Internship Training

At

Piramal Swasthya Management and Research Institute (Patna, Bihar)

(April 1st – June

30th,2026)

A Report

By

N. Lavanya

On

Distribution and Determinants of Infant and Young Child Feeding Practices Among Mothers of Children Aged 12-23 In Rural Bihar

Under guidance of

Dr. Ekta Saroha

PGDM (Hospital and Health Management)

2024-2026

International Institute of Health Management Research

(Completion of Internship Training from Piramal Swasthya)

The certificate is awarded to

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Date: 16th March – 14th June 2026.

Organization: Piramal Swasthya Management and Research Institute

She comes across as a committed, sincere & diligent person
who has a strong drive & zeal for learning

We wish her all the best for future endeavors

Organization Supervisor **Head-HR/Department Head**

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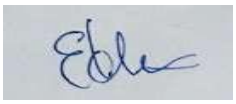
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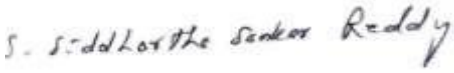


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The following dissertation titled **"Distribution and Determinants of Infant and Young Child Feeding Practices Among Mothers of Children Aged 12-23 in Rural Bihar"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

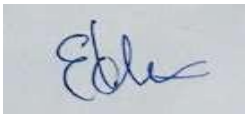
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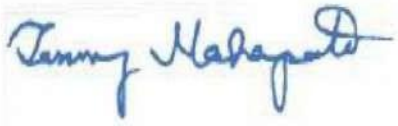
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- Applied public health research and data analysis skills in real-world projects.
- Conducted data quality assurance through MWRA backchecks.
- Developed reports, presentations, and literature reviews.

Deliverables:

- MWRA backcheck reports and data quality summaries.
- Literature review reports and case study documentation.
- Data support for Bihar story ppt.
- Dissertation research outputs and presentations.

Strengths:

- Attention to data quality and accuracy.
- Effective documentation and presentation preparation.
- Quick learner and adaptable team member.

Suggestions for Improvement:

- More exposure to field implementation activities.
- Greater participation in stakeholder review meetings.

Suggestions for Institute (Course Curriculum, Industry Interaction, Placement, Alumni):

- Provide more live projects and field-based learning opportunities.



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Objectives met: The student successfully met the objectives of the dissertation by examining the distribution and determinants of Infant and Young Child Feeding (IYCF) practices among mothers of children aged 12–23 months in rural Bihar. The study involved data analysis, interpretation of findings, identification of key determinants, and the preparation of the final dissertation report.

Deliverables: The student successfully completed the assigned dissertation work and submitted the final dissertation report within the stipulated timeline.

Strengths Has strong analytical and research skills throughout the internship. She showed sincerity, dedication, responsibility, and a willingness to learn.

Suggestions for Improvement: The student may further strengthen her advanced statistical analysis, scientific writing, and presentation skills.

Suggestions for Institute (course curriculum, industry interaction, placement, alumni): The Institute may continue to strengthen industry exposure through internships, field visits, practical research projects, and interactions with public health organisations.



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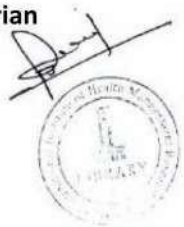
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Acknowledgements

I am deeply grateful for the invaluable learning and career development opportunity I received during my internship training with the **Piramal Swasthya Foundation in Bihar**. Being part of this initiative was a truly enriching experience, and I consider myself fortunate to have engaged with such dedicated professionals and experts who supported me throughout this journey.

I would like to extend my heartfelt thanks to **Dr. Tanmay Mahapatra** (Director, Data and Learning, Piramal Swasthya Management and Research Institute), **Mr. Saurabh Kumar** (Senior RMLE leaders) for their consistent guidance, encouragement, and valuable insights. Their mentorship played a vital role in the successful completion of my project, and I am sincerely appreciative of their contributions.

I am also thankful to **Dr. Shuchi Sree Akhouri** for his supervision and to **Mr. N.S. Reddy**, and **Mr. Ashish Kashyap** for their assistance, collaboration, and support in providing the data and direction necessary for this study.

A special note of gratitude to my mentor, **Dr. Ekta Saroha** (Associate Professor, IIHMR Delhi), whose continuous support was instrumental in shaping both the academic and field components of my work. I also wish to thank **Dr. Sutapa Bandyopadhyay Neogi** (Director, IIHMR Delhi) and **Dr. Punit Yadav** (Associate Dean, Academics and Student Affairs, IIHMR Delhi) for their encouragement and valuable feedback.

This internship has been a significant milestone in my professional development. I am committed to applying the knowledge and skills I have gained and will continue striving for excellence in my future endeavours. I look forward to future opportunities to collaborate with many of you again.

N. Lavanya

Abbreviations:

ANM – Auxiliary Nurse Midwife
ASHA – Accredited Social Health Activist
AWC – Anganwadi Centre
AWW – Anganwadi Worker
BCC – Behaviour Change Communication
CAAD – Child Minimum Acceptable Diet
CDD – Child Dietary Diversity
CF – Complementary Feeding
CMF – Child Minimum Meal Frequency
EBF – Exclusive Breastfeeding
EIBF – Early Initiation of Breastfeeding
FLW – Frontline Worker
ICDS – Integrated Child Development Services
IYCF – Infant and Young Child Feeding
JSY – Janani Suraksha Yojana
LMICs – Low- and Middle-Income Countries
MAD – Minimum Acceptable Diet
MDD – Minimum Dietary Diversity
MDDF – Minimum Dietary Diversity Failure
MMF – Minimum Meal Frequency
NFHS – National Family Health Survey
NHM – National Health Mission
OBC – Other Backward Class
PPS – Probability Proportional to Size
PSU – Primary Sampling Unit
RMNCH+N – Reproductive, Maternal, Newborn, Child Health and Nutrition
SC – Scheduled Caste
SES – Socioeconomic Status
SHG – Self-Help Group
SRS – Simple Random Sampling
SSU – Secondary Sampling Unit
ST – Scheduled Tribe
UNICEF – United Nations Children's Fund
WHO – World Health Organization

Contents

Abstract 1
Organization Profile: 2
Background: 3
Rationale: 8
Research Questions 11
Aim 11
Objectives 11
Review of Literature 12
Introduction 12
Concept of Infant and Young Child Feeding (IYCF) 14
1.Early Initiation of Breastfeeding (EIBF) 14
2. Exclusive Breastfeeding (EBF) 14
3. Continued Breastfeeding 15
4. Introduction of complementary feeding at the right time 15
5. Minimum Dietary Diversity (MDD) 15
6. Minimum Meal Frequency (MMF) 15
7.Minimum Acceptable Diet (MAD) 15
Global Scenario of IYCF Practices 16
National Scenario of IYCF Practices in India 18
Studies Related to IYCF Practices in Bihar 21
Frontline Worker Counselling and Community-Based Interventions 24
Sociodemographic Determinants of IYCF Practices 24
Gender and Social Inequality in IYCF Practices 30
Urban Slum Studies and Nutritional Transition 33
Methodology 38
Study Design: 38
Study Population: 38
Study Area 38
Inclusion Criteria 38
Exclusion Criteria 39
Sampling Strategy 39
Stage 1: Primary Sampling Unit (PSU) – Selection of Blocks 39
Stage 2: Secondary Sampling Unit (SSU) – Selection of Anganwadi Catchment Areas ... 40

Stage 3: Tertiary Sampling Unit – Selection of Households 40
Sample size: 40
Total Sample Size (Overall Study) 40
Sample Size for This Study: 41
Variables: 41
Dependent Variables (IYCF Indicators): 41
Independent Variables (Determinants): 41
Key indicators: 41
1.Continued Breastfeeding: 42
3. Minimum Dietary Diversity (MDD) 42
4.Minimum Acceptable Diet (MAD) 43
RESULT 44
Descriptive analysis 44
Stratified analysis: 47
Logistic regression analysis: 49
Discussion: 51
References: 54
Annexure 1 57
Annexure 2 58
Annexure 3 59
Annexure 4 60
Annexure 5 61
Annexure 6 62

Abstract

Appropriate Infant and Young Child Feeding (IYCF) practices are essential for ensuring optimal growth, development, and survival of children during the first two years of life. Despite various national nutrition programmes and policies, suboptimal feeding practices remain a major public health concern in India, particularly in socioeconomically disadvantaged states such as Bihar. This study aimed to assess the distribution of recommended IYCF practices and identify the socio-demographic, economic, maternal, child-related, and health service factors associated with these practices among mothers of children aged 12–23 months in rural Bihar.

A community-based cross-sectional study was conducted using data collected from rural households in Bihar. The study included mothers of children aged 12–23 months. The primary outcome variables were continued breastfeeding, Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), and Minimum Acceptable Diet (MAD), defined according to World Health Organization (WHO) guidelines. Descriptive statistics were used to estimate the prevalence of IYCF indicators, while bivariate analysis and multivariable logistic regression were performed to identify determinants of optimal feeding practices.

The findings revealed that the prevalence of continued breastfeeding was **85.4%**, MMF was **80.7%**, MDD was **42.1%**, and MAD was **37.6%**. Maternal education, household wealth status, maternal age, frontline worker (FLW) visits, complementary feeding counselling, and utilization of maternal and child health services were significantly associated with one or more IYCF indicators. Mothers with higher educational attainment and those from wealthier households were more likely to provide adequate dietary diversity and acceptable diets. Exposure to counselling and regular FLW visits was positively associated with improved complementary feeding practices.

The study concludes that although continued breastfeeding and meal frequency were relatively satisfactory, dietary diversity and minimum acceptable diet remain inadequate among rural children in Bihar. Strengthening nutrition counselling, improving maternal education, enhancing frontline worker engagement, and addressing socioeconomic disparities are essential to improve complementary feeding practices. The findings provide evidence to inform policymakers and programme managers in designing targeted interventions to enhance child nutrition and contribute towards achieving national nutrition goals and Sustainable Development Goal 2 (Zero Hunger).

Organization Profile:

Piramal Foundation creates creative answers to problems that stand in the way of India's economic potential being fully realized. India has started the process of guaranteeing universal health coverage, and Piramal Swasthya is helping with that by using its experience and knowledge of creating ground-breaking solutions that have a big impact. The goal of Piramal Swasthya is to close the gaps in public healthcare by supporting and enhancing the Government of India's plan to achieve universal health coverage. One of the biggest non-profits in India's primary public healthcare sector, Piramal Swasthya focuses on non-communicable diseases, maternal health, and child and adolescent health.

Piramal Swasthya (a subsidiary of Piramal Foundation) is among the largest not-for-profit primary public healthcare organisations in India. Rooted in over a decade of on-ground experience, we work in 17 states through innovative programmes, serving more than 40 million individuals- especially in maternal, child and adolescent health and non-communicable diseases. With a team of 1400+ colleagues driven by seva bhaav, our mission is to complement government efforts and advance Universal Health Coverage.

Digital Bharat Collaborative is a part of Piramal Swasthya and leverages digital technology to enable equitable access to quality public services for all.

With more than ten years of expertise, Piramal Swasthya has managed several healthcare innovations at scale that are meeting the primary healthcare requirements of the majority of India's underprivileged and marginalized communities. Through 35 creative public healthcare delivery schemes, Piramal Swasthya operates in 21 Indian states and has provided services to over 112 million beneficiaries to date. Over 2500 workers, including more than 250 physicians, are employed by Piramal Swasthya and collaborate with Seva Bhav.

The Group's key values—Knowledge, Action, Care, and Impact—direct the organization as it fulfils its social obligations.

Background:

One of the most well-known and successful ways to save lives and support children's growth, nutrition, and cognitive development in their early years is through infant and young child feeding (IYCF) programs. Eating well over these two years is crucial for building a strong immune system, supporting brain development, and promoting rapid growth. WHO and UNICEF state that the first 1000 days of life spanning from birth through age two is a critical window for health and development. Currently, malnutrition leads to irreversible outcomes including stunting, wasting, micronutrient deficiencies, impaired cognitive development, greater vulnerability to illness, poor academic achievement, and reduced productivity in adulthood. (1)

WHO and UNICEF have recommended several essential practices to guarantee children have a healthy diet, including the following: nursing should begin within an hour of the baby's birth, be exclusive for six months, start supplementary feeding after six months, maintain nursing for two years or longer and give healthful supplemental feeding. The minimum allowable diet (MAD), minimum dietary diversity (MDD), and minimum meal frequency (MMF) are some of the most significant indicators of complementary feeding.

Despite international initiatives to support child nutrition, incorrect IYCF behaviours remain a public health concern, particularly in underdeveloped nations. Malnutrition is one of the leading causes of illness and death in children under five globally, which has been greatly influenced by feeding patterns. International research in nations including Tanzania (2), Ghana (3), Bangladesh (4), and Nepal (5) found that children were primarily affected by poor dietary diversity, incorrect supplemental feeding, insufficient feeding frequency, and growing nutritional inequities. Numerous factors, such as mother education, socioeconomic level, culture, healthcare access, and counselling, have been identified as having an impact on children's feeding patterns.

Child malnutrition is a major issue in India despite the existence of numerous maternal and child health initiatives. Stunting, wasting, micronutrient deficits and underweight are prevalent among Indian children under five, according to research published in a large body of literature. In many parts of the nation, there are insufficient supplemental feeding methods, notwithstanding the notable rise in exclusive breastfeeding. Numerous research using data from NFHS have proven that pupils in India are not following the standards of the MAD and MDD.(6)

Numerous research undertaken in various parts of India have identified a variety of factors effecting IYCF practices. A mother's education and income, caste, work, access to healthcare services, counselling, family support, and cultural beliefs all have a big impact on breastfeeding and supplemental feeding habits. West Bengal, Maharashtra, Gujarat, Tamil Nadu, Rajasthan, Haryana, and Uttarakhand are just a few of the Indian states that have documented poor food intake frequency, delayed breastfeeding initiation, and insufficient supplemental feeding practices among infants under two. (7)

A major factor that exacerbates the nutritional status of children in India is the prevalence of gender discrimination and socioeconomic inequality. Research from both national and regional studies in India indicates that female children are provided with a less diverse range of food and nutrition compared to male children.

Bihar ranks as one of India's most impoverished, least educated, and underdeveloped states. The elevated levels of food insecurity, poverty, inadequate sanitation, and restricted access to healthcare in the state adversely affect children's nutrition outcomes. In addition to this, the rural population in Bihar has other challenges, such as limited access to medical services, ignorance of children's nutrition, and deeply ingrained societal impacts on feeding habits..(8)

Numerous studies conducted in Bihar have shown poor practices with IYCF children under the age of two (9). Studies found that pre-lacteal feeding was widespread, supplementary feeding indicators were poor, and the usefulness of frontline worker counselling was limited in changing feeding patterns. The study also showed that mothers had a modest memory rate and that provider conduct and communication quality have a significant role in mothers' comprehension of feeding information about IYCF counselling. Child feeding patterns in Bihar have been found to be significantly influenced by mother's education, caste, family wealth status, and accessibility to healthcare.(9)

Research on using women's self-help groups and behaviour change communication in community intervention in Bihar also revealed that these interventions could improve nutritional variety and mother and child health practices. The results of studies reported by (10, 11) that demonstrate women's group engagement and community mobilization have it is good to see a favourable influence on kid feeding behaviours. However, there is evidence that unless other social and cultural variables are addressed, counselling and awareness efforts are unlikely to be successful in altering eating patterns.

As they transition from nursing to supplemental and family foods, youngsters that are 12 to 23 months old are most vulnerable. During this time, appropriate complementary feeding is essential to fulfil their increased nutritional demands for healthy growth and development. During this crucial time, many kids don't eat a diverse, nutritionally balanced diet, which puts them at risk for stunting, wasting, sickness, and developmental delays.(12)

There are still several unanswered questions regarding nursing and supplementary feeding in India, even though numerous studies are conducted in this field. One, youngsters that are 12 to 23 months are not well studied, despite the fact that studies on child aged 0 to 23 months and even 6 - 23 years have been conducted. Second, it should be noted that no attempts have been made to investigate the ways in which mothers' feeding behaviours are influenced by socioeconomic, demographic, health care, cultural, and behavioural factors.

Considering this, the present research titled "Distribution and Determinants of Infant and Young Child Feeding Practices among Mothers of Children 12-23 Months of Age in Rural Bihar" is being developed to investigate the presence and trends of infant and young child feeding behaviours and the elements affecting these feeding behaviours among mothers in rural areas. This study aims to enhance outcomes, incorporating details on nursing practices and additional feeding methods applicable to each location.

IYCF habits have a major impact on children's survival, growth, development, and nutritional health. A healthy diet during the 1st 2years of life helps prevent malnutrition, infections, developmental delays, and childhood mortality. There is an important "window of opportunity" between birth and 24 months of age because undernutrition during this time can cause irreversible brain and bodily harm. Therefore, improving IYCF practices is essential to reducing the prevalence of malnutrition and improving child health outcomes.

The issue of improper IYCF practices is pervasive, particularly in India's underdeveloped states like Bihar, despite the country's various nutrition programs and interventions for mothers and children. Previous national surveys and studies have revealed that many children during the supplemental feeding phase lack adequate dietary diversity, meal frequency and a minimum acceptable diet. Children under the age of five experience

significant levels of stunting, wasting, micronutrient and underweight deficiencies as a result of unfavourable feeding patterns.(13)

Bihar's biggest problems are still maternal health and child nutrition. The state is characterized by poverty, low female literacy, food insecurity, inadequate sanitation, limited access to healthcare, and strong societal impacts on childcare. Due to their lack of knowledge about nutrition, reliance on traditional feeding methods, Rural areas are especially susceptible due to their restricted access to high-quality healthcare services. In rural Bihar, it is essential to look at the factors and feeding practices of IYCF.(8)

Maternal education, financial status, caste, usage of healthcare services, exposure to counselling, and cultural beliefs have all been shown to be linked to inadequate feeding methods in Bihar and other Indian regions. However, most of the studies that are now accessible do not particularly target children between the ages of 12 and 23 months and are somewhat broad in terms of the children they focus on (0–23 months or 6–23 months). Given that children are more likely to suffer from dietary deficiencies and developmental setbacks during this transitional period between breastfeeding and supplementary and family eating.(9)

Increased dietary diversity, proper meal frequency, and nutrient-dense supplementary foods are important for the 12–23month age group to sustain fast growth and development. Inadequate nutrition during this period may result in a higher chance of stunting, recurrent infections, weakened immunity, and delayed cognitive development. However, little is understood about how kids eat in rural Bihar between the ages of 12 and 23 months.(9)

The lack of context-specific rural evidence from Bihar is the other primary motivation for doing this inquiry. Several studies conducted at the national level rely on secondary data, such as NFHS, which provides general figures but does not take into account the behavioural factors that influence feeding patterns in rural areas or the local sociocultural environment. Feeding behaviours can be impacted by a number of things, such as gender norms, maternal autonomy, traditional beliefs, family influence, food availability, and regional and local variations in healthcare systems.(6)

The literature study also revealed that a cross-sectional quantitative technique was employed in the majority of previous investigations that relied on statistical association and prevalence estimations. A few research have focused on comprehending how several

socioeconomic, demographic, healthcare, cultural, and behavioural factors interact to influence maternal feeding patterns in rural Bihar.

Furthermore, a number of studies found that despite government nutrition initiatives and frontline worker counselling, habits such as pre-lacteal feeding, delayed breastfeeding beginning, low nutritional diversity, and inadequate complementary feeding persisted. This implies that social, economic, and cultural factors must be taken into consideration in order to change eating habits; information alone is insufficient.(14)

The current study is important because it looks at the distribution and factors that impact IYCF practices among rural Bihar mothers of children aged 12 to 23 months. The study aims to give data on feeding habits and factors linked to inadequate feeding practices focuses on this particular age range, which is a susceptible population.

The results of the study could contribute in the creation of culturally and community-specific interventions for child eating habits in rural Bihar by lawmakers, healthcare practitioners, Anganwadi workers, and designers of nutrition programs. The study could also help the community's current nutrition initiatives, such POSHAN Abhiyaan, ICDS, and nutrition counselling.

Additionally, future researchers and public health experts working on maternal and child nutrition research may find useful information from this study. Determining the variables affecting IYCF practices is essential for creating plans to improve child health and fight malnutrition in rural Bihar, as well as for assisting in the achievement of national and international nutrition goals.

Rationale:

The distribution and determinants of IYCF practices among mothers of children in rural Bihar between the ages of 12-23 months are the main focus of this study. The study aims to investigate the degree and trends of advised feeding practices as well as the socioeconomic, demographic, health service use, cultural, and behavioural aspects which impact these practices among rural women.

This research is limited to mothers in Bihar's rural areas who have children between the ages of 12-23 months. The age range was specifically selected because it marks a vital transition stage between exclusive nursing to introduction of supplemental and family meals. During this time children require enough nutrient intake, optimal meal frequency and nutritionally diverse supplementary meals to support general growth and development. Inadequate feeding may greatly raise the risk of infections, malnutrition, stunted growth, and developmental problems during this time.

This study focuses on IYCF indicators that are recommended by the WHO and the UNICEF, including CBF, MMF, MDD, and MAD. These markers offer important insights into children's nutritional well-being throughout the first two years of life and are widely accepted measurements of ideal child feeding practices.

The study further examines the influence of various determinants on feeding practices. Sociodemographic characteristics including the mother's age, education, and employment are among these influences, religion, caste, household wealth status, family characteristics and the sex of the child. In addition, health and service-related factors such as frontline worker (FLW) visits, complementary feeding counselling and maternal access to health information are assessed. Behavioural and informational factors, including smartphone use and exposure to nutrition counselling are also explored as potential determinants of feeding practices.

To comprehensively understand the distribution of IYCF practices this study employs **stratified analysis** which allows the prevalence of feeding indicators to be examined across different population subgroups. This approach helps identify disparities in feeding practices according to maternal, household and child characteristics and highlights vulnerable groups requiring targeted interventions. Stratified analysis is particularly useful for describing variations in feeding practices and understanding how different social and economic factors influence child nutrition outcomes.

However, feeding practices are influenced by multiple interconnected factors and simple comparisons Confounding effects might not be sufficiently taken into consideration. In order to determine the independent predictors of IYCF practices, the study additionally makes use of multivariable logistic regression analysis. Because the outcome variables CBF, MMF, MDD, and MAD are binary in nature (achieved or not achieved). The regression model estimates adjusted odds ratios (AORs), which measure the strength and direction of associations between determinants and feeding practices while controlling for other relevant variables. This approach provides a more accurate understanding of the factors that independently influence child feeding practices and strengthens the evidence generated by the study.

Another important aspect of the study is the examination of cultural and behavioural influences on child feeding practices. Traditional beliefs, food taboos, family influence, maternal perceptions regarding child feeding and prevailing social norms related to breastfeeding and complementary feeding are considered within the broader context of rural Bihar. These factors often shape feeding decisions and may influence the adoption of recommended feeding practices.

The study is restricted to rural areas of Bihar and does not include urban populations. Consequently, these findings should be interpreted within the specific socioeconomic, cultural and healthcare context of rural Bihar. While relevant literature from urban settings may be discussed for comparison, the conclusions of the study are intended primarily to reflect rural realities and challenges.

The research includes a public health and nutritional perspective and depends largely on mother reporting of feeding patterns. Comprehensive food intake evaluations, biochemical testing of micronutrient deficiencies, and clinical exams are outside the purview of this study unless they are integrated within the technique and dataset that are supplied.

By offering context-specific data on the distribution and factors influencing IYCF practices among children in rural Bihar the study contributes to the corpus of existing research between the ages of 12 and 23 months. It is anticipated that the results will point out weaknesses in the current nutrition programs and guide the creation of targeted treatments aimed at improving child feeding habits and reducing malnutrition in disadvantaged populations.

Although efforts have been made to include a broad range of determinants, certain limitations should be acknowledged. As the study is based on a cross-sectional approach, it is unable to conclusively determine the causal links between eating behaviours and factors. The accuracy of the data gathered may also be impacted by recollection bias and social desirability bias in maternal reporting of feeding habits.

Notwithstanding these drawbacks, the study offers valuable information about how children should be fed during a crucial stage of development. The study provides a thorough understanding of the factors related to IYCF practices in rural Bihar and produces evidence that can support future nutrition policies, programs, and research initiatives to improving child health and nutrition outcomes by combining descriptive, stratified, and multivariable analytical approaches.

Research Questions

The focus of this study:

1. What is the distribution of Infant and Young Child Feeding practices among mothers of children aged 12–23 months in rural Bihar?

2. What percentage of children's get:

o Minimum Dietary Diversity (MDD)?

o Minimum Meal Frequency (MMF)?

o Minimum Acceptable Diet (MAD)?

3. What demographic and socioeconomic factors affect moms' IYCF practices?

4. How are feeding practices affected by mother education, household income, healthcare use and exposure to counseling?

5. What are the gaps in mothers' current IYCF practices for children between the ages of 12-23 months?

Aim

To assess and ascertain the primary distribution and determinants of IYCF practices among rural Bihar women with children aged 12-23 months.

Objectives

1. To assess the prevalence of the key IYCF practices such as minimum acceptable diet MAD, MDD, MMF, and CBF among mothers of children aged 12–23 months.
2. To examine the socio-demographic and economic factors like mother education, occupation, child gender, caste, wealth index, associated with IYCF practices.

Review of Literature

Introduction

IYCF practices rank among the most vital and effective methods to guarantee the survival, growth, health, and nutritional well-being of children throughout their initial 1000 days of life. In the initial two years of life, a nutritious diet is crucial for children to grow physically, enhance their brain development, boost their immune systems, and increase their cognitive skills. The WHO and UNICEF state that a child's growth is vital during the initial two years of life and the first 1,000 days from conception to two years, and malnutrition during this period can lead to lasting effects.(1)

For IYCF, WHO and UNICEF recommend the following best practices: EBF for the first 6 months; early breastfeeding initiation (within an hour of birth); prompt introduction of complementary foods (at six months); nutrient-dense and varied complementary foods; and breastfeeding for at least two years. MMF, MDD, and MAD are examples of complementary feeding indicators. These metrics are frequently used to assess the efficacy of feeding programs for children aged six to twenty-three months.(13)

In many developing nations, inappropriate IYCF practices remain a public health risk, despite national and international nutrition efforts. Childhood malnutrition, which includes stunting, wasting, underweight, micronutrient deficiencies, and susceptibility to infection, is largely caused by breastfeeding and complementary feeding habits. Research conducted in LMICs has consistently demonstrated that young children are not performing well in terms of nutrition, either due to a lack of diversity in their diet, delayed feeding of complementary foods, infrequent feeding, or low-quality feed.(1-3, 5)

India is among the countries most adversely impacted by child malnutrition. POSHAN Abhiyaan, Integrated Child Development Services (ICDS), National Health Mission (NHM), and the encouragement of ideal breastfeeding practices are some of the maternal-child health and nutrition programs that have been initiated. Nevertheless, some studies indicate that different regions of the country may not implement optimum IYCF methods. Maternal education, household financial position, the use of health services, exposure to counselling, belief systems, gender discrimination, and food insecurity are the main factors influencing feeding behaviors, according to national and regional studies.

One of India's poorest states is Bihar, continues to struggle with issues related to maternal and child nutrition. Bihar's high rates of poverty, low female literacy, inadequate healthcare, poor sanitation, and food insecurity all have a detrimental effect on children feeding habits and nutrition status. According to the data that is currently available in Bihar, the minimum recommended diet for children under two years old is low, complementary feeding is on the negative side, whereas dietary diversity and the adoption of pre-lacteal feeding techniques are high..(10)

In Bihar and other regions of India, the prevalence and causes of IYCF have been covered in the current review, which offers useful information on the subject. (10, 15) Research conducted in Bihar revealed that seasonality, caste, front-line worker counseling, and mother education all had an impact on complementary feeding habits and breastfeeding. Similarly, studies conducted in Maharashtra (16), Rajasthan (17), Uttarakhand (18), West Bengal (19), and Haryana (20) found that a number of factors, including low food diversity, Child feeding behaviors are significantly impacted by low complementary feeding, gender concerns, cultural views, and socioeconomic differences.

To evaluate community-based interventions and counseling programs, some research has been done. Research from Bihar and other Indian states suggests that behavior modification treatments such as women's self-help groups, peer counseling, and communication might enhance young babies' eating habits and dietary variety. However, several other studies show that counseling is useless if there are other social and cultural variables influencing women's eating habits. (10)

Malnutrition, inadequate dietary diversification, and child health outcomes are strongly correlated with improper feeding habits, according to international data from Bangladesh, Ghana, Tanzania, and Nepal. These studies all show how maternal education, the use of health services, socioeconomic variables, and culturally appropriate nutrition interventions may improve IYCF practices..(1, 2, 5) (3)

On breastfeeding and supplemental feeding methods, there are a lot of resources and publications available, however there are also significant holes out in the field. These should be emphasized since many studies focus primarily on infants between the ages of 0-23 months rather than the nutritionally critical age range of children between the ages of 12-23 months. Additionally, only a small number of studies have examined the combined impact of sociocultural, health-related, demographic, and socioeconomic factors on IYCF practices among rural women in Bihar. (11)

Therefore, the current evaluation of the literature focuses on rigorously assessing the data about the distribution and factors that influence how women in rural Bihar feed their newborns and young children, especially those between the ages of 12-23 months. An overview of current feeding practices, feeding-related traits, types of interventions, and research gaps pertinent to the current study are given in the review.

Concept of Infant and Young Child Feeding (IYCF)

The aim of the recommendations referred to as IYCF is to improve the nutrition, growth, survival, and development of infants up to two years old. Proper nutrition during infancy and early childhood is considered essential because children are especially susceptible during this period owing to their significant nutritional requirements for rapid physical growth, brain development, and immune system maturation.

The WHO and UNICEF define IYCF as a blend of evidence-driven feeding methods that enhance children's complementary feeding and optimal breastfeeding in their initial two years of life. The initial 1,000 days of life—ranging from conception to the first two years—are essential for a child's proper development and the avoidance of malnutrition. Undernutrition during this vital period can impact health and nutrition results in adulthood, such as hindered growth and development, wasting, cognitive abilities, academic success, vulnerability to diseases, productivity, and more.(1)

Both complementary feeding and breastfeeding are included in the IYCF concept. WHO and UNICEF have suggested the following fundamental IYCF practices:

1.Early Initiation of Breastfeeding (EIBF)

One hour after delivery is the ideal time to start nursing. The neonates receive colostrum, which includes nutrients and antibodies and protects them from infection, thanks to first assistance. Additionally, it enhances the likelihood that the newborn will survive and strengthens the bond between mother and child.

2. Exclusive Breastfeeding (EBF)

For the first 6 months of life, only breast milk should be given to infants; all food and liquids (including water) should be avoided, with the exception of prescription medications and oral rehydration therapies. Exclusive breastfeeding reduces the risk of malnutrition, respiratory infections, and diarrhoea while providing all the nutrients required for early infancy.

3. Continued Breastfeeding

After 6 months of nursing, complementary feeding should begin, and it should continue until the kid is two years old or older. Breastfeeding is an essential source of energy and immunity for young children.

4. Introduction of complementary feeding at the right time

By six months the breast milk is not adequate to meet the nutritional needs of the infant. Therefore, it is advised to supply supplemental foods that are nutritionally sufficient in addition to breastfeeding. Early or delayed introduction of complementary foods might have a detrimental impact on children's growth and nutrition.

5. Minimum Dietary Diversity (MDD)

Dietary diversity refers to consuming a range of foods within dietary groupings. According to the WHO, children between the ages of 6-23 months should eat meals from at least five different food groups in order to have enough nutrition. Malnutrition and micronutrient deficits are intimately linked to a low variety of foods consumed.

6. Minimum Meal Frequency (MMF)

Children should be fed according to their age and the frequency of feedings. Due to their small stomachs, young toddlers require frequent meals in order to receive adequate nutrients.

7.Minimum Acceptable Diet (MAD)

The two variables of meal frequency and dietary diversity are combined to create the composite indicator known as MAD. It reflects generally appropriate supplementary feeding practices for infants aged six to twenty-three months.

IYCF encompasses not just nutrition but also food cleanliness, responsive feeding, maternal knowledge, health support, feeding behaviors, and caregiver feeding practices. Feeding methods may be affected by numerous elements, including maternal education, economic conditions of the family, cultural beliefs, family assistance, guidance and information, access to food, and healthcare resources.

Malnutrition in children is still largely caused by poor IYCF practices in underdeveloped countries like India. Low rates of breastfeeding initiation, pre-lacteal feeding, nutritional diversity, meal frequency, early breastfeeding cessation, and inappropriate supplemental

feeding are the main issues. These practices are caused by poverty, food insecurity, low mother literacy, cultural attitudes, and ignorance about child nutrition.

Since children transition from breast milk to family meals between the ages of 12-23 months, this age is known to be quite crucial. During this period, poor nutritional outcomes including as stunting, wasting, recurrent infections, and poor developmental outcomes might result from nutrient shortages. Therefore, it is essential to implement appropriate IYCF practices at this time to improve children's nutrition and overall health.

A few studies that highlighted the importance of IYCF practices in reducing malnutrition and improving children's growth outcomes were found in the current review. However, research from Bihar and other Indian studies indicates that family SES, sociocultural variables, maternal education, and counseling exposure are significant determinants of mothers' feeding behaviors for young infants.(9, 10)

Therefore, a comprehensive approach to children's growth, nutrition, and feeding habits at their most vulnerable stage of life is incorporated into the IYCF concept.

Global Scenario of IYCF Practices

IYCF practices continue to pose a major global public health issue in low- and middle-income nations, where malnutrition in children is linked to a high rate of illness and mortality among those under five. Appropriate breastfeeding and supplementary feeding techniques are essential for early childhood development, nutrition, immunity, and cognition. Despite international nutrition programs and legislative initiatives, several nations continue to report subpar IYCF practices.

Poor feeding habits, including delayed breastfeeding initiation, non-exclusive breastfeeding, dietary variability, irregular meals, and nutritionally insufficient supplementary feeding, are key global factors to infant malnutrition, according to UNICEF and the WHO. Child mortality, impaired cognitive development, recurrent infections, nutritional deficiencies, wasting, and stunting are all linked to poor IYCF practices.(1)

Complementary feeding indicators are still low in the nation, especially for youngsters who are six to twenty-three months old. Many children are unable to meet the requirements for child dietary diversity (CDD), child minimum meal frequency (CMF),

and child minimum acceptable diet (CAAD). Children are negatively impacted by poverty, food insecurity, poor mother education, and limited access to healthcare eating patterns, and low quality supplementary feeding is more frequent among the economically disadvantaged communities. The prevalence and causes of IYCF practices in different countries have been identified by few research investigations.

The study conducted in Northern Tanzania examined the effects of improper supplemental feeding methods on the nutritional condition of infants aged 6 to 24 months. Early food introduction, infrequent meals, and insufficient dietary diversity were linked to a higher risk of stunting, wasting, and underweight in children, according to the study. The results demonstrated that children's nutritional status was significantly impacted by inappropriate feeding practices for supplemental meals outcomes. The study's longitudinal methodology confirmed the evidence concerning eating habits and their connection to malnutrition.(1)

Similarly, a cross-sectional research was conducted in Ghana's northern region to ascertain how IYCF indicators pertaining to children's nutritional status between six and twenty-three months of age. The results of the study showed insufficient feeding indicators of supplemental feeding, and mother education and family socioeconomic status were variables influencing feeding habits and health service usage. Children who did not receive enough varied foods and frequent meals were more likely to have poor nutritional outcomes.(3)

Recently, a In Bangladesh, a community-based cross-sectional study was carried out to assess IYCF practices among children aged 0-23 month who lived in low-income neighbourhoods of Dhaka. The research revealed extremely low results for children's minimal tolerable diet and minimum dietary variety. Moreover, such harmful dietary behaviors as excess ultra-processed meals and sugar containing foods were growing increasingly widespread. The study found that children in urban disadvantaged neighbourhoods are increasingly experiencing issues with inadequate nutrition.(1)

The research, conducted in two areas of Nepal, looks at how IYCF habits changed when an integrated IYCF and vitamin powder program was scaled up. Despite some changes in feeding patterns, the study discovered that children's long-term eating behaviors were less receptive to health professional counseling. The findings suggested that the impact of dietary interventions may be influenced by more significant social, structural, and household variables..(5)

Significant evidence of disparities in feeding habits by maternal education, household affluence, urban vs rural residency, and cultural traditions has also been found on a worldwide scale. Higher educated mothers are more likely to breastfeed and provide supplemental meals in more appropriate ways. Similarly, children from wealthier households are more likely than those from less wealthy households to receive a sufficient variety of foods and meals.

Cultural values and traditional feeding traditions in different nations can have a significant influence on feeding patterns. Pre-lacteal feeding, delayed breastfeeding beginning, dietary taboos, and improper supplementary feeding methods are all still explained by false knowledge and traditional beliefs in many countries. Elderly people and grandmothers often have a big impact on what kids eat.

Improved eating practices have been found to benefit from peer counseling, behavior change communication initiatives, community-based nutrition therapy, and, in some countries, women's support groups. Counseling alone, however, may not be sufficient until the other factors that determine food security poverty, food security, women's empowerment, and access to health care are addressed.

Despite worldwide attempts to promote child nutrition, the international literature typically finds that child feeding habits remain inadequate. Undernutrition in children is mostly caused by access to supplementary foods, and social inequality is still a big problem. The worldwide findings are important for comprehending comparable problems in India, particularly in Bihar's rural areas, where mothers' feeding habits are greatly influenced by their socioeconomic level, cultural norms, and customs.(21)

National Scenario of IYCF Practices in India

Despite economic growth and various maternal and child health initiatives, India continues to have a high rate of child malnutrition. Demonstrated effective IYCF practices can enhance child survival, growth, and nutrition results, yet most IYCF indicators in India do not meet the levels recommended by UNICEF and the WHO.

In India, children under five frequently experience stunting, wasting, being underweight, and deficiencies in micronutrients, making undernutrition a major public health concern. Supplemental feeding techniques and inadequate breastfeeding have a significant impact on these nutritional issues. Although breastfeeding awareness has grown over time, many states and demographic groups still have low levels of supplementary feeding indicators such as MDD, MMF and MAD.

Undernutrition poses a significant public health challenge in India, where stunting, wasting, underweight issues, and micronutrient deficiencies are common among children below five years old. These dietary concerns are significantly influenced by insufficient breastfeeding and supplementary feeding methods. Although breastfeeding awareness has grown over time, supplemental feeding indicators such as MDD, MMF, and MAD continue to be low in numerous states and demographic categories.

The incorrect use of IYCF practices is still popular in India despite a number of governmental measures and nutrition programs. According to the review, delayed breastfeeding initiation, inadequate supplemental feeding, insufficient nutritional diversity, and infrequent feedings all contribute to the high incidence of infant malnutrition. The survey revealed that poverty, maternal ignorance, lack of food security, cultural beliefs, and insufficient counseling are the key obstacles to ideal feeding practices. (12)

National research utilizing data from the National Family Health Survey (NFHS) has examined the occurrence and factors influencing IYCF practices in India. A secondary research was conducted to investigate regional variations in supplemental feeding practices among Indian children aged six to twenty-three months. Significant geographical variance was discovered by the study, with northern and central regions showing a tendency toward worse feeding indicators than southern areas. Feeding behaviors have been found to be significantly influenced by maternal characteristics, including education, financial position, prenatal care use, and institutional delivery.(14)

Analyse the factors that contribute to Minimum Dietary Diversity Failure (MDDF) in Indian children. The study came to the conclusion that children's nutritional variety was severely lacking. Feeding adequacy was significantly linked with mother education, family wealth, socioeconomic position, and exposure to health care. Children from affluent parents and those from disadvantaged social backgrounds were more likely to exhibit adequate eating behaviors.(22)

Another key issue that impacts children's feeding patterns in India is gender disparity, was conducting a nationally representative study on children's nutritional variety (6–24 months). The study found that feeding habits differ by gender and that women are less likely than men to be given a sufficiently varied diet. The findings demonstrated the impact of uneven food distribution among households and son choice across different regions of India.(17)

Based on socioeconomic and cultural backgrounds, additional research from other Indian states shows significant variation in IYCF practices among the states. The study conducted in Gujarat indicated that mother education, age and pregnancy interval and manner of birth had substantial influence on eating patterns of children. The usage of supplemental feeding methods and successful breastfeeding were shown to be strongly correlated with mothers' educational attainment (12). There was little early breastfeeding start, and exclusive breastfeeding was quite common, according to an analysis of IYCF practices in infants under two in Uttarakhand. The study's feeding results also showed a gender disparity.(18)

Research conducted in Tamil Nadu found that complementary feeding practices are severely lacking despite comparatively excellent food diversity. Children in the research, ages 7 to 24 months, had low MAF and MAD scores. (23)

Similarly research conducted in West Bengal revealed low rates of early beginning and declining exclusively breastfeeding practices as children grew older. There have also been reports of poor supplementary feeding practices and a rise in the use of animal milk and plain water..(4)

Qualitative data from Haryana revealed that while mothers were aware of the suggested feeding techniques, traditional beliefs, dietary taboos, familial pressure, ignorance, and financial limitations all had an impact on their behavior. The importance of sociocultural influences influencing mothers' feeding decisions was highlighted in the study.(20)

The results of a research conducted in Pune, Maharashtra, further supported the inadequate supplemental feeding habits of children who are economically deprived. According to the studies, children aged 0 to 24 months had a poor minimum recommended diet and little dietary variety, delayed breastfeeding beginning, and higher consumption of processed foods. The findings demonstrated that disadvantaged individuals in metropolitan settings also have nutritional issues.(16, 24)

Research conducted thus far on intervention in India has demonstrated that community mobilization and behavior change communication can improve eating patterns. A quasi-experimental study conducted in Chandigarh showed that complementary feeding practices and child development were positively impacted by culturally appropriate nutrition education initiatives. Peer counseling initiatives in Uttar Pradesh also revealed that breastfeeding improved over time and supplemental feeding techniques were preferred.(25) (26)

Overall, the national literature shows that although breastfeeding awareness has grown in India, many regions of the country have poor supplementary feeding practices. IYCF practices are always influenced by a number of important factors, including maternal education, household finances, access to healthcare, counseling, cultural views, gender norms, and food security.

The data examined indicates that there are notable geographical disparities and enduring inequities in child nutrition in India. The findings are particularly significant in Bihar, where maternal literacy is low, socioeconomic conditions are still extremely poor, and cultural customs continue to influence young parents' feeding habits.

Studies Related to IYCF Practices in Bihar

Bihar has some of the worst maternal and child health outcomes and is the most economically deprived state in India data. The state's high prevalence of poverty, low literacy among women, limited access to healthcare facilities, unsanitary conditions, food instability, and sociocultural variables all have a significant impact on child malnutrition and poor IYCF practices. Numerous studies conducted in Bihar have revealed that feeding behaviors were influenced by many socioeconomic, demographic, healthcare-related, and cultural elements, as well as those nursing and supplemental feeding practices were poor in children under the age of two.

One of the major studies carried out in Bihar examined the reliability of mother reports of IYCF counseling collected through community interactions. Mothers of small children (less than a year old) in Bihar participated in the study, and the results showed a modest sensitivity and specificity for maternal recollection of counseling sessions. The findings suggested that retention and comprehension of feeding-related information may be

significantly impacted by the quality of provider behavior and communication. The study emphasized how important it is to improve the counseling and communication skills of front-line healthcare professionals..(10)

A more significant study (9) focused on the preservation of exclusive breastfeeding among neonates in Bihar and pre-lacteal eating behavior. The study claims that pre-lacteal feedings were given to around one-fourth of the babies, which had a detrimental effect on exclusive breastfeeding. Gender, caste, and maternal education were shown to be major determinants influencing feeding behaviors. According to the study, Bihar's traditional feeding methods are still problematic and have an influence on newborn feeding best practices.

Although the results were not statistically significant, the study found that counseling had some beneficial impacts on eating indicators. The findings suggested that without considering additional factors such maternal education, food availability, and household socioeconomic situations, counseling would not be sufficient to improve eating habits.(10)

Another study found that exclusive breastfeeding practices in impoverished parts of Bihar were impacted by seasonal fluctuations and frontline worker counseling. The study found that exclusive breastfeeding behaviors varied by season and that exclusive breastfeeding practices were positively impacted by FLW counseling. However, the study focused primarily on breastfeeding behaviors and did not fully cover supplementary feeding variables like meal frequency and nutritional diversity.(15)

A cross sectional research was indicated that there were insufficient signs of complementary feeding, with a small proportion of the kids consuming meals from every category that was advised. There was a strong link between mother education and socioeconomic status and feeding adequacy. Better CF practices were linked to moms' higher socioeconomic position and educational attainment. A behavioral and qualitative investigation of feeding-related obstacles was not included in the study. (8)

Research on community-based intervention in Bihar has also produced important data on methods for enhancing eating habits. Sudipta Mondal conducted a pre-post intervention study to evaluate how JEE Vika's Behavior Change Communication (BCC) modules affect rural Bihar's women's Self-Help Groups (SHGs). The study revealed that toddlers aged 6 to 23 months in the intervention groups had significantly improved dietary diversification. Mothers who participated in SHG-based counseling sessions and nutrition

education showed a considerable increase in dietary variety. The findings suggested that Through women's organizations, community mobilization and intervention for child feeding practices may be effective.(11)

Similarly, a quasi-experimental research in rural Bihar investigated the effects of integrating health treatments within women's Self-Help Groups (SHGs) on maternal and child health practices. Improved rates of vaccination, institutional delivery, and breastfeeding have all been linked to health-focused behavioral change interventions. Despite focusing on maternity and child health, the study did demonstrate how women's collectivization and community involvement improve health-related behaviors.(11)

According to the findings of many research conducted in Bihar, there are generally obvious social disparities in child feeding patterns. Feeding adequacy has repeatedly demonstrated to be significantly influenced by maternal literacy, household affluence, caste, exposure to healthcare facilities, and counseling. A number of obstacles, including poverty, food insecurity, limited knowledge, traditional beliefs, gender discrimination, and power disparities within the family, are faced by rural moms.(9)

Results from Bihar also demonstrate the continued importance of long-standing cultural traditions in the area, like as pre-lacteal feeding, delayed breastfeeding beginning, and insufficient supplemental feeding. Traditional beliefs and family elders frequently influence the decision to feed a newborn. The feeding practices of rural women are impacted by societal conventions, taboos concerning food, and economic restrictions as well as maternal expertise.

While some intervention trials have demonstrated the effectiveness of behavior change communication (BCC) approaches, despite some problems. Research on the use of extra feeding or specific breastfeeding reasons in bigger kid age groups (0–23 months) is few in Bihar. Research on children between the ages of 12-23 months is scarce.re particularly at risk while switching from nursing to family meals.(26)

Furthermore, the ways in which socioeconomic, cultural, family, and health care variables interact to influence feeding behaviors among rural moms have not been adequately explored in prior study. Additionally, there is a dearth of qualitative data about women' attitudes toward eating, the distribution of food within households, and providing care.

In order to understand the prevalence and contributing aspects of IYCF behaviors among mothers of children in rural Bihar between the ages of 12-23 months, additional focused

investigation is essential. In order to combat childhood malnutrition in the state, this data is crucial for enhancing nutrition programs, offering better nutrition advice, and creating locally specific action plans.

Frontline Worker Counselling and Community-Based Interventions

Through counseling and nutrition education, frontline employees like ASHAs, AWWs, and ANMs significantly contribute to the promotion of IYCF practices. The relationship between complementary feeding indicators and counseling given by frontline workers to children in Bihar between the ages of 9 and 11 months was investigated using an ecological study. Despite counseling treatments, the study observed no increase in feeding indicators, indicating that larger socioeconomic and family issues may lessen the efficacy of counseling alone..(26)

Community-based treatments have shown promising results. The effects of behavior change communication (BCC) provided in a pre-post intervention study, in rural Bihar, women's self-help groups (SHGs) were assessed. Children's dietary diversity was better between the ages of six and twenty-three months. following the intervention, according to the research.(10)

In a similar vein, the study assessed how health treatments were incorporated into rural Bihar women's self-help groups. In socially deprived populations, the study showed improvements in mother and child health habits, such as vaccination and breastfeeding.(10) According to these research, peer-based interventions and community mobilization may have a positive effect on the eating patterns of rural youngsters.

Sociodemographic Determinants of IYCF Practices

Many sociodemographic factors influence infants' and young children's access to food, nutrition, feeding practices, and utilization of healthcare services. Various factors, such as mother's education, household socioeconomic position, marital status, job, caste, religion, living location, child's gender, and parental migration, have consistently been shown to significantly influence breastfeeding and complementary feeding practices for infants under two years in India and other developing countries.

Maternal Education

According to a Gujarati research, a mother's level of education had a major influence on her breastfeeding and supplemental feeding practices for newborn babies (12). A comparable study conducted in rural Bihar found a strong correlation between efficient supplementary feeding practices and maternal education. Mothers with higher education levels were more inclined to provide their children with a range of foods and the necessary daily meals.(14) Furthermore, a national study utilizing NFHS data revealed that infants born to less educated mothers were more susceptible to improper feeding practices and insufficient dietary diversity.(6, 13)

Household Socioeconomic Status

Household food security, access to healthcare, nutritional diversity, and adequate feeding are all significantly influenced by household economic status. Families with higher incomes are probably able to provide their kids with a more varied and healthful diet.

Studies carried out nationally, in Bihar, and in Maharashtra have repeatedly demonstrated that children from lower-income homes are less likely to consume the minimum tolerable diet and minimal dietary variety. A research conducted in Bihar found a strong correlation between supplementary feeding practices and socioeconomic position (16). Similarly, the national study revealed that the dietary diversity of Indian children was significantly influenced by home resources. Low earnings frequently lead to poor nutrition, particularly low consumption of fruits and vegetables and a dependence on low-protein cereal-based diets. Mothers' awareness of diet and their use of health care are both impacted by their financial circumstances..

Maternal Occupation

Depending on the type of mother's employment, her available support system, and the amount of time she spends caring for her children, eating habits may be positively or negatively correlated with her occupation. Breastfeeding and food preparation may be challenging for working women with higher incomes.

Some research suggests that while working mothers may find it difficult to maintain appropriate feeding habits, jobless mothers may be more likely to continue nursing since they spend more time with their babies. Even though more access to healthcare and family food purchasing power facilities may also result from increasing mother work, a Gujarat research found that maternal occupation was a significant factor in determining children's eating habits.(12)

Family structure and household environment.

Feeding habits are also influenced by other circumstances, such as family structure and home dynamics. In many rural Indian homes, grandparents and other elderly members play a important role in the process of decision-making about feeding. Elderly guidance and traditional ideas have an impact on supplementary feeding methods and breastfeeding.

Qualitative evidence acquired in Haryana demonstrated revealed cultural norms, traditional beliefs, and familial pressure influenced mothers' feeding habits, even if they were somewhat aware of the suggested feeding standards (20). In rural settings, mothers typically have a limited involvement in making decisions about what to feed their children. This is especially true in patriarchal households. Improving feeding habits is crucial and is impacted by family members' and spouses' assistance.

Caste and social inequalities.

In India, social stratification and caste-based disparities continue to have an impact on healthcare access and nutrition outcomes. Due to their exposure to poverty, prejudice, and limited access to health care, children from socially disadvantaged backgrounds are more likely to engage in bad eating habits.

A research conducted in Bihar revealed a significant relation between caste and the maintenance of exclusive breastfeeding and pre-lacteal feeding. Due to their lower levels of knowledge and restricted access to healthcare, underprivileged people were more likely to engage in inappropriate eating habits..(9)

Gender of the Child

Gender inequality is a key feature impacting eating patterns in many regions of India. Traditionally, boys are given preference over girls when it comes to food, medical attention, and other forms of care.

According to research done in Rajasthan, compared to male children, female children were less likely to to get the bare minimum of nutritional diversification. Similarly, a nationwide survey revealed a gender disparity in children's food diversification in India. The findings imply that there are still differences in home nutrition provisioning and son choice.(17)

Parental Migration

Another element that is crucial in shaping kid feeding patterns is parental relocation. Migration may have an effect on the mother's workload, home care arrangements, and financial stability. The Rajasthani study found that the tribal children's supplemental nutrition indicators were significantly impacted by parental relocation. Children's eating schedules may change and there may be less parental monitoring as a result of migration. (17)

Urban-Rural Differences

Rural residents frequently have low feeding indices due to limited access to healthcare services, low maternal literacy, low levels of poverty, and ignorance about nutrition. Urban slum inhabitants also face significant nutritional issues due to overcrowding, food poverty, and processed food intake. Numerous studies found that youngsters in Pune's urban slums consumed a lot of processed foods and had low dietary diversification. Rural Studies conducted in Bihar, Haryana, and Uttarakhand indicated that poverty and limited access to healthcare services were linked to inadequate supplemental feeding practices. (21)

Birth Spacing and Maternal Age

Maternal age and pregnancy interval also affect feeding practices. Maternal attention and child nutrition care may be diminished if mothers are younger and have less experience and understanding about feeding their children, or if pregnancies occur close to one another. Maternal age and pregnancy interval were found to have a substantial impact on IYCF practices.(27)

Cultural and Behavioural Determinants

Significant cultural beliefs, traditions, societal norms, and maternal practices impact IYCF methods, particularly in low- and middle-income nations such as India. Many elements, including family traditions, religious beliefs, societal standards, household decision-making, and perspectives on child health, impact feeding practices alongside nutrition awareness and food access.(7)

In many rural regions, breastfeeding and supplemental feeding methods are still influenced by cultural customs and traditional beliefs. In some regions of India, pre-lacteal feeding, delayed breastfeeding beginning, dietary taboos, avoidance of particular foods, and the early introduction of water or animal milk are still common baby feeding practices. Following health care counseling and awareness efforts, these behaviors could persist.

One of the significant cultural practices influencing optimum feeding is pre-lacteal feeding, which is the practice of giving the baby any meal other than breastmilk before to the first breastfeed. According to a study done in Bihar, pre-lacteal feeding habits were still rather common and had a detrimental effect on exclusive breastfeeding. Less-than-ideal eating habits were shown to be highly influenced by cultural practices, family influence, caste customs, and maternal education. (9)

The qualitative data from the state of Haryana demonstrated that, even though mothers were aware of the IYCF's suggested feeding practices, family elders' pressure, misconceptions, and conventions affected their feeding habits. Traditional views about honey feeding, postponing nursing, and avoiding complementary foods continued to have an impact on maternal behavior. The study emphasized that, in order to effectively impact feeding behaviors, information must be supported with sociocultural ideas.(20)

Similarly research conducted in West Bengal discovered that pre-lacteal feeding and bottle feeding were common, and that these practices were influenced by household routines and cultural factors. Because feeding was a socially acceptable behavior, certain feeding indicators were good, but others were still poor. (4)

Young children's nutritional variety is also negatively impacted by food taboos and misconceptions regarding supplementary feeding. In certain tribes, mothers avoid giving their kids eggs, meat, fish, fruits, or certain vegetables because they think these foods may make them sick, create stomach issues, or impede their speech development. Dietary variety and nutrition are negatively impacted by these limitations.

A research carried out in Tamil Nadu found that poor complementary feeding practices were associated with cultural food-related restrictions and knowledge gaps about balanced eating, among other things. Similar conditions were found in Bihar and Maharashtra, where poor dietary diversity was noted, mostly due to cultural and economic constraints that resulted in a reliance on diets high in cereals. (23)

Behavioural factors such as mother attitudes, feeding responses, hunger perceptions, and feeding self-efficacy also affect children's eating patterns. Extra meals are served either too early or too late, depending on the parents' perception of the sufficiency of breast milk or the child's appetite. Feeding decisions may also be influenced by children's unwillingness to eat, dietary intolerance, and health concerns.

According to a research conducted in Pune's urban slums, children between the ages of 6-24 months consumed a lot of packaged and processed food. The caregivers favoured commercially accessible foods for a variety of reasons, including convenience, kid preferences, urban lifestyles, and shorter cooking times. The study found that feeding patterns in urban poor settings are increasingly influenced by shifting food conditions and caregiver behaviors.(24)

Important behavioural aspects for IYCF practices include household decision-making and family influences. In many Indian households, grandmothers and elderly women play a major role in guiding mothers over child feeding. Their conventional beliefs and past experiences may have a greater influence on their decision-making than medical counseling. Mothers with little autonomy may find it difficult to adopt recommended feeding habits for their infants, even with nutrition education. Childcare, health care, and food distribution are often under the control of male leaders or senior family members in patriarchal rural households.

Frontline worker counseling and behavior change communication initiatives have tried to influence feeding habits via community involvement and awareness-raising. However, there is evidence that the effectiveness of treatment depends as much on the ability to challenge deeply rooted cultural ideas and social norms as it does on imparting information.

Maternal recollection and comprehension of IYCF counseling messages were shown to be significantly impacted by the quality of providers' communication in a cross-sectional research conducted in Bihar. Similarly, it has been discovered that in rural Bihar, higher dietary diversity and child health practices resulted from behavior change messages given through women's self-help groups.(10)

Seasonal and religious factors may also have an impact on eating. Certain meals are restricted in some groups due to religious festivals or seasonal beliefs about disease and digestion. Seasonal fluctuations in exclusive breastfeeding patterns in Bihar were found

in the study, suggesting a relationship between feeding behaviors and behavioural and environmental variables. (15)

The examined research generally indicates that mothers of young children's IYCF behaviors are greatly influenced by cultural and behavioural variables. Breastfeeding and supplementary feeding habits can be impacted by traditional beliefs, myths, food taboos, family influence, maternal views, and societal conventions, despite the growing awareness and understanding of suggested feeding standards.

Given the widespread impact of poverty, it is essential to comprehend these cultural and behavioural characteristics in order to create successful nutrition interventions in rural Bihar, where sociocultural influences are substantial. Therefore, programs that support IYCF practices should incorporate culturally relevant counseling techniques, community involvement, women's empowerment, and behavior change communication. (8)

Gender and Social Inequality in IYCF Practices

In many developing nations, including India, gender and socioeconomic inequalities have an impact on IYCF practices. Young children's nutritional condition and eating habits are often impacted by unequal access to food, healthcare, education, and care services. Particularly in socioeconomically challenged regions, gender, caste, class, poverty, and rural-urban factors continue to influence household decision-making and child feeding habits.

In many Indian cultural and societal frameworks, son preference and gender inequity are strongly embedded. Families usually treat children differently depending on their gender; male children receive greater attention in terms of food availability, access to healthcare, and care, while female children receive different treatment, including less care and nutritional intake. This discrepancy negatively impacts appropriate eating and nutrition outcomes for young girls.

The current study has demonstrated that gender can influence IYCF practices, as indicated by several articles included in this analysis. In the PANChSHEEEL project in Rajasthan, the eating behaviors of tribal children aged 6-23 months were analysed concerning gender and parental migration. The findings showed that girls' nutritional health was impacted by societal norms and discriminatory feeding practices in the home.

Similarly, in a nationally representative research, (6) examined the dietary diversity of children aged 6 to 24 months using data from the NFHS. A study found that female

children's diets were less varied than those of male children. The authors discovered that feeding practices are impacted by the persistence of intra-household food distribution rules and son preference in many Indian households.

Gender inequality in society is also frequently linked to child feeding habits. In rural households, females may receive less attention when it comes to health care, education, and nutrition since boys are perceived as the future earners. Female children have nutritional disadvantages from a very young age as a result of these discriminatory behaviors.

Eating behaviors are shaped by social disparities, economic standing, and caste. Children from low-income families are more prone to inadequate nutrition due to poverty, food scarcity, low maternal education levels, and limited healthcare access.
Breastfeeding and pre-lacteal feeding practices were shown to be significantly influenced by caste and educational level, according to Bihar research, Due to their lack of knowledge and access to medical services, mothers in disadvantaged social groups were more likely to engage in improper feeding practices. The study demonstrated how social deprivation relates to uneven child nutrition in Bihar.(9)

Using the same technique, (14) discovered that children from underprivileged socioeconomic groups and those in the poorest families were more likely to experience Minimum Dietary Diversity Failure (MDDF) at the national level. Children's nutritional status was shown to be significantly influenced by mother education and household affluence.

IYCF practices are also impacted by rural-urban differences. Food insecurity, inadequate health facilities, low literacy rates, and a lack of nutrition counseling services are all common in rural areas. Although access to healthcare is often greater in metropolitan settings, many children in urban slums live in cramped quarters and suffer from acute malnutrition due to poverty.

In Pune's urban slums, it was discovered that children from low-income families had inadequate dietary diversity and were not receiving "complimentary feeding." Research in these slums revealed that children from impoverished households were lacking "complimentary feeding" and a diet with necessary diversity. These results indicate that dietary habits in underprivileged rural and urban areas exhibit socioeconomic inequalities.(16)

Gender and societal disparities in feeding habits are strongly associated with mothers' educational attainment and women's autonomy. Mothers with poor levels of knowledge and decision-making ability may not be able to follow recommended feeding methods, even if they are aware of child nutrition. In many patriarchal families, child feeding is influenced by adults, especially family elders and male household leaders.

Mothers' feeding methods were frequently impacted by cultural beliefs and practices, familial pressure, erroneous information regarding the nutritional worth of breast milk, and other elements, according to qualitative data collected in Haryana. The study showed societal and cultural norms frequently dominate over the maternal expertise on infant feeding methods. (20)

There are social disparities in the delivery of dietary counseling and healthcare services as well. For underprivileged groups, it might be challenging to get help from frontline workers, maternity health programs, and Anganwadi centres. Limited access to healthcare is also connected to low feeding awareness and poor feeding practices among impoverished communities.

There has been modest success in reducing disparities in eating behaviors through community-based interventions with socially disadvantaged people. Research done in Bihar demonstrated found self-help groups and behavior change communication programs were helpful in improving women's and children's health practices and dietary diversity in rural Bihar's underprivileged areas. The therapies concentrated on women's empowerment, community engagement, and collective action to improve habits connected to nutrition.(9, 10)

The examined research demonstrates that the practices of IYCF and children's nutritional outcomes are strongly correlated with gender and socioeconomic inequalities. Malnutrition and poor eating practices are more common among female children from economically disadvantaged and socially disadvantaged homes. In rural Bihar, gender and social inequality persist, with widespread poverty and caste disparities, lower literacy rates for women compared to men, and adherence to traditional gender norms impacting maternal feeding practices and child nutrition results. Recognizing and understanding the impacts of gender and socioeconomic factors is crucial, inequality in order to develop equitable and culturally appropriate nutrition interventions that can enhance baby and early child eating habits among disadvantaged groups.

Urban Slum Studies and Nutritional Transition

High rates of urbanization have changed the food environment, lifestyle, and child feeding patterns in emerging nations. Children in urban slums have poor nutritional status due to poverty, overcrowding, food insecurity, poor sanitation, and living circumstances, even if access to healthcare facilities, education, and food markets is frequently greater in urban regions than in rural ones. Urban slum communities are particularly susceptible to improper Infant and Young Child Feeding (IYCF) practices due to their economic instability, lack of caring assistance, and reliance on cheap processed meals.(12)

Recent changes in eating patterns, a move toward processed food consumption, and the cohabitation of undernutrition and overnutrition have all contributed to India's nutritional transition. eating insecurity and nutritional deficiencies continue to be problems for urban poor people, especially those residing in slums, since they are increasingly exposed to bad eating surroundings. In urban children, the dual burden of malnutrition is becoming a public health concern. (12)

The current review examined a few studies that looked at IYCF practices and the nutritional condition of kids living in urban slums. This cross-sectional study looked at the connection between IYCF practices and malnutrition in children between the ages of 0-24 months in urban slums in Pune, Maharashtra, India. According to the study, children who reside in slums have a significant frequency of stunting and poor supplemental eating practices. Meal frequency, bottle feeding, a variety of foods ingested, and delayed breastfeeding beginning were all commonly noted.

The study found a substantial correlation between the worst IYCF procedures and children's undernutrition. (24), which investigated the factors that influence supplemental feeding in children in Pune's urban slums between the ages of six and twenty-four months.

The findings showed that processed and packaged food intake was high and that very few children were following the MAD. According to the survey, caregivers were starting to choose commercially processed meals due to their affordability, convenience, children's preferences, and urban lifestyle.(24)

Young children's usage of processed meals has grown, emphasizing the continuous nutritional transition in urban India. Traditionally, children's meals in India included home-prepared supplemental foods, but in recent years, children's consumption of commercial processed foods, sugary foods, and packaged snacks has increased due to

their availability on the market. These foods are frequently high in caloric density and have poor nutritional value, which can lead to a diet heavy in calories or deficiencies in certain micronutrients in children.

A recent study conducted in low-income areas of Dhaka, Bangladesh, reveals that children aged 0–23 months exhibit very low levels of MDD and MAD. The research also found that the consumption of unhealthy foods increases with age, particularly ultra-processed and sugary items. The results indicated that although urban dwellers enjoyed greater access to markets, their nutritional quality did not automatically enhance at the same time.(1)

In urban slum areas, malnutrition often presents as a "double burden": besides undernutrition, there is an increased risk of being overweight and having a poor diet. The limited variety of "food," intake of low-protein diets, and reliance on inexpensive meals are the primary reasons for inadequate nutrition among young children. The research indicates that IYCF approaches could serve as a "dual-purpose strategy" to tackle both undernutrition and overnutrition in children from urban slums. To lessen the long-term risks associated with both forms of malnutrition, it was acknowledged that enhancing nutritional variety and food consumption in young children is crucial.(12)

Unhealthy dietary practices in urban slums are driven by various social, economic, and behavioural factors. Mothers in impoverished urban neighbourhoods usually are employed in the informal sector and often lack time for breastfeeding and making nutritious supplementary meals. Feeding behaviors are shaped by various elements, such as poor sanitation, overcrowded living conditions, insufficient childcare assistance, and limited family support.(16)

Economic constraints also influence the dietary choices made by slum residents. Because they are inexpensive, easily accessible, require little preparation, and are widely advertised, processed foods are frequently the first option. Despite its low nutritional value, food packaging might be perceived as contemporary and appealing. Urbanization has also had an impact on patterns of care and family structure. Mothers' caring responsibilities are increased since migration and the nuclear family structure limit the conventional family support networks. In this situation, convenience eating behaviors are more likely to take place.(27)

Despite the terrible nutritional conditions seen in slum neighbourhoods, the majority of intervention programs focus primarily on the rural population, giving urban poor people'

nutritional needs less attention. According to the reviewed literature, specific nutrition therapies are required for undernutrition and increasing nutrition risk in urban slums as a result of nutrition transition.

The findings from the urban slum studies are important as they indicate that unsuitable IYCF practices also occur in urban areas. Food insecurity and limited access to health care services are difficulties faced by rural individuals, while urban poor communities are increasingly struggling with toxic food surroundings, reliance on processed foods, and unhealthy eating habits.

In summary, this data indicates that the IYCF behaviors of slum inhabitants are impacted by the dietary transition and urban poverty in general. Urban youngsters are becoming more concerned about insufficient nutritional variety, low MAD and rising processed food intake. The findings emphasize the necessity of raising the standard of nutrition education, promoting complementary feeding behaviors that are healthful, and limiting the exposure of vulnerable urban populations to bad foods.

Considerable efforts have been undertaken, according to a review of the literature on IYCF practices in India as well as at the national and international levels to promote breastfeeding, complementary feeding, and child nutrition. Maternal education, socioeconomic position, healthcare use, counseling exposure, cultural attitudes, and gender inequity are some of the significant factors that have been shown to influence children's eating patterns under two years of age. Even so, there are still a lot of gaps in the current research, particularly when it comes to rural Bihar and children between the ages of 12-23 months.

Numerous constraints in the reported studies include a lack of focus on children specifically aged 12–23 months. In most studies carried out in Bihar and India, the age group of children analysed is typically 0–23 months or 6–23 months, but the dietary patterns of children specifically aged 12–23 months are not evaluated independently. The age range is crucial since it relates to the transition from breastfeeding to solid foods, a time when children face a significant risk of nutritional deficiency, developmental delays, and increased susceptibility to illness.

While many studies concentrate on breastfeeding indicators like early initiation of breastfeeding and exclusive breastfeeding, fewer studies fully address complementary feeding indicators like MDD, MMF and MAD. Although complementary feeding is

essential for children's nutrition after six months, nothing is known about its efficacy in rural Bihar.

The lack of sufficient evidence available at the district and rural levels in Bihar is another significant missing component. The majority of current research is focused on either a broader regional examination or a national data collection like NFHS. Such studies reveal overall trends, but could not represent local social, economic and behavioral aspects impacting feeding patterns in the rural parts of Bihar.

Many studies have employed cross-sectional research with a quantitative methodology, according to the evaluated literature. These studies have demonstrated statistical correlations between feeding habits and determinants, but they have not provided much insight into the underlying behavioural and sociocultural factors that influence mothers' feeding decisions. Not enough research has been done impacts family decision-making processes, food care practices, intra-household food distribution, maternal viewpoints, and food beliefs.

Numerous studies have shown that cultural beliefs, myths, and traditional practices significantly influence eating habits, but there is a lack of qualitative research on this topic. Cultural norms, food taboos, and family pressures have been recorded in West Bengal and Haryana; however, similar qualitative information remains limited in rural Bihar.

Women's household autonomy and decision-making related to IYCF practices is another significant point of contention. The impact of maternal empowerment, gender dynamics, and family power structures on child feeding practices in rural areas has not received as much focus as maternal education and socioeconomic conditions.

Gender disparity has been found to be a significant factor in certain national and regional studies, with female children less likely than their male counterparts to receive adequate dietary diversity. However, there aren't many studies in Bihar that concentrate on how gender affects household nutrition allocation and feeding habits.

However, little study has also looked at how frontline worker counselling's efficacy and quality affect mothers' feeding habits. Evidence suggests that counseling alone might not be sufficient to influence feeding patterns unless institutional and cultural barriers are addressed, despite the fact that many research conducted in Bihar assessed the relationship between exposure to counseling and feeding indicators. More research is

required to examine how counseling processes of communication, trust, and behavioural modification interact with maternal customs.

Studies on urban slums have shown that children's use of processed and packaged meals is increasing due to changing dietary settings and nutritional transitions. To find out if rural residents, particularly those in rural Bihar, are going through a similar dietary shift, however, not much study has been done.

The literature review's dependence on mother recall data gathering techniques is one of its main flaws. Recall bias and social desirability bias may be introduced by these techniques, particularly when mothers are asked about their feeding habits after the fact.

Additionally, the majority of research use cross-sectional designs, which make it impossible to establish causal links between eating variables and feeding outcomes. Research on how feeding habits have changed over time and how they relate to children's development outcomes is scarce in Bihar and India.

Moreover, there are limited intervention studies aimed at evaluating the effects of interventions on overall mother and child health programs, instead of focusing solely on feeding practices in children aged 12 to 23 months. The effects of long-term behavioural change on mothers in rural areas and the sustainability of nutrition programs are not thoroughly recorded.

Additionally, the research demonstrates how poorly sociocultural, behavioural, and socioeconomic elements are integrated into a unified analytical framework. The majority of research focus solely on dietary indicators or demographic variables, ignoring the connection between maternal behavior and cultural traditions, health care access, gender norms, and socioeconomic issues.

Consequently, this study intends to address these gaps by examining the distribution and factors influencing IYCF practices among mothers with children aged 12 to 23 months in rural Bihar. To provide research on dietary habits and related sociocultural, healthcare system, and socioeconomic and demographic factors concerning maternal feeding behaviors particular to the study region.

The findings of the study are expected to contribute to the existing knowledge of rural-specific data, reveal shortcomings in feeding practices, and assist in creating focused nutrition interventions to improve nutritional outcomes and child health in Bihar.

Methodology

Study Design:

This study is a secondary data analysis utilizing data from the ASSIST Household dataset conducted in 2026. The analysis focuses on rural area of Bihar and includes mothers of children aged 12–23 months in all districts of Bihar selected from 9 Commissionerate and 180 blocks. To assess the distribution of IYCF practices and to identify the determinants influencing these practices in rural Bihar.

Study Population:

The survey has been taken among women residing in rural Bihar who have children aged 12–23 months at the time of the survey. Mothers who delivered the baby and are permanent residents of the selected villages will be eligible to participate in the study.

Study Area

The study is conducted in rural areas of Bihar. Bihar is administratively divided into 9 divisions, each comprising several districts. For this study, selected districts from all nine administrative divisions of Bihar will be included to ensure geographical representation and capture variations in socio-demographic and health service characteristics across the state.

Inclusion Criteria

- Mothers having infants aged 12-23 months at the time of survey.
- Mothers who are permanent residents of the selected rural areas of Bihar.
- Mothers who provide informed consent to participate in the study.

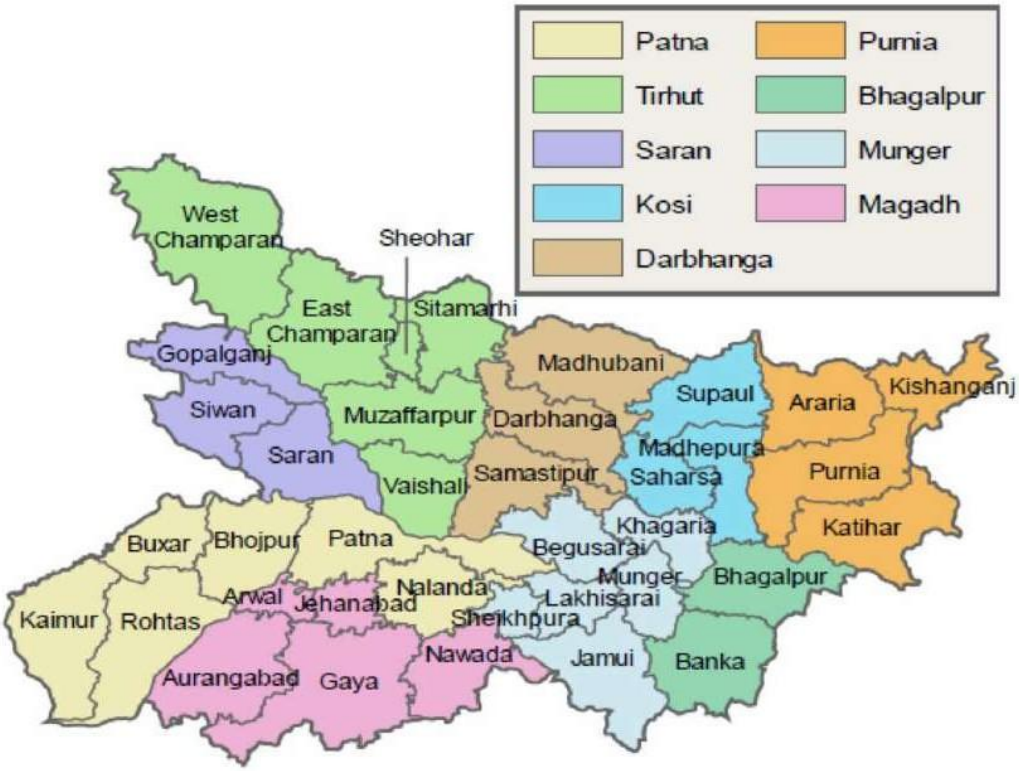
Exclusion Criteria

- Mothers who are not available during the time of data collection after repeated visit.
- Mothers who are unable to respond due to severe illness or mental incapacity.

Sampling Strategy

This study is part of a larger study on Reproductive, Maternal, Newborn, Child Health and Nutrition (RMNCH+N) practices conducted by the Piramal Foundation in rural Bihar. A three-stage sampling approach is used to ensure representativeness across administrative levels.

Stage 1: Primary Sampling Unit (PSU) – Selection of Blocks



Bihar is administratively divided into 9 divisions (Commissionerate's).
From each division, 20 blocks are selected using Simple Random Sampling (SRS).
Thus, the total number of selected blocks are:
20 × 9 = 180 blocks

Stage 2: Secondary Sampling Unit (SSU) – Selection of Anganwadi Catchment Areas

From each selected block, 2 Anganwadi Centre (AWC) catchment areas or municipal wards are selected using Probability Proportional to Size (PPS) sampling. Therefore, each division has 40 SSUs. Selection varies depending on the block type: Purely rural blocks: 40 AWCs are selected using PPS sampling.
Mixed rural-urban blocks: Selection of rural AWCs and urban wards are done based on the proportion of rural and urban population.

Stage 3: Tertiary Sampling Unit – Selection of Households

Within each selected SSU, systematic sampling is used to select households.
In rural areas, the Anganwadi household register serve as the sampling frame.
Households are selected using a random start and a fixed sampling interval.
Eligible mothers with infants in the selected age groups are interviewed.

Sample size:

Total Sample Size (Overall Study)

For the larger RMNCH+N study:
20 PSUs × 40 SSUs × 2 interviews per age group = 1600 respondents per age group per division
Children are divided into three age groups:
0–5 months
6–11 months
12-23 months
Thus, per division,
1600 respondents × 3 age groups = 4800 respondents

Across 9 divisions of Bihar:

4800 × 9 = 43,200 respondents

Sample Size for This Study:

This study used data only from mothers of infants aged 12-23 months.

Per division:

20 PSUs × 40 SSUs × 2 households = 1,600 respondents

Across 9 divisions:

1,600 × 9 = 14,400 respondents **(11226 study is ongoing)**

Thus, the final sample size for this study will be 11,226 rural mothers of infants aged 12-23months.

Variables:

Dependent Variables (IYCF Indicators):

- Minimum acceptable diet
- Minimum dietary diversity (≥4 food groups)
- Minimum meal frequency
- Continued breastfeeding

Independent Variables (Determinants):

- Maternal (age, education & occupation)
- Caste
- Religion
- Father (education & occupation)
- Front line worker visit
- Counselling on complimentary feeding
- Media exposure and maternal knowledge of nutrition
- Child's gender and total number of children
- Wealth index

Key indicators:

1.Continued Breastfeeding:

WHO Global Strategy for Infant and Young kid Feeding says that kid should continue nursing for at least two years or beyond. While unwell children frequently have little taste for solid meals, nursing is essential during sickness. Maintaining breastfeeding can assist avoid dehydration and supply the nutrients needed for healing.

Children who have been nursed for more than a year stand to gain the most from continued breastfeeding in terms of reduced mortality and morbidity as well as consistent performance on IQ tests.

2. Minimum Meal Frequency (MMF)

According to WHO guidelines, breastfed newborns aged 6 to 8 months should have supplemental meals two to three times a day, while children aged 9 to 23 months should receive complementary foods three to four times a day along with extra supplemental snacks one to two times a day. The frequency is increased to four or five meals per day for the youngster who is not breastfed. Growth wasting, stunting, and micronutrient shortages may result from feeding meals and snacks less often than is advised since this might affect the total energy and micronutrient supply.

Minimum required frequency:

- **Breastfed children:**
  - 6–8 months: at least **2 times/day**
  - 9–23 months: at least **3 times/day**
- **Non-breastfed children (6–23 months):** at least **4 times/day** (including milk feeds)

3. Minimum Dietary Diversity (MDD)

The breastfed kid and non-breastfed child indicate that children between the ages of 6–23 months should be fed varied meals minimum 5 food categories to guarantee that nutrient needs are reached. Better linear growth in young infants is associated with diversity in dietary categories. Children's physical and cognitive development may be negatively impacted by micronutrient deficiencies, which can be increased by an undiversified diet. One study found that stunting was associated with little or no

consumption of nutrient-dense foods such as eggs, milk products, fruits, and vegetables between six months and 23 months of age.

The 8 food groups are:

- Breast milk
- Grains, roots and tubers, and plantains
- Nuts, seeds, and pulses (beans, peas, and lentils)
- Dairy goods
- Foods made of flesh (meat, fish, poultry, and organ meats)
- Eggs
- Fruits and vegetables high in vitamin A
- Additional fruits and veggies

4.Minimum Acceptable Diet (MAD)

The percentage of children between the ages of 6 and 23 months who obtained both MMF and MDD on the preceding day is known as the MAD. In order to ensure that their energy and nutritional demands are sufficiently satisfied, non-breastfed youngsters must also consume milk or milk products at least twice throughout the previous day.

We did descriptive analysis using the SAS program. A fundamental method for investigating and comprehending data is descriptive analysis. It's a method of summarizing and arranging data in a way that makes patterns and significant traits immediately apparent.

This helps to condense massive amounts of data into understandable summaries. This might take the kind of tables, charts, or statistical metrics (such mean, median, and mode) that offer quick insights into the dataset. It provides initial patterns and insights that can guide future in-depth research. For example, more study may be done on the impact of mothers' education on children's health if a significant percentage of moms are discovered to be illiterate. Descriptive statistics highlight both beneficial and unhealthy health practices. Descriptive statistics of particular important health indicators provide information to aid in the creation of programs and policies. For instance, if the numbers reveal that a substantial proportion of children are not breastfed at all, initiatives may be established to promote and encourage breastfeeding.

RESULT:

Descriptive analysis

11,226 mothers with children between the ages of 12-23 months participated in the study. Table 1 presents the respondents' sociodemographic characteristics. The findings indicate that a variety of maternal characteristics may have an impact on IYCF practices, family socioeconomic position, and child-related variables. Mothers were mostly young adults, according to the age distribution. A comparable percentage (48.1%; n = 5,401) of the respondents were between the ages of 25 and 34, while almost half (48.4%; n = 5,435) were under 24. Of the moms, only 3.5% (n = 390) were older than 35. This indicates that the majority of mothers were in their peak reproductive years, which is in line with Bihar's demographic profile of women with small children. Mothers' minimal engagement in paid employment was highlighted by the occupational profile. Just 6.0% (n = 679) reported having a job, while the vast majority (94.0%; n = 10,547) were either homemakers or jobless. The conventional gender roles that are common in rural Bihar, where women are mostly involved in childcare and domestic duties, are reflected in this research. The research population's maternal education differed significantly. There was a considerable burden of educational disadvantage because 30.4% of mothers (n = 3,415) were illiterate. Approximately 20.8% (n = 2,335) had completed up to eight years of school, while almost half (48.8%; n = 5,476) had completed more than eight years. Nearly one-third of respondents were illiterate, which highlights ongoing educational disparities that may affect eating habits and health awareness despite the fact that a significant majority of mothers had some formal education. Hindus made up 86.7% (n = 9,734) of the studied population. Muslims and other minority religious groups made up the remaining 13.3% (n = 1,492) who practiced non-Hindu religions. The religious makeup of Bihar is generally reflected in this distribution. In India, caste is still a significant social determinant that can affect nutritional results, healthcare, and resource access. 24.6% (n = 2,758) of the participants in this study were from marginalized social groupings, whereas 75.4% (n = 8,468) came from non-marginalized groups. The presence of a substantial, impoverished population emphasizes how crucial it is to take socioeconomic inequality into account when analysing child feeding habits and nutritional results. Males significantly outnumbered females, but overall the gender distribution of children was fairly balanced. Of the sample, 53.6% (n = 6,020) of the children were male, and 46.4% (n = 5,206) were female. Gender-related disparities in feeding patterns and child nutrition may be meaningfully examined thanks to this almost equal representation. Educational

attainment among dads followed a trend resembling mothers. Approximately 32.5% (n = 3,647) of dads were illiterate, whereas 19.1% (n = 2,144) had completed up to eight years of education. Nearly half (48.4%; n = 5,435) had attended school for more than eight years. The relatively high proportion of males who have completed secondary or higher education may have a favourable impact on childcare practices, health-seeking behavior, and family decision-making. Fathers participated in the workforce at a far higher rate than moms. Just 2.6% (n = 294) of dads were jobless, compared to almost all (97.4%; n = 10,904). This data demonstrates that dads were the major income earners in most homes and illustrates the gendered division of work within the research group. The distribution of households in each of the three wealth levels was about equal. The low wealth quintile accounted for around 33.4% (n = 3,747), the intermediate wealth quintile for 33.3% (n = 3,743), and the affluent wealth quintile for 33.3% (n = 3,736). Examining socioeconomic differences in IYCF practices across various household wealth levels is made possible by this balanced distribution. The distribution of exposure and outcome factors among Bihar children between the ages of 12 and 23 months is shown in Table 2. These variables offer valuable information on nutritional outcomes, baby feeding habits, maternal-child health service usage, and household factors. Larger family sizes were typical, according to the respondents' distribution by total number of children. 32.1% (n = 3,607) of moms had two children, compared to 30.1% (n = 3,375) who had just one. Three or more children were reported by the greatest percentage of respondents (37.8%; n = 4,244). This result implies that a significant percentage of households had more than one kid, which might have an impact on how household resources are allocated and how care is provided. There was not much interaction with front-line healthcare providers. Of the moms, only 10.4% (n = 1,171) said they had received a visit from a frontline worker, while 89.6% (n = 10,055) said they had not. Mothers may have less opportunity to get counseling and assistance on appropriate child feeding methods as a result of this restricted outreach. The majority of those surveyed said they used smartphones. Smartphone users made up around 82.7% (n = 9,287), whilst non-users made up 17.3% (n = 1,939). The large percentage of people who own smartphones suggests that there is a lot of opportunity for nutrition education, digital health interventions, and the distribution of IYCF-related information via mobile platforms. Among children between the ages of 12 and 23 months, breastfeeding habits were still quite common. At the time of the study, 14.6% (n = 1,635) of children were not breastfed, whereas the vast majority (85.4%; n = 9,591) were. This result shows a comparatively high rate of breastfeeding continuation throughout the second year of life, which is in line with national standards that support nursing for at least two years. Meal

frequency is an important component of optimal baby and early child nutrition. The results showed that 19.3% (n = 2,164) of children had less than three meals per day, whereas 80.7% (n = 9,062) of children obtained the required MMF(≥3 meals per day). Nearly one-fifth of youngsters were still at danger of consuming insufficient amounts of energy, even though the majority of them reached the recommended feeding frequency. Many children were found to have inadequate dietary diversification. Just 42.1% (n = 4,729) of the children met the necessary dietary diversity of four or more food categories, while more than half (57.9%; n = 6,497) ingested items from less than four food groups. This result raises the possibility that many kids aren't getting a diversified enough diet to support healthy growth and enough intake of micronutrients. Counseling for supplemental feeding was received at a relatively low rate. Just 8.7% (n = 980) of mothers said they had received counseling about supplemental feeding, but the vast majority (91.3%; n = 10,246) did not. This reveals a serious deficiency in programs for behavior change communication and nutrition education. Just 37.6% (n = 4,225) of children met the MAD, a composite measure that includes MMF and MDD. Conversely, 62.4% (n = 7,001) failed to fulfil the criteria for MAD. According to suggested guidelines, over two-thirds of children in Bihar between the ages of 12 and 23 months were not getting acceptable feeding practices.

Stratified analysis:

Among moms between the ages of 19 and 25 claimed that the greatest percentage of their children were presently breastfed (87.2%), followed by moms over the age of 25 (89.7%), and mothers under the age of 18 (83.3%). Children of mothers between the ages of 19 and 25 showed comparatively better eating behaviors than younger moms, according to similar trends shown for MMF, MDD, and MAD. MMF(83.7%), MDD(47.8%), and MAD(43.2%) were more common in children whose mothers had completed more than eight years of schooling. Children of illiterate mothers, on the other hand, had significantly lower rates of MAD (30.1%) and MDD (34.3%). However, sustained breastfeeding was slightly greater among illiterate moms (88.3%) than among better educated mothers. About 86.0% of children of working moms continued to be breastfed, 80.7% got MMF, 46.1% received MDD, and 42.4% received MAD. Mothers without jobs showed similar but slightly lower proportions, suggesting that working women had a little advantage in terms of complementary feeding indicators. The majority of children in Hindu homes attained MMF(81.9%), MDD (42.0%), MAD(37.9%), and sustained breastfeeding (85.9%). While dietary variety levels were comparable (42.7%), non-Hindu families had lower rates of meal frequency (73.2%) and maintained breastfeeding (82.4%). In terms of caste, children from disadvantaged groups had greater rates of MMF (82.5%) and sustained breastfeeding (89.1%) than children from non-marginalized groups. Nonetheless, compared to children from disadvantaged homes (39.0% and 35.7%, respectively), children from non-marginalized households showed more dietary diversity (43.1%) and MAD (38.3%). In every indication, the eating habits of male and female children were comparable. Male children were somewhat more likely to continue breastfeeding (86.4%) than female children (84.3%), although the frequency of MDD and MAD was about the same in both genders. Respondents whose dads had more than 8 years of schooling reported the highest prevalence of MMF (83.8%), MDD (47.5%), and MAD (43.0%). On the other hand, children with illiterate dads had significantly lower rates of MAD (29.9%) and dietary variety (34.2%). In every category of paternal education, the rate of continued breastfeeding remained high, ranging from 83.3% to 87.5%. Compared to children whose fathers were jobless, children whose fathers were employed showed comparable levels of feeding behaviors. However, dietary variety (49.7%) and MAD (43.2%) were comparatively greater among children of jobless dads, while the sample size was limited. Family size indicated considerable disparities. moms with one kid reported the greatest rates of dietary diversity (43.8%) and MAD (39.1%),

whereas moms with more than two children reported the highest frequency of continuous breastfeeding (89.4%). The minimal tolerable diet and sufficient dietary diversity were less likely to be attained by children from bigger households. The prevalence of MMF (86.8%), MDD (63.8%), and MAD (59.7%) was significantly greater among women who got a Frontline Worker (FLW) visit than among mothers who did not (80.0%, 39.6%, and 35.1%, respectively). Both groups continued to nurse in a comparable manner. In a similar vein, those who got supplemental eating counseling showed noticeably improved meal habits. Among moms who did not get counseling, the corresponding rates were 79.9%, 39.9%, and 35.3%, whereas about 89.4% obtained MMF, 65.6% achieved MDD, and 62.3% reached MAD. Additionally, moms who received counseling continued to breastfeed at a somewhat greater rate (86.6%). Compared to non-users, smartphone users had superior supplementary feeding results. 81.3% of smartphone users had MMF, 43.5% had MDD, and 38.9% had MAD, while the corresponding percentages for non-users were 77.8%, 35.6%, and 31.5%. In both groups, the rate of continued breastfeeding remained high. A large wealth gradient was identified across feeding indicators. MMF (83.9%), MDD (49.8%), and MAD (44.9%) were most common among children from wealthy homes, with middle-class households coming in second. In contrast, children from impoverished homes exhibited the lowest incidence of dietary diversity (34.5%) and minimum tolerable diet (30.9%). It's interesting to note that continuous breastfeeding was lowest in wealthy homes (82.1%) and greatest in impoverished households (88.2%).

Logistic regression analysis:

Complementary feeding habits were substantially correlated with mother age, according to the multivariable logistic regression study. Children of mothers between the ages of 19 and 25 were more likely to achieve MAD (AOR=1.10, 95% CI: 1.01–1.21, p=0.031) and MMF(AOR=1.31, 95% CI: 1.17–1.46, p<0.001) than moms who were 18 or younger. In a similar vein, children whose mothers were older than 25 were more likely to fulfil the MMF(AOR=1.45, 95% CI: 1.09–1.92, p=0.010). However, neither MDD nor CBF were highly connected with mother age. Maternal employment was favourably connected with dietary outcomes. Children of working mothers had substantially greater probabilities of meeting MDD(AOR=1.22, 95% CI: 1.03–1.43, p=0.018) and Minimum Acceptable Diet (AOR=1.25, 95% CI: 1.06–1.47, p=0.008) compared to children of unemployed moms. Children from Hindu homes were more likely to get Continued Breastfeeding (AOR=1.31, 95% CI: 1.12–1.52, p<0.001) and MMF(AOR=1.60, 95% CI: 1.40–1.82, p<0.001) than those from non-Hindu households. Similarly, children from disadvantaged castes were more likely to have MMF(AOR=1.18, 95% CI: 1.05–1.33, p=0.006) and Continued Breastfeeding (AOR=1.33, 95% CI: 1.16–1.53, p<0.001). There was no significant correlation seen for MMF, MDD, or MAD, however female children were less likely than male children to continue breastfeeding (AOR=0.86, 95% CI: 0.77–0.95, p=0.005). The number of children in the home has a big impact on nursing habits. moms with two children (AOR=1.30, 95% CI: 1.14–1.48, p<0.001) and more than two children (AOR=1.75, 95% CI: 1.51–2.04, p<0.001) were more likely to continue nursing than moms with one child. However, having more than two children lowered the chance of meeting MMF(AOR=0.87, 95% CI: 0.76–0.99, p=0.044). Children whose mothers got visits from Frontline Workers (FLWs) had substantially greater probabilities of reaching MDD (AOR=1.91, 95% CI: 1.43–2.56, p<0.001) and MAD (AOR=1.65, 95% CI: 1.24–2.21, p=0.001). Similarly, receipt of complementary feeding counselling was strongly associated with improved feeding practices, including MMF(AOR=2.94, 95% CI: 2.00–4.31, p<0.001), MDD(AOR=1.53, 95% CI: 1.11–2.10, p=0.009), and MAD(AOR=1.86, 95% CI: 1.36–2.55, p<0.001). Smartphone use was another important determinant, with smartphone users having significantly higher odds of achieving MMF(AOR=1.15, 95% CI: 1.02–1.31, p=0.025), Minimum Dietary Diversity (AOR=1.22, 95% CI: 1.10–1.36, p<0.001), and MAD(AOR=1.23, 95% CI: 1.10–1.37, p<0.001). Complementary feeding behaviors were shown to be strongly predicted by household affluence. Children from middle-class homes were more likely than those from poor households to achieve

MMF(AOR=1.16, 95% CI: 1.03–1.31, p=0.012), MDD(AOR=1.37, 95% CI: 1.24–1.51, p<0.001), and MAD(AOR=1.32, 95% CI: 1.19–1.46, p<0.001). The association was even stronger among children from rich households, who had significantly higher odds of achieving MMF (AOR=1.44, 95% CI: 1.27–1.64, p<0.001), MDD (AOR=1.82, 95% CI: 1.64–2.01, p<0.001), and MAD (AOR=1.77, 95% CI: 1.59–1.96, p<0.001), although they were less likely to be continued breastfed (AOR=0.72, 95% CI: 0.63–0.83, p<0.001).

Discussion:

The present study studied the distribution and determinants of IYCF practices among mothers of children aged 12–23 months in rural Bihar. The data demonstrated that CBF(85.4%) and MMF(80.7%) were reasonably high, however MDD(42.1%) and MAD(37.6%) remained unsatisfactory. These findings show that while the majority of children continue to be breastfed and consume meals on a regular basis during their second year of life, the variety and quality of supplementary foods are still insufficient.

The results of earlier research carried out in Bihar and other regions of India are consistent with the prevalence of continued breastfeeding found in this study. (9) found that breastfeeding rates in Bihar are still comparatively high, especially among those from lower socioeconomic backgrounds. In a similar vein, (28) discovered that children in West Bengal under the age of two continued to nurse. In comparison to commercially available alternatives, breast milk is more accessible and affordable, which may account for the greater incidence of sustained breastfeeding among lower-income households and families with multiple children seen in this study. (9, 28).

Complementary feeding indicators were insufficient even when breastfeeding practices were encouraged. Just 37.6% of children reached the minimum tolerable diet requirements, and only 42.1% of children attained the minimal dietary diversity. These results are in line with other research from Bihar and India that found young children had inadequate dietary diversification (8) (6, 13). Only a tiny percentage of children in rural Bihar consumed meals from all recommended dietary categories, according to a research by Kumar et al. (2020). Similarly, national analyses utilizing NFHS data have consistently found dietary variety as one of the poorest IYCF variables in India (6, 13). These unfavourable results may be caused by a lack of family resources, food instability, low mother awareness, and limited access to a variety of foods.

Complementary feeding methods were substantially correlated with maternal age. Compared to children of younger mothers, children of moms between the ages of 19 and 25 and older mothers were more likely to attain the minimum tolerable diet and minimal meal frequency. Similar results were reported by (12), who noted that IYCF practices in urban India were positively impacted by mother age. Improved feeding habits may result from older moms' more childcare experience, increased autonomy in making decisions, and increased exposure to health knowledge.

Maternal work was positively connected with MDD and MAD. Compared to children of jobless moms, children of working mothers were more likely to eat a varied and sufficient diet. This outcome may be explained by higher household income and more exposure to health information among working women. Similar favourable correlations between mother work, socioeconomic empowerment, and better supplementary feeding results have been shown in earlier research.., (14, 16)

MMF and prolonged breastfeeding were shown to be significantly influenced by caste and religion. Adequate meal frequency and prolonged breastfeeding were more common in Hindu families and disadvantaged caste groups. Similar correlations between sociocultural norms and traditional feeding practices and children's eating behaviors have been documented in national and Bihar research (10) (14). After correction, caste and religion did not substantially correlate with dietary variety or a satisfactory diet, indicating that characteristics connected to the economy and services may be more important in determining dietary quality.

According to the current study, female children were less likely than male children to continue breastfeeding. This result is in line with data from Rajasthan, where it was found that there were gender differences in how children were fed, with some households giving preference to boys (17). The reduced chance of sustained breastfeeding among girls may be a reflection of ongoing gender biases in caregiving behaviors, even though no significant gender differences were found for MDD and MAD.

Another significant factor influencing eating habits was family size. While households with more than two children were less likely to meet the necessary meal frequency, mothers with two or more children were more likely to continue breastfeeding. Larger families have less time, food, and caregiving resources available for each kid, according to research looking at resource allocation within households. (13).

The significant beneficial impact of supplementary feeding counseling and frontline worker (FLW) visits was one of the study's most significant conclusions. MDD & MAD were far more likely to be attained by children whose moms got FLW visits. In a similar vein, better MMF, MDD, and MAD were significantly correlated with complementary feeding counseling. These results corroborate data from Bihar and other regions of India showing the efficacy of dietary counseling and behavior change communication programs (11) (26) (22). Community-based therapies and self-help group platforms have also

demonstrated large increases in nutritional diversity and complementary feeding practices among young children (11).

Complementary feeding behaviors have been found to be significantly influenced by smartphone use. Mothers who used cell phones were more likely to attain MMF, MDD, and MAD. This research underlines the expanding relevance of digital technology in spreading nutrition-related information and enhancing health communication. Digital health interventions may be a viable approach to enhancing IYCF practices in rural Bihar, since over four-fifths of women in the current study reported using smartphones.

Household affluence was among the biggest determinants of supplemental feeding results. Children from middle- and high-income homes had considerably greater probabilities of attaining MMF, MDD, and MAD compared with children from impoverished households. These results are in line with earlier national and regional research that found home wealth to be a major factor influencing feeding and nutrition behaviors for children (13) (6) (8). Richer households are more likely to have access to a wider variety of foods, better medical care, and educational materials that promote healthy eating habits. However, children from affluent homes were less likely to continue nursing, which may indicate growing dependence on substitute milk products and commercially accessible diets.

Overall, the data imply that socioeconomic position, maternal characteristics, health service usage, and availability to information are key drivers of IYCF practices in rural Bihar. While prolonged breastfeeding and meal frequency remain reasonably high, nutritional diversity and minimum permissible diet continue to be key problems. Strengthening frontline worker outreach, expanding supplementary feeding counselling, boosting digital nutrition education, and enhancing family access to inexpensive nutritious foods may dramatically enhance child feeding behaviors and nutritional results in Bihar.

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Annexure 1

S. No	Respondent's Characteristics	Categories	description	values	Bihar N	n	%	LCL	UCL
1	Age of mother	<24		0	11226	5435	48.4144	47.4898	49.339
		25-34		1		5401	48.1115	47.1871	49.0359
		>=35		2		390	3.4741	3.1353	3.8129
2	Occupation of mother	employed		1	11226	679	6.0485	5.6074	6.4895
		unemployed		0		10547	93.9515	93.5105	94.3926
3	Education level of mother	Illiterate		0	11226	3415	30.4205	29.5693	31.2716
		Up to 8		1		2335	20.7999	20.049	21.5509
		Above 8		2		5476	48.7796	47.8548	49.7044
4	Religion	Hindu	Hindu	1	11226	9734	86.7094	86.0814	87.3375
		Muslim	Non-Hindu	0		1492	13.2906	12.6625	13.9186
		Christian							
		Jain							
		Buddhist							
		Sikh							
		Others							
5	Caste	SC	marginalized	1	11226	2758	24.568	23.7715	25.3644
		ST							
		OBC	Non marginalized	0		8468	75.432	74.6356	76.2285
		General							
6	Gender of child	male		0	11226	6020	53.6255	52.7029	54.5481
		female		1		5206	46.3745	45.4519	47.2971
7	Education level of father	Illiterate		0	11226	3647	32.4871	31.6206	33.3535
		up to 8		1		2144	19.0985	18.3713	19.8258
		above 8		2		5435	48.4144	47.4898	49.339
8	Occupation of father	employed		1	11198	10904	97.3745	97.0783	97.6707
		unemployed		0		294	2.6255	2.3293	2.9217
9	Wealth Index	Poor class		0	11226	3747	33.3779	32.5054	34.2503
		Middle class		1		3743	33.3422	32.47	34.2145
		Rich class		2		3736	33.2799	32.4081	34.1517

Annexure 2

S. No	Respondent's Characteristics	Categories	values	Bihar				
				N	n	%	LCL	UCL
1	Total no of children	1	0	11226	3375	30.0641	29.2158	30.9125
		2	1		3607	32.1308	31.2668	32.9947
		>=3	2		4244	37.8051	36.908	38.7022
2	FLW visit	no	1	11226	10055	89.5689	89.0033	90.1344
		yes	0		1171	10.4311	9.8656	10.9967
3	SMART phone user	no	0	11226	1939	17.2724	16.573	17.9718
		yes	1		9287	82.7276	82.0282	83.427
4	Currently breastfeeding	no	0	11226	1635	14.5644	13.9118	15.217
		yes	1		9591	85.4356	84.783	86.0882
5	Meal frequency	<3	0	11226	2164	19.2767	18.5469	20.0065
		>=3	1		9062	80.7233	79.9935	81.4531
6	Dietary Diversity	<4	0	11226	6497	57.8746	56.9611	58.7881
		>=4	1		4729	42.1254	41.2119	43.0389
7	Received any counselling on complementary feeding	no	0	11226	10246	91.2703	90.748	91.7925
		yes	1		980	8.7297	8.2075	9.252
8	Minimum acceptable diet	no	0	11226	7001	62.3642	61.4678	63.2605
		yes	1		4225	37.6358	36.7395	38.5322

Annexure 3

Var Name	Respondent's Characteristics	Categories	continued breast feeding (Ref:- No)			
			CBF			
			yes			
			AOR	LCI	UCI	p-value
M_AGE	Age of mother (Ref:- >=18)	19-25	1.122	0.994	1.267	0.0616
		>25 - <=35	1.232	0.868	1.748	0.2434
M_EDU	Education level of mother (Ref:- illiterate)	Literate	0.545	0.167	1.775	0.3138
OCC_M	Occupation of mother (Ref:- Unemployed)	employed	0.929	0.74	1.165	0.5223
RELIGION	Religion (Ref:- Non-Hindu)	Hindu	1.306	1.124	1.518	0.0005
CASTE	Caste (Ref:- Non Marginalised)	Marginalised	1.33	1.155	1.531	<.0001
GEN_CHILD	Gender of child (Ref:- Male)	female	0.858	0.771	0.954	0.0046
F_EDU	Education level of father (Ref:- Illiterate)	Literate	<0.001	<0.001	>999.999	0.9492
OCC_f	Occupation of father (Ref:- Unemployed)	employed	1.047	0.764	1.435	0.7742
tot_child	Total no of children (Ref:- 1 Child)	2	1.3	1.142	1.48	<.0001
		>2	1.754	1.507	2.042	<.0001
FLW_V	FLW visit (Ref:-No)	Yes	0.721	0.499	1.04	0.0804
cf_t	Received any counselling on complementary feeding (Ref:-No)	yes	1.494	0.994	2.246	0.0537
smartp	Smart phone user (Ref:-No)	yes	1.069	0.921	1.24	0.38
WI	Wealth Index (Ref:- Poor)	Middle class	0.896	0.778	1.03	0.1235
		Rich class	0.723	0.628	0.833	<.0001

Annexure 4

Var Name	Respondent's Characteristics	Categories	Minimum Meal Frequency (Ref:- No)			
			MMF			
			yes			
			AOR	LCI	UCI	p-value
M_AGE	Age of mother (Ref:- >=18)	19-25	1.311	1.174	1.463	<.0001
		>25 - <=35	1.451	1.094	1.923	0.0097
M_EDU	Education level of mother (Ref:- illiterate)	Literate	1.868	0.962	3.626	0.0648
OCC_M	Occupation of mother (Ref:- Unemployed)	employed	0.976	0.799	1.193	0.8133
RELIGION	Religion (Ref:- Non-Hindu)	Hindu	1.6	1.403	1.824	<.0001
CASTE	Caste (Ref:- Non Marginalised)	Marginalised	1.183	1.049	1.334	0.006
GEN_CHILD	Gender of child (Ref:- Male)	female	0.994	0.903	1.093	0.8977
F_EDU	Education level of father (Ref:- Illiterate)	Literate	1.105	0.305	4.003	0.8794
OCC_f	Occupation of father (Ref:- Unemployed)	employed	0.959	0.704	1.307	0.7926
tot_child	Total no of children (Ref:- 1 Child)	2	0.974	0.861	1.103	0.6792
		>2	0.87	0.76	0.996	0.0436
FLW_V	FLW visit (Ref:-No)	Yes	0.718	0.517	0.996	0.0471
cf_t	Received any counselling on complementary feeding (Ref:-No)	yes	2.939	2.003	4.311	<.0001
smartp	Smart phone user (Ref:-No)	yes	1.153	1.018	1.305	0.0246
WI	Wealth Index (Ref:- Poor)	Middle class	1.162	1.034	1.305	0.0116
		Rich class	1.444	1.273	1.639	<.0001

Annexure 5

Var Name	Respondent's Characteristics	Categories	Minimum Dietary Diversity (Ref:- No)			
			MDD			
			yes			
			AOR	LCI	UCI	p-value
M_AGE	Age of mother (Ref:- >=18)	19-25	1.074	0.983	1.173	0.1125
		>25 - <=35	1.121	0.896	1.403	0.3183
M_EDU	Education level of mother (Ref:- illiterate)	Literate	1.42	0.729	2.768	0.3032
OCC_M	Occupation of mother (Ref:- Unemployed)	employed	1.216	1.034	1.429	0.0179
RELIGION	Religion (Ref:- Non-Hindu)	Hindu	0.973	0.867	1.093	0.6449
CASTE	Caste (Ref:- Non Marginalised)	Marginalised	0.96	0.873	1.056	0.4045
GEN_CHILD	Gender of child (Ref:- Male)	female	1.015	0.94	1.097	0.699
F_EDU	Education level of father (Ref:- Illiterate)	Literate	0.485	0.164	1.432	0.1905
OCC_f	Occupation of father (Ref:- Unemployed)	employed	0.789	0.622	1.001	0.0508
tot_child	Total no of children (Ref:- 1 Child)	2	0.951	0.861	1.05	0.3225
		>2	0.956	0.857	1.067	0.4236
FLW_V	FLW visit (Ref:-No)	Yes	1.911	1.428	2.556	<.0001
cf_t	Received any counselling on complementary feeding (Ref:-No)	yes	1.527	1.112	2.097	0.009
smartp	Smart phone user (Ref:-No)	yes	1.218	1.095	1.356	0.0003
WI	Wealth Index (Ref:- Poor)	Middle class	1.369	1.241	1.509	<.0001
		Rich class	1.815	1.639	2.01	<.0001

Annexure 6

Var Name	Respondent's Characteristics	Categories	Minimum Acceptable Diet (Ref:- No)			
			MAD			
			yes			
			AOR	LCI	UCI	p-value
M_AGE	Age of mother (Ref:- >=18)	19-25	1.104	1.009	1.207	0.0312
		>25 - <=35	1.162	0.925	1.461	0.1976
M_EDU	Education level of mother (Ref:- illiterate)	Literate	1.738	0.843	3.584	0.1345
OCC_M	Occupation of mother (Ref:- Unemployed)	employed	1.247	1.059	1.469	0.008
RELIGION	Religion (Ref:- Non-Hindu)	Hindu	1.073	0.953	1.209	0.2445
CASTE	Caste (Ref:- Non Marginalised)	Marginalised	0.996	0.904	1.098	0.9408
GEN_CHILD	Gender of child (Ref:- Male)	female	1.02	0.943	1.103	0.6224
F_EDU	Education level of father (Ref:- Illiterate)	Literate	0.542	0.186	1.583	0.2627
OCC_f	Occupation of father (Ref:- Unemployed)	employed	0.86	0.676	1.093	0.2182
tot_child	Total no of children (Ref:- 1 Child)	2	0.951	0.859	1.052	0.3269
		>2	0.944	0.844	1.055	0.3076
FLW_V	FLW visit (Ref:-No)	Yes	1.652	1.235	2.209	0.0007
cf_t	Received any counselling on complementary feeding (Ref:-No)	yes	1.862	1.358	2.554	0.0001
smartp	Smart phone user (Ref:-No)	yes	1.227	1.099	1.369	0.0003
WI	Wealth Index (Ref:- Poor)	Middle class	1.317	1.191	1.456	<.0001
		Rich class	1.767	1.592	1.96	<.0001