VHSND): The Village Health Sanitation & Nutrition Day is a programme implemented by the GoI in the rural areas to improve the health, sanitation, and nutritional status of the village population. It comes under the National Health Mission and aims to provide essential healthcare services along with promoting health awareness at the community level.

D) Maternity Waiting Homes (Maa Gruha): The Maa Gruha are maternity waiting homes established near delivery points to accommodate expecting pregnant

women for delivery from difficult geographical regions before 7-10 days of the expected delivery date for safe institutional delivery. The maternity waiting homes along with providing facilities for temporary resting homes also provide counselling services to mothers on personal hygiene, family planning measures, new born care etc.

- E) SUMAN (Surakshita Matritva Ashwasan):** Surakshit Matritva Ashwasan (SUMAN) is a programme launched by the Government of India to guarantee that every pregnant woman and new born child in the country receives respectful and excellent healthcare. The programme was introduced in 2020 as part of the National Health Mission's (NHM) Maternal and Child Health (MCH) services. SUMAN's mission is to provide comprehensive prenatal care, skilled birth attendance, and postnatal care to pregnant women and babies, with a focus on lowering maternal and neonatal mortality and improving health outcomes. The programme is carried out through a network of public health institutions with the goal of making healthcare services easily accessible, inexpensive, and of high quality.

For Child Health improvement:

- A) Kangaroo Mother Care (KMC) Units:** Kangaroo Mother Care (KMC) facilities are specialised healthcare environments that offer kangaroo mother care, which is a technique of caring for preterm or low birth weight infants. KMC is a non-incubator-based care option that emphasises close and continuous skin-to-skin contact between the mother (or another carer) and the newborn. KMC units have been developed in all 40 SNCUs to cater for premature babies and ill new-borns.
- B) Intensified Diarrhoea Control Month (IDCM):** An intensified diarrhoea control program is held fortnightly every year since 2015 during the monsoon season. A prophylactic dose of ORS is distributed among under-five children to prevent death due to childhood diarrhoea. In 2018, the campaign was modified where ASHA distributes prophylactic ORS packets to each household to prevent and control diarrhoea in both adults and children. A special zinc awareness campaign was included to increase the utilization of zinc during diarrhoea.
- C) National Newborn Week (NNW):** National Newborn Week is an annual observance that focuses on the health and well-being of newborn babies. The week is dedicated to raising awareness about the unique needs of new-borns and promoting initiatives that support their survival, development, and overall health.

During National New-born Week, various organizations, healthcare professionals, and communities come together to highlight the importance of new-born care and early interventions. The campaign aims to educate parents, caregivers and the general public about essential practices to improve newborn health outcomes.

D) India New-born Action Plan (INAP): The India New-born Action Plan (INAP) is a comprehensive initiative launched by the Government of India to address the high neonatal mortality rate and improve new-born health outcomes in the country. The plan focuses on reducing new-born deaths and ensuring the well-being of infants during their first 28 days of life, commonly referred to as the neonatal period.

The INAP sets forth a strategic framework that encompasses various evidence-based interventions and strategies to tackle key issues affecting new-born health. These include improving antenatal care, promoting institutional deliveries, enhancing the quality of care during childbirth, ensuring essential new-born care practices, early detection and management of complications, and strengthening referral systems.

Nutrition Programmes:

A) Ojan Utsaba: Ojan Utsaba is a biannual state-wide initiative to collect anthropometric data of children under the age of 5 years at the AWCs. This helps to reduce growth faltering by adding the mindfulness of the caregivers on the significance of importing and growth monitoring. Through this action pockets having high, moderate, and low malnutrition and pockets with bettered nutrition status are linked. This is observed across all AWCs twice in May and November. All children (0- 5 yrs.) enrolled at the AWCs are counted at the AWC on the specified day.

B) Mukhyamantri Samproona Pushti Yojana (MSY): Mukhyamantri Samproona Pushti Yojana which was previously known as SOPAN (Strategy for Odisha's Pathway to Accelerated Nutrition) scheme is a state-funded project seeking to improve nutrition results for nutritionally weak beneficiaries in 125 nutritionally susceptible blocks.

The major intervention being covered under the scheme are:

1. Observation of Kishori Mela and weekly nutrition supplements to Adolescent girls (15-19 years).

2. Adolescent females (14-18 years) would be covered under nutritional and non-nutritional components under the SAG of the Government of India in 10 Aspirational Districts.
3. Take-home ration for pregnant women and lactating mothers provided in the form of nutrient-rich food products, including millets.
4. Coverage of MAM children

C) Odisha Millet Mission: In order to promote the cultivation and consumption of millets in the state, the Odisha Millet Mission is an initiative undertaken by the Government of Odisha. The Odisha Millet Mission is an initiative undertaken by the Government of Odisha to promote the cultivation and consumption of millets. The initiative intends to solve the state's food security, hunger and climate change issues by promoting millet cultivation and consumption as millets are a sustainable and nutritious crop. The initiative aims to empower farmers, increase their income, and give a nutritious food alternative to Odisha citizens.

CONCLUSION

The comparison of the prevalence of anaemia among women and children in Odisha using the state fact sheets of the National Family Health Survey (NFHS) – 4 and 5 was performed and useful insights were inferred. Both the studies found significant prevalence of anaemia in the state with higher prevalence among the pregnant women and children under five years, making it a serious public health issue in Odisha.

As per the findings, anaemia among pregnant women and children in the state have seen a rise in prevalence since NFHS 4. The findings show that there has been improvement over time in factors related to prevalence of anaemia but not significantly much. The improvements are not significant in terms of reducing the burden of anaemia in the state.

Various programmes have been implemented in the state to improve the health and nutritional indicators associated with prevalence of anaemia. Despite the efforts the findings point to the need for an improvised and comprehensive intervention to address the burden of anaemia in the state. More stringent supervision and monitoring needs to be done to reduce the burden of anaemia among pregnant women and children.

Furthermore, there is an urgent need to create monitoring and evaluation tools to evaluate the development of treatments and their influence on anaemia reduction. Regularisation of research and data collecting, such as the NFHS, is critical in giving further information on the incidence of anaemia and in making evidence-based decisions.

To summarise, continuous efforts and a comprehensive approach are required to prevent anaemia among mothers and children in Odisha. The burden of anaemia can be decreased, and the general health and well-being of the Odisha population enhanced by adopting comprehensive therapies and effectively monitoring development.

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