

**COMPLEMENTARY FEEDING KNOWLEDGE AND PRACTICES AMONG
MOTHERS OF CHILDREN AGED 6-23 MONTHS IN BENIN CITY, NIGERIA**

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**BEING A ONE-YEAR PROJECT PRESENTED TO DEPARTMENT OF PUBLIC
HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, COLLEGE OF
MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE,
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THE UNIVERSITY OF BENIN, BENIN CITY**

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DEDICATION

This project is dedicated to God, for his grace and mercy granted to us from the beginning of this work to its conclusion.

We also dedicate it to our Parents and members of our families for their unwavering support, and to all the mothers who took part in this project.

DECLARATION

We hereby declare that this project work titled “Complementary feeding knowledge and practices among mothers of children aged 6-23 months in Benin” was conducted under the supervision of Prof. V.O Omuemu and has not been submitted anywhere else in part or in full for any purpose.

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CERTIFICATION

This is to certify that this research study titled “Complementary feeding knowledge and practices among mothers of children aged 6-23 months in Benin City, Nigeria” was carried out by Jamiu Iyanulolorun Adisa with matriculation number, MED1807354 and Joan Oghenerukevwe Agbaohwo with matriculation number MED1807355 under supervision of Prof. Vivian O. Omuemu in the Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

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LIST OF ABBREVIATIONS

ANC	Antenatal care
ARNS	Africa Regional Nutrition Strategy
AU	African Union
DHS	Demographic Health Survey
DQQ	Diet Quality Questionnaire
DSS	Dietary Diversity Score
EFF	Egg and/or Flesh Food Consumption
FAO	Food and Agricultural Organization
FMOH	Federal Ministry of Health
GAIN	Global Alliance For Improved Nutrition
ICFI	Infant and Child Feeding Index
IYC	Infant and Young Child
IYCF	Infant and Young Child Feeding
LGA	Local Government Area
LMICs	Low and Middle Income Countries
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MMF	Minimum Meal Frequency
MISC	Mother and Infant Study Cohort
NDHS	Nigeria Demographic Health and Survey
NFHS	National Family Health Survey

PAHO	Pan African Health Organization
PHC	Primary Health Care
PNC	Postnatal Care
SDGs	Sustainable Development Goals
SUN	Scaling Up Nutrition
SwB	Sweet Beverage Consumption
UFC	Unhealthy Food Consumption
UNICEF	United Nations Children’s Fund
WHO	World Health Organization
ZVF	Zero Vegetable and Fruit Consumption

DEFINITION OF TERMS

Complementary Feeding: the introduction of nutritionally adequate, and safe food around six months, with continued breastfeeding.

Exclusive Breastfeeding: a practice whereby the infants receive only breast milk without mixing it with water, other liquids, tea, herbal preparations or food in the first six months of life, with the exception of vitamins, mineral supplements or medicines

Minimum Acceptable Diet (MAD): percentage of children 6-23 months of age who;

- *for breastfed children:* received at least the minimum dietary diversity and minimum meal

frequency for their age during the previous day.

- *for non-breastfed children:* received at least the minimum dietary diversity and minimum

meal frequency for their age during the previous day as well as at least two milk feeds.

Minimum Dietary Diversity (MDD): percentage of children 6-23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day.

Minimum Meal Frequency (MMF): percentage of children 6-23 months of age who consumed solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) at least the minimum number of times during the previous day.

Sweet Beverage Consumption (Swb): percentage of children 6-23 months of age who consumed a sweet beverage during the previous day.

Unhealthy Food Consumption (UFC): percentage of children 6-23 months of age who consumed selected sentinel unhealthy foods during the previous day

ABSTRACT

BACKGROUND: Complementary feeding is a component of infant and young child nutrition, particularly between 6 and 23 months of age when nutritional needs increase beyond what breast milk alone can provide. Despite global and national recommendations, poor complementary feeding practices remain prevalent in many low- and middle-income settings, including Nigeria.

OBJECTIVES: This study assessed the knowledge and practices of complementary feeding among mothers of children aged 6–23 months in Benin city, Edo State, and factors associated with these outcomes.

METHODS: A descriptive cross-sectional study was conducted among 442 mothers of children aged 6–23 months selected using a multistage sampling technique. Data were collected using a structured, pretested, interviewer-administered questionnaire. Minimum meal frequency (MMF), minimum dietary diversity (MDD) and minimum acceptable diet (MAD) were determined using WHO criteria. Dietary diversity was assessed using a 24-hour recall method. Data were analyzed using IBM SPSS version 27. Associations were tested using Chi-square and Fischer’s exact test, and logistic regression was performed to identify predictors of good knowledge, practice and dietary diversity at $p < 0.05$ (95% CI).

RESULTS: The mean age of the mothers and index children were 32.3 ± 5.6 years and 14.6 ± 5.9 months respectively. Mothers’ knowledge assessment revealed that 32 (29.9%) of the mothers demonstrated good knowledge of complementary feeding. Knowledge was significantly higher among married women ($p < 0.001$), mothers with higher level of education ($p < 0.001$), higher

skill level ($p < 0.001$), higher household income ($p < 0.001$), more educated spouses ($p < 0.001$), spouses with higher skill level ($p < 0.001$), older index child ($p = 0.012$), and those with more children ($p = 0.034$). Being married and having higher education were significant predictors of good knowledge ($OR = 20.767$, $p = 0.004$; $OR = 4.438$, $p < 0.001$). Mothers who demonstrated good practice were 41 (10.1%), MMF was 48.2%, and MAD was 19.0%. Good practice was significantly higher among married mothers ($p = 0.009$), mothers with higher education ($p < 0.001$), higher skill levels ($p < 0.001$), higher household income ($p = 0.008$), more educated spouses ($p < 0.001$), spouses with higher skill level ($p < 0.001$), older index child ($p < 0.001$), and higher complementary feeding knowledge level ($p < 0.001$). Having an older index child and higher education were significant predictors of good practice ($OR = 0.335$, $p = 0.021$; $OR = 3.767$, $p = 0.001$). A total of 167 (41.3%) of respondents' children consumed five or more of the recommended food group in the last 24 hours, and MDD was 37.8%. Dietary diversity was significantly higher in older mothers ($p = 0.033$), those married ($p = 0.034$), with more educated spouses ($p = 0.002$), higher household income ($p = 0.003$), better socioeconomic status ($p = 0.033$) and older index child ($p < 0.001$). Mothers with lower socioeconomic status were less likely to have good practice ($OR = 0.402$, $p = 0.018$) and those with an older index child were more likely ($OR = 4.075$, $p < 0.001$).

CONCLUSION: Majority of the mothers had poor knowledge and practice of complementary feeding and a majority of children had poor dietary diversity. Targeted nutrition education focusing on simplifying complementary feeding guidelines and interventions to support local food production in order to improve dietary diversity are recommended.

KEYWORDS: Complementary feeding, Minimum dietary diversity, Minimum meal frequency, Minimum acceptable diet

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Optimal infant and young child feeding (IYCF) means exclusively breastfeeding for the first six months of life, followed by the initiation of appropriate complementary foods while continuing to breastfeed until at least two years or beyond.¹ Complementary feeding starts when breast milk alone can no longer supply all the nutritional requirements of the infant, making it necessary to introduce additional foods. This period typically spans from 6 to 23 months of age, although breastfeeding may extend beyond two years.²

The first two years of a child's life, especially the period from 6-23 months of age is a critical period of rapid growth and development during which infants are at high risk of nutrient deficiencies. During this time, optimal complementary feeding practices play an essential role in supporting the child's nutritional needs.^{3,4} Complementary feeding ensures the supply of vital micro-nutrients such as iodine, iron, zinc and vitamins, as breastmilk alone can no longer sufficiently meet the requirements necessary for the overall health of the child.

Complementary feeding plays significant role in preventing all forms of malnutrition. When given in the right way and the right amount, it reduces the incidence of undernutrition, overnutrition and micronutrient deficiencies.⁵ Inappropriate complementary feeding can lead to growth stunting and wasting. This is particularly prevalent in Low and Middle Income Countries (LMICs) where access to diverse and nutrient-rich food is limited. According to the 2023-2024 Nigeria Demographic Health and Survey (NDHS), the prevalence of malnutrition in Nigeria remains high, as 40% of children under five were stunted, 8% wasted and 27% underweight.⁶

Complementary feeding help monitor and balance calorie intake, thereby reducing the risk of obesity which can occur in children fed food high in sugar and saturated fat.⁵ The NDHS reported that about 1% of Nigerian under-fives were considered overweight.⁶ Micronutrient deficiencies like iron deficiency anemia or Vitamin A deficiency are also preventable with optimal complementary feeding.

Appropriate complementary feeding is directly linked to improved immunity. The complementary foods introduced contain a variety of micro and macro nutrients which fortifies their immune system, and enable them resist infections and allergies.^{5,7} Studies have shown that children who receive appropriate complementary feeding experience fewer cases of diarrhea, pneumonia and other respiratory diseases common to children.⁵ Early introduction of complementary foods can improve child's tolerance to food, and lower the risk of developing allergies later in life.

Proper complementary feeding also supports cognitive development. Studies have shown that children who receive adequate nutrition early perform better in school, have sharper memories and exhibit better problem-solving skills. Beyond cognitive benefits, early exposure to a variety of food, with different taste, texture and flavor helps children develop good eating habits and establish health food preferences. This reduces the tendency of picky eating and food aversions.

^{5,8}

Despite the established benefits of optimal complementary feeding, many families across the world still struggle to adopt the practice of optimal complementary feeding. Several challenges prevent caregivers from providing quality nutrition to their children, ultimately impacting the child's health. A key challenge is limited access to nutrient-rich foods due to poverty and food

insecurity.⁹ Many families rely on staple foods like rice and maize, which lack essential vitamins and minerals such as iron, vitamin A, and zinc, leading to micronutrient deficiencies. Additionally, poor dietary diversity further exacerbates malnutrition, as many caregivers lack awareness of the importance of balanced meals.¹⁰ Some introduce solid foods too early, leading to digestive issues, while others delay complementary feeding, increasing the risk of undernutrition and developmental delays. The rise in processed foods also poses a threat. Many commercially available complementary foods are high in sugar, salt, and unhealthy fats, leading to childhood obesity and long-term health risks.^{9,10} Coupled with poor hygiene and unsafe food preparation, contaminated water and inadequate sanitation contribute to infections that impair nutrient absorption and overall growth. Socioeconomic and cultural factors further complicate complementary feeding. Financial constraints often force families to prioritize adult nutrition over infant feeding. In some communities, traditional beliefs restrict nutrient-rich foods such as meat, eggs, or fish, leading to preventable deficiencies.⁹ Additionally, working mothers face difficulties maintaining proper feeding schedules due to inadequate maternity leave and workplace support, increasing reliance on formula or processed foods. Environmental challenges, including climate change and food scarcity, further reduce access to fresh, nutrient-dense foods.

In recognition of the critical role of complementary feeding in a child's growth and development, both global, regional and local bodies have taken action to promote optimal IYCF practices. The global organizations play an essential role in advancing complementary feeding practices through nutrition education, policy development, food fortification and financial assistance. Among the notable global organizations includes World Health Organization (WHO), United

Nations Children's Fund (UNICEF), Food and Agricultural Organization (FAO), Global Alliance for Improved Nutrition (GAIN), Scaling Up Nutrition (SUN).

The World Health Organization (WHO) provides evidence-based nutrition guidelines and recommendations. Through the Global Infant and Young Child Feeding (IYCF) Strategy, it ensures infants and young children receive timely, adequate, safe and properly fed complementary foods. In addition, the strategy promotes maternal and caregiver support, local food production, and food fortification.¹¹ UNICEF works closely with WHO and other partners to combat child malnutrition, leading initiatives like the Global Complementary Feeding Collective and food fortification programs. It also runs nutrition education campaigns, informing caregivers with better feeding practices.^{11,12} The Food and Agriculture Organization (FAO) enhances food security and sustainable agriculture, helping families access nutrient-rich foods. It also supports community-based nutrition programs and provides country-specific dietary guidelines. GAIN (Global Alliance for Improved Nutrition) partners with the private sector to produce and distribute fortified complementary foods. It also promotes workforce nutrition programs, ensuring working mothers can continue appropriate infant feeding. The SUN (Scaling Up Nutrition) strengthens national policies on complementary feeding, ensuring collaboration and accountability between public and private sector to improve food availability.¹²

Regional and national organizations also play a crucial role in promoting complementary feeding practices at a local level. Their interventions are tailored to ensuring that caregivers have access to nutritious complementary foods, proper feeding education, and healthcare support.

The African Union (AU) has integrated maternal and child nutrition into its Africa Regional Nutrition Strategy (ARNS). The AU's ARNS provides a framework for addressing malnutrition

from 2015 to 2025. This framework provides guidance to member states on implementing nutrition-sensitive policies, supporting biofortification of staple foods, and strengthening complementary feeding programs at the community level.¹³

In Nigeria, the Federal Ministry of Health (FMOH) leads the National Policy on Infant and Young Child Feeding (IYCF), which aims to ensure the optimal growth, protection and development of the Nigerian child from birth to the first five years of life.¹⁴ Additionally, the Micronutrient Fortification Initiative by the Nigerian government ensures that staple foods such as flour, salt, and vegetable oil are fortified with essential vitamins and minerals.

The efforts of international organizations and governments in promoting optimal complementary feeding align with several Sustainable Development Goals (SDGs).¹⁵ One of the most significant goals related to complementary feeding is SDG 2: Zero Hunger, which seeks to end all forms of malnutrition and ensure adequate nutrition for children under five. Additionally, SDG 3: Good Health and Well-being focuses on reducing preventable child mortality, which is often linked to malnutrition and infections.

Beyond physical health, complementary feeding also contributes to SDG 4: Quality Education, as proper nutrition in early childhood supports brain development, cognitive function, and learning capacity. Children who receive the right nutrients during their formative years perform better in school and have higher educational attainment, ultimately leading to better life opportunities. Furthermore, SDG 5: Gender Equality recognizes the important role of mothers and caregivers in infant feeding. By providing education and support for complementary feeding, governments and organizations empower women to make informed nutrition choices, improving both child and maternal well-being.

Clean Water and Sanitation (SDG 6) is highly relevant to complementary feeding. Safe food preparation and hygienic feeding practices reduce the risk of diarrhea, malnutrition, and foodborne illnesses, which are common among young children in low-resource settings. Additionally, the long-term impact of complementary feeding extends to SDG 8: Decent Work and Economic Growth, as well-nourished children grow into healthy, productive adults who contribute to economic development.¹⁵

1.2 STATEMENT OF THE PROBLEM

Globally, the prevalence of appropriate complementary feeding knowledge and practice remains low. In 2017, the global prevalence of timely initiation of complementary feeding was 64.5%.¹⁶ According to the 2023 UNICEF Expanded Global Database, the percentages of children aged 6-23 months globally that met the minimum appropriate diet, minimum dietary diversity and minimum meal frequency were 21%, 34% and 51% respectively.¹⁷

In Africa, only 11% of children aged 6-23 months met the minimum acceptable dietary requirement. Minimum dietary diversity was met by 25% and the required minimum meal frequency met by 37% of children aged 6 – 23 months.¹⁷

In Nigeria data from the 2023-24 Demographic and Health Survey shows poor performance in the joint WHO and UNICEF indicators for assessment of appropriate complementary practices. More than 50% of infants are given complementary food too early which is usually of poor nutritional value.⁶ Only 12.4% of children aged 6-23 months met the minimum dietary diversity while sweet beverage and unhealthy food consumption were at 41.2% and 23.7% respectively.⁶

Interventions such as education about complementary feeding, provision of fortified foods and use of simple technologies to increase nutrient bioavailability in complementary foods have

aimed at improving the knowledge and practice of appropriate complementary feeding among mothers of children aged 6-23 months globally.¹⁸ However factors such as poverty, food insecurity, maternal ill health, low household income and maternal level of education contribute to continued low levels of appropriate complementary feeding worldwide.¹⁹

Despite various nutrition related policies and interventions in Nigeria, such as Baby Friendly Initiatives (BFI) and the Nigeria National Policy on Infant and Young Child Feeding (IYCF), several variations in the pattern, timing, quality, and quantity of complementary foods have been observed in studies on complementary feeding among mothers in different regions in the country.²⁰ Studies have reported timely introduction of complementary feeding among respondents in Cross River, South-South Nigeria to be 85.4%, while 52.4% of respondents in Sokoto North-West Nigeria introduced complementary foods before 6 months.^{21,22} Minimum acceptable diet and minimum meal frequency were 9.2% and 33.6% in a study done in Ogun state. In Cross Rivers, minimum acceptable diet and minimum meal frequency were 7.3% and 36.7%.^{23,21}

Inappropriate complementary feeding practices may result in malnutrition in childhood. This remains a major public health concern, especially in developing countries where poor child feeding practices and high prevalence of common diseases in childhood such as diarrhoea, malaria, pneumonia exert a serious negative impact on health outcomes. Consequently, almost half (45%) of mortalities among children aged under five years are associated with undernutrition and children in sub-Saharan Africa are over 15 times more likely to die before the age of five than children in developed regions.²⁴

Undernutrition causes stunting, underweight and wasting. The most recent UNICEF-WHO-World Bank Group Joint Child Malnutrition Estimates indicates that stunting affects 22.3% (148 million), wasting affects 6.8% (45 million), and overweight affects 5.6% (37 million) of children under five years globally. Africa accounts for 43%,27%,28% of the global rates of stunting, wasting and overweight respectively.²⁵ In Nigeria 40% of children aged below five years are stunted, 8% are wasted, 27% are underweight, and 1% overweight.⁶

Inappropriate complementary feeding can also result in overweight, type 2 diabetes, increased risk of noncommunicable diseases (NCDs), and disability in adulthood. Other consequences of malnutrition during these formative years are delayed motor, cognitive, and socioemotional development. In the long term, early childhood undernutrition leads to reduced work capacity and earnings and, among girls, reduced reproductive capacity which contributes to poverty and slows national development.^{26,24} Hence timely and appropriate complementary feeding practices not only regulate growth and functional development in childhood but also appear to play a crucial role in lifelong programming effects that regulate health, disease, mortality risks, neural function and behaviour, and quality of life in adulthood.²⁷

1.3 JUSTIFICATION

Appropriate complementary feeding is essential to meet the nutritional requirements of children between the ages of 6-23 months. This developmental period coincides with the peak period for risk of growth faltering, nutrient deficiencies, and the long-term effects of malnutrition.²

Previous studies have assessed the prevalence of timely complementary feeding introduction and its adequacy in Egor LGA of Edo state.²⁸ While the Nigerian National Policy on Infant and Young Child Feeding was last updated in 2010, ¹⁴ the WHO guidelines on Complementary

feeding and the joint WHO-UNICEF Indicators for assessing infant and young child feeding practices have been revised after these studies, updated WHO guidelines and WHO-UNICEF indicators were published in 2023 and 2021 respectively.¹¹ The purpose of this study is therefore to assess complementary feeding knowledge and practice among mothers of children 6-23 months in Benin City using the revised guidelines and indicators.

This study will also help to identify the factors that affect the knowledge and practice of complementary feeding among mothers and the dietary diversity among children aged between 6-23 months in Benin City. This will aid in developing strategies to address gaps in improving the adequacy of complementary feeding among mothers in Benin City.

1.4 RESEARCH QUESTIONS

1. What knowledge do mothers of children aged 6-23 months in Benin City possess regarding complementary feeding?
2. What factors are associated with the knowledge of complementary feeding among mothers of children aged 6-23 months in Benin City?
3. What are the complementary feeding practices among mothers of children aged 6-23 months in Benin City?
4. What factors influence mothers' complementary feeding practices in Benin City?
5. What is the dietary diversity pattern among children aged 6-23 months in Benin City?
6. What factors are associated with dietary diversity among children aged 6-23 months in Benin City?

1.5 RESEARCH OBJECTIVES

1.5.1 General objectives

To assess the knowledge and practices of complementary feeding among mothers of children aged 6-23 months in Benin City.

1.5.2 Specific objectives

This study sets to achieve the following objectives

1. To assess the knowledge of complementary feeding among mothers of children aged 6-23 months in Benin City
2. To identify the factors associated with the knowledge of complementary feeding among mothers of children aged 6-23 months in Benin City
3. To ascertain the complementary feeding practices among mothers of children aged 6-23 months in Benin City
4. To identify the factors that influence the mothers' complementary feeding practice in Benin City
5. To determine the dietary diversity pattern among children aged 6-23 months in Benin City
6. To identify the factors associated with dietary diversity among children aged 6-23 months in Benin City

CHAPTER TWO

LITERATURE REVIEW

The nutritional status and overall wellbeing of infants and young children is directly influenced by maternal knowledge and practices of complementary feeding, as well as the dietary diversity pattern of the children. According to global policies from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), the standard of knowledge expected from mothers regarding complementary feeding involves several key principles.^{1,2}

Firstly, complementary foods should be introduced at six months of age while continuing breastfeeding up to at least two years. This transition should be timely and appropriate to ensure that the infant receives adequate nutrients beyond what breastmilk alone can provide. The types of food to be introduced must be nutrient-dense and age-appropriate, with food consistency progressing from soft purees to semi-solid and eventually small pieces of solid food as the child develops chewing and swallowing skills.^{2,11}

Furthermore, meal frequency and portion sizes must be tailored to the child's age. Infants aged 6–8 months should be fed two to three times daily, increasing to three to four meals per day by 9–24 months, supplemented with nutritious snacks as needed.

In addition, proper hygiene and food safety practices are essential in preventing infections and ensuring food quality. Mothers should be knowledgeable about safe food preparation, handwashing, and proper storage to minimize the risk of contamination. Responsive feeding, characterized by patience and attentiveness to a child's hunger and satiety cues, is also a crucial aspect of effective complementary feeding. A supportive feeding environment, free from distractions, encourages healthy eating habits and strengthens the caregiver-child bond.^{2,11}

In 2021, the World Health Organization revised its Infant and Young Child Feeding (IYCF) indicators to better assess and monitor the quality of complementary feeding practices for children aged 6 to 23 months. These updated indicators are designed to reflect both the adequacy and appropriateness of the child's diet during this critical stage of growth.²⁹

Among the eight core indicators, the first is the introduction of solid, semi-solid or soft foods, which measures whether children aged 6 to 8 months have started receiving complementary foods alongside breastmilk, as recommended. The minimum dietary diversity (MDD) indicator assesses whether a child has consumed foods from at least five out of eight defined food groups in the previous day, highlighting the variety and nutritional quality of the diet. The minimum meal frequency (MMF) measures whether a child is being fed the appropriate number of times per day, considering age and breastfeeding status. When both diversity and frequency are met, the minimum acceptable diet (MAD) indicator is achieved, reflecting a combination of quality and quantity in complementary feeding.²⁹

Further, the updated core indicators include egg and/or flesh food consumption (EFF), which checks whether the child consumed animal-source protein, a key source of iron and essential nutrients. To monitor poor feeding habits, the indicators also assess the consumption of sweet beverages (SwB) and unhealthy foods (UFC) such as sugary snacks or fried foods high in unhealthy fats. Another crucial measure is the zero vegetable or fruit consumption (ZVF) indicator, which flags children who had no fruit or vegetable intake the previous day—an important red flag for micronutrient deficiencies. These indicators are essential tools for identifying complementary feeding practices that may contribute to malnutrition.²⁹

In Nigeria, the Federal Ministry of Health developed the National Policy on Infant and Young Child Feeding in 2005, and revised it in 2010. The policy outlines core principles, objectives, key stakeholders, and strategies to ensure optimal growth, protection, and development of the Nigerian child from birth up to the first five years of life. ^{6,14}

The guiding principles of frequency, adequacy, density, utilisation, and safety (FADUS) of the complementary food was adopted to achieve optimal complementary feeding of children up to the age of 24 months. This ensures that children aged 6-23 months are fed an appropriate variety of complementary foods sufficient to meet their energy and nutrient needs with a gradual increase in food density as often as the child requires. It also ensures that foods are hygienically stored, prepared and fed. Complementary foods should also be provided in a manner that can be easily digested and absorbed. ^{6,14}

Strategies employed by the policy to accomplish its goal include Legal, gender and cultural considerations, advocacy and social mobilisation, Information Education and Communication (IEC), capacity building and development, counselling and support services, research, monitoring and evaluation, supervision, and coordination. In line with these strategies various programs and initiatives have been implemented targeting the introduction of appropriate, diverse, and nutrient-rich foods to children starting at six months of age while continuing breastfeeding. ^{6,14}

An example is the implementation of the Community Infant and Young Child Feeding (C-IYCF) Counselling Package in Kajuru Local Government Area of Kaduna State in 2014. Health workers and community volunteers were trained to deliver key messages and support caregivers on optimal complementary feeding practices, such as meal frequency, dietary diversity, and

hygienic food preparation. This intervention led to improved caregiver knowledge and better complementary feeding behaviors within the community.³⁰ In Jigawa and Katsina States, complementary feeding messages were integrated into Community-Led Total Sanitation (CLTS) programs as part of the UNICEF supported Federal Government of Nigeria Water, Sanitation and Hygiene Program (2014-2017). This strategic integration aimed not only to address poor hygiene but also to promote practical feeding solutions for infants, including the use of locally available and affordable nutrient-dense foods. The approach fostered increased awareness of optimal feeding practices and emphasized sanitation during food preparation, thereby supporting more holistic child health outcomes.³¹

Research and evaluation by various stakeholders have also informed the development and targeting of complementary feeding interventions. Studies conducted across rural and urban areas in Nigeria have revealed significant gaps in complementary feeding practices, including low dietary diversity and inadequate feeding frequency. These findings have been instrumental in designing evidence-based nutrition programs, such as recipe demonstrations and educational sessions that utilize culturally familiar and nutritious food options.³²

This section aims to review relevant existing literature, with a focus on scrutinizing current findings, and identifying research gaps. By critically examining these studies, we seek to uncover areas that require further exploration and lay the groundwork for our research-ultimately deepening our understanding on the factors that influence mother's knowledge and practices of complementary feeding, as well as the dietary diversity pattern of children aged 6-24 months in Benin City.

2.1 KNOWLEDGE OF COMPLEMENTARY FEEDING AMONG MOTHERS OF CHILDREN AGED 6-23 MONTHS

A cross-sectional study was carried out among 250 mothers in Kathmandu Medical College and Teaching Hospital, in Nepal from June to November 2019. Convenient sampling method was applied and the mothers of children between 6 to 24 months were interviewed using a structured questionnaire to ascertain the knowledge, attitude, and practices regarding complementary feeding. Among the 250 respondents, findings revealed that 161 (64.4%) mothers knew the proper age of initiating complementary feeding and 172 (68.8%) knew that complementary food should be given thrice a day. One limitation of the study was its use of convenience sampling, which could result in selection bias and reduce the validity of the findings.³³

A cross-sectional descriptive observational study was conducted between October and December 2022 in a rural community in Ecuador. The objective was to investigate the association between caregivers' knowledge, attitudes, and practices of complementary feeding and the nutritional status of children aged 6 to 23 months attending the Camilo Ponce Enriquez Health Center. The study population included caregivers of 137 children. Convenience sampling was used. Data were collected using a self-administered, interviewer-supported KAP survey developed by the Food and Agriculture Organization (FAO).

Findings related to the knowledge of complementary feeding showed that 77.89% of caregivers had adequate knowledge about complementary feeding. Specifically, 86.86% of the caregivers knew that complementary feeding should begin at six months of age. Furthermore, 98.55% of caregivers correctly recognized that complementary feeding should be introduced because breast milk alone becomes insufficient after six months. However, knowledge regarding the

recommended duration of breastfeeding was lower; only 20.44% of caregivers knew that breastfeeding should continue until 24 months of age or beyond.

A limitation to the study was the use of convenience sampling method, which limits the generalizability of the study findings. Additionally, the self-administered format of the survey, even though supported by interviewers, may have introduced information bias due to possible misinterpretation of questions by respondents.³⁴

A cross-sectional study was done among primary caregivers of children aged 6–23 months in Education institutions across several provinces in China from March to April 2023. The study aimed to assess both the children's and caregivers' feeding knowledge and practices. A convenience sampling was used to recruit 2731 children and their caregivers. Using a self-administered questionnaire, the study found that for the feeding knowledge, less than 20% of caregivers believed that children should be continued breastfeeding at two years or above, and less than half (46.6%) of the caregivers knew that children should be introduced to complementary feeding at six months. The use of convenience sampling method is a key limitation of the study, as it could lead to selection bias and reduce the validity of the findings.³⁵

A cross-sectional mixed-methods study conducted in 2019 in the Vakinankaratra region of Madagascar assessed maternal knowledge of complementary feeding among 391 mothers with children aged 6 to 23 months. Participants were selected using a multi-stage cluster sampling method, and data were collected through interviewer-administered questionnaires and focus group discussions. Findings revealed an average maternal knowledge score of 6.4 out of 11. While most mothers knew several recommended practices, only 23.3% correctly identified the feeding frequency for children aged 9–23 months, and fewer than half knew that vegetables

should be given daily. One key limitation of the study was that the use of self-reported data may have introduced recall and social desirability bias.³⁶

A cross-sectional descriptive study conducted between January and February 2019 in Laisamis Sub-county, Marsabit County, Kenya, investigated the relationship between complementary feeding practices and the nutritional status of children aged 6 to 23 months. The study involved 289 mothers, selected using a two-stage cluster sampling technique. Data were collected through interviewer-administered structured questionnaires aligned with WHO infant and young child feeding indicators. Regarding knowledge, 79.2% of mothers correctly identified six months as the appropriate age to begin complementary feeding. However, knowledge about feeding during illness and recovery was lower, with only 61.6% aware that feeding frequency should be increased during such periods. Understanding of dietary diversity and the role of nutrient-dense foods was also limited, pointing to gaps in comprehensive knowledge of complementary feeding. A key limitation of the study was the reliance on self-reported data may have introduced recall bias and social desirability bias.³⁷

A cross-sectional study conducted in the Kpandai District of Northern Ghana in 2020 assessed maternal knowledge of complementary feeding among mothers and caregivers of children aged 6 to 23 months. Purposive sampling was used to select participants. Data were collected using interviewer-administered structured questionnaires. Findings showed that 72% of respondents correctly identified six months as the appropriate age to introduce complementary foods. Eighty-four percent knew the appropriate consistency of meals to give children, though only 27.5% could explain that thicker porridge is more nutritious due to food diversity. Additionally, 81% had knowledge of ways to encourage young children to eat. Overall, 52% of them were categorized as having a high level of knowledge based on their scores. A limitation of the study

was the use of purposive sampling, which may have introduced selection bias and limited the representativeness of the findings. Furthermore, the reliance on self-reported data introduces concerns about recall bias.³⁸

A cross-sectional study was conducted between February and April 2022 in Dar-es-Salaam, Tanzania, to assess the knowledge and practices of complementary feeding among nursing mothers of children aged 6–24 months. A sample size of 422 was determined and multistage sampling technique was employed for participant selection. Data was collected through an interviewer-administered structured questionnaire.

Findings related to knowledge of complementary feeding showed that 41.9% of mothers were aware of the correct timing for initiating complementary feeding. Additionally, 26.1% had knowledge of iron-rich foods, 19.9% had knowledge about the addition of iodized salt to food, and 30.6% had knowledge about dietary diversity. Furthermore, 71.8% of mothers believed that breastfeeding enhances the mother-child bond, and 55.9% believed that breastfeeding can prevent diseases. Approximately 75.1% of respondents identified healthcare providers as their main source of information regarding complementary feeding.

Although multistage sampling was used, the initial selection of the Dar-es-Salaam region was done conveniently, which could introduce selection bias.³⁹

A cross-sectional study done in Eti-Osa Local Government Area, Lagos State, Nigeria in 2017, aimed to assess maternal knowledge and practices of complementary feeding among 355 mothers of children under five years old. Participants were selected using a multi-stage sampling technique, and data were collected through interviewer-administered questionnaires. The study found that while 72.4% of respondents correctly defined complementary feeding and 61.1%

knew it should be introduced at six months, only 25.4% had correct knowledge of when breastfeeding should stop. Additionally, 72.1% knew that breastfeeding should continue on demand after the introduction of complementary foods. However, knowledge about the minimum daily feeding frequency was low, with only 29.6% knowing that children aged 6 - 8.9 months should be fed at least twice daily, and 45.9% and 63.6% correctly identifying the required frequency for children aged 9–12 months and above 12 months, respectively. Although 61.7% knew that fortified local foods are ideal for infants, less than half (47.0%) were aware that late introduction of complementary feeding could lead to malnutrition. Most respondents (82.5%) knew the appropriate utensils for feeding. Despite these pockets of awareness, only 14.9% of mothers had overall good knowledge of complementary feeding. A limitation of the study was the inclusion of mothers with children up to five years, which may have introduced recall bias regarding feeding practices during infancy.²⁴

Between March and May 2022, a cross-sectional study was conducted in Osun State, Nigeria. It assessed maternal nutrition literacy and its relationship with complementary feeding practices among 407 nursing mothers of children aged 6 to 23 months. Participants were selected using a multi-stage sampling technique, and data were collected using structured interviewer-administered questionnaires. Findings showed that only 19.2% of mothers had good knowledge of the timely introduction of complementary feeding, while 80.8% had poor knowledge. On the other hand, knowledge of food diversification was relatively strong where over three-quarters of respondents agreed that fruits and vegetables protect infants from disease, and that animal-based foods like milk and liver help with bone development and iron status. Overall, 19% of respondents had low nutrition literacy, 75% had medium, and just 6% had high literacy levels. A major limitation of the study is that while the study used interviewer-administered questionnaires,

the self-reported nature of the responses may have introduced social desirability and recall bias. Additionally, since the study was conducted in only one region of Osun State, which might not be fully representative of the entire state population or other states.⁴⁰

2.2 FACTORS ASSOCIATED WITH THE KNOWLEDGE OF COMPLEMENTARY FEEDING

A cross-sectional study conducted from May to July 2013 across various regions of Kosovo assessed the knowledge, attitudes, and practices of mothers with children aged 6 to 24 months regarding complementary feeding. Among 492 mothers who participated through interviewer-administered questionnaires, the study found significant distinctions according to mothers' education levels. Among mothers with higher education, 96% correctly defined complementary feeding as the act of giving foods and liquids other than breast milk. Additionally, 61.9% of mothers with high school education identified six months as the appropriate time to begin complementary feeding. Furthermore, according to age group, those mothers aged 40 years and above showed a statistically significant level of knowledge regarding the feeding recommendations for babies aged 6 to 8 months. Specifically, 73.3% of mothers aged 40+ correctly agreed or responded that "A breastfed baby between 6 to 8 months should receive 2 to 3 solid meals per day and 1 to 2 snacks between meals". In essence, the study reported significant association between knowledge of mothers for complementary feeding according to the level of education as well as for older mothers. A key limitation of the study was the absence of a clearly defined sampling method, which raises concerns about the representativeness of the findings.⁴¹

A cross-sectional mixed-methods study conducted in 2019 in the Vakinankaratra region of Madagascar assessed maternal knowledge of complementary feeding among 391 mothers with

children aged 6 to 23 months. Participants were selected using a multi-stage cluster sampling method, and data were collected through interviewer-administered questionnaires and focus group discussions. From the focus group discussion, it was found that higher knowledge regarding complementary feeding was associated with receiving information from multiple sources, especially community nutrition agents and health workers, which accounted for 69% of responses. Media exposure also appeared to influence knowledge, although 56.1% of mothers had not listened to the radio in the past week. Qualitative findings identified maternal workload, time constraints, and cultural beliefs—such as avoiding eggs and legumes before age one—as barriers to acquiring and applying feeding knowledge. A key limitation of the study was that the use of self-reported data introduced the risk of recall and social desirability bias, and the regional focus of the study may limit its generalizability to other parts of the country.³⁶

A baseline cross-sectional study was conducted from March 1 to April 3, 2022, in Maji Woreda, West Omo Zone, Ethiopia, as part of a larger cluster-randomized controlled trial. The objective was to assess the determinants of knowledge, attitude, and self-efficacy towards complementary feeding among rural mothers of children aged 0 to 24 months. A total of 516 mothers participated, divided equally into intervention (258) and control (258) groups. Participants were selected through multistage sampling, followed by systematic random sampling within clusters. Data were collected using an interviewer-administered structured questionnaire. The study revealed that maternal educational status, the number of antenatal care (ANC) visits, and receipt of information on complementary feeding were statistically significant predictors of better knowledge. Mothers with secondary education or higher were significantly more likely to demonstrate good knowledge of complementary feeding practices. Having a female child and attending four or more ANC visits were positively associated with favorable attitudes toward

complementary feeding. A key limitation of the study was the use of self-reported data, which may have introduced social desirability bias. Additionally, since the data represent a baseline assessment before intervention implementation, causal inferences cannot be drawn from the associations observed.⁴³

In 2017, a cross-sectional study conducted in Eti-Osa Local Government Area, Lagos State, Nigeria, aimed to assess maternal knowledge and practices of complementary feeding among 355 mothers of children under five years old. Participants were selected using a multi-stage sampling technique, and data were collected through interviewer-administered questionnaires. The study identified several factors significantly associated with higher maternal knowledge. Mothers who were older, married, and had higher levels of education were more likely to have better knowledge of complementary feeding. Employment type was also linked to knowledge, with mothers in non-manual jobs demonstrating greater awareness. A limitation of the study was the inclusion of mothers with children up to five years, which may have introduced recall bias regarding feeding practices during infancy.²⁴

2.3 COMPLEMENTARY FEEDING PRACTICES AMONG MOTHERS

A cross-sectional study was conducted between August and December 2018 in Bhimphedi Rural Municipality of Nepal to assess complementary feeding practices and their determinants among mothers of children aged 6–23 months. The study population comprised mothers residing in the municipality for at least one year who had children within the specified age group. A total of 259 mothers were randomly selected from a pool of 714 eligible participants using a probability-based random sampling technique. Data collection was carried out using a structured, interviewer-administered questionnaire via face-to-face interviews, conducted using the Open Data Kit (ODK) mobile application on tablet phones. The questionnaire gathered information on

feeding practices in line with WHO indicators, including timely introduction of complementary foods, minimum meal frequency (MMF), and minimum dietary diversity (MDD). Findings revealed that only 25% of the mothers practiced appropriate complementary feeding as defined by the composite indicator. While 82% initiated complementary feeding between 6–8 months, only 71% met the MMF, 37% met the MDD, and 27% met the criteria for the minimum acceptable diet (MAD). A major limitation of this study was the reliance on a 24-hour recall method for dietary assessment, which could introduce recall bias. Additionally, although sampling was randomized, the relatively small sample size might limit the generalizability of the findings to broader populations. ⁴⁴

A cross-sectional study carried out in India between 2019 and 2021 analyzed the association between mass media exposure and complementary feeding practices among mothers of children aged 6 to 24 months. The study utilized data from the National Family Health Survey 5 (NFHS-5) and included a nationally representative sample of 122,458 women aged 15–49 years who had given birth in the preceding 36 months. The sampling technique was a stratified two-stage cluster design, ensuring representation across urban and rural settings. Data collection was interviewer-based using structured questionnaires and findings revealed that only 45.9% of mothers of children aged 6–8 months had timely introduced complementary foods, and just 11% of breastfed children aged 6–23 months were provided with a minimum acceptable diet (MAD). A key limitation of the study is that self-reported data may have introduced recall and social desirability biases. ⁴⁵

A cross-sectional descriptive study was conducted between September and December 2023 in Turkey to assess complementary feeding practices among children aged 6–23 months using the 2021 WHO Infant and Young Child Feeding (IYCF) indicators. The study population comprised

mothers aged 18 and above who had children within the 6–23 months age range. A total of 572 mother–child pairs were included. The sampling technique used was snowball sampling, primarily through social media and WhatsApp groups. Data collection was done via a self-administered online questionnaire, which included sections on sociodemographic characteristics and the Turkish Health Literacy Scale-32 (TSOY-32). Findings revealed that all children had started complementary feeding by 6–8 months. However, only 69.8% met the Minimum Dietary Diversity (MDD), 78.1% met the Minimum Meal Frequency (MMF), and 58.9% achieved the Minimum Acceptable Diet (MAD). Egg and/or flesh food consumption (EFF) was reported in 87.1% of the children, while 21.7% had zero vegetable or fruit consumption (ZVF), 21.9% consumed unhealthy foods (UFC), and 5.6% consumed sweet beverages (SwB). Bottle feeding was prevalent among 42.5% of the children. The use of convenience sampling through online platforms may have introduced selection bias by excluding less tech-savvy or lower-educated mothers. Additionally, the relatively high education level among respondents may limit generalizability to the entire population. ⁴²

A community-based cross-sectional study, between 2015 and 2020, analyzed data collected from many households across 19 sub-Saharan African countries. It analyzed recent Demographic and Health Survey (DHS) data with the aim to determine the prevalence of appropriate complementary feeding practices and identify factors associated with these practices among mothers of children aged 6 to 23 months. A weighted total sample of 60,266 mothers was analyzed using a stratified two-stage sampling approach to ensure national representation. Data collection was carried out through a mixed-method approach, using both self-administered and interviewer-administered questionnaires in line with DHS protocols. The study found that the overall prevalence of appropriate complementary feeding practices among mothers in sub-

Saharan Africa was 13.02%. The majority of infants aged 6 to 8 months consumed solid, semi-solid, or soft foods in the 24 hours preceding the survey, yet dietary diversity remained poor. Only 14% of children had consumed eggs, and 20% consumed other fruits and vegetables within that time frame. Despite the breadth of the data and the strength of multilevel analysis, the study had notable limitations. It relied on self-reported data, which are prone to recall and social desirability bias. Furthermore, it relied on existing data, which may have missed important local feeding habits or cultural practices that were not included in the original surveys.⁴⁶

A community-based cross-sectional study conducted in May 2023. Its main objective was to determine the prevalence and patterns of appropriate complementary feeding practices and the associated factors among mothers of children aged 6–23 months in Bokoji Town, Oromia Region, Ethiopia. Out of the calculated sample size of 439, a total of 434 participants were successfully enrolled, achieving a 98.9% response rate. The sampling technique used was simple random sampling, employing computer-generated random numbers from health post family folders. Data was collected using an interviewer-administered structured questionnaire, which included a 24-hour dietary recall to assess feeding indicators like dietary diversity and meal frequency. Findings revealed a low prevalence of appropriate complementary feeding in the study area: 80% of the children had a timely introduction to complementary foods at 6 months; 19.8% met the minimum dietary diversity, defined as receiving food from at least five food groups; 93.8% met the minimum meal frequency based on age recommendations. However, only 19.4% received the minimum acceptable diet, which includes both meal frequency and dietary diversity. The overall prevalence of appropriate complementary feeding practices (meeting all WHO/UNICEF criteria) was just 13.1%. While simple random sampling was used, the reliance on health post family folders may have introduced selection bias if records were outdated or incomplete. Additionally,

recall bias could have affected accuracy in reporting feeding practices over the previous 24 hours.⁴⁷

In 2017, A cross-sectional study was conducted in Eti-Osa Local Government Area, Lagos State, Nigeria, aimed to assess maternal knowledge and practices of complementary feeding among 355 mothers of children under five years old. Participants were selected using a multi-stage sampling technique, and data were collected through interviewer-administered questionnaires.

The study found that only 47.9% of mothers practiced timely initiation of complementary feeding, introducing food at the recommended age of six months. Regarding meal frequency, just 2.0% of children aged 6–8.9 months met the minimum meal frequency of two meals per day. However, 92.1% of children aged 9–11.9 months and 95.6% of those aged 12–23 months received the recommended three meals per day.

In terms of feeding methods, only 11.8% of mothers practiced bottle-feeding. The majority (84.3%) used cups or plate and spoon, while a small proportion (3.3%) practiced hand feeding. Responsive feeding was reported by 66.2% of mothers, although an equal proportion (66.6%) reported adding salt to their child's meals, which is not recommended for infants. Most mothers (73.5%) fed their children themselves, and 56.8% gave meals of the right consistency.

Basic hygiene practices were largely observed: 85.8% of mothers reported washing their hands before feeding their children, and 86.1% washed the feeding utensils after use. Overall, appropriate complementary feeding practices were observed in only 47.0% of the mothers surveyed. A limitation of the study was the inclusion of mothers with children up to five years, which may have introduced recall bias regarding feeding practices during infancy.²⁴

In 2020, a descriptive cross-sectional study was conducted among mothers and caregivers of children aged 6 to 24 months attending immunization clinics in selected Primary Health Centers (PHCs) within Ijebu-Ode Local Government Area (LGA) of Ogun State. The study aimed to assess complementary feeding practices among this population using the WHO Infant and Young Child Feeding (IYCF) indicators. A multistage sampling technique was used to select 283 mother-child pairs from approximately 50% of the PHCs in the LGA. Data were collected through a semi-structured, interviewer-administered questionnaire. Findings revealed that only 33.6% of the children met the minimum meal frequency as per the WHO Infant and Young Child Feeding (IYCF) indicators. A small proportion, 14.5%, received the minimum dietary diversity, consuming at least four different food groups. Even fewer, 9.2%, achieved the minimum acceptable diet, combining both meal frequency and dietary diversity. Overall, appropriate complementary feeding practices were alarmingly low, with just 4.2% of the children adhering to the recommended practices for complementary feeding. A key limitation of the study was its reliance on self-reported data, which may be subject to recall and social desirability bias, potentially affecting the accuracy of reported feeding practices.²³

A cross-sectional study was conducted in 2021 among mothers of children aged 0 to 2 years in Ado-Ekiti, Ekiti State, Nigeria. The study aimed to assess the complementary feeding patterns among these mothers. A total of 135 mothers were recruited using a proportionate stratified sampling technique followed by random selection within each stratum. Data was collected using an interviewer-administered semi-structured questionnaire that captured socio-demographic data and complementary feeding-related practices. Findings revealed that a majority (62.5%) of the mothers introduced complementary foods to their children between three and five months of age, which is earlier than the World Health Organization's recommendation of six months.

Additionally, 43.3% of the mothers introduced water to their infants at three months, with only 26.7% waiting until six months. Formula milk (45.9%) and fermented cereal gruel (37%) were the most common initial complementary foods. While cereals were frequently introduced between three to five months, iron-rich foods such as fish, meat, and eggs were introduced by only 15.1% of mothers between six months and one year. Similarly, fruits and vegetables were mostly introduced after the first year of life, indicating a delay in the introduction of these nutrient-rich foods. Breastfeeding alongside complementary feeding was a common practice, with 85.8% of mothers continuing to breastfeed after introducing other foods. Most of the food provided was thick enough to stay on a spoon (58.3%), suitable for children between 6–12 months, and mothers generally practiced patience when feeding a sick child. The most commonly used feeding utensils were bowls and spoons (59.2%), although some still used feeding bottles (30.8%) and hand feeding (5.8%), which may reflect cultural norms. Hygienic practices were relatively good among the mothers, with 84.2% reporting that they always sterilized feeding utensils, 91.7% washed their hands before feeding, and 93.3% did so after changing diapers. The use of only two primary health centers and the reliance on self-reported data may introduce bias. This limitation suggest that the results may not reflect the broader population, and there is a possibility of recall and social desirability bias affecting responses.⁴⁸

A cross-sectional study conducted between March and May 2022 in Osun State, Nigeria, assessed maternal nutrition literacy and its relationship with complementary feeding practices among 407 nursing mothers of children aged 6 to 23 months. Participants were selected using a multi-stage sampling technique, and data were collected using structured interviewer-administered questionnaires. findings revealed that 82.8% of nursing mothers met the minimum meal frequency (MMF) recommended for children aged 6–23 months. Despite this, a large

proportion of mothers did not meet other critical complementary feeding indicators. Specifically, 71.5% failed to meet the minimum dietary diversity (MDD), 78.5% did not meet the minimum acceptable diet (MAD), and 86% did not achieve appropriate complementary feeding practices (ACFP) overall. A major limitation of the study is that while the study used interviewer-administered questionnaires, the self-reported nature of the responses may have introduced social desirability and recall bias. Additionally, since the study was conducted in only one region of Osun State, which might not be fully representative of the entire state population or other states.

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A descriptive cross-sectional study was carried out between May 2016 and January 2017 in Edaiken community, located in Egor Local Government Area of Edo State, Nigeria. The aim was to assess infant and young child feeding practices, particularly complementary feeding, as well as the nutritional status of children aged 0 to 24 months. A total of 418 mother-child pairs participated in the study. They were selected using a multistage sampling technique. Data was collected using a structured, interviewer-administered questionnaire which gathered information on feeding practices, socio-demographic characteristics, and nutritional indicators. The study found that 49.9% of the respondents introduced complementary foods at the recommended age of six months. However, 31.2% introduced such foods earlier than six months, while 18.9% delayed the introduction beyond six months. Corn gruel (pap) was the most commonly used first food, given by 62.1% of mothers, followed by processed cereals (27.2%). Only a small percentage offered mashed foods or a mixture of foods. Meal frequency was another area of concern. About 76.3% of children did not meet the minimum meal frequency recommended for their age group. One major limitation was the reliance on maternal recall for infant feeding practices, which may be subject to recall bias.²⁸

2.4 FACTORS THAT INFLUENCE MOTHERS' COMPLEMENTARY FEEDING PRACTICE

A narrative review of observational studies published between 2012 to 2023 across various countries in five continents was conducted in 2023 to describe current parental practices during the complementary feeding period and examine whether they align with international recommendations. Findings from the review showed that parental characteristics such as level of education, socioeconomic status, maternal age, culture, and ethnicity were associated with the practice of complementary feeding among parents. These factors may influence complementary feeding practices through a lack of knowledge, resulting in a lower adherence to official guidelines.⁴⁹

Studies in the review found associations between maternal occupation/employment, education, and timing of complementary food. While some found that mothers who were employed as farmers and less-educated mothers tended to introduce complementary foods earlier than their counterparts, other studies showed that higher maternal education was associated with an earlier introduction to complementary foods, possibly through increased workload and obligations leading mothers to return to work shortly after birth. Higher levels of education were also found to be related with the practice of baby-led weaning. In Brazil studies found that large consumption of added sugars during infancy was especially prevalent among families of low-socioeconomic status and with a lower education level. Several studies also found an association between formula-feeding and added sugar consumption during the complementary feeding period. In Europe, younger maternal age and lower socio-economic status were also found to be predictors of added sugar consumption. In Austria and in Poland, breastfeeding was negatively

associated with the consumption of added sugars during the complementary feeding period. Cultural beliefs and ethnicity influenced the timing of introduction of eggs, animal products, peanuts, and the progression of food texture and consistency fed to infants. Pre-masticating was relatively prevalent at 9–11 months, especially among parents of African American ethnicity. Parents of Hispanic ethnicity also offered purees for a longer duration compared to non-Hispanic parents. Studies in France also found a prolonged consumption of pureed foods by infants during the complementary feeding period.⁴⁹

The review covered many countries and made use of international and regional complementary feeding guidelines. Limitations to this narrative review include the different definitions of feeding practices examined and differing methods of assessment across included studies, which hindered the ability to compare data. Some countries were also underrepresented in the literature as compared to others.⁴⁹

In 2021, a systematic review of 47 qualitative or mixed-method studies on factors influencing complementary feeding practices among parents and primary caregivers of children aged under three years in upper-middle- and high-income countries including the US, UK and Australia was done to understand the considerations parents make during the complementary feeding period and how these influence adherences to official guidelines.⁵⁰ The review included studies that were published or completed data collection from 2001 following publication of WHO complementary feeding guidelines till 2021. Each included study underwent a quality assessment using the Standards for Reporting Qualitative Research (SRQR) to ensure methodological soundness and adherence to the inclusion criteria of a qualitative design and focus on complementary feeding. Findings from the study were classified into; factors related to the

timing of introduction of complementary feeding, factors related to the type of complementary foods, and factors related to both timing and type of complementary foods.

Infant-related cues and maternal factors were found to influence timing of introduction of complementary feeding. Infant-related cues, such as perceived hunger after breastfeeding, seeing baby settle or sleep longer after providing food, changes in weight, excitement at the sight of food, and early attainment of some developmental milestones such as loss of tongue thrust and good eye-hand coordination were commonly cited reasons for initiating solids, often earlier than recommended. Maternal factors including the need to return to work, social norms, personal excitement to see child eat family diet, and cultural expectations, all contributed to feeding decisions. Knowledge and attitudes of parents and caregivers towards guidelines varied. While many parents were aware of the recommended six-month mark, skepticism and perceived rigidity of the guidelines led to deviations.⁵⁰

Factors related to the type of complementary food offered included health properties of the food, infants' food preferences, culture, cost and parental considerations. Organic food, fruits and vegetables were perceived to have health benefits while certain foods (e.g., dairy, eggs, fish) were avoided due to fears that they would cause allergy or that the infants' digestive system was mature enough to process them. Parents observed that their infants had distinct food likes and dislikes which guided the choice of complementary foods. Cultural traditions and religious beliefs also influenced the type of food fed to infants. Parental consideration of appropriate texture, parent's food preferences and cooking skills also guided their decision on the type of first foods fed to infants. Hard foods, or foods with seeds raised concerns of choking and were, therefore, avoided. Foods considered tasty and cooking skills determine the variety of food children are exposed to. A general preference for home-made foods over ready-prepared baby

foods emerged from the studies included. Despite seeing commercial foods as convenient and timesaving in some cases, mothers voiced mistrust for products marketed for infants, because their label ‘suitable from 4 months’ contradicted the 6-month recommendation and could contribute to maternal confusion over timing of complementary feeding. Other negative aspects of marketed baby foods, as perceived by parents, included uncertainty regarding presence of potentially harmful ingredients and nutritional value, inferior flavour and cost, food preferences, and fears surrounding allergies.⁵⁰

Factors related to both timing and type of complementary foods were predominantly external influences, particularly advice from health professionals, grandmothers and peers, and health professionals, played a significant role. Conflicting advice often led to confusion, undermining adherence to national or international guidelines.

Strengths of the study include its comprehensive scope, high methodological rigor, and relevance to public health policy. It identifies modifiable factors that interventions could target, such as improving guideline communication and addressing cultural or socioeconomic barriers. However, the evidence base is predominantly drawn from the UK, USA, and Australia, limiting global applicability. Also, variations in participant demographics (e.g., socioeconomic status, education) were not always clearly reported, limiting the ability to differentiate subgroup experiences. Additionally, as with all qualitative synthesis, findings are interpretive and may reflect the authors' lens despite attempts to minimize bias.⁵⁰

A multilevel mixed-effect analysis was carried out in 2023 using recent demographic health survey data from 19 sub-Saharan African countries, which were conducted between 2015 and 2020 to determine the prevalence and associated factors of appropriate complementary feeding

practices among mothers of children aged 6 to 23 months in sub-Saharan African countries. A total of 60,266 mothers of children aged 6-23 months were included in the study.⁴⁶ The demographic health survey employed a stratified two-stage sampling technique and use of questionnaires. Multilevel mixed-effects logistic regression was used to determine the factors associated with complementary feeding practice. This study identified different factors significantly associated with appropriate complementary feeding practices, including maternal educational level, marital status of the mother, sex of the household head, total children ever born, media exposure, ANC visits attended during pregnancy, place of delivery, current breastfeeding, PNC checkup, the current age of the child, birth order, number of under five children in the household, community illiteracy, and country category.⁴⁶

Maternal education was positively associated with appropriate complementary feeding practices as they may have a better chance of exposure to education about infant and young children's feeding and child health services through mass media. Married women were more likely to have appropriate complementary feeding practices as engaging fathers in activities like buying suggested foods, caring for and feeding children, and helping with household tasks improves complementary feeding. Households with female heads, mothers with media exposure, good utilization of ANC services and PNC follow up were also more likely to have appropriate complementary feeding practices. In contrast, households with large family sizes, food insecurity, and mothers with poor utilization of maternity services were more likely to have inappropriate complementary feeding practices.⁴⁶

In the study, current age of child and birth order was significantly associated with appropriate complementary feeding practices. Children aged 6–11 months were less likely to have appropriate complementary feeding practices while older children were more likely to have

increased meal frequency and diversity. Children with a birth order of second to fourth had higher odds of appropriate complementary feeding practices.

This study has the following strengths: First, the problem of the hierarchical nature of the DHS data is resolved as the study uses a multilevel mixed-effects model. Second, the most recent (2015–2020) DHS and region-wide survey data were used to help the concerned health authorities in sub-Saharan Africa set appropriate nutrition intervention strategies. Finally, the study uses the revised WHO indicators to determine the prevalence of appropriate complementary feeding practices in sub-Saharan Africa. Limitations of the study are the secondary nature of the data and there might be an introduction of recall and social desirability bias as meal frequency, dietary diversity, and the introduction of solid, semi-solid, and soft foods were measured based on mothers' self-reports.⁴⁶

In Guto Gida district of Ethiopia, a cross-sectional study was conducted from February 2018 to January 2019 among 410 mothers that had children aged between 6-23 months to assess complementary feeding knowledge, practice, dietary diversity, and associated factors among mothers of children 6-23 months in the district. Sampling was done using cluster sampling, simple random sampling, and systematic random sampling techniques. Interviewer-administered structured and semi-structured questionnaires were used for data collection. Findings from the study showed that age, occupation, and wealth index of mothers had a significant relationship with mothers' complementary feeding practices. Mothers 16-20 years aged were less practicing on complementary foods of children than mothers above 36 years of age. Furthermore, mothers that were involved in private work were four times more likely to practice complementary feeding for their children than daily laborers mothers. In addition, mothers from low wealthy

index were less likely practicing on complementary foods of feeding their children than mothers from high wealthy index.⁵¹

Strengths of the study include the supervision of five percent of the surveyed households by the principal investigator to confirm whether the houses were interviewed in the intended way and rechecking of completed questionnaires to maintain quality.

In Ogun State Southwestern Nigeria, a descriptive cross-sectional study was conducted in 2020 among mothers or caregivers of children aged 6-24 months attending immunization clinics in selected primary health centers (PHCs) in Ijebu Ode LGA.²³ The aim of the study was to assess and compare complementary feeding practices of nursing mothers using the WHO IYCF Indicators and the Infant and Child Feeding Index (ICFI), and to explore the factors associated with these feeding practices. A multistage sampling technique was used to select 283 mother-child pairs from approximately 50% of the PHCs within the local government area. A pre-tested semi-structured interviewer-administered questionnaire was used for data collection. The study reported that mother's place of work, antenatal care use and child welfare clinic attendance showed statistically significant associations with feeding practices. Appropriate complementary feeding also increased with increasing level of mother's education. With respect to the factors associated with complementary feeding practices using both tools, some disparities were observed; the ICFI components and categories were associated with mother's level of education and household size while the WHO IYCF indicators were associated with antenatal care use, mother's workplace, and child welfare clinic attendance.²³

The use of both the WHO IYCF Indicators and the Infant and Child Feeding Index in this study reflected complementary feeding practices more holistically than just one or few behaviors

studied separately. However, the assessment of children's feeding was based on their mother's recall of foods consumed. This could have resulted in a recall bias as some mothers could overestimate or underestimate their children's food intake or not be as observant as required. Secondly, the study was done in PHCs but not all mothers patronize primary health facilities.²³

In 2019, a descriptive cross-sectional study was done among 193 postpartum mothers in selected LGAs of Osun State, Nigeria, aimed at assessing the knowledge and factors associated with complementary feeding among postpartum mothers.²⁰ Following a multistage sampling, a semi-structured, interviewer-administered questionnaire was used to collect data from mothers. Analysis of factors associated with complementary feeding revealed that meal frequency was significantly associated with mother's knowledge about complementary feeding, mother's monthly income and household food security status. Mother's knowledge about complementary feeding was also significantly associated with meal diversity while minimum acceptable diet was significantly associated with mother's employment status and household food security.²⁰

The training of research assistants to use local language in explaining questionnaire enabled better understanding of infants' mothers. A limitation of this study is that the study population were postpartum mothers in only Osun State, South-West Nigeria, findings from this study may therefore not be considered nationally representative.

2.5 DIETARY DIVERSITY AMONG CHILDREN AGED 6-23 MONTHS

A two-year prospective cohort study (The Mother and Infant Study Cohort [MISC]) was carried out between December 2015 and December 2017 among 167 pregnant women living in the United Arab Emirates (UAE) to evaluate breastfeeding and complementary feeding practices and

their determinants among infants and young children in the United Arab Emirates using the 2021 WHO/UNICEF IYCF guidelines.⁵² The Mother and Infant Study Cohort (MISC) is a prospective study of mothers recruited via convenient sampling in their third gestational trimester and followed with their infants (n= 104) up to 18 months of age. Data were collected at 3rd trimester, delivery, 2, 6, 12, and 18 months postpartum via interviewer-administered questionnaires, review of medical records, anthropometric measurements, and 24-hour dietary recalls of the child's intake at 6, 12, and 18 months.

Study findings revealed that only 4.3% of infants consumed foods and beverages from at least five of the eight groups (MDD) at 6 months of age, while this percentage increased to 43.0% and 40.4% at 12 and 18 months of age, respectively. The percentage of breastmilk feeding was 84% at 6 months, which decreased to 34% and 44% at 12 and 18 months, respectively. The consumption of grains, roots, tubers, and plantains was reported in 56% of the infants at 6 months, 46% at 12 months, and increased to 98% at 18 months. The consumption of pulses, nuts, and seeds increased gradually from 4% at 6 months, to 9% and 13% at 12 and 18 months, respectively. The consumption of dairy products was similar at 6 and 12 months, 45% and 41%, respectively, then increased to 95% at 18 months. The percentage of infants who consumed flesh foods was 4% at 6 months and increased to 25% at 12 months, and to 68% at 18 months. None of the infants consumed eggs at 6 months, and the percentage increased to 11% and 32% at 12 and 18 months, respectively. The proportion of infants who consumed vitamin A-rich fruits and vegetables decreased from 11% at 6 months, to 9% and 7% at 12 and 18 months, respectively. Finally, the percentage of infants who consumed other fruits and vegetables was comparable at 6 and 12 months (36% and 35%) and increased to 71% at 18 months.⁵²

The study reported on IYCF practices using the WHO and UNICEF 2021 indicators, hence enabling regional and international comparisons. Robust analyses of the variables associated with the different breast feeding and complementary feeding practices were provided by adjusting for several potential cofounders. Nevertheless, the MISC was restricted to Arab mothers attending public health clinics which limits its generalizability. Another limitation relates to the cognitive process of recalling foods consumed over the past 24 hours which could have affected the mothers' ability to accurately report their infants' food consumption.⁵²

A descriptive cross-sectional study was carried out in Côte d'Ivoire, Niger and Senegal among 3,528 children aged 6–23 months to assess the level of dietary diversity and associated factors using data collected between August 2022 to January 2023.⁵³ Households were randomly selected and children's prior 24-hour dietary intake was assessed using interviewer-administered Diet Quality Questionnaires (DQQ). The study found that the majority of children from the three countries consumed breast milk and grains, roots, tubers or plantains the previous day and about half consumed at least one vitamin A-rich fruit or vegetable. Dairy product intake was 42.4% in Côte d'Ivoire, 42.5% in Niger and 52.4% in Senegal. Flesh foods were consumed by 52.5, 24.2 and 45.3% of children in Côte d'Ivoire, Niger and Senegal, respectively. Egg consumption was <20% in all three countries. Over half of the children in Côte d'Ivoire (54.2%) and about e-third of the children in Niger (33.3%) and Senegal (30.8%) were provided a minimally diverse diet ($\geq$ 5 food groups) the previous day.

The percentage of children provided breast milk the previous day was substantially higher among infants aged 6–11 months, compared to children 12–23 months, in all three countries (Côte d'Ivoire: 96.3% vs. 65.6%; Niger: 83.8% vs. 55.0%; Senegal: 96.0% vs. 56.4%). In all three countries, the consumption of grains/roots/tubers/plantains, pulses/nuts/seeds, flesh foods,

dairy products, vitamin A-rich fruits/vegetables, and other fruits/vegetables was significantly higher among children aged 12–23 vs. 6–11 months. MDD prevalence was also higher among children aged 12–23 months, compared to those aged 6–11 months, in all three countries (Côte d’Ivoire: 68.8% vs. 37.0%; Niger: 40.8% vs. 17.0%; Senegal: 37.2% vs. 18.7%).

The use of the novel DQQ methodology is a key strength of the study as it allows for an understanding of both health-promoting and unhealthy food contributors to daily diets and, thereby, adds valuable data for country nutrition program planning. Limitations of the study were that other factors such as household food security and caregiver knowledge of IYCF practices, were not assessed. Also as with all self-reported data, recall and social desirability biases may have occurred.⁵³

A secondary data analysis of the Ghana Multiple Indicator Cluster Survey 6 (GMICS6) conducted in 2017–18 was done in 2022 to estimate the prevalence of MDD, MMF and MAD among IYC aged 6–23 months and investigate its associated socioeconomic and demographic factors.⁵⁴ This study utilised data from the mother/caregiver-child pair about breastfeeding and dietary practices of 2,585 infants and young children (IYC) aged 6–23 months. The GMICS6 employed a multi-stage stratified cluster sampling approach using a sampling frame based on the 2010 Population and Housing Census. Data for the GMICS6 was collected via face-to-face interviews using Computer-Assisted Personal Interviewing (CAPI) technique. Analysis showed that over a quarter (25.4%) of IYC in this study met MDD. Almost equal proportions of male and female IYC achieved MDD, 24.7% and 26.2% respectively. The majority (33.6%) of the IYC who achieved MDD were in the 12–17 months age group. Almost one-third of the IYC (31.7%) from urban areas achieved MDD whilst a fifth (20.6%) IYC from rural areas also achieved MDD. The Central region of Ghana recorded the highest prevalence of IYC who

achieved MDD (34.7%) whilst the Upper West region recorded the least prevalence of MDD (13.9%). Nearly a fifth (18.4%) of IYC whose mothers/caregivers had no formal education achieved MDD whilst over half (52.4%) of IYC whose mothers/caregivers had above secondary-level education achieved MDD. The staples (grains, roots, tubers, and plantain) were the food group that most (79%) IYC were fed with during the previous day. The majority of IYC (77%) were also fed breastmilk during the previous 24 hours. Consumption of other food groups by IYC was all below 50% with legumes or pulses, nuts and seeds recording a consumption of 16%.⁵⁴

This study utilized recent nationally representative GMICS6 data with a large sample size (13,202 households with 2,585 IYC aged 6–23 months) and high response rate (99.4%). This study used the WHO and UNICEF definition of MMD which has been recommended for measuring intermediate outcome indicators for tracking progress towards the 2025 global nutrition targets. Nevertheless, the data used in this study has a limitation of having only one day of diet recall per child, which may not be representative of the day-to-day dietary intake and is prone to recall bias. In addition, the measure does not take into consideration the amount of food consumed and thus it does not completely measure nutrient adequacy.

In Ogun State Southwestern Nigeria, a descriptive cross-sectional study was conducted in 2020 among mothers or caregivers of children aged 6-24 months attending immunization clinics in selected primary health centers (PHCs) in Ijebu-Ode LGA. The aim of the study was to assess and compare complementary feeding practices of nursing mothers using the WHO IYCF Indicators and the ICFI, and to explore the factors associated with these feeding practices. A multistage sampling technique was used to select 283 mother-child pairs from approximately 50% of the PHCs within the local government area.²³ A pre-tested semi-structured interviewer-

administered questionnaire was used for data collection. MDD was met by only 14.5% of children aged 6-24 months. Only 1.8% of children aged 6-8 months, 6.7% of children aged 9-11 months, and 6.0% of children aged 12-24 months met MDD. Additionally, the 24-hour dietary recall revealed that more than half of the mothers gave grains/roots/tubers (92.6%) followed by dairy products (50.9%).²³

In 2017, a descriptive cross-sectional study was conducted in Eti-Osa area of Lagos State, Nigeria to determine the complementary feeding knowledge, practices, minimum dietary diversity, and acceptable diet among mothers of under-five children in an urban Local Government Area. A multi-stage sampling technique was employed to select 355 mothers. Data was collected using a pre-tested interviewer administered questionnaire and 24-hour diet recall was used to assess dietary diversity. The study found that only 16.0% of children aged 6-8.9 months met MDD, while MDD was met by 67.7% and 70.9% of children aged 9-11.9 months and 12-24 months respectively.²⁴

Mothers of under-five children were assessed rather than mothers of children aged 6-23 months which is the age-group that need complementary feeding. Hence, some parameters which should have been based on 24-hour diet recall which were based on ordinary recall (among mothers whose children were above 24 months) could have been affected by recall bias. Moreover, since the study was cross-sectional, cause and effect between independent and dependent variables were difficult to determine therefore determinants of suboptimal complementary feeding knowledge, practices and dietary diversities could not be ascertained.²⁴

2.6 FACTORS ASSOCIATED WITH DIETARY DIVERSITY AMONG CHILDREN AGED 6-23 MONTHS

A two-year prospective cohort study (The Mother and Infant Study Cohort [MISC]) was carried out between December 2015 and December 2017 among 167 pregnant women living in the United Arab Emirates (UAE) to evaluate breastfeeding and complementary feeding practices and their determinants among infants and young children in the United Arab Emirates using the 2021 WHO/UNICEF IYCF guidelines. From the study, results of the multiple regression showed that mothers who did high-intensity physical activity during pregnancy have higher odds of offering their infants foods and beverages from at least five out of the eight defined food groups (MDD). Additionally, children who were continuously breastfed at 12 months demonstrated significantly higher MDD levels at 18 months compared to those who were not continuously breastfed.⁵²

A descriptive cross-sectional study was carried out in Côte d'Ivoire, Niger, and Senegal among 3,528 children aged 6–23 months to assess the level of dietary diversity and associated factors using data collected between August 2022 to January 2023. Households were randomly selected, and children's prior 24-hour dietary intake was assessed using interviewer-administered Diet Quality Questionnaires (DQQ). In the multivariable analyses for Niger and Senegal, children 12–23 months had a higher likelihood of MDD, compared to those aged 6–11 months. In Senegal, children of mothers with a secondary or higher education were more likely to attain MDD compared to children whose mothers had no formal education. Increased household wealth was also positively associated with children's MDD in Senegal, with those in medium and high wealth households having a higher likelihood of MDD, compared to children in the poorest households. However, the cross-sectional survey design precludes causal inferences.⁵³

A secondary data analysis of the Ghana Multiple Indicator Cluster Survey 6 (GMICS6) conducted in 2017–18 was done in 2022 to estimate the prevalence of MDD, MMF and MAD among IYC aged 6–23 months and investigate its associated socioeconomic and demographic factors. This study utilised data from the mother/caregiver-child pair about breastfeeding and dietary practices of 2,585 infants and young children (IYC) aged 6–23 months. The GMICS6 employed a multi-stage stratified cluster sampling approach using a sampling frame based on the 2010 Population and Housing Census (PHC). Data for the GMICS6 was collected via face-to-face interviews using Computer-Assisted Personal Interviewing technique. The socioeconomic and demographic predictors of MDD among IYC aged 6–23 months from the study included IYC age group, mother's level of education, socioeconomic status of the household and region of the country.⁵⁴

IYC from the age groups of 9–11 months, 12–17 months and 18–23 months were 2.39, 4.48 and 3.54 times more likely to achieve MDD respectively compared to IYC aged 6–8 months. IYC having a mother or caregiver with secondary education and with above secondary education had 2 times the odds of achieving MDD compared to IYC with mothers or caregivers with no formal education. IYC from the richest households had over twice the odds of achieving MDD compared to IYC from the poorest households. IYC from the western region had higher odds of achieving MDD. IYC from rural areas had 44% reduced odds of achieving MDD compared to IYC from urban areas. The data used in this study has a limitation of having only one day of diet recall per child, which may not be representative of the day-to-day dietary intake.⁵⁴

In 2017, a descriptive cross-sectional study was conducted in Eti-Osa area of Lagos State, Nigeria to determine the complementary feeding knowledge, practices, minimum dietary diversity, and acceptable diet among mothers of under-five children in an urban Local

Government Area. A multi-stage sampling technique was employed to select 355 mothers. Data was collected using a pre-tested interviewer administered questionnaire and 24-hour diet recall was used to assess dietary diversity. None of the factors considered in this study (marital status, mother's education, maternal knowledge of complementary feeding and monthly income) was significantly associated with minimum dietary diversity.²⁴

A descriptive cross-sectional study was conducted in 2020 among mothers or caregivers of children aged 6-24 months attending immunization clinics in selected primary health centers (PHCs) in Ijebu Ode of Ogun State Southwestern Nigeria.²³ The aim of the study was to assess and compare complementary feeding practices of nursing mothers using the WHO IYCF Indicators and the ICFI, and to explore the factors associated with these feeding practices. A multistage sampling technique was used to select 283 mother-child pairs from approximately 50% of the PHCs within the local government area. A pre-tested semi-structured interviewer-administered questionnaire was used for data collection. Findings from the study showed that the ICFI mean scores varied among the different age groups of the children with the 9-11 months and 6-8 months having the highest and lowest ICFI mean scores respectively. Dietary Diversity Score (DDS) were highest among 12-24 months old children and lowest among 6-8 months old children. This reveals greater vulnerability to poor feeding in children of the younger age group.²³

CHAPTER THREE

MATERIALS AND METHODS

3.1 STUDY AREA

This study was conducted in Benin City, Edo State, Nigeria. Edo State is one of the 36 states in Nigeria and is part of the six states making up the South-South geopolitical zone. It shares boundaries with Delta State to the south and southeast, Kogi State to the north and northeast, and Ondo State to the west.⁵⁵ It covers an area of approximately 19,794 square kilometers and is geographically situated approximately between latitudes 5°44' N and 7°34' North and longitudes 5°4' E and 6°45' East.⁵⁵

According to the 2006 national census, Edo State had a recorded population of 3,233,366. By 2025, the population is projected to have increased to approximately 5,420,000. This translates to an average annual population growth rate of about 3.2%.⁵⁶ Edo State consists of 18 Local Government Areas (LGAs), with five of these; Egor, Ovia North-East, Ikpoba-Okha, Ughunmwonde and Oredo, located within Benin City. The predominant ethnic groups in Edo State include the Benin, Esan, Afemai, Akoko Edo, and Owan.⁵⁷

Benin City is the capital city and largest urban area of Edo State. It is strategically located along a tributary of the Benin River and serves as a transportation hub, linked by major highways to Lagos and other eastern Nigerian states. It is also well-connected by roads to surrounding cities such as Sapele, Siluko, Okene, and Ubiaja.⁵⁶ The city is recognized for its robust industries, particularly in rubber and palm oil production. Many residents engage in subsistence agriculture, cultivating crops like yam, plantain, and cassava, and are involved in various trades such as hairdressing, fashion design, and petty commerce.⁵⁵ The climate in Benin City is tropical,

characterized by a wet season from April to October and a dry season from November to March. This seasonal pattern significantly influences agricultural practices and food availability.⁵⁵

Edo State is home to a substantial number of healthcare facilities across all levels of care. These include one major tertiary facility, the University of Benin Teaching Hospital (UBTH), which serves as a referral center for Edo state and neighboring states. Additionally, the state has at least four secondary-level public hospitals, such as Edo Specialist Hospital and Stella Obasanjo Hospital, which provide a range of medical services. At the primary care level, the Edo State Primary Healthcare Development Agency (EDSPHCDA) oversees over one hundred primary healthcare facilities providing free medical services under the Basic Health Care Provision Fund (BHCPF).⁵⁸

3.2 STUDY DESIGN

A community-based descriptive cross-sectional study design was used for this study.

3.3 STUDY POPULATION

The study population consists of mothers of children aged 6-24 months in Benin City

3.4 SELECTION CRITERIA

3.4 1 Inclusion criteria

1. Mothers who have been residents of Benin City for at least six months prior to the study.
2. Mothers who are primarily responsible for the daily feeding and care of the child.

3.4 2 Exclusion criteria

1. Mothers of children with medical conditions that significantly affects feeding practices (e.g., cleft palate, severe neurological disorders).

2. Mothers who are unable to communicate effectively due to language barriers or cognitive impairments.

3.5 DURATION OF STUDY

The study spanned for over 1 year, from January 2025 to April 2026. The timeline is represented in the Gantt chart presented in Appendix 1.

3.6 SAMPLE SIZE DETERMINATION

The sample size was calculated using the Cochran formula⁵⁹.

$$n = \frac{Z^2 pq}{d^2}$$

Where n = sample size

Z = standard normal deviate

p = prevalence of characteristic of interest

q = 1 – p

d = margin of error

Z = 1.96 (at 95% confidence level)

p = 14.9% based on the prevalence of complementary feeding knowledge among mothers of under-five children in Eti-Osa, Lagos State Nigeria done in 2017.²⁴

q = 1- p. Hence q = 0.851, d = 5% (0.05)

$$n = \frac{1.96^2 \times 0.149 \times 0.851}{0.05^2} = 194.8$$

$$\text{Attrition rate of 10\%} = \frac{n_f}{1 - nr} = \frac{n}{1 - nr}$$

Where;

n_f = Final Minimum Sample Size

n = Minimum Sample Size

nr = Non-response rate at 10% = 0.1

Thus;

$$= 194.8 / 0.9 = 216.44$$

Applying a design of 2;

$$= 216.44 \times 2$$

$$= 432.8$$

However, the final minimum sample size used for this study was 442.

3.7 SAMPLING METHOD

A multistage sampling technique was used to select participants for this community-based study.

The sampling process was carried out in the following stages:

STAGE 1: SELECTION OF LOCAL GOVERNMENT AREA

From the five Local Government Areas in Benin City (Egor, Oredo, Ikpoba-Okha, Umunwonde and Ovia North-East), Egor LGA was selected using simple random sampling by balloting.

STAGE 2: SELECTION OF THE WARD

Out of the ten wards in Egor LGA (Otubu, Oliha, Ogida/Use, Egor, Uwelu, Evbareke, Ugbowo, Uselu I, Uselu II and Okhoro), one ward (Ugbowo) was selected using simple random sampling by balloting

STAGE 3: SELECTION OF STREETS

Six major residential streets in Ugbowo ward were identified. These included 19th Street, Adolor Road, Federal Girls Road, Osasogie Road, Technical College Road, and Uwasota Road. From these, three streets were selected using simple random sampling by balloting. The selected streets were 19th Street, Adolor Road, and Federal Girls Road.

STAGE 4: SELECTION OF HOUSES

Each selected street was divided into two clusters based on the sides of the road (left and right). One cluster was selected by simple random sampling, and eligible households within the selected cluster were included in the study.

STAGE 5: SELECTION OF RESPONDENTS

In each selected house, all eligible mothers of children aged 6 – 24 months were identified and invited to participate.

3.8 METHOD OF DATA COLLECTION

A pre-tested, structured interviewer-administered questionnaire on complementary feeding adapted from similar studies^{23,51} was used to collect data on socio-demographic characteristics, knowledge of complementary feeding and complementary feeding practices. Data on dietary diversity and 24-hour diet recall was collected using a section of questionnaire adapted from the Nigeria NDHS 2023-24 questionnaire⁶⁰. Appendix 3 presents the study questionnaire.

3.9 TRAINING OF RESEARCH ASSISTANTS

Four research assistants (a master's degree holder in Educational Psychology and School Counselling, and three undergraduate medical students) were trained for two days on the proper administration of the questionnaire, use of local languages to explain questions and placing of locally available foods into the appropriate WHO food group.

3.10 PRETESTING

Pretesting was conducted in medical village, Ondo-west Local Government Area, using 10% of the final sample size (50). This was to ensure accuracy of the questionnaire.

3.11 DATA MANAGEMENT

3.11.1 DATA ANALYSIS

Raw data from the questionnaire was cleaned, coded and entered into the IBM Statistical Package for Social Sciences (SPSS) version 27 for further analysis. Data on maternal socio-demographic characteristics, mothers' knowledge and feeding practice on complementary foods was summarized using descriptive statistics of frequency and percentages. Bivariate analysis was carried out with Chi-squared statistical test or Fischer's exact test of association used to find associations between the socio-demographic characteristics of mothers and the variables for their knowledge and practice. Multivariate analysis was carried out using logistic regression to identify significant predictors of knowledge and practice. The crude and adjusted odds ratio together with its corresponding 95% confidence intervals was computed. P-value < 0.05 was considered to declare a result as statistically significant in this study.

3.11.2 MEASUREMENT OF VARIABLES

3.11.2.1 STUDY VARIABLES

The dependent variables of the study are mothers' knowledge and practice of complementary feeding, and dietary diversity of children 6-23 months. The independent variables are the socio-demographic factors like ethnicity, family size, socioeconomic status of the family, income, age of mothers, occupation of mothers, educational level of mothers, religion, occupation of fathers, sex of child, age of child and birth order of child.

Definition of variables are according to the Nigeria NDHS 2023-24⁶ which are in line with the WHO and UNICEF 2021 guidelines.¹⁷

Minimum meal frequency is defined as the percentage of children 6–23 months of age who consumed solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) at least the minimum number of times during the previous day. This is: 2 times for breastfed infants 6–8 months of age; 3 times for breastfed children 9–23 months of age; and 4 times (including at least 1 non-milk feeding) for non-breastfed children 6–23 months of age.¹⁷

Minimum dietary diversity is defined as the percentage of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day. The eight food groups are: (i) breastmilk; (ii) grains, roots, tubers and plantains; (iii) pulses (beans, peas, lentils), nuts and seeds; (iv) dairy products (infant formula, milk, yogurt, cheese); (v) flesh foods (meat, fish, poultry, organ meats); (vi) eggs; (vii) vitamin-A rich fruits and vegetables; (viii) other fruits and vegetables.¹⁷

Minimum acceptable diet is defined as the percentage of children 6–23 months of age who;

- *for breastfed children*: received at least the minimum dietary diversity and minimum meal

frequency for their age during the previous day.

- *for non-breastfed children*: received at least the minimum dietary diversity and minimum meal frequency for their age during the previous day as well as at least two milk feeds.¹⁷

3.11.2.2 OCCUPATIONAL CLASSIFICATION

Occupation of respondents was classified using the revised socioeconomic classification by Ibadin and Akpede, which groups occupations into six classes based on level of skill, with the lower skill levels having a higher score⁶¹.

Skill level 1: Senior political office holders, top military officers, chief executives, and top professionals. Common examples include commissioners, directors, chief judges, professors, consultants, and chief executive officers.

Skill level 2: Senior public servants and large-scale business owners. Examples include senior civil servants, senior lecturers, large-scale contractors, big traders, and senior clergy.

Skill level 3: Skilled workers and middle-level officers. Examples include technologists, nurses, teachers, junior professionals, medium-scale business owners, and other skilled self-employed workers.

Skill level 4: Semi-skilled workers. Examples include clerical staff, technicians, artisans, drivers, mechanics, tailors, hairdressers, welders, carpenters, and electricians.

Skill level 5: Low-skilled workers. Examples include petty traders, clerical assistants, attendants, messengers, and subsistence farmers.

Skill level 6: Unemployed and dependents. Examples include the unemployed, full-time housewives, students, and apprentices.

3.11.2.3 SOCIOECONOMIC STATUS

The socioeconomic status of parents/caregivers of children aged 6-23 months was computed using a composite scoring system based on the occupation and level of education of both parents/caregivers according to the revised scoring scheme for the classification of socioeconomic status in Nigeria by Ibadin and Akpede.⁶¹

The occupation of respondents was classified into skill levels according to the revised scheme. Skill levels were assigned scores from 1-6 with lower skill levels having a higher score.

Level of education was assigned scores from 1-6 from postgraduate education to inability to read and write. The lower levels of education will have a higher score.

Socioeconomic status was then be classified into⁶¹;

High class 1-2

Middle class 3-4

Low class 5-6

3.11.2.4 COMPLEMENTARY FEEDING KNOWLEDGE

Complementary feeding knowledge was scored on a 22-point scale. Every correct answer was given a score of one (1), while a wrong answer or “I don’t know” response was scored zero (0).

The knowledge scores were categorized into⁵¹:

Good knowledge 70 – 100%

Poor knowledge 0 – 69%

The knowledge variables were assessed based on WHO recommendations. Correct responses were defined as follows:

Definition of Complementary Feeding

- Introduction of solid, semi-solid, or soft foods at 6 completed months
- Continued breastfeeding alongside complementary feeding

Age of Introduction of Complementary Feeding

- Correct: 6 completed months
- Incorrect: Before or after 6 months

Duration of Breastfeeding

- Correct: Breastfeeding continued up to 24 months
- Incorrect: Breastfeeding stopped before 24 months or unknown

Breastfeeding Frequency

- Correct: Feeding on demand
- Incorrect: Scheduled or restricted feeding

Age-specific Feeding Frequency

- Correct:
 - 6–8 months: ≥ 2 meals/day (breastfed)
 - 9–23 months: ≥ 3 meals/day (breastfed)
 - Non-breastfed: ≥ 4 meals/day

Recommended Food Groups

- Correct: Inclusion of foods from the following eight food groups:

- Breast milk
- Grains, roots and tubers
- Legumes and nuts
- Dairy products (milk, yogurt, cheese)
- Flesh foods (meat, fish, poultry, organ meats)
- Eggs
- Vitamin A-rich fruits and vegetables
- Other fruits and vegetables

Minimum Dietary Diversity

- Correct: Consumption of foods from at least 5 out of the 8 food groups
- Incorrect: Fewer than 5 food groups

Appropriate Food Consistency

- Correct: Semi-solids thick enough to stay on spoon
- Incorrect: Watery or overly thick foods

Appropriate Feeding Utensils

- Correct: Use of cup and spoon
- Incorrect: Bottle feeding

Unhealthy/Inappropriate Foods

- Correct: Avoidance of the following foods for infants and young children:
 - Sugary beverages (e.g., soft drinks, sweetened juices)
 - Herbal teas and caffeinated drinks
 - Adult milk (e.g., condensed milk, evaporated milk, or non-infant formula)

- Pastries and baked snacks (e.g., cakes, biscuits)
- Highly processed snacks (e.g., chips, sweets)
- Foods high in salt
- Incorrect: Routine feeding of any of the above foods

Risk of Late Introduction of Complementary Feeding

- Correct: Malnutrition, micronutrient deficiencies
- Incorrect: Lack of awareness of these risks

3.11.2.5 COMPLEMENTARY FEEDING PRACTICES

Complementary feeding practices were scored on a 15-point scale. Practice in keeping with guidelines was awarded a score of 1 and poor practice a score of 0. The practice scores were categorized into⁵¹;

Good practice 80 – 100%

Poor practice 0 – 79%

3.11.2.6 MINIMUM MEAL FREQUENCY (MMF)

MMF was calculated as follows.

$$\frac{\text{no. of children 6-23 months of age who consumed solid, semi-solid or soft foods at least the minimum number of times during the previous day}}{\text{no. of children aged 6-23 months}}$$

3.11.2.7 MINIMUM DIETARY DIVERSITY (MDD)

MDD was computed using;

$$\frac{\text{no. of children 6-23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day}}{\text{no. of children aged 6-23 months}}$$

3.11.2.8 MINIMUM ACCEPTABLE DIET (MAD)

MAD was calculated using;

$$\frac{\text{no. of children 6-23 months of age who consumed a minimum acceptable diet during the previous day}}{\text{no. of children aged 6-23 months}}$$

3.12 ETHICAL CONSIDERATION

Ethical approval was sought from the University of Benin Teaching Hospital Ethics and Research Committee. Permission was also sought from the various community heads/representatives. Informed verbal consent was obtained from the study participants and the privacy of the participants and confidentiality of the information was assured.

3.13 LIMITATIONS OF THE STUDY

1. The information on dietary diversity and meal frequency was obtained from the mothers' recall of food eaten in the past 24 hours and can therefore be subject to recall bias.
2. The use of interviewer-administered questionnaires may have introduced social desirability bias, as the mothers could have provided answers they perceived to be acceptable rather than their true practice. This was minimized by ensuring the participants of anonymity and by conducting the interviews in a non-judgmental manner.

3.14 STRENGTHS

1. The dietary diversity among children aged 6-23 months was assessed based on the recent WHO-UNICEF guidelines and indicators.
2. It provides data on maternal understanding and feeding behavior for children aged 6 to 23 months. The findings would add to existing literature on complementary feeding and may support the development of specific interventions and policies to improve infant and young child nutrition.

CHAPTER FOUR

RESULTS

Four hundred and forty-two (442) respondents participated in the study, with a 100% response rate. The results were presented in sections as follows:

Section A: Socio-demographic characteristics of mothers

Section B: Mothers' knowledge of complementary feeding

Section C: Factors associated with mothers' knowledge of complementary feeding

Section D: Mothers' practice of complementary feeding

Section E: Factors associated with mothers' practice of complementary feeding

Section F: Dietary diversity among children aged 6-23 months

Section G: Factors associated with children's dietary diversity

SECTION A

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF MOTHERS

Table 1: Socio-demographic characteristics of the mothers

Variables	Frequency (n=442)	Percent
Age groups(years)		
15–19	7	1.6
20–24	26	5.9
25–29	100	22.6
30–34	162	36.7
35–39	95	21.5
≥40	52	11.8
Mean ± SD = 32.3±5.6		
Ethnic group		
Benin	126	28.5
Igbo	72	16.3
Esan	58	13.1
Urhobo	45	10.2
Afemai	39	8.8
Yoruba	24	5.4
Isoko	15	3.4
Ijaw	14	3.2
Ika	11	2.5
Others*	38	8.6
Marital status		
Married	365	82.6
Cohabiting	34	7.7
Single	28	6.3
Separated/Divorced	8	1.8
Widowed	7	1.6
Religion		
Christianity	411	93.0
Islam	31	7.0

Others*: Tiv (9), Anang/Efik (7), Itsekiri (6), Ukwani (5), Hausa (5), Ebira (3), Ngas (1), Tula (1), Basange (1)

The ages of the respondents ranged from 15 to 48 years of age, with a mean age of 32.3 ± 5.6 years. The mothers aged 30–34 years accounted for 162 (36.7%) of the respondents. This was

followed by those aged 25–29 years, 100 (22.6%), and 35–40 years, 95 (21.5%). Mothers aged 40 years and above constituted 52 (11.8%), while those aged 20–24 years were 26 (5.9%). The least represented age group was 15–19 years, comprising 7 (1.6%) of the respondents.

Benin constituted the largest proportion of respondents, 126 (28.5%). This was followed by Igbo, 72 (16.3%), and Esan, 58 (13.1%). Urhobo respondents accounted for 45 (10.2%), while Afemai consisted of 39 (8.8%). The Yorubas were 24 (5.4%), and Isoko 15 (3.4%). Ijaw 14 (3.2%), Tiv 9(2.0%) and Ika accounted for 11 (2.5%). Respondents from other ethnic groups, including Anang/Efik, Itsekiri, Ukwani, Hausa, Ebira, Nga, Tula, Basange , constituted 38 (8.6%).

The respondents that were married accounted for 365 (82.6%). This was followed by those cohabiting, 34 (7.7%), and single mothers, 28 (6.3%). A small proportion were separated or divorced, 8 (1.8%), while widowed respondents constituted 7 (1.6%) of the study population.

Most of the respondents were Christians, comprising 411 (93.0%), while 31 (7.0%) were Muslims.

Table 2: Socio-economic characteristics of the mothers and their spouse

Variables	Frequency	Percent
Mothers' level of education (n=442)		
No formal education	4	0.9
Primary	42	9.5
Secondary	196	44.3
Tertiary	200	45.2
Mothers' employment status (n=442)		
Employed	407	92.1
Unemployed	35	7.9
Mothers' occupation (n=442)		
Skill level 2	49	11.1
Skill level 3	132	29.9
Skill level 4	52	11.8
Skill level 5	174	39.4
Skill level 6	35	7.9
Spouse's level of education (n=407)		
No formal education	3	0.7
Primary	33	7.5
Secondary	148	33.4
Tertiary	223	54.8
Spouse's employment status (n=407)		
Employed	398	97.8
Unemployed	9	2.2
Spouse's occupation (n=407)		
Skill level 1	2	0.5
Skill level 2	83	20.4
Skill level 3	113	27.8
Skill level 4	143	35.1
Skill level 5	57	14.0
Skill level 6	9	2.2
Socio-economic status (n=442)		
Lower class	43	9.7
Middle class	396	89.6
Upper class	3	0.7
Household income (₦) (n=442)		
< 70000	112	25.3

≥ 70000	330	74.7
Mean $\pm$ SD = 200873 $\pm$ 203553		

A large proportion of mothers, 200 (45.2%) had attained tertiary level of education. This was followed by those with a secondary level of education with 196 (44.3%). mothers with primary education were 42 (9.5%) and 4 (0.9%) had no formal education.

The majority of mothers were employed, comprising 407 (92.1%), while 35 (7.9%) were unemployed. The mothers who belonged to Skill level 5 accounted for 174 (39.4%). This was followed by Skill level 4, 132 (29.9%), and Skill level 3, 52 (11.8%). Skill level 2 accounted for 49 (11.1%), while Skill level 6 constituted 35 (7.9%). No mother fell into Skill level 1.

A total of 223 (54.8%) of spouses had tertiary education. This was followed by those with secondary education, 148 (33.4%). Spouses with primary education were 33 (7.5%) while those that had no formal education accounted for 3 (0.7%).

The spouses that were employed consisted of 398 (97.8%), while only 9 (2.2%) were unemployed. The spouses in Skill level 4 were 143 (35.1%). This was followed by Skill level 3, 113 (27.8%), and Skill level 2, 83 (20.4%). Skill level 5 constituted 57 (14.0%) of respondents. A smaller proportion of spouses were in Skill level 6, 9 (2.2%), while 2 (0.5%) were in Skill level 1.

A total of 396 (89.6%) respondents belonged to the middle socioeconomic class. This was followed by those in the lower class, 43 (9.7%), while 3 (0.7%) were in the upper class.

Households earning less than ₦70,000 monthly income accounted for 112 (25.3%), while those earning ₦70000 and more accounted for 330 (74.7%). The mean monthly household income was ₦200,873 $\pm$ ₦203,553.

Table 3: Characteristics of index child

Variables	Frequency (442)	Percent
Number of children		
1-2	241	54.5
3-4	131	29.6
≥ 5	70	15.8
Mean ± SD = 2.8±1.5		
Number of under-five children		
1 – 2	422	95.5
3 – 4	20	4.5
Mean ± SD = 1.5±0.6		
Age of index child(months)		
6–8	98	22.2
9–11	57	12.9
≥12	287	64.9
Mean ± SD = 14.6±5.9		
Sex of child		
Female	236	53.4
Male	206	46.6
Birth order		
1	116	26.2
2 – 3	196	44.3
4 – 5	108	24.4
≥ 6	22	5.0
Mean ± SD = 2.7±1.5		

Respondents with 1–2 children were 241 (54.5%), those with 3–4 children were 131 (29.6%), and 70 (15.8%) had five or more children. Households with 1–2 children under five were 422 (95.5%), while 20 (4.5%) had 3–4 under-five children, with a mean of 1.5 ± 0.6 . Those with children aged 12 months and above were 287 (64.9%), those with 6–8 months were 98 (22.2%),

and 57 (12.9%) were with 9–11 months. Female children were 236 (53.4%) and male children were 206 (46.6%). Birth order 2–3 accounted for 196 (44.3%), firstborns were 116 (26.2%), those of birth order 4–5 were 108 (24.4%), and 22 (5.0%) were sixth or higher. The mean birth order was 2.7 ± 1.5 .

SECTION B

MOTHERS' KNOWLEDGE OF COMPLEMENTARY FEEDING

Table 4: Mothers' knowledge of complementary feeding

Knowledge Domains	Frequency	Percent
Meaning of complementary feeding (n=442)		
Introduction of semi-solids and solids with continued breast feeding	209	47.3
Adding infant formula to a child's meal	29	6.8
Adding solids only to breastfeeding	23	5.0
I don't know	181	40.9
Source of information (n=261)		
Health workers	180	68.9
Television	66	25.3
Social media	58	22.2
Family	48	18.3
Friends	39	14.9
Radio	16	6.1
School	5	1.9
Training program	2	0.8
Newspaper	1	0.4

A total of 209 (47.3%) respondents defined complementary feeding as the introduction of semi-solid and solid foods with continued breastfeeding, 29 (6.8%) of the respondents defined it as adding infant formula to a child's meal, 23 (5.0%) as adding solids only to breastfeeding, while 181 (40.9%) did not know the meaning.

Health workers accounted for 180 (68.9%), television 66 (25.3%), social media 58 (22.2%), family member 48 (18.3%), friends 39 (14.9%), and radio 16 (6.1%). School, training programs and newspapers were reported by 5 (1.9%), 2 (0.8%), and 1 (0.4%) respectively.

Table 4 cont'd: Mothers' knowledge of complementary feeding

Knowledge Domains	Frequency (n=442)	Percent
Age to introduce complementary feeding (months)		
<6	61	13.8
6	268	60.6
>6	110	24.9
I don't know	3	0.7
Age to stop breastfeeding completely(months)		
<24	258	58.3
24	178	40.3
>24	3	0.7
I don't know	3	0.7
Breastfeeding frequency		
As often as the child desires	318	71.9
3 times	36	8.1
2 times	15	3.4
I don't know	73	16.5

A total of 268 (60.6%) identified 6 months as the age to initiate complementary feeding, 110 (24.9%) reported introducing complementary feeding after 6 months, 61 (13.8%) indicated introduction before 6 months, and 3 (0.7%) did not know the age of introduction.

A total of 258 (58.3%) reported cessation of breastfeeding before 24 months. A total of 178 (40.3%) identified 24 months, 3 (0.7%) reported cessation to be beyond 24 months, while 3(0.7%) did not know.

Breastfeeding was reported to be given as often as the child desires by 318 (71.9%) respondents, while 36 (8.1%) and 15 (3.4%) reported breastfeeding three times and two times respectively. A total of 73 (16.5%) respondents did not know.

Table 5: Mothers' knowledge of age-based minimum feeding frequency

Knowledge domains	Frequency (n=442)	Percent
Minimum feeding frequency (6–8 months)		
< 2 times	53	12.0
2-3 times	131	29.6
3 – 5 times	69	15.6
I don't know	189	42.8
Minimum feeding frequency (9–11 months)		
< 3 times	62	14.0
3-4 times	136	30.8
4 – 6 times	56	12.7
I don't know	188	42.5
Minimum feeding frequency (≥12 months)		
< 3 times	30	6.8
3-4 times	99	22.4
4-6 times	95	21.5
>6 times	27	6.1
I don't know	191	43.2

For children aged 6–8 months, 131 (29.6%) of children reported 2–3 times as the minimum feeding frequency, while 53 (12.0%) reported less than two times and 69 (15.6%) reported 3–5 times; 189 (42.8%) did not know. Among children aged 9–11 months, 136 (30.8%) reported 3–4 times, while 62 (14.0%) reported less than three times and 56 (12.7%) reported 4–6 times; 188 (42.5%) did not know. For children aged 12 months and above, 99 (22.4%) reported 3–4 times, while 30 (6.8%) reported less than three times, 95 (21.5%) reported 4–6 times, and 27 (6.1%) reported more than six times; 191 (43.2%) did not know.

Table 6: Mothers' knowledge of recommended food groups

Knowledge domains	Frequency (n=442)	Percent
Recommended food groups		
Infant formula		
Yes	421	95.2
No	21	4.8
Usual family food		
Yes	373	84.4
No	69	15.6
Soft family food		
Yes	427	96.6
No	15	3.4
Herbal tea		
Yes	55	12.4
No	387	87.6
Sweet beverages		
Yes	392	88.7
No	50	11.3
Adult milk		
Yes	337	76.2
No	105	23.8

A total of 421 (95.2%) identified infant formula as appropriate, while 427 (96.6%) identified modified family foods as appropriate for infant feeding.

A total of 387 (87.6%) indicated that herbal tea as inappropriate for children, 69 (15.6%) identified usual family food as inappropriate, 50 (11.3%) identified that sweet beverages is not an appropriate option for complementary feeding and 105 (23.8%) indicated that adult milk is not an appropriate option for complementary feeding

Table 6 cont'd: Mothers' knowledge of recommended food groups

Knowledge domains	Frequency (n=442)	Percent
Recommended food groups		
Breastmilk		
Yes	437	98.9
No	5	1.1
Milk, yogurt, cheese		
Yes	407	92.1
No	35	7.9
Fruits and vegetables		
Yes	436	98.6
No	6	1.4
Plain pap		
Yes	161	36.4
No	281	63.6
Pap with proteins		
Yes	346	78.3
No	96	21.7
Pastries		
Yes	383	86.7
No	59	13.3

A total of 437 (98.9%) respondents identified breast milk as an appropriate food group in complementary feeding. Similarly, 407 (92.1%) identified milk, yoghurt, and cheese as appropriate food option and.

Most respondents, 436 (98.6%), identified fruits and vegetables as appropriate for complementary feeding, while 281 (63.6%) indicated that plain pap is not appropriate. In addition, 346 (78.3%) identified that pap fortified with proteins like crayfish, soyabeans and groundnuts is appropriate for complementary feeding, while 59 (13.3%) indicated that pastries was not an appropriate option for infant feeding.

Table 7: Mothers' knowledge of risk of late complementary feeding, appropriate food sources, and feeding utensils

Knowledge domains	Frequency (442)	Percent
Risk of late introduction		
Malnutrition	167	37.8
Picky eating/Slow transition	62	14.0
No risk	45	10.2
Better development	6	1.4
Low immunity	2	0.4
I don't know	160	36.1
Most appropriate food source		
Fortified locally available foods	260	58.8
Processed packaged cereals	119	26.9
I don't know	63	14.3
Appropriate feeding utensil		
Cup and spoon	221	50.0
Feeding bottle	98	22.2
Cup only	2	0.5
I don't know	121	27.4

Malnutrition was reported by 167 (37.8%) respondents, Picky eating accounted for 62 (14.0%), 45 (10.2%) believed there was no risk, 2 (0.4%) identified low immunity as a risk, 6 (1.4%) believed it improved development, and 160 (36.2%) did not know any risk. A total of 260 (58.8%) identified fortified locally available foods as the best source of food, 119 (26.9%) reported processed packaged cereals, while 63 (14.3%) did not know. Those who identified the cup and spoon as the appropriate method for feeding were 221 (50.0%), 98 (22.2%) reported the

use of feeding bottles, 2 (0.5%) reported the use of a cup only, while 121 (27.4%) did not know the appropriate method.

Table 8: Summary of mothers' knowledge of complementary feeding

Knowledge domains	Correct n (%)	Incorrect n (%)
Meaning of complementary feeding	209 (47.3)	233 (52.7)
Appropriate age of introduction	268 (60.6)	174 (39.4)
Age of breastfeeding cessation	178 (40.3)	264 (59.7)
Breastfeeding frequency	318 (71.9)	124 (28.1)
Minimum meal frequency 6–8 months	200 (45.2)	242 (54.8)
Minimum meal frequency 9–11 months	192 (43.4)	250 (56.6)
Minimum meal frequency ≥ 12 months	221 (50)	221 (50)
Infant formula is appropriate	421 (95.2)	21 (4.8)
Family foods are inappropriate	69 (15.6)	373 (84.4)
Soft family foods are appropriate	427 (96.6)	15 (3.4)
Herbal tea is inappropriate	387 (87.6)	55 (12.4)
Sweet beverage is inappropriate	50 (11.3)	392 (88.7)
Adult milk is inappropriate	105 (23.8)	337 (76.2)
Breast milk is appropriate	437 (98.9)	5 (1.1)
Milk/yogurt/cheese is appropriate	407 (92.1)	35 (7.9)
Fruits/vegetables are appropriate	436 (98.6)	6 (1.4)
Plain pap is inappropriate	281 (63.6)	161 (36.4)
Pap with protein is appropriate	346 (78.3)	96 (21.7)
Pastries is inappropriate	59 (13.3)	383 (86.7)
Late complementary feeding risk	167 (37.8)	275 (62.2)
Appropriate food source	260 (58.8)	182 (41.2)
Feeding utensil	221 (50.0)	221 (50.0)

A total of 318 (71.9%) correctly identified the breastfeeding frequency, while 268 (60.6%) correctly identified the appropriate age for introducing complementary feeding. A total of 209 (47.3%) correctly defined the meaning of complementary feeding, and 178 (40.3%) correctly identified the appropriate age to stop breastfeeding.

Knowledge of minimum meal frequency with correct responses were reported by 200 (45.2%), 192 (43.4%), and 221 (50.0%) respondents for 6–8 months, 9–11 months, and 12 months and above respectively.

Correct knowledge for the recommended food groups were as follows; breast milk 437 (98.9%), fruits and vegetables 436(98.6%), soft/modified family foods 427 (96.6%), infant formula 421 (95.2%), and milk products 407 (92.1%). Knowledge was observed for inappropriate food items as follows; 69 (15.6%) correctly identifying family foods as inappropriate, 50 (11.3%) for sugary drinks, and 59 (13.3%) for pastries.

A total of 346 (78.3%) correctly identified pap with protein as appropriate, whereas 281 (63.6%) correctly identified plain pap as inappropriate. 167 (37.8%) provided correct responses to risks associated with late initiation of complementary feeding.

Furthermore, 260 (58.8%) correctly identified fortified locally available foods as the most appropriate food source, while 221 (50.0%) correctly identified cup and spoon as the appropriate feeding utensil.

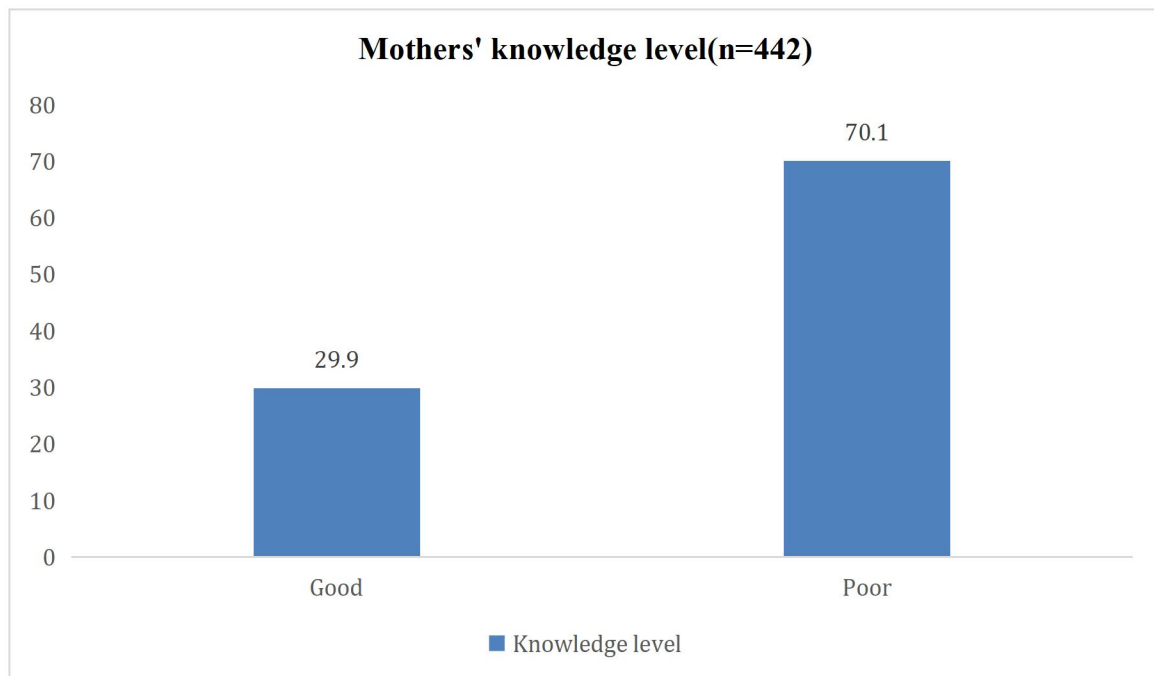


Figure 1: Overall knowledge of complementary feeding among mothers

A majority of the respondents had poor knowledge, with 310 (70.1%) while 132 (29.9%) of the mothers demonstrated good knowledge of complementary feeding.

SECTION C

FACTORS ASSOCIATED WITH MOTHERS' KNOWLEDGE OF COMPLEMENTARY FEEDING

Table 9: Association between mothers' socio-demographic characteristics and their knowledge of complementary feeding

Variables	Mothers' knowledge of complementary feeding		Test statistic	p-value
	Poor (n=310) Freq (%)	Good (n=132) Freq (%)		
Age group (years)				
< 20	7 (100.0)	0 (0.0)	*=2.919	0.231
20 – 34	202 (70.1)	86 (29.9)		
≥ 35	101 (68.7)	46 (31.3)		
Ethnicity				
Edo	160 (70.8)	66 (29.2)	$\chi^2 = 0.096$	0.835
Non-Edo	150 (69.4)	66 (30.6)		
Marital status				
Ever married	249 (65.5)	131 (34.5)	$\chi^2 = 27.480$	<0.001
Never married	61 (98.4)	1 (1.6)		
Mothers' education				
No formal education	3 (75.0)	1 (25.0)	*=77.738	<0.001
Primary	41 (97.6)	1 (2.4)		
Secondary	166 (84.7)	30 (15.3)		
Tertiary	100 (50.0)	100 (50.0)		
Employment status				
Unemployed	27 (77.1)	8 (22.9)	$\chi^2 = 0.891$	0.442
Employed	283 (69.5)	124 (30.5)		
Mother's occupation				
Skill level 1	0 (0.0)	0 (0.0)	$\chi^2 = 67.238$	<0.001
Skill level 2	17 (34.7)	32 (65.3)		
Skill level 3	97 (73.5)	35 (26.5)		
Skill level 4	22 (42.3)	30 (57.7)		
Skill level 5	147 (84.5)	27 (15.5)		
Skill level 6	27 (77.1)	8 (22.9)		

*=Fisher's exact test χ^2 =Chi square

Mothers aged 20–34 years had a slightly higher proportion of good knowledge 86 (29.9%) compared to those aged ≥ 35 years 46 (31.3%), while none of the mothers aged < 20 years demonstrated good knowledge 0 (0.0%). This observed variation was not statistically significant ($\chi^2 = 12.919$, $p = 0.231$). The proportions among Edo 66 (29.2%) and non-Edo respondents 66 (30.6%) were similar, and no statistically significant association was observed ($\chi^2 = 0.096$, $p = 0.835$). Mothers who had ever been married had a higher proportion of good knowledge 131 (34.5%) compared to those who had never been married 1 (1.6%), and this association was statistically significant ($\chi^2 = 27.480$, $p < 0.001$).

Mothers with tertiary education demonstrated higher knowledge 100 (50.0%) compared to those with secondary 30 (15.3%), primary 1 (2.4%), and no formal education 1 (25.0%), and this association was statistically significant ($\chi^2 = 77.738$, $p < 0.001$). A higher proportion of employed mothers had good knowledge 124 (30.5%) compared to unemployed mothers 8 (22.9%), although this difference was not statistically significant ($\chi^2 = 0.891$, $p = 0.442$). Higher proportions of good knowledge were observed among skill level 4 30 (57.7%) and skill level 2 32 (65.3%) compared to other levels, and this association was statistically significant ($\chi^2 = 67.238$, $p < 0.001$).

Table 10: Association between spouse's socio-economic characteristics and the mothers' knowledge of complementary feeding

Variables	Mothers' knowledge of complementary feeding		Test statistic	p-value
	Poor (n=276) Freq (%)	Good (n=131) Freq (%)		
Spouse level of education				
No formal education	3 (100.0)	0 (0.0)	*=54.549	<0.001
Primary	33 (100.0)	0 (0.0)		
Secondary	120 (81.1)	28 (18.9)		
Tertiary	120 (53.8)	103 (46.2)		
Spouse employment status				
Unemployed	7 (77.8)	2 (22.2)	*=0.419	0.725
Employed	269 (67.6)	129 (32.4)		
Spouse's occupation				
Skill level 1	1 (50.0)	1 (50.0)	*=36.824	<0.001
Skill level 2	40 (48.2)	43 (51.8)		
Skill level 3	66 (58.4)	47(41.6)		
Skill level 4	118 (82.5)	25 (17.5)		
Skill level 5	44 (77.2)	13 (22.8)		
Skill level 6	7 (77.8)	2 (22.2)		

*=Fisher's exact test χ^2 - Chi square

None of the mothers whose spouses had no formal education or primary education demonstrated good knowledge (0.0%), 28 (18.9%) of mothers with spouses who had secondary education had good knowledge, while 103 (46.2%) were among mothers whose spouses had tertiary education. This association was statistically significant ($\chi^2 = 54.549$, $p < 0.001$).

More mothers with employed spouses had good knowledge 129 (32.4%) compared to those with unemployed spouses 2 (22.2%). This association was not statistically significant ($\chi^2 = 0.419$, $p = 0.725$). Mothers with good knowledge was highest among those whose spouses were in skill level 2 occupations 43 (51.8%) and skill level 1 occupations 1 (50.0%), followed by skill level 3 at 47 (41.6%). Lower knowledge level was seen in skill level 4 at 25 (17.5%), skill level 5 at 13

(22.8%), and skill level 6 at 2 (22.2%). This association was statistically significant ($\chi^2 = 36.824$, $p < 0.001$).

Table 11: Association between mother and spouse's socio-economic characteristics and the mothers' knowledge of complementary feeding

Variables	Mothers' knowledge of complementary feeding		Test statistic	p-value
	Poor (n=310) Freq (%)	Good (n=132) Freq (%)		
Household income (₦)				
< 70000	100 (89.3)	12 (10.7)	$\chi^2 = 26.265$	<0.001
≥70000	210 (63.6)	120 (36.4)		
Socioeconomic status				
Upper	3 (100.0)	0 (0.0)	*=5.163	0.068
Middle	283 (71.5)	113 (28.5)		
Lower	24 (55.8)	19 (44.2)		

*=Fisher's exact test χ^2 =Chi square

Mothers with income $\geq$ ₦70,000 had a higher proportion of good knowledge 120 (36.4%) compared to those with income $<$ ₦70,000 12 (10.7%), and this association was statistically significant ($\chi^2 = 26.265$, $p < 0.001$).

The proportions of good knowledge were higher among the lower class 19 (44.2%) compared to the middle class 113 (28.5%), while none was observed among the upper class 0 (0.0%), and this variation was not statistically significant (* = 5.163, $p = 0.068$).

Table 12: Association between index child characteristics and the knowledge of complementary feeding

Variables	Mothers' knowledge of complementary feeding		Test statistic	p-value
	Poor (n=310) Freq (%)	Good (n=132) Freq (%)		
Age of child (months)				
6–8	67 (68.4)	31 (31.6)	$\chi^2 = 8.805$	0.012
9–11	31 (54.4)	26 (45.6)		
≥12	212 (73.9)	75 (26.1)		
Sex of child				
Female	168 (71.2)	68 (28.8)	$\chi^2 = 0.267$	0.677
Male	142 (68.9)	64 (31.1)		
Birth order				
1	79 (68.1)	37 (31.9)	$\chi^2 = 5.472$	0.139
2 – 3	133 (67.9)	63 (32.1)		
4 – 5	78 (72.2)	30 (27.8)		
≥ 6	20 (90.9)	2 (9.1)		
Number of children				
1 – 2	161 (66.8)	80 (33.2)	$\chi^2 = 6.713$	0.034
3 – 4	91 (69.5)	40 (30.5)		
≥ 5	58 (82.9)	12 (17.1)		
Number of under-five children				
1 – 2	296 (70.1)	126 (29.9)	$\chi^2 = 0.000$	>0.999
3 – 4	14 (70.0)	6 (30.0)		
χ^2 - Chi square				

A higher proportion of mothers with children aged 9–11 months had good knowledge 26 (45.6%) compared to those aged 6–8 months 31 (31.6%) and those aged ≥12 months 75 (26.1%). This association was statistically significant ($\chi^2 = 8.805$, $p = 0.012$).

A slightly higher proportion of mothers with male children had good knowledge 64 (31.1%) compared to those with female children 68 (28.8%). This association was not statistically significant ($\chi^2 = 0.267$, $p = 0.677$).

The proportion of mothers with good knowledge was similar among those with birth order 1 at 37 (31.9%) and birth order 2–3 at 63 (32.1%), but lower among birth order 4–5 at 30 (27.8%) and markedly lower among those with birth order ≥ 6 at 2 (9.1%). This association was not statistically significant ($\chi^2 = 5.472$, $p = 0.139$).

A higher proportion of mothers with 1–2 children had good knowledge 80 (33.2%) compared to those with 3–4 children 40 (30.5%) and those with ≥ 5 children 12 (17.1%). This association was statistically significant ($\chi^2 = 6.713$, $p = 0.034$).

The proportion of mothers with good knowledge was similar among those with 1–2 under-five children 126 (29.9%) and those with 3–4 under-five children 6 (30.0%). This association was not statistically significant ($\chi^2 = 0.000$, $p > 0.999$).

Table 13: Predictors of good knowledge of complementary feeding among mothers

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Mothers' age	-0.031	0.970	0.921	1.021	0.240
Ethnicity					
Edo*		1			
Non-Edo	0.088	1.092	0.684	1.743	0.713
Marital status					
Never married		1			
Ever married	3.033	20.767	2.641	163.319	0.004
Mothers' educational status					
Non-Tertiary*		1			
Tertiary	1.490	4.438	2.554	7.711	<0.001
Mothers' occupation					
Lower skill level*		1			
Higher skill level	0.072	1.075	0.646	1.787	0.782
Household income (₦)					
< 70,000*		1			
≥ 70,000	0.398	1.489	0.703	3.152	0.298
Socio-economic status					
Lower		1			
Higher	-0.209	0.811	0.372	1.771	0.599

CI = Confidence interval; *reference category

Mothers' age was not a significant predictor of good knowledge of complementary feeding (OR = 0.970; 95% CI: 0.921–1.021; p = 0.240), indicating that with increasing age, mothers were 0.97 times as likely to have good knowledge.

Non-Edo mothers were 1.092 times more likely to have good knowledge compared to Edo mothers (OR = 1.092; 95% CI: 0.684–1.743; $p = 0.713$), although this was not statistically significant.

Marital status was a significant predictor, as mothers who had ever been married were 20.767 times more likely to have good knowledge compared to those never married (OR = 20.767; 95% CI: 2.641–163.319; $p = 0.004$).

Mothers with tertiary education were 4.438 times more likely to have good knowledge compared to those with non-tertiary education (OR = 4.438; 95% CI: 2.554–7.711; $p < 0.001$), and this association was statistically significant.

Mothers with higher skill level occupations were 1.075 times more likely to have good knowledge compared to those with lower skill level occupations (OR = 1.075; 95% CI: 0.646–1.787; $p = 0.782$), though this was not statistically significant.

Mothers with a household income $\geq 70,000$ were 1.489 times more likely to have good knowledge compared to those earning less than 70,000 (OR = 1.489; 95% CI: 0.703–3.152; $p = 0.298$), but this was not statistically significant.

Mothers from higher socio-economic status households were 0.811 times as likely to have good knowledge compared to those from lower socio-economic status households (OR = 0.811; 95% CI: 0.372–1.771; $p = 0.599$), although this was not statistically significant.

Table 13 cont'd: Predictors of good knowledge of complementary feeding among mothers

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Age of index child(months)					
6-8*		1			
9-11	0.634	1.885	0.847	4.196	0.120
≥ 12	-0.438	0.646	0.361	1.154	0.140
Sex of index child					
Female*		1			
Male	0.109	1.116	0.700	1.778	0.645
Birth order of child					
1-3*		1			
≥ 4	0.075	1.078	0.178	6.520	0.935
Number of children					
1-3*		1			
≥ 4	-0.335	0.716	0.119	4.287	0.714
Number of under-five children					
1-2*		1			
≥ 3	-0.205	0.814	0.266	2.492	0.719

CI = Confidence interval; *reference category

Mothers of children aged 9–11 months were 1.885 times more likely to have good knowledge compared to those with children aged 6–8 months (OR = 1.885; 95% CI: 0.847–4.196; p = 0.120), while those with children aged ≥ 12 months were 0.646 times less likely to have good knowledge (OR = 0.646; 95% CI: 0.361–1.154; p = 0.140). These associations were not statistically significant.

Mothers with male index children were 1.116 times more likely to have good knowledge compared to those with female children (OR = 1.116; 95% CI: 0.700–1.778; $p = 0.645$), though not statistically significant.

Mothers with a birth order of ≥ 4 were 1.078 times more likely to have good knowledge compared to those with birth order 1–3 (OR = 1.078; 95% CI: 0.178–6.520; $p = 0.935$), and this was not statistically significant.

Mothers with ≥ 4 children were 0.716 times less likely to have good knowledge compared to those with 1–3 children (OR = 0.716; 95% CI: 0.119–4.287; $p = 0.714$), though this was not statistically significant.

Finally, mothers with ≥ 3 under-five children were 0.814 times less likely to have good knowledge compared to those with 1–2 under-five children (OR = 0.814; 95% CI: 0.266–2.492; $p = 0.719$), and this was not statistically significant.

SECTION D

MOTHERS' PRACTICE OF COMPLEMENTARY FEEDING

Table 14: Mothers' practice of complementary feeding

Variables	Frequency	Percent
Still breastfeeding (n=442)		
Yes	250	56.6
No	192	43.4
Reason for cessation breastfeeding (n=192)		
Because of work	32	16.7
Got pregnant/had another child	22	11.5
Baby bites while feeding	20	10.4
Breast pain/ soreness	18	9.4
Think child is old enough	18	9.4
Too stressful	17	8.9
Child stopped sucking	16	8.3
Personal choice	10	5.2
No longer lactating	8	4.1
Child eats family foods well	8	4.1
Mother was tired	8	4.1
Child started school	5	2.6
Due to mother's health	4	2.1
To avoid sagging of breast	3	1.6
Others*	3	1.6
Breastfeeding frequency (n=250)		
On demand	147	58.8
>3 times	41	16.4
3 times	9	3.6
2times	24	9.6
I don't breastfeed daily	29	11.6

*-to ensure child eats family foods, child was not growing well

A total of 250 (56.6%) were still breastfeeding, while 192 (43.4%) were no longer breastfeeding. Cessation of breastfeeding due to work was reported by 32 (16.7%). Getting pregnant or having another child accounted for 22 (11.5%), while 20 (10.4%) stopped because the baby bites during feeding. Breast pain or soreness and the perception that the child was old enough were each reported by 18 (9.4%), while 17 (8.9%) stopped because it was too stressful. Child stopping sucking was reported by 16 (8.3%), and personal choice accounted for 10 (5.2%). No longer lactating was reported by 8 (4.1%). Child eating family foods well and maternal tiredness were each reported by 8 (4.1%), while 5 (2.6%) stopped because the child started school. Maternal health reasons accounted for 4 (2.1%), while 3 (1.6%) stopped to avoid sagging of the breast. Other reasons were reported by 3 (1.6%).

Breastfeeding on demand was practiced by 147 (58.8%). A smaller proportion breastfed more than three times daily 41 (16.4%), while 9 (3.6%) breastfed three times daily and 24 (9.6%) breastfed two times daily. However, 29 (11.6%) reported that they did not breastfeed daily.

Table 14 cont'd: Mothers' practice of complementary feeding

Variables	Frequency	Percent
Age breastfeeding was stopped (months) (n=192)		
1 – 6	3	1.5
7 – 12	103	53.6
13 – 18	70	36.5
19 – 23	8	4.2
Unspecified	8	4.2
Mean $\pm$ SD = 12.9$\pm$3.4		
Introduction of complementary feeding (n=442)		
Yes	404	91.4
No	38	8.6
Reasons for not starting complementary feeds (n=38)		
Child just completed 6 months	25	65.8
Child stomach isn't strong enough	2	5.3
Child rejects complementary foods	3	7.9
Lack of money for baby foods	4	10.5
Not specified	4	10.5
Age at introduction (months) (n=404)		
6	227	56.2
< 6	136	33.7
> 6	41	10.1
Mean $\pm$ SD = 5.7$\pm$1.9		
Complementary feeding schedule (n=404)		
Anytime child cues	142	35.1
At scheduled times	163	40.3
When family is eating	22	5.5
I don't know	77	19.1

Breastfeeding was stopped between 1–6 months in 3 (1.5%), between 7–12 months in 103 (53.6%), between 13–18 months in 70 (36.5%), and between 19–24 months in 8 (4.4%). Complementary feeding had been introduced by 404 (91.4%), while 38 (8.6%) had not introduced complementary feeding.

Not starting complementary feeding because the child had just completed 6 months was reported by 25 (65.8%). The belief that the child's stomach was not strong enough was reported by 2 (5.3%), while 3 (7.9%) reported that the child rejects complementary foods. Lack of money for baby foods was reported by 4 (10.5%), and those that didn't specify accounted for 4 (10.5%).

Complementary feeding was introduced at 6 months by 227 (56.2%) respondents, 136 (33.7%) introduced before 6 months, while 41 (10.1%) introduced it after 6 months.

Feeding at scheduled times was reported by 163 (40.3%), while 142 (35.1%) fed anytime the child cues. Feeding when the family was eating was reported by 22 (5.5%), and 77 (19.1%) reported that they did not know the appropriate timing.

Table 14 cont'd: Mothers' practice of complementary feeding

Variables	Frequency (n=404)	Percent
Feeding utensil		
Cup and spoon	261	64.6
Feeding bottle	24	5.9
Both	72	17.8
Handfeeding	47	11.7
Food consistency		
Thick enough to stay on spoon	227	56.2
Same as everyone	146	36.1
Light as breastmilk	31	7.7
Feeding during illness or loss of appetite		
Feed slowly and patiently	176	43.6
Give favourite food	48	11.9
Feed forcefully	83	20.5
Reduce feeding	67	16.6
Reprimand the child	30	7.4

Use of cup and spoon was reported by 261 (64.6%), while 24 (5.9%) used a feeding bottle. A combination of both methods was used by 72 (17.8%), and 47 (11.7%) practiced hand feeding.

Food that was thick enough to stay on the spoon was given by 227 (56.2%), while 146 (36.1%) fed children food similar to what the rest of the family eats. Food as light as breastmilk was given by 31 (7.7%).

During illness or loss of appetite, feeding slowly and patiently was practiced by 176 (43.6%). Giving favourite food was reported by 48 (11.9%), while 83 (20.5%) fed children forcefully. Reduction in feeding was reported by 67 (16.6%), and 30 (7.4%) reprimanded the child.

Table 14 cont'd: Mothers' practice of complementary feeding

Variables	Frequency (n=404)	Percent
Washes hand with soap and water		
Always	161	39.8
Sometimes	227	56.2
Never	16	4.0
Sterilization of utensils		
Always	306	75.7
Sometimes	78	19.3
Never	20	5.0
Dietary diversity (≥ 5 recommended food groups)		
Yes	167	41.3
No	237	58.7
Unhealthy food consumption		
Sweet beverages		
Yes	165	40.8
No	239	59.2
Snacks/Pastries		
Yes	281	69.6
No	123	30.4
Salt addition		
Yes	6	1.5
No	398	98.5

Hand washing with soap and water was practiced always by 161 (39.8%), while 227 (56.2%) practiced it sometimes and 16 (4.0%) never practiced it. Sterilization of utensils was always practiced by 306 (75.7%), while 78 (19.3%) practiced it sometimes and 20 (5.0%) never practiced it. Consumption of ≥ 5 recommended food groups was reported by 167 (41.3%), while 237 (58.7%) reported taking less than 5. Consumption of sweet beverages was reported by 165 (40.8%), Pastries were consumed by 281 (69.6%), Salt was added to children's food by 6 (1.5%).

Table 15: Mothers' practice of feeding frequency by age

Variables	Frequency	Percent
Minimum feeding frequency 6-8 months (n=62)		
< 2 times	11	17.7
2-3 times	15	24.2
3-5 times	9	14.5
> 5 times	11	17.7
I don't know	16	25.8
Minimum feeding frequency 9-11 months (n=55)		
< 3 times	11	20.0
3-4 times	20	36.4
4-6 times	10	18.2
> 6 times	8	14.5
I don't know	6	10.9
Minimum feeding frequency ≥ 12 months (n=287)		
< 3 times	25	8.7
3-4 times	60	20.9
4-6 times	90	31.4
> 6 times	32	11.1
I don't know	80	27.9

For children aged 6–8 months, feeding less than two times was reported by 11 (17.7%). Feeding 2–3 times was reported by 15 (24.2%), while 9 (14.5%) fed 3–5 times and 11 (17.7%) fed more than five times. A total of 16 (25.8%) reported that they did not know.

For children aged 9–11 months, feeding less than three times was reported by 11 (20.0%). Feeding 3–4 times was reported by 20 (36.4%), while 10 (18.2%) fed 4–6 times and 8 (14.5%) fed more than six times. A total of 6 (10.9%) reported that they did not know.

For children aged 12 months and above, feeding less than three times was reported by 25 (8.7%). Feeding 3–4 times was reported by 60 (20.9%), while 90 (31.4%) fed 4–6 times and 32 (11.1%) fed more than six times. A total of 80 (27.9%) reported that they did not know.

Table 16: Domains of mothers' practice of complementary feeding

Practice domains	Appropriate n (%)	Inappropriate n (%)
Still breastfeeding	250 (56.6)	192 (43.4)
Breastfeeding frequency	147 (33.3)	295 (66.7)
Introduction of complementary feeding	404 (91.4)	38 (8.6)
Age at introduction	227 (56.2)	176 (43.7)
Feeding schedule	142 (35.1)	262 (64.9)
Feeding utensil	261 (64.6)	143 (35.4)
Food consistency	227 (56.2)	177 (43.8)
Handwashing	163 (40.3)	241 (59.7)
Sterilization	306 (76.0)	98 (24)
Responsive feeding	224 (55.4)	180 (44.6)
Age-based feeding frequency	256(63.4)	148(36.6)
Dietary diversity	167 (41.3)	237 (58.7)
Sweet beverages	232 (57.4)	172 (42.6)
Snacks	121 (30.0)	283 (70.0)
Salt addition	398 (98.5)	6 (1.5)

A total of 250 (56.6%) respondents were still breastfeeding, while 192 (43.4%) were not. However, appropriate breastfeeding frequency was observed in 147 (33.3%) respondents, while 295 (66.7%) had inappropriate breastfeeding practices.

The respondents who had introduced complementary feeding were 404 (91.4%), while 38 (8.6%) had not introduced complementary feeding. Of these, 227 (56.2%) respondents introduced complementary feeding at the right age, while 176 (43.7%) did not. The right feeding schedule was reported by 142 (35.1%) respondents, while 262 (64.9%) did not practice the right feeding schedule.

A total of 261 (64.6%) respondents used the right utensil for feeding, while 143 (35.4%) used the wrong utensils. Similarly, appropriate food consistency was reported by 227 (56.2%) respondents, while 177 (43.8%) was inappropriate.

A total of 163 (40.3%) respondents practiced appropriate hand hygiene, while 241 (59.7%) did not. However, a higher proportion, 306 (76.0%), practiced appropriate sterilization of utensils, while 98 (24.0%) did not.

Responsive feeding was practiced appropriately by 224 (55.4%) respondents, while 180 (44.6%) had inappropriate practices.

The respondents who met the minimum dietary diversity were 167 (41.3%), while 237 (58.7%) did not. A total of 232 (57.4%) respondents appropriately avoided sweet beverage consumption, while 172 (42.6%) did. In contrast, only 121 (30.0%) respondents appropriately avoided pastries, while 283 (70.0%) had inappropriate practice. Appropriate salt addition practices were reported by 398 (98.5%) respondents, while only 6 (1.5%) had inappropriate practices.

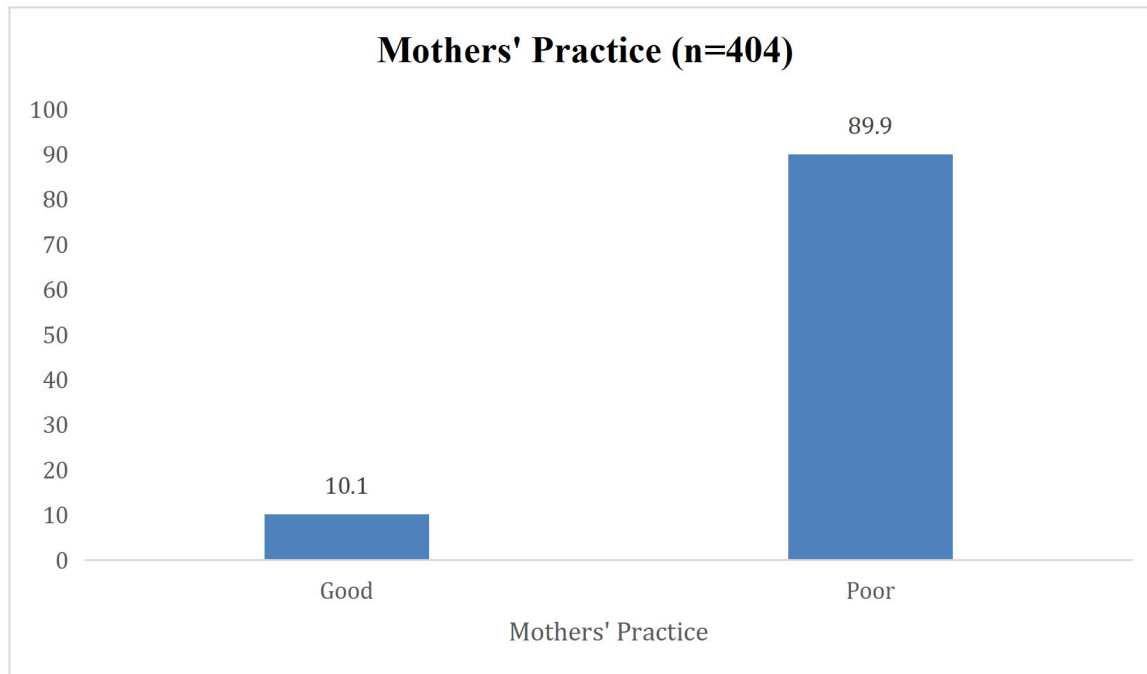


Figure 2: Overall practice of complementary feeding among mothers

A majority of the respondents had poor practice with 363 (89.9%), while 41 (10.1%) of the mothers demonstrated good practice of complementary feeding.

MINIMUM MEAL FREQUENCY (MMF)

Table 17: Age-based feeding frequency and breastfeeding status

Feeding frequency	Breastfed n (%)	Not Breastfed n (%)
6-8 months (n=62)		
< 2 times	10(17.2)	1(20.0)
2-3 times	15(27.6)	0(0.0)
3-5 times	9(15.5)	0(0.0)
> 5 times	7(12.1)	4(80.0)
I don't know	16(27.6)	0(0.0)
9-11 months (n=55)		
< 3 times	9(18.0)	2(40.0)
3-4 times	19(38.0)	1(20.0)
4-6 times	9(18.0)	1(20.0)
> 6 times	7(14.0)	1(20.0)
I don't know	6(12.0)	0(0.0)
≥12 months (n=287)		
< 3 times	10(9.4)	15(7.3)
3-4 times	19(17.9)	41(22.9)
4-6 times	41(38.7)	49(27.4)
> 6 times	7(6.6)	25(14.0)
I don't know	29(27.4)	51(28.5)

MMF

no. of children 6-23 months of age who consumed solid, semi-solid or soft foods at least the
 minimum number of times during the previous day

 no. of children aged 6-23 months

Breastfed children

No of children (6-8) who consumed feeds at least 2 times= $15+9+7=31$

No of children (9-11) who ate at least 3 times= $19+9+7=35$

No of children (≥ 12) who ate at least 3 times= $19+41+7=67$

Non-breastfed children

No of children (6-8) who consumed feeds at least 4 times = 4

No of children (9-11) who ate at least 4 times = $1+1=2$

No of children (≥ 12) who ate at least 4 times = $49+25=74$

Total no. of children who met the MMF = 213

Total no. of children in study = 442

$MMF = 213 / 442$

$MMF = 0.482$

Therefore, MMF is 48.2%

MINIMUM ACCEPTABLE DIET

$$\frac{\text{no. of children 6-23 months of age who consumed a minimum acceptable diet during the previous day}}{\text{no. of children aged 6-23 months}}$$

Breastfed children who consumed a minimum acceptable diet during the previous day

6-8 months = 6 9-11 months = 8

≥12 months = 36

Non-breastfed children who consumed a minimum acceptable diet during the previous day

6-8 months = 1

9-11 months = 1

≥12 months = 32

Total no. of children who met the MAD = 84

Total no. of children in study = 442

MAD = 84 / 442

MAD = 0.190

Therefore, MAD is 19.0%

SECTION E

**FACTORS ASSOCIATED WITH MOTHERS' PRACTICE OF COMPLEMENTARY
FEEDING**

Table 18: Association between mothers' socio-demographic characteristics and their practice of complementary feeding

Variables	Mothers' practice of complementary feeding		Test statistic	p-value
	Poor (n=363) Freq (%)	Good (n=41) Freq (%)		
Age group (years)				
< 20	6 (100.0)	0 (0.0)	$\chi^2=4.601$	0.100
20 – 34	238 (91.9)	21 (8.1)		
≥ 35	119 (85.6)	20 (14.4)		
Ethnicity				
Edo	185 (88.5)	24 (11.5)	$\chi^2=0.846$	0.358
Non-Edo	178 (91.3)	17 (8.7)		
Marital status				
Ever married	311 (88.4)	41 (11.6)	$\chi^2=6.741$	0.009
Never married	52 (100.0)	0 (0.0)		
Mothers' education				
No formal education	2 (66.7)	1 (33.3)	$\chi^2=19.547$	<0.001
Primary	42 (100.0)	0 (0.0)		
Secondary	163 (94.8)	9 (5.2)		
Tertiary	156 (83.4)	31 (16.6)		
Employment status				
Unemployed	26 (83.9)	5 (16.1)	$\chi^2=1.317$	0.251
Employed	337 (90.3)	36 (9.7)		
Mother's occupation				
Skill level 1	0 (0.0)	0 (0.0)	$\chi^2=21.769$	<0.001
Skill level 2	35 (74.5)	12 (25.5)		
Skill level 3	109 (88.6)	14 (11.4)		
Skill level 4	43 (89.6)	5 (10.4)		
Skill level 5	150 (96.8)	5 (3.2)		
Skill level 6	26 (83.9)	5 (16.1)		

χ^2 - Chi square

Mothers aged ≥ 35 years had a higher proportion of good practice 20 (14.4%) compared to those aged 20–34 years 21 (8.1%), while none of the mothers aged < 20 years demonstrated good practice 0 (0.0%). This difference was not statistically significant ($\chi^2 = 4.601$, $p = 0.100$).

The proportion of good practice among Edo mothers 24 (11.5%) was comparable to that among non-Edo mothers 17 (8.7%), with no statistically significant association observed ($\chi^2 = 0.846$, $p = 0.358$).

A higher proportion of good practice was observed among mothers who had ever been married 41 (11.6%) compared to those who had never been married, among whom none demonstrated good practice 0 (0.0%). This association was statistically significant ($\chi^2 = 6.741$, $p = 0.009$).

Mothers with tertiary education had the highest proportion of good practice 31 (16.6%), followed by those with secondary education 9 (5.2%), while none of the mothers with primary education demonstrated good practice 0 (0.0%). Although 1 (33.3%) of those with no formal education had good practice, this was based on very few respondents. This association was statistically significant ($\chi^2 = 19.547$, $p < 0.001$).

A higher proportion of good practice was seen among unemployed mothers 5 (16.1%) compared to employed mothers 36 (9.7%), although this difference was not statistically significant ($\chi^2 = 1.317$, $p = 0.251$).

Good practice was most common among mothers in skill level 2 occupations 12 (25.5%), followed by skill level 6, 5 (16.1%), and skill level 3, 14 (11.4%). Lower proportions were observed in skill level 4, 5 (10.4%), and skill level 5, 5 (3.2%), while none of those in skill level 1 demonstrated good practice. This association was statistically significant ($\chi^2 = 21.769$, $p < 0.001$).

Table 19: Association between spouse's socio-economic characteristics and the mothers' practice of complementary feeding

Variables	Mothers' practice of complementary feeding		Test statistic	p-value
	Poor (n=363)	Good (n=41)		
	Freq (%)	Freq (%)		
Spouse level of education				
No formal education	2 (100.0)	0 (0.0)	$\chi^2=17.164$	<0.001
Primary	29 (100.0)	0 (0.0)		
Secondary	130 (95.6)	6 (4.4)		
Tertiary	173 (83.2)	35 (16.8)		
Spouse employment status				
Unemployed	7 (87.5)	1 (12.5)	$\chi^2=0.021$	0.886
Employed	327 (89.1)	40 (10.9)		
Spouse's occupation				
Skill level 1	0 (0.0)	1 (100.0)	$\chi^2=24.487$	<0.001
Skill level 2	60 (78.9)	16 (21.1)		
Skill level 3	91 (86.7)	14 (13.3)		
Skill level 4	123 (93.9)	8 (6.1)		
Skill level 5	53 (98.1)	1 (1.9)		
Skill level 6	7 (87.5)	1 (12.5)		
χ^2 - Chi square				

None of the mothers whose spouses had no formal education or primary education demonstrated good practice of complementary feeding (0.0%), while a small proportion of those whose spouses had secondary education had good practice 6 (4.4%). This proportion increased among those whose spouses had tertiary education to 35 (16.8%). This association was statistically significant ($\chi^2 = 17.164$, $p < 0.001$).

A slightly higher proportion of mothers with unemployed spouses had good practice 1 (12.5%) compared to those with employed spouses 40 (10.9%). This association was not statistically significant ($\chi^2 = 0.021$, $p = 0.886$).

The proportion of mothers with good practice was highest among those whose spouses were in skill level 1 occupations 1 (100.0%), followed by skill level 2 at 16 (21.1%), skill level 3 at 14 (13.3%), and skill level 6 at 1 (12.5%). Lower proportions were observed in skill level 4 at 8 (6.1%) and skill level 5 at 1 (1.9%). This association was statistically significant ($\chi^2 = 24.487$, $p < 0.001$).

Table 20: Association between mother and spouse's socio-economic characteristics and the mothers' practice of complementary feeding

Variables	Mothers' practice of complementary feeding		Test statistic	p-value
	Poor (n=363) Freq (%)	Good (n=41) Freq (%)		
Income				
< 70000	95 (96.9)	3 (3.1)	$\chi^2=7.127$	0.008
≥ 70000	268 (87.6)	38 (12.4)		
Socioeconomic status				
Upper	3 (100.0)	0 (0.0)	$\chi^2=1.190$	0.552
Middle	324 (90.3)	35 (9.7)		
Lower	36 (85.7)	6 (14.3)		

χ^2 - Chi square

Households earning $\geq 70,000$ had a higher proportion of good practice 38 (12.4%) compared to those earning $< 70,000$, among whom only 3 (3.1%) demonstrated good practice. This difference was statistically significant ($\chi^2 = 7.127$, $p = 0.008$).

The proportion of good practice was slightly higher among mothers in the lower socioeconomic class 6 (14.3%) compared to the middle class 35 (9.7%), while none of those in the upper class demonstrated good practice 0 (0.0%). This variation was not statistically significant ($\chi^2 = 1.190$, $p = 0.552$).

Table 21: Association between index child characteristics and the mothers' practice of complementary feeding

Variables	Mothers' practice of complementary feeding		Test statistic	p-value
	Poor (n=363)	Good (n=41)		
	Freq (%)	Freq (%)		
Age of child(months)				
6–8	52 (83.9)	10 (16.1)	$\chi^2=26.703$	<0.001
9–11	40 (72.7)	15 (27.3)		
≥12	271 (94.4)	16 (5.6)		
Sex of child				
Female	189 (89.6)	22 (10.4)	$\chi^2=0.037$	0.847
Male	174 (90.2)	19 (9.8)		
Birth order				
1	96 (92.3)	8 (7.7)	$\chi^2=3.615$	0.306
2 – 3	158 (87.8)	22 (12.2)		
4 – 5	91 (89.2)	11 (10.8)		
≥ 6	18 (100.0)	0 (0.0)		
Number of children				
1 – 2	200 (91.3)	19 (8.7)	$\chi^2=2.923$	0.232
3 – 4	104 (86.0)	17 (14.0)		
≥ 5	59 (92.2)	5 (7.8)		
Number of under-five children				
1 – 2	347 (89.9)	39 (10.1)	$\chi^2=0.019$	>0.999
3 – 4	16 (88.9)	2 (11.1)		
χ^2 - Chi square				

A higher proportion of mothers with children aged 9–11 months had good practice of complementary feeding 15 (27.3%) compared to those aged 6–8 months 10 (16.1%) and those aged ≥ 12 months 16 (5.6%). This association was statistically significant ($\chi^2 = 26.703$, $p < 0.001$).

A slightly higher proportion of mothers with female children had good practice 22 (10.4%) compared to those with male children 19 (9.8%). This association was not statistically significant ($\chi^2 = 0.037$, $p = 0.847$).

The proportion of mothers with good practice was highest among those with birth order 2–3 at 22 (12.2%), followed by birth order 4–5 at 11 (10.8%) and birth order 1 at 8 (7.7%), while none of the mothers with birth order ≥ 6 demonstrated good practice (0.0%). This association was not statistically significant ($\chi^2 = 3.615$, $p = 0.306$).

A higher proportion of mothers with 3–4 children had good practice 17 (14.0%) compared to those with 1–2 children 19 (8.7%) and those with ≥ 5 children 5 (7.8%). This association was not statistically significant ($\chi^2 = 2.923$, $p = 0.232$).

The proportion of mothers with good practice was similar among those with 3–4 under-five children 2 (11.1%) and those with 1–2 under-five children 39 (10.1%). This association was not statistically significant ($\chi^2 = 0.019$, $p > 0.999$).

Table 22: Association between the mothers' knowledge level and their practice of complementary feeding

Variables	Mothers' practice of complementary feeding		Test statistic	p-value
	Poor (n=363) Freq (%)	Good (n=41) Freq (%)		
Knowledge level				
Good	95 (76.6)	29 (23.4)	$\chi^2=34.387$	<0.001
Poor	268 (95.7)	12 (4.3)		

χ^2 - Chi square

Mothers with good knowledge demonstrated a markedly higher proportion of good practice 29 (23.4%) compared to those with poor knowledge 12 (4.3%). This association was statistically significant ($\chi^2 = 34.387$, $p < 0.001$).

Table 23: Predictors of good practice of complementary feeding among mothers

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Mothers' age	0.045	1.046	0.970	1.127	0.243
Ethnicity					
Edo*		1			
Non-Edo	-0.059	0.943	0.446	1.993	0.878
Marital status					
Never married		1			
Ever married	17.719	4958809 2.392	0.000	—	0.997
Mothers' educational status					
Non-Tertiary*		1			
Tertiary	0.664	1.943	0.750	5.029	0.171
Mothers' occupation					
Lower skill level*		1			
Higher skill level	0.778	2.178	0.960	4.940	0.062
Household income					
< 70,000*		1			
≥ 70,000	0.127	1.136	0.281	4.586	0.858
Socio-economic status					
Lower		1			
Higher	-0.438	0.645	0.203	2.054	0.458

CI = Confidence interval; *reference category

Mothers' age was associated with a slight increase in the likelihood of good complementary feeding practice (OR = 1.046; 95% CI: 0.970–1.127; p = 0.243), though this was not statistically significant.

Non-Edo mothers were 0.943 times less likely to have good complementary feeding practice compared to Edo mothers (OR = 0.943; 95% CI: 0.446–1.993; $p = 0.878$), but this was not statistically significant.

Mothers who had ever been married were more likely to have good complementary feeding practice compared to those who had never been married (OR = 49588092.392; 95% CI: 0.000—; $p = 0.997$), although this estimate was unstable and not statistically significant.

Mothers with tertiary education were 1.943 times more likely to have good complementary feeding practice compared to those with non-tertiary education (OR = 1.943; 95% CI: 0.750–5.029; $p = 0.171$), but this was not statistically significant.

Mothers with higher skill occupations were 2.178 times more likely to have good complementary feeding practice compared to those with lower skill occupations (OR = 2.178; 95% CI: 0.960–4.940; $p = 0.062$), although this did not reach statistical significance.

Mothers with higher income ($\geq 70,000$) were 1.136 times more likely to have good complementary feeding practice compared to those earning $< 70,000$ (OR = 1.136; 95% CI: 0.281–4.586; $p = 0.858$), but this was not statistically significant.

Mothers from higher socioeconomic status households were 0.645 times less likely to have good complementary feeding practice compared to those from lower socioeconomic status (OR = 0.645; 95% CI: 0.203–2.054; $p = 0.458$), though not statistically significant.

Table 23 cont'd: Predictors of good practice of complementary feeding among mothers

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Age of index child(months)					
6-8*		1			
9-11	0.684	1.982	0.690	5.689	0.204
≥ 12	-1.095	0.335	0.132	0.846	0.021
Sex of index child					
Female*		1			
Male	-0.171	0.843	0.404	1.759	0.648
Birth order of child					
1-3*		1			
≥ 4	-0.469	0.625	0.057	6.905	0.702
Number of children					
1-3*		1			
≥ 4	0.387	1.472	0.139	15.651	0.748
Number of under-five children					
1-2*		1			
≥ 3	-0.063	0.939	0.166	5.317	0.943
Knowledge level					
Poor*		1			
Good	1.326	3.767	1.686	8.416	0.001

CI = Confidence interval; *reference category

Mothers of children aged 9–11 months were 1.982 times more likely to have good complementary feeding practice compared to those with children aged 6–8 months (OR = 1.982; 95% CI: 0.690–5.689; $p = 0.204$), while those with children aged ≥ 12 months were 0.335 times less likely to have good complementary feeding practice (OR = 0.335; 95% CI: 0.132–0.846; $p = 0.021$). This latter association was statistically significant.

Mothers with male index children were 0.843 times less likely to have good complementary feeding practice compared to those with female children (OR = 0.843; 95% CI: 0.404–1.759; $p = 0.648$), though not statistically significant.

Mothers with a birth order >3 were 0.625 times less likely to have good complementary feeding practice compared to those with birth order 1–3 (OR = 0.625; 95% CI: 0.057–6.905; $p = 0.702$), though not statistically significant.

Mothers with more than three children were 1.472 times more likely to have good complementary feeding practice compared to those with 1–3 children (OR = 1.472; 95% CI: 0.139–15.651; $p = 0.748$), but this was not statistically significant.

Mothers with >2 under-five children were 0.939 times less likely to have good complementary feeding practice compared to those with 1–2 under-five children (OR = 0.939; 95% CI: 0.166–5.317; $p = 0.943$), but this was not statistically significant.

Mothers with good knowledge were 3.767 times more likely to have good complementary feeding practice compared to those with poor knowledge (OR = 3.767; 95% CI: 1.686–8.416; $p = 0.001$), and this association was statistically significant.

SECTION F

DIETARY DIVERSITY AMONG CHILDREN AGED 6-23 MONTHS

Table 24: 24-Hour recall of children of respondents

Variables	Frequency (n=404)	Percent
Breastmilk		
Yes	207	51.2
No	197	48.8
Grains, tubers and plantain		
Yes	362	89.6
No	42	10.4
Beans, groundnut, lentils, peas, nuts, seeds		
Yes	257	63.6
No	147	36.4
Milk, cheese, yoghurt, infant formula		
Yes	262	64.9
No	142	35.1
Fish, meat, poultry, snails, organ meat		
Yes	198	49.0
No	206	51.0
Eggs		
Yes	168	41.6
No	236	58.4
Vitamin A-rich vegetables		
Yes	186	46.0
No	218	54.0
Other vegetables		
Yes	47	11.6
No	357	88.4
Sweet beverages, herbs, tea		
Yes	172	42.6
No	232	57.4
Pastries, fries, chocolate, noodles		
Yes	283	70.0
No	121	30.0

A total of 207 (51.2%) children consumed breastmilk within the last 24 hours, while 197 (48.8%) did not. Grains, tubers and plantain were consumed by 362 (89.6%) children, whereas 42 (10.4%) did not consume this food group.

A total of 257 (63.6%) children consumed legumes and nuts (beans, groundnut, lentils, peas, nuts, and seeds) within the last 24 hours, while 147 (36.4%) did not. Similarly, 262 (64.9%) children consumed milk and milk products (milk, cheese, yoghurt, infant formula) within the last 24 hours, whereas 142 (35.1%) did not.

Fish, meat, poultry, snails, and organ meat were consumed by 198 (49.0%) children, while 206 (51.0%) did not consume this food group within the last 24 hours. Eggs were consumed by 168 (41.6%) children, while 236 (58.4%) did not consume eggs. Vitamin A-rich vegetables were consumed by 186 (46.0%) children, whereas 218 (54.0%) did not consume this food group.

A total of 47 (11.6%) children consumed other vegetables within the last 24 hours, while 357 (88.4%), did not consume other vegetables.

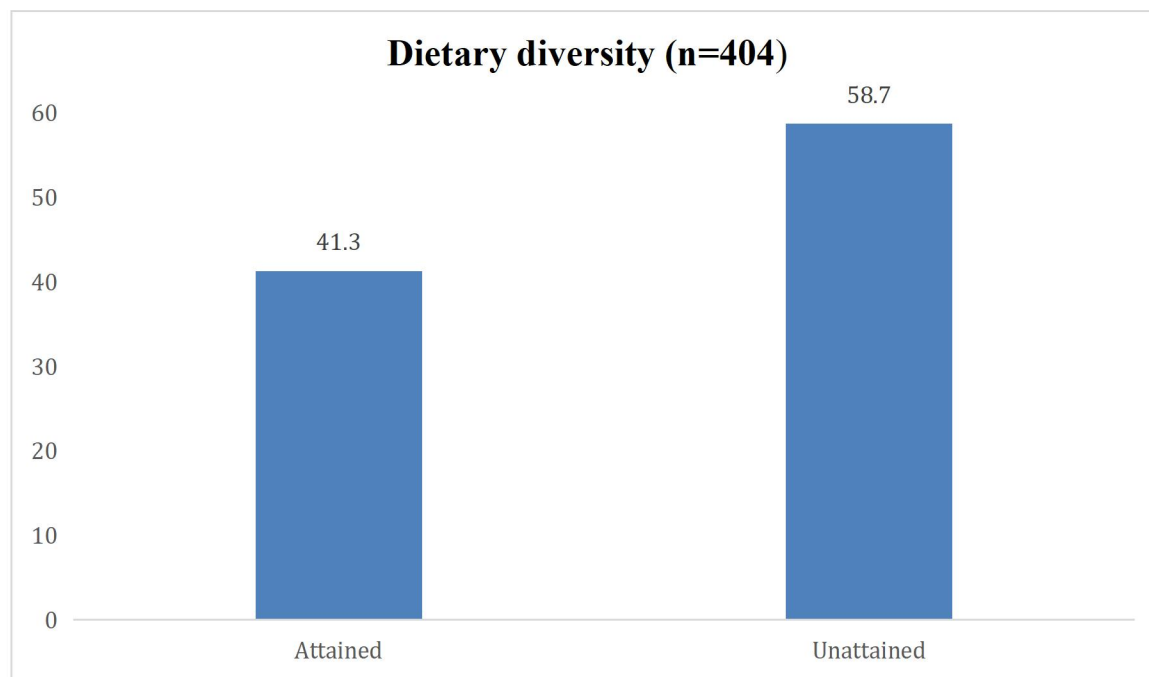


Figure 3: Dietary diversity of mothers' children

A total of 237 (58.7%) children consumed fewer than five food groups out of the eight recommended food groups, while 167 (41.3%) consumed five or more of the recommended food group.

MINIMUM DIETARY DIVERSITY (MDD)

MDD of the children;

$$\frac{\text{no. of children 6-23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day}}{\text{no. of children aged 6-23 months}}$$

No of children who food and beverage from at least five out of eight defined food groups = 167

Total no of eligible children aged 6-23 months = 442

$$\text{MDD} = 167/442$$

$$= 0.378$$

Therefore, 37.8% of respondent's children aged 6-23 months attained the minimum dietary diversity.

SECTION G

FACTORS ASSOCIATED WITH CHILDREN'S DIETARY DIVERSITY

Table 25: Association between mothers' socio-demographic characteristics and dietary diversity among children aged 6–23 months

Variables	Dietary diversity		Test statistic	p-value
	Not attained	Attained		
	(n=237) Freq (%)	(n=167) Freq (%)		
Age group (years)				
< 20	6 (100.0)	0 (0.0)	* = 6.282	0.033
20 – 34	157 (60.6)	102 (39.4)		
≥ 35	74 (53.2)	65 (46.8)		
Ethnicity				
Edo	122 (58.4)	87 (41.6)	$\chi^2 = 0.015$	0.920
Non-Edo	115 (59.0)	80 (41.0)		
Marital status				
Ever married	199 (56.5)	153 (43.5)	$\chi^2 = 5.113$	0.034
Never married	38 (73.1)	14 (26.9)		
Mothers' education				
No formal education	2 (66.7)	1 (33.3)	*= 6.756	0.064
Primary	28 (66.7)	14 (33.3)		
Secondary	110 (64.0)	62 (36.0)		
Tertiary	97 (51.9)	90 (48.1)		
Employment status				
Unemployed	22 (71.0)	9 (29.0)	$\chi^2 = 2.096$	0.185
Employed	215 (57.6)	158 (42.4)		
Mother's occupation				
Skill level 1	0 (0.0)	0 (0.0)	$\chi^2 = 4.633$	0.329
Skill level 2	24 (51.1)	23 (48.9)		
Skill level 3	67 (54.5)	56 (45.5)		
Skill level 4	28 (58.3)	20 (41.7)		
Skill level 5	96 (61.9)	59 (38.1)		
Skill level 6	22 (71.0)	9 (29.0)		

* = Fisher's exact test χ^2 - Chi square

Older mothers had higher proportions of children attaining dietary diversity, with 65 (46.8%) among those aged ≥ 35 years compared to 102 (39.4%) in those aged 20–34 years, while none was recorded among mothers < 20 years 0 (0.0%). This association was statistically significant ($\chi^2 = 6.282$, $p = 0.033$).

Between Edo 87 (41.6%) and non-Edo 80 (41.0%) groups, dietary diversity attainment was nearly identical. This association was not statistically significant ($\chi^2 = 0.015$, $p = 0.920$).

Children of ever-married mothers had higher attainment 153 (43.5%) compared to those of never married mothers 14 (26.9%). This association was statistically significant ($\chi^2 = 5.113$, $p = 0.034$).

Attainment increased gradually with maternal education, from no formal education 1 (33.3%) and primary 14 (33.3%) to secondary 62 (36.0%) and highest at tertiary level 90 (48.1%), although this was not statistically significant ($\chi^2 = 6.756$, $p = 0.064$).

Children of employed mothers had higher attainment 158 (42.4%) compared to those of unemployed mothers 9 (29.0%). This association was not statistically significant ($\chi^2 = 2.096$, $p = 0.185$).

Attainment ranged between 23 (48.9%) and 56 (45.5%) across occupational skill levels, with slightly higher proportions in skill levels 2 and 3, without a clear gradient. This association was not statistically significant ($\chi^2 = 4.633$, $p = 0.329$).

Table 26: Association between spouse's socio-economic characteristics and dietary diversity among children aged 6-23 months

Variables	Dietary diversity		Test statistic	p-value
	Not attained	Attained		
	(n=237) Freq (%)	(n=167) Freq (%)		
Spouse level of education				
No formal education	2 (100.0)	0 (0.0)	*= 13.035	0.002
Primary	25 (86.2)	4 (13.8)		
Secondary	74 (54.4)	62 (45.6)		
Tertiary	113 (54.3)	95 (45.7)		
Spouse employment status				
Unemployed	4 (50.0)	4 (50.0)	* = 0.167	0.729
Employed	210 (57.2)	157 (42.8)		
Spouse's occupation				
Skill level 1	1 (100.0)	0 (0.0)	* = 8.533	0.106
Skill level 2	44 (57.9)	32 (42.1)		
Skill level 3	53 (50.5)	52 (49.5)		
Skill level 4	86 (65.6)	45 (34.4)		
Skill level 5	26 (48.1)	28 (51.9)		
Skill level 6	4 (50.0)	4 (50.0)		

* = Fisher's exact test χ^2 - Chi square

Dietary diversity attainment increased with spouse's level of education, from 0 (0.0%) among those with no formal education to (13.8%) with primary level, and was higher among those with secondary 62 (45.6%) and tertiary education 95 (45.7%). This association was statistically significant ($\chi^2 = 13.035$, $p = 0.002$). Children of employed spouses had similar attainment 157 (42.8%) compared to those whose spouses were unemployed 4 (50.0%). This association was not statistically significant ($\chi^2 = 0.167$, $p = 0.729$). Attainment was highest among skill level 5 occupations 28 (51.9%) and lowest among skill level 4 45 (34.4%). This association was not statistically significant ($\chi^2 = 8.533$, $p = 0.106$).

Table 27: Association between mother and spouse's socio-economic characteristics and dietary diversity among children aged 6–23 months

Variables	Dietary diversity		Test statistic	p-value
	Not attained	Attained		
	(n=237) Freq (%)	(n=167) Freq (%)		
Income				
< 70000	70 (71.4)	28 (28.6)	$\chi^2 = 8.694$	0.003
≥ 70000	167 (54.6)	139 (45.4)		
Socioeconomic status				
Upper	3 (100.0)	0 (0.0)	* = 6.268	0.033
Middle	216 (60.2)	143 (39.8)		
Lower	18 (42.9)	24 (57.1)		

* = Fisher's exact test χ^2 - Chi square

Children from higher-income households ($\geq 70,000$) had better attainment 139 (45.4%) compared to those from lower-income households ($< 70,000$) 28 (28.6%). This association was statistically significant ($\chi^2 = 8.694$, $p = 0.003$).

The proportion of children who attained minimum dietary diversity was highest among those from lower socioeconomic class 24 (57.1%), followed by those from the middle class 143 (39.8%), while none of the children from the upper socioeconomic class attained minimum dietary diversity 0 (0.0%). This association was statistically significant (* = 6.268, $p = 0.033$).

Table 28: Association between index child's characteristics and dietary diversity among children aged 6–23 months

Variables	Dietary diversity		Test statistic	p-value
	Not attained	Attained		
	(n=237) Freq (%)	(n=167) Freq (%)		
Age of child(months)				
6–8	50 (80.6)	12 (19.4)	$\chi^2 = 23.398$	<0.001
9–11	40 (72.7)	15 (27.3)		
≥12	147 (51.2)	140 (48.8)		
Sex of child				
Female	122 (57.8)	89 (42.2)	$\chi^2 = 0.130$	0.762
Male	115 (59.6)	78 (40.4)		
Birth order				
1	65 (62.5)	39 (37.5)	$\chi^2 = 3.381$	0.339
2 – 3	105 (58.3)	75 (41.7)		
4 – 5	54 (52.9)	48 (47.1)		
≥ 6	13 (72.2)	5 (27.8)		
Number of children				
1 – 2	133 (60.7)	86 (39.3)	$\chi^2 = 3.327$	0.185
3 – 4	63 (52.1)	58 (47.9)		
≥ 5	41 (64.1)	23 (35.9)		
Number of under-five children				
1 – 2	223 (57.8)	163 (42.2)	$\chi^2 = 2.838$	0.140
3 – 4	14 (77.8)	4 (22.2)		

χ^2 - Chi square

Dietary diversity attainment increased with age, from 12 (19.4%) among children aged 6–8 months to 15 (27.3%) at 9–11 months and 140 (48.8%) among those ≥12 months. This association was statistically significant ($\chi^2 = 23.398$, $p < 0.001$).

Attainment was similar between females 89 (42.2%) and males 78 (40.4%). This association was not statistically significant ($\chi^2 = 0.130$, $p = 0.762$).

Attainment was highest among children of birth order 4–5 48 (47.1%), followed by 2–3 75 (41.7%) and first-born 39 (37.5%), but declined among those ≥ 6 5 (27.8%). This association was not statistically significant ($\chi^2 = 3.381$, $p = 0.339$).

Children from households with 3–4 children had higher attainment 58 (47.9%) compared to those with 1–2 86 (39.3%) and ≥ 5 children 23 (35.9%). This association was not statistically significant ($\chi^2 = 3.327$, $p = 0.185$).

Attainment was higher in households with 1–2 under-five children 163 (42.2%) compared to those with 3–4 4 (22.2%). This association was not statistically significant ($\chi^2 = 2.838$, $p = 0.140$).

Table 29: Association between mothers' knowledge of complementary feeding and dietary diversity among children aged 6–23 months

Variables	Dietary diversity		Test statistic	p-value
	Not attained	Attained		
	(n=237) Freq (%)	(n=167) Freq (%)		
Knowledge level				
Good	68 (54.8)	56 (45.2)	1.079	0.325
Poor	169 (60.4)	111 (39.6)		

Children of mothers with good knowledge had higher attainment 56 (45.2%) compared to those with poor knowledge 111 (39.6%), although the association was not statistically significant ($\chi^2 = 1.079$, $p = 0.325$).

Table 30: Predictors of attainment of dietary diversity among respondent's children

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Mothers' age	0.025	1.025	0.978	1.075	0.299
Ethnicity					
Edo*		1			
Non-Edo	-0.061	0.940	0.615	1.439	0.777
Marital status					
Never married		1			
Ever married	0.240	1.271	0.578	2.795	0.551
Mothers' educational status					
Non-Tertiary*		1			
Tertiary	0.141	1.151	0.680	1.949	0.599
Mothers' occupation					
Lower skill level*		1			
Higher skill level	0.454	1.575	0.985	2.517	0.058
Household income					
< 70,000*		1			
≥ 70,000	0.387	1.473	0.815	2.662	0.200
Socio-economic status					
Lower		1			
Higher	-0.911	0.402	0.189	0.855	0.018

CI = Confidence interval; *reference category

Mothers' age was associated with a slight increase in the likelihood of meeting minimum dietary diversity (OR = 1.025; 95% CI: 0.978–1.075; p = 0.299), though this was not statistically significant.

Non-Edo mothers were 0.940 times less likely to meet minimum dietary diversity compared to Edo mothers (OR = 0.940; 95% CI: 0.615–1.439; $p = 0.777$), but this was not statistically significant.

Mothers who had ever been married were 1.271 times more likely to meet minimum dietary diversity compared to those who had never been married (OR = 1.271; 95% CI: 0.578–2.795; $p = 0.551$), although this was not statistically significant.

Mothers with tertiary education were 1.151 times more likely to meet minimum dietary diversity compared to those with non-tertiary education (OR = 1.151; 95% CI: 0.680–1.949; $p = 0.599$), but this was not statistically significant.

Mothers with higher skill occupations were 1.575 times more likely to meet minimum dietary diversity compared to those with lower skill occupations (OR = 1.575; 95% CI: 0.985–2.517; $p = 0.058$), although this did not reach statistical significance.

Mothers with higher income ($\geq 70,000$) were 1.473 times more likely to meet minimum dietary diversity compared to those earning $< 70,000$ (OR = 1.473; 95% CI: 0.815–2.662; $p = 0.200$), but this was not statistically significant.

Mothers from higher socioeconomic status households were 0.402 times less likely to meet minimum dietary diversity compared to those from lower socioeconomic status (OR = 0.402; 95% CI: 0.189–0.855; $p = 0.018$), and this association was statistically significant.

Table 30 cont'd: Predictors of attainment of dietary diversity among respondent's children

Predictors	β (regression coefficient)	ODDS RATIO	95% CI		p – value
			Lower	Upper	
Age of index child(months)					
6-8*		1			
9-11	0.339	1.404	0.568	3.472	0.463
≥ 12	1.405	4.075	2.027	8.195	<0.001
Sex of index child					
Female*		1			
Male	-0.212	0.809	0.528	1.240	0.330
Birth order of child					
1-3*		1			
≥ 4	0.698	2.011	0.436	9.278	0.371
Number of children					
1-3*		1			
≥ 4	-0.452	0.636	0.141	2.874	0.557
Number of under-five children					
1-2*		1			
≥ 3	-0.873	0.418	0.125	1.401	0.158
Knowledge level					
Poor*		1			
Good	0.154	1.167	0.699	1.948	0.555

CI = Confidence interval; *reference category

Mothers of children aged 9–11 months were 1.404 times more likely to meet minimum dietary diversity compared to those aged 6–8 months (OR = 1.404; 95% CI: 0.568–3.472; $p = 0.463$), while those with children aged ≥ 12 months were 4.075 times more likely to meet minimum dietary diversity (OR = 4.075; 95% CI: 2.027–8.195; $p < 0.001$). This latter association was statistically significant.

Mothers with more than three children were 0.636 times less likely to meet minimum dietary diversity compared to those with 1–3 children (OR = 0.636; 95% CI: 0.141–2.874; $p = 0.557$), but this was not statistically significant.

Mothers with birth order >3 were 2.011 times more likely to meet minimum dietary diversity compared to those with birth order 1–3 (OR = 2.011; 95% CI: 0.436–9.278; $p = 0.371$), although this was not statistically significant.

Mothers with three or more under-five children were 0.418 times less likely to meet minimum dietary diversity compared to those with 1–2 under-five children (OR = 0.418; 95% CI: 0.125–1.401; $p = 0.158$), but this was not statistically significant.

Mothers with male index children were 0.809 times less likely to meet minimum dietary diversity compared to those with female children (OR = 0.809; 95% CI: 0.528–1.240; $p = 0.330$), though not statistically significant.

Mothers with good knowledge were 1.167 times more likely to meet minimum dietary diversity compared to those with poor knowledge (OR = 1.167; 95% CI: 0.699–1.948; $p = 0.555$), but this was not statistically significant.

CHAPTER FIVE

DISCUSSION

This study assessed mothers' knowledge and practices of complementary feeding, as well as dietary diversity among children aged 6–23 months in Benin City, and determined the factors associated with them. The findings showed the level of maternal knowledge, complementary feeding practices, and dietary diversity within the study population, and their associations with maternal, spousal, and index child sociodemographic characteristics. The findings further revealed gaps in infant feeding knowledge and practices that may adversely affect child nutritional status and health outcomes, emphasizing the need for targeted interventions to improve infant and young child feeding practices within the community.

Most mothers were aged between 25 and 39 years. This is consistent with a study conducted in Osun State, Nigeria in 2022, which reported that most mothers were within the 25–34 year age group.²³ This age distribution is typical of mothers who are actively involved in childbearing and childcare. More than three-quarters of the mothers were married. Similar patterns have been reported in studies conducted in South-West Nigeria²³ and Northern Ghana.⁶³ This may be explained by the cultural context in which childbearing commonly occurs within marriage.

A large proportion of mothers had attained at least secondary education, with nearly half having tertiary education, while only a very small proportion had no formal education. This is comparable to findings from Ekiti State, where more than half of mothers had secondary education and a considerable proportion had tertiary education.⁴⁸ This may be due to the urban setting of the study, where access to education is higher and female education is emphasized.

The majority of mothers were employed, which is similar to findings from Southwestern Nigeria,²³ where most mothers were engaged in trading and other forms of employment. A large proportion of mothers were in higher skill levels, particularly skill levels 3 and 5, suggesting a relatively skilled and economically active population. Almost all spouses were employed, and a large proportion had tertiary education. Similar findings were reported in Ekiti State, where most spouses had at least secondary education and were employed.²³ The majority of households belonged to the middle socio-economic class, while more than two-thirds of households earned ₦70,000 or more monthly. This is comparable to findings from Southwestern Nigeria, where most households were within the middle-income category.²³

More than half of households had one to two children, which is consistent with findings from Ekiti State, where most mothers had between one and three children.⁴⁸ These findings may reflect smaller family sizes, which are more common in urban settings. More than half of the index children were aged 12 months and above, and there was a nearly equal sex distribution with a slight female predominance. This is consistent with findings from Southwestern Nigeria, where male and female children were almost equally represented.²³

Findings from this study revealed that more than two-thirds of mothers had poor knowledge of complementary feeding, indicating that maternal knowledge of complementary feeding is inadequate in the study population. This is consistent with a study conducted in Osun State, Nigeria, in 2022, which reported that 80.8% of mothers had poor knowledge of complementary feeding,⁴⁰ and a study conducted in Eti-Osa Local Government Area of Lagos State, Nigeria, in 2017, which reported that 85.1% of mothers had poor knowledge.²⁴ The poor knowledge of complementary feeding may be attributed to factors such as lack of education as nearly all mothers with no formal education had poor knowledge of complementary feeding. Mothers with

lower levels of education have limited access to health information and a reduced ability to understand recommended feeding practices. Poor knowledge of complementary feeding will result in inadequate complementary feeding practices, including suboptimal meal feeding frequency, poor dietary diversity, and the introduction of unhealthy and unsuitable foods into a child's diet including sweet beverages, all of which can negatively affect child growth and development.¹ Education strategies should be simplified and adapted to suit mothers with lower levels of education, using clear language and culturally appropriate teaching methods to enhance comprehension. In addition, the use of mass media platforms such as radio, television, and social media should be expanded to improve access to accurate and consistent information on complementary feeding beyond health facilities.

Findings from this study showed that maternal knowledge of complementary feeding was significantly associated with mother and spouse's socio-demographic characteristics as well as index child's characteristics. Knowledge was significantly associated with marital status, mothers' level of education, mothers' occupation, household income, spouse's level of education, spouse's occupation, age of the index child, and number of children. A higher proportion of good knowledge was observed among mothers who had ever been married compared to those who had never been married, suggesting that marital status may influence access to information and support systems that enhance maternal knowledge. Similarly, mothers with higher levels of education demonstrated better knowledge compared to those with lower levels of education, indicating that education may improve understanding and interpretation of complementary feeding recommendations. A similar pattern was observed with household income and mothers' occupation, where mothers with higher income levels and those in certain occupational categories demonstrated better knowledge. This may reflect differences in access to resources,

exposure to health information, and opportunities for learning. Spouse-related characteristics also showed significant associations, as mothers whose spouses had higher levels of education and were engaged in higher occupational categories demonstrated better knowledge. This suggests that household-level factors may influence access to information and decision-making regarding child feeding practices. In addition, knowledge varied with index child related factors such as age of the index child and number of children. Mothers with children in higher age groups and those with a moderate number of children demonstrated better knowledge, which may be related to increased exposure to childcare practices over time. However, when these variables were adjusted for in multivariate analysis, only marital status and mothers' level of education remained significant predictors of good knowledge. Mothers with higher educational attainment were more likely to have good knowledge of complementary feeding, which indicates that education plays an important role in shaping knowledge and understanding of recommended feeding practices. Mothers who had ever been married were more likely to have good knowledge compared to those who had never been married, emphasizing the need for social and economic support, as married mothers may have greater access to resources, and exposure to health information through their partners and household networks. These findings highlight the role of maternal education and marital status in influencing knowledge of complementary feeding. This is consistent with findings from a study conducted in Osun State, Nigeria, in 2022, which reported that maternal level of education was a significant factor associated with knowledge of complementary feeding.⁴⁰

However, it contrasts with a study conducted in Madagascar in 2019 which found that knowledge was significantly associated with exposure to multiple sources of information.³⁶

Similarly, a study conducted in Ethiopia in 2022 reported that antenatal care attendance and receipt of nutrition information were the predictors of maternal knowledge.⁴³

The identification of factors associated with maternal knowledge of complementary feeding is important for the design of targeted interventions. The findings of this study suggest that certain groups of mothers, particularly those with lower educational attainment, lower income, and limited household support, may be at higher risk of poor knowledge of complementary feeding.

There is need for public health interventions to be tailored towards these vulnerable groups in order to improve maternal knowledge. Targeted nutrition education programs should be designed to reach mothers with lower levels of education, using simplified and culturally appropriate communication strategies to improve understanding of complementary feeding recommendations.

Interventions should also incorporate spousal involvement in child feeding education, recognizing the influence of spouse's education and occupation on maternal knowledge. Furthermore, community-based programs should prioritize mothers with limited social and economic support, including those with lower income and less skilled occupations, by providing additional counselling and support on infant feeding practices.

Findings from this study revealed that almost all mothers demonstrated poor complementary feeding practices. In addition, less than half of the children met the minimum meal frequency, while less than one-quarter achieved the minimum acceptable diet. This pattern suggests that complementary feeding practices in the study population were generally poor, particularly in relation to minimum meal frequency and minimum dietary adequacy. This is consistent with the findings of a study conducted in an Eti-Osa community, Lagos State which reported that 47% of the mothers demonstrated poor complementary feeding practices and 16% met the minimum

acceptable diet in that study, reflecting inadequate feeding practices. It is in contrast with a study done in Northern Ghana in 2024, which reported that 70.1% met the minimum meal frequency. The poor complementary feeding practices observed in this study may be explained by inadequate maternal knowledge, which may directly limit the ability of mothers to correctly implement recommended feeding practices. A higher proportion of mothers who had poor knowledge demonstrated poor practice compared to those with good knowledge, suggesting that insufficient knowledge and understanding of complementary feeding may influence appropriate complementary feeding practices.

Poor complementary feeding practices may increase the frequency of childhood illnesses, leading to greater demand for care and increased healthcare expenditure. This may reduce caregiver productivity and place additional strain on limited household resources.¹ Failure to meet minimum meal frequency and minimum acceptable diet may result in inadequate nutrient intake during a critical period of growth, which can impair physical development, weaken immunity, and adversely affect cognitive development.

Therefore, caregivers should receive education on incorporating a variety of locally available foods into children's meals, using simple combinations within the household to improve the quality of the child's diet. Education should also address common misconceptions on feeding practices such as forceful feeding, early introduction of complementary foods, and early cessation of breastfeeding, with emphasis on promoting more appropriate and child-friendly feeding approaches.

Analysis of socio-demographic factors showed that mothers' practice of complementary feeding was associated with mothers' occupation, spouse's level of education, spouse's occupation, household income, age of the index child and mother's knowledge of complementary feeding.

The associations observed with maternal occupation and household income may be due to increased financial capability to afford multiple meals and purchase of diverse nutrient-rich foods among mothers with a higher skill level and income. Likewise, spouses with a higher educational and skill level are more likely to have better support for spending on recommended feeding practices such as meal frequency, hand hygiene, sterilization of feeding items and food diversity. A higher proportion of mothers with children aged 9-11 months had good practice which may be due to increased dietary diversity and feeding frequency among children in older age groups. The association with mother's knowledge of complementary feeding reflects behavioural change that accompanies provision of effective nutrition education.

These findings are similar to those from a study conducted in Guto Gida district of Ethiopia⁵¹ which reported maternal occupation and wealth index to be significantly associated with their complementary feeding practice. Multivariate analysis showed that the odds of having good practice were higher among mothers with older children and those with good knowledge of complementary feeding. Maternal age, level of education, occupation, marital status and number of children were not statistically significant as predictors of good complementary feeding practice.

The identification of factors associated with mothers' practice of complementary feeding will help in developing effective implementation strategies for various national and local nutrition policy and programs designed to improve infant and young child feeding practices.

Ongoing Infant and Young Child Feeding programs such as the Edo State Multi-sectoral Plan of Action for Food and Nutrition (2025-2029)⁶³ should promote healthy complementary feeding practices through television, radio edutainment and verified social media platforms. Giving of infographic cards to mothers can also help improve their understanding of appropriate complementary feeding practices while fostering spousal support.

In this study, about two-fifth of children aged 6-23 months attained the recommended minimum dietary diversity. Food groups predominantly consumed were grains, roots and tubers; pulses, nuts and seeds; dairy products; and breast milk while flesh foods, eggs and vitamin-A rich fruits and vegetables were less consumed. More children from older age groups attained the minimum dietary diversity relative to those in younger age groups. The poor dietary diversity and low consumption of flesh foods, eggs and vitamin-A rich fruits and vegetables observed in the study may be attributable to poor knowledge of complementary feeding among mothers and belief that the child's stomach was not strong enough for some foods. Household income may also contribute to inability to purchase less consumed food groups. Similar patterns were observed in Ogun²³ and Niger⁵³ where only one-fifth and a third of children respectively met the recommended minimum dietary diversity with the predominant food groups consumed been same as found in this study.

In contrast, a study conducted in Lagos²⁴ reported two-third of the children attained minimum dietary diversity.²⁴ The low attainment of recommended minimum dietary diversity observed in this study may be attributable to the poor knowledge of mothers of standard recommendations and higher cost of obtaining food groups such as flesh foods, eggs and vitamin-A rich fruits/vegetable. The high prevalence of sweet beverage and unhealthy snacks consumption may also contribute to reduced feeding from nutritious food groups by children.

The minimum dietary diversity of 37.8% in this study is an improvement compared to the national minimum dietary diversity of 12.4% reported in the 2023 NDHS.⁶ Improvement in dietary diversity lowers childhood malnutrition, reduces the risk of childhood mortality and enhances cognitive development.

Current efforts and strategies including behaviour change communication; nutritional assessment services; counselling and support services; coordination, collaborative partnership and accountability; monitoring and evaluation should be sustained. All levels of government should improve mechanized farming, empower local farmers and livestock breeders so as to make nutritious foods more affordable, improve household food security and dietary diversity.

Factors found to be positively associated with dietary diversity in this study were; maternal age, marital status, higher spouse's level of education, household income and socio-economic status, age of the index child.

A higher proportion of children with older mothers attained the recommended MDD, this may reflect better caregiving experience, confidence in introducing variety of foods and increased exposure to antenatal/postnatal nutrition education among older mothers. The associations observed with marital status and spouse's level of education may reflect resource pooling, better understanding of the importance of a diverse diet and support for spending on nutritious and varied foods among married mothers and spouses with a higher level of education. The lower proportion of attainment of MDD among lower income households and socioeconomic status reinforce the role of socio-economic capacity in enabling food security and reducing dependence on single food group diets. The non-significant association with mother's complementary feeding knowledge suggests that knowledge alone may not be sufficient in achieving dietary

diversity without addressing other constraints such as food affordability and availability. A higher proportion of children aged 12 months and above attained MDD, this may reflect an expanded diet among older children as they are more likely to be fed varieties of family foods.

These findings are similar to those from a study in Niger⁵³ which reported that increased household wealth was positively associated with a higher likelihood of attaining minimum dietary diversity. Similarly, a study conducted in Ghana⁵⁴ found child's age and household socio-economic status to be positively associated with dietary diversity. In contrast, a study conducted in Lagos²⁴ did not find any significant association between household income and attainment of minimum dietary diversity.²⁴

Child's age emerged as a significant determinant of MDD with older children more likely to attain MDD compared to younger children. Children of mothers with a higher socio-economic status were less likely to attain MDD. Other factors including maternal age, level of education, occupation, marital status and knowledge of complementary feeding were not statistically significant as predictors of dietary diversity.

Identifying factors associated with dietary diversity aids in determination of at-risk groups, designing evidence-based interventions, planning and delivery of effective nutrition education, and provision of targeted counseling.

Nutrition education should incorporate demonstrations on preparation of low-cost diverse meal and develop evidence-based recipe books using affordable and locally available ingredients. Mass media should also be employed in educating fathers on their role in supporting complementary feeding, and ensuring they provide the resources needed for a diverse diet.

CONCLUSION

This study assessed the knowledge and practices of complementary feeding among mothers of children aged 6-23 months in Benin City and the dietary diversity among these children. The study showed that knowledge of complementary feeding among mothers was generally poor, with significant gaps in knowledge of appropriate time of cessation of breastfeeding, feeding frequency and food groups. Marital status, higher level of education and skill level of both mothers and their spouses, higher household income, increasing child age and number of children were associated with good knowledge. Having a tertiary level of education and ever being married were found to be significant predictors of good knowledge among mothers.

Majority of mothers in the study had poor complementary feeding practice. Less than half of the children attained the recommended minimum feeding frequency and only about one-fifth achieved the minimum acceptable diet. Factors found to be associated with good practice were higher level of education and skill level of mothers and their spouses, higher household income, good maternal complementary feeding knowledge and increasing age of index child. Good maternal knowledge of complementary feeding was a significant predictor for good complementary feeding practice.

Attainment of minimum dietary diversity among children in the study was low, the food groups mostly consumed were grains, roots and tubers; pulses, nuts and seeds; dairy products; and breast milk. Mother's age, marital status, spouse's level of education, household income, socio-economic status and age of child were observed to be associated with dietary diversity. Mothers, socio-economic status and child's age were significant predictors of attainment of dietary diversity among children.

RECOMMENDATIONS

The following recommendations were made based on the findings from this study with the hope that if implemented, they will improve complementary feeding knowledge and practices among mothers of children aged 6-23 months.

RECOMMENDATIONS TO THE GOVERNMENT

1. Strengthen National Policy on Complementary Feeding:

The Federal Ministry of Health should strengthen existing national policies on Infant and Young Child Feeding by placing greater emphasis on key complementary feeding indicators such as minimum dietary diversity, minimum meal frequency, and minimum acceptable diet, in line with national and international guidelines.

2. Integrate Complementary Feeding into Maternal and Child Health Programs

The National Primary Health Care Development Agency (NPHCDA) should design and integrate structured complementary feeding interventions into existing maternal and child health services, including counselling, scheduled education sessions during maternal and child health visits, and the use of simple teaching and demonstration tools.

3. Strengthen Implementation and Monitoring at State Level

State Ministries of Health should ensure effective implementation of complementary feeding programs by adapting national policies to the local context and establishing monitoring systems to track feeding practices across health facilities.

4. Enhance Community-Level Delivery of Nutrition Interventions

Local Government Health Authorities should coordinate and support the delivery of complementary feeding interventions at primary healthcare centres and through community outreach activities to improve caregiver practices.

5. Improve Availability of Diverse and Nutritious Foods

The Federal Ministry of Agriculture and Food Security should implement policies that support local food production and improve the availability of diverse and nutritious foods for households with young children.

6. Improve Household Economic Access to Nutrition

The Ministry of Humanitarian Affairs and Poverty Alleviation should strengthen social protection programs, including conditional cash transfers and food assistance schemes, to improve the ability of low-income households to provide adequate nutrition for children.

7. Promote Public Awareness

The National Orientation Agency (NOA) should implement mass awareness campaigns through media and community-based platforms to improve maternal knowledge and promote appropriate complementary feeding practices.

RECOMMENDATIONS TO THE COMMUNITY

1. Promote Community-Based Nutrition Education

Community leaders, religious institutions, and local organizations should organize regular health education sessions on complementary feeding, with emphasis on dietary diversity, feeding frequency, and appropriate feeding during illness.

2. Utilize Existing Community Platforms for Information Dissemination

Community structures such as churches, markets, women's groups, and social gatherings should be used to disseminate accurate information on complementary feeding practices to caregivers.

3. Support Behaviour Change Through Community Influence

Traditional rulers, religious leaders, and respected community members should reinforce appropriate feeding practices and discourage harmful cultural beliefs and practices related to child feeding.

4. Establish Mother-to-Mother Support Systems

Community groups should facilitate the formation of peer support groups where mothers can share experiences, receive practical guidance, and reinforce appropriate complementary feeding practices.

5. Promote Practical Demonstration of Appropriate Feeding Practices

Community-based programs should include demonstrations on the preparation of balanced meals for children using affordable and locally available foods to improve dietary diversity.

6. Encourage Family and Household Support for Child Feeding

Family members, including fathers and older caregivers, should support mothers in providing appropriate complementary feeding by contributing to food provision and childcare.

RECOMMENDATIONS TO MOTHERS/CAREGIVERS

1. Provide Adequate Dietary Diversity

Mothers should include a variety of food groups in the child's daily diet, including grains, legumes, fruits, vegetables, and animal-source foods, using locally available and affordable options to improve nutrient intake.

2. Maintain Appropriate Feeding Frequency

Mothers should feed children the recommended number of times per day based on their age and breastfeeding status to ensure that nutritional needs are adequately met.

3. Continue Feeding During Illness

Mothers should continue to feed children during periods of illness and increase feeding after recovery to support nutritional needs and prevent weight loss.

4. Avoid Low-Nutrient Foods and Unhealthy Feeding Practices

Mothers should limit the use of sugary drinks, snacks, and low-nutrient foods, and avoid inappropriate practices such as forceful feeding or early cessation of breastfeeding.

5. Use Information from Health Services Effectively

Mothers should apply the information received during antenatal and postnatal visits to improve feeding practices at home.

6. Adopt Safe and Appropriate Feeding Practices

Mothers should ensure that food is prepared hygienically, given in appropriate consistency for the child's age, and fed using suitable utensils to reduce the risk of infection and improve feeding efficiency.

REFERENCES

1. World Health Organization. Infant and young child feeding. Geneva: World Health Organization; 2023 [accessed 2025 Apr 27]. Available from: <https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding>
2. World Health Organization. Complementary feeding. Geneva: World Health Organization; 2023 [accessed 2025 Apr 27]. Available from: https://www.who.int/health-topics/complementary-feeding#tab=tab_1
3. United Nations Children's Fund (UNICEF). Early childhood nutrition. New York: UNICEF; 2019 [accessed 2025 Apr 27]. Available from: <https://www.unicef.org/nutrition/early-childhood-nutrition>
4. Antiporta D, Ambikapathi R, Bose A, Maciel B, Mahopo T, Patil C, et al. Micronutrient intake and the probability of nutrient adequacy among children 9–24 months of age: results from the MAL-ED birth cohort study. Public Health Nutr. 2020;1–11. <https://doi.org/10.1017/s1368980020000877>
5. Bafila P, Bisla G, Gupta S. Nourishing the future: the crucial importance of complementary feeding in childhood nutrition. Int J Food Sci Nutr. 2023;8(3):45–9. www.foodsciencejournal.com
6. Federal Ministry of Health and Social Welfare (Nigeria), National Population Commission (NPC) [Nigeria], ICF. Nigeria Demographic and Health Survey 2023–24: Key Indicators Report.

- Abuja (Nigeria): NPC and ICF; 2024. Available from <https://dhsprogram.com/pubs/pdf/PR157/PR157.pdf>
7. Romero-Velarde E, Villalpando-Carrión S, Pérez-Lizaur AB, Rivera JA, Shamah-Levy T, Hernández-Ávila M, et al. Guidelines for complementary feeding in healthy infants. *Bol Med Hosp Infant Mex*. 2016;73(5):338–56. <https://doi.org/10.1016/j.bmhmx.2016.06.007>
 8. Moghaddam HT, Khademi G, Abbasi MA, Saeidi M. Infant and young child feeding: a key area to improve child health. *Int J Pediatr*. 2015;3(6.1):1083–92. <https://doi.org/10.22038/ijp.2015.5603>
 9. Kulkarni G, Dobe M, Ravi MD, Verma R, Dutt S, et al. Overcoming the challenges of complementary feeding and the potential role of fortified infant cereals: a position paper from India and Nepal. *J Pediatr Perinatol Child Health*. 2023;7(3):142–58. <https://www.doi.org/10.26502/jppch.74050158>
 10. Ahishakiye J, Bouwman L, Brouwer ID, Matsiko E, Armar-Klemesu M, Koelen M. Challenges and responses to infant and young child feeding in rural Rwanda: a qualitative study. *J Health Popul Nutr*. 2019;38(1):43. <https://doi.org/10.1186/s41043-019-0207-z>
 11. World Health Organization. Guideline for complementary feeding of infants and young children 6–23 months of age. Geneva: World Health Organization; 2023 [accessed 2025 Apr 27]. Available from: <https://www.who.int/publications/i/item/9789240081864>
 12. Micronutrient Forum. Making food systems work for complementary feeding in low- and middle-income countries: meeting report. Washington (DC): Micronutrient Forum; 2024 [accessed 2025 Apr 27]. Available from: <https://micronutrientforum.org/wp->

content/uploads/2024/02/Making-food-systems-work-for-complementary-feeding-in-LMICs-Meeting-report_FINAL.pdf

13. African Union Commission (AUC). Africa regional nutrition strategy 2015–2025. Addis Ababa: African Union; 2015. Available from https://au.int/sites/default/files/documents/41659-doc-32895-file-arns_english.pdf

14. Federal Ministry of Health, Nigeria. National policy on infant and young child feeding in Nigeria. Abuja: Federal Ministry of Health; 2010. Available from <https://www.medbox.org/index.php/dl/5e148832db60a2044c2d36d5>

15. Mazzocchi A, De Cosmi V, Scaglioni S, Agostoni C. Towards a more sustainable nutrition: complementary feeding and early taste experiences as a basis for future food choices. *Nutrients*. 2021;13(8):2695. <https://doi.org/10.3390/nu13082695>

16. White JM, Begin F, Kumapley R, Murray C, Krasevec J. Complementary feeding practices: current global and regional estimates. *Matern Child Nutr*. 2017;13(S2):e12505. <https://doi.org/10.1111/mcn.12505>

17. United Nations Children’s Fund (UNICEF) Division of Data, Analysis, Planning and Monitoring. Global UNICEF Global Databases: Infant and young child feeding: Egg and/or flesh food consumption, minimum dietary diversity, minimum meal frequency, minimum acceptable diet. 2023 [accessed 2025 Apr 27]. Available from: <https://data.unicef.org/topic/nutrition/diets/>

18. Darnton-Hill IA. Interventions for improving complementary feeding practices. e-Library of Evidence for Nutrition Actions (eLENA); 2023 [accessed 2025 Apr 27]. Available from: <https://www.who.int/tools/elena/commentary/complementary-feeding>

19. Nassanga P, Okello-Uma I, Ongeng D. The status of nutritional knowledge, attitude and practices associated with complementary feeding in a post-conflict development phase setting: the case of Acholi sub-region of Uganda. *Food Sci Nutr*. 2018;6(8):2374–85. <https://doi.org/10.1002/fsn3.829>
20. Afolabi KO, Afolabi A, Omishakin MY. Complementary feeding and associated factors: assessing compliance with recommended guidelines among postpartum mothers in Nigeria. *Popul Med*. 2021;3:1–11. <https://doi.org/10.18332/popmed/138939>
21. Udoh EE, Amodu OK. Complementary feeding practices among mothers and nutritional status of infants in Akpabuyo Area, Cross River State Nigeria. *SpringerPlus*. 2016;5:2073. <https://doi.org/10.1186/s40064-016-3751-7>
22. Jiya F, Mohammad A, Adamu I, Tukur U, Auwal U, Muhammad B, et al. Complementary feeding practices of mothers and caregivers of under-fives in Sokoto, North-Western Nigeria. *Ann Basic Med Sci*. 2022;3(2):104–11. <https://doi.org/10.51658/ABMS.202232.10>
23. Samuel FO, Ibidapo EG. Complementary feeding practices and associated factors among nursing mothers in Southwestern Nigeria. *Int J Matern Child Health AIDS*. 2020;9(2):223–31. <https://doi.org/10.21106/ijma.363>
24. Olatona FA, Adenihun JO, Aderibigbe SA, Adeniyi OF. Complementary feeding knowledge, practices, and dietary diversity among mothers of under-five children in an urban community in Lagos State, Nigeria. *Int J Matern Child Health AIDS*. 2017;6(1):46–59. <https://doi.org/10.21106/ijma.203>
25. United Nations Children’s Fund (UNICEF), World Health Organization (WHO), International Bank for Reconstruction and Development/The World Bank. Levels and trends in

- child malnutrition. UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates: Key findings of the 2023 edition. 2023 [accessed 2025 Apr 27]. Available from: <https://data.unicef.org/resources/jme-report-2023/>
26. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, De Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382(9890):427–51. [https://doi.org/10.1016/s0140-6736\(13\)60937-x](https://doi.org/10.1016/s0140-6736(13)60937-x)
27. Metzger MW, McDade TW. Breastfeeding as obesity prevention in the United States: a sibling difference model. *Am J Hum Biol*. 2010;22(3):291-6. <https://doi.org/10.1002/ajhb.20982>
28. Atimati AO, Adam VY. Infant and young child feeding practices and nutritional status of children (0–24 months) in Egor Local Government Area of Edo State, Nigeria. *Niger J Nutr Sci*. 2019;40(1):22–30. Available from: <https://www.researchgate.net/publication/333618233>
29. World Health Organization. Indicators for assessing infant and young child feeding practices. Geneva: World Health Organization; 2021 [accessed 2025 Apr 27]. Available from: <https://iris.who.int/bitstream/handle/10665/340706/9789240018389-eng.pdf>
30. Lamstein S, Perez-Escamilla R, Koniz-Booher P, Begin F, De Wagt A, Kaligirwa C, et al. Evaluation of the Community Infant and Young Child Feeding Counselling Package in Nigeria. Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project. 2015 [accessed 2025 Apr 27]. Available from: https://spring-nutrition.org/sites/default/files/publications/reports/nigeria_ciycf_eval_rep_15-2-18.pdf
31. Ogunjobi B, Dayyabu A, Rabi A. Integrating infant and young child feeding with community-led total sanitation: a case study of strategic partnership to fight stunting in Jigawa

and Katsina States of Nigeria. WEDC, Loughborough University; 2015 [accessed 2025 Apr 27]. Available from: <https://hdl.handle.net/2134/31238>

32. Ogbo FA, Page A, Idoko J, Claudio F, Agho KE. Trends in complementary feeding indicators in Nigeria, 2003–2013. *BMJ Open*. 2015;5(10):e008467. doi:10.1136/bmjopen-2015-008467

33. Shrestha S, Pokhrel M, Mathema S. Knowledge, attitude and practices among mothers of children 6 to 24 months of age regarding complementary feeding. *J Nepal Med Assoc*. 2020;58(230):517–22.

34. Lara R, García K, Valencia L, Silva A. Study of knowledge, attitudes and practices of complementary feeding among caregivers of children from 6 to 23 months of age from a rural community of Ecuador: a cross-sectional study. *Rev Esp Nutr Hum Diet*. 2024;28(4):251–60. doi:10.14306/renhyd.28.4.2200

35. Wu Q, Meng N, Wang X, Li L, Zhang J, Huang Y, et al. Complementary feeding practices for children aged 6–23 months in early childhood education institutions in urban China: a cross-sectional study. *J Glob Health*. 2024;14:04043. doi:10.7189/jogh.14.04043

36. Rakotomanana H, Hildebrand D, Gates GE, Thomas DG, Fawbush F, Stoecker BJ. Maternal knowledge, attitudes, and practices of complementary feeding and child undernutrition in the Vakinankaratra Region of Madagascar: a mixed-methods study. *Curr Dev Nutr*. 2020;4(11):nzaa166.

37. Mutuku JN, Ochola S, Osero J. Maternal knowledge and complementary feeding practices and their relationship with nutritional status among children 6–23 months old in pastoral

community of Marsabit County, Kenya: a cross-sectional study. *Curr Res Nutr Food Sci J*. 2020;8(3):862–76.

38. Bimpong KA, Cheyuo EKE, Abdul-Mumin A, Ayanore MA, Kubuga CK, Mogre V. Mothers' knowledge and attitudes regarding child feeding recommendations, complementary feeding practices and determinants of adequate diet. *BMC Nutr*. 2020;6:63. doi:10.1186/s40795-020-00380-0

39. Sichalwe MM, Behera MR, Behera D, Dehury RK, Degge H. Knowledge and practice of complementary feeding among mothers in Dar-es-Salaam, Tanzania: a community-based cross-sectional study. *Clin Epidemiol Glob Health*. 2023;24:101430. doi:10.1016/j.cegh.2023.101430

40. Akinrinmade R, Ogunba B, Aluko O, Adaralegbe M. Maternal nutrition literacy and complementary feeding practices in Osun State, Nigeria. *Int J Home Econ*. 2024;17(1):23–32.

41. Berisha M, Ramadani N, Hoxha R, Gashi S, Zhjeqi V, Zajmi D, et al. Knowledge, attitudes and practices of mothers in Kosova about complementary feeding for infant and children 6–24 months. *Med Arch*. 2017;71(1):37–41.

42. Kocagozoglul SG, Sengelen M, Yalcin SS. Evaluation of complementary feeding indicators among children aged 6–23 months according to the health literacy status of their mothers. *Nutrients*. 2024;16(20):3537. doi:10.3390/nu16203537

43. Gizaw AT, Sopory P, Sudhakar M. Determinants of knowledge, attitude and self-efficacy towards complementary feeding among rural mothers: baseline data of a cluster-randomized control trial in South West Ethiopia. *PLoS One*. 2023;18(11):e0293267.

44. Gurung TB, Paudel R, Acharya A, Khanal PK. Appropriate complementary feeding practice and associated factors among mothers of children aged 6–23 months in Bhimphedi Rural Municipality of Nepal. *PLoS One*. 2024;19(3):e0299969.
45. Dhawan D, Pinnamaneni R, Viswanath K. Association between mass media exposure and infant and young child feeding practices in India: a cross-sectional study. *Sci Rep*. 2023;13(1):17893.
46. Mekonen EG, Zegeye AF, Workneh BS. Complementary feeding practices and associated factors among mothers of children aged 6 to 23 months in Sub-Saharan African countries: a multilevel analysis of the recent demographic and health survey. *BMC Public Health*. 2024;24(1):115. doi:10.1186/s12889-023-17629-w
47. Tololu AK, Teshome B, Fessaha HZ, Kaso AW. Determinants of appropriate complementary feeding practices among mothers of children aged 6–23 months in Bokoji Town, Oromia Region, Ethiopia. *BMC Pediatr*. 2025;25(1):61.
48. Esan DT, Adegbilero-Iwari OE, Hussaini A, Adetunji AJ. Complementary feeding pattern and its determinants among mothers in selected primary health centers in the urban metropolis of Ekiti State, Nigeria. *Sci Rep*. 2022;12(1):6358.
49. Nantel A, Gingras V. Are complementary feeding practices aligned with current recommendations? A narrative review. *Children (Basel)*. 2023;10(5):794. doi:10.3390/children10050794
50. Spyreli E, McKinley MC, Dean M. Parental considerations during complementary feeding in higher income countries: a systematic review of qualitative evidence. *Public Health Nutr*. 2021;24(10):2834–47. doi:10.1017/S1368980021001749

51. Rumicha TD, Gemedde HF. Complementary feeding knowledge, practice, dietary diversity and associated factors among mothers of children 6–23 months in Guto Gida District, Oromia, Ethiopia. *J Nutr Food Sci*. 2021;11(8):1000P343. doi:10.5281/zenodo.7651002
52. Hashim M, Rizk R, Abbas N, Abdelrahim DN, Hasan H, Obaid RS, et al. Infant and young child feeding practice status and its determinants in UAE: results from the MISC cohort. *Int Breastfeed J*. 2025;20(6):16. doi:10.1186/s13006-024-00685-2
53. Janmohamed A, Baker MM, Doledec D, Ndiaye F, Konan ACL, Leonce A, et al. Dietary diversity and associated factors among infants and young children in three West African countries. *Front Public Health*. 2024;12:1386664.
54. Akanbonga S, Hasan T, Chowdhury U, Kaiser A, Akter Bonny F, Lim IE, et al. Infant and young child feeding practices and associated socioeconomic and demographic factors among children aged 6–23 months in Ghana: findings from Ghana Multiple Indicator Cluster Survey, 2017–2018. *PLoS One*. 2023;18(6):e0286055.
55. Benin. Britannica. [assessed 2025 May 25]. Available at <https://www.britannica.com/place/Benin-historical-kingdom-West-Africa>
56. National Population Commission. How we arrived at Nigeria’s latest population figure — NPC [Internet]. Premium Times; 2018 Apr 26 [assessed 2025 Jun 23]. Available from: <https://www.premiumtimesng.com/news/top-news/265547-how-we-arrived-at-nigerias-latest-population-figure-npc.html>
57. Edo State Government. About Edo. [assessed 2025 May 25]. Available from: <https://edostate.gov.ng/edo/>

58. Edo State Primary Health Care Development Agency. List of BHCPF/IMPACT facilities in Edo state offering free medical services [Internet].[Cited 2026 Apr 26]. Available from: <https://www.facebook.com/100069355533266/posts/pfbid02ZkUyyTDKyTNmQUpQHRNRtMLFTfc2hNcSP5rXsVVZcJkY9zzBxdKXRuDorF6xm5D5l/>
59. Conchran WG. Sampling techniques. 3rd ed. New York: John Wiley & Sons; 1977. Available from; <https://www.myrelab.com/learn/sample-size>
60. Federal Ministry of Health and Social Welfare (Nigeria), National Population Commission (NPC) [Nigeria], ICF. Nigeria Demographic and Health Survey 2023-24 Model woman's questionnaire. Abuja (Nigeria): NPC and ICF; 2024:44-50 Available from; <https://dhsprogram.com/publications/publication-DHSQ8-DHS-Questionnaires-and-Manuals.cfm>
61. Ibadin MO, Akpede GO. A revised scoring scheme for the classification of socio-economic status in Nigeria. Nigeria Journal of Paediatrics.2021;48(8):26-33. <http://dx.doi.org/10.4314/njp.v48i1.5>
62. Abubakari AR, Alhassan AS, Salifu A, Ziblim SD, Sufyan SB. Complementary feeding practices in Northern Ghana: a study of prevalence, predictors, and socio-cultural influences. Res Sq. 2025 Oct 23. doi:[10.21203/rs.3.rs-7453597/v1](https://doi.org/10.21203/rs.3.rs-7453597/v1) .
63. Westernpost. Edo government unveils 4-year multi-sectoral plan to tackle malnutrition. 07 December 2025 Available at <https://www.westernpost.ng/edo-govt-unveils-4-year-multi-sectoral-plan-to-tackle-malnutrition/#:~:text=Edo%20govt%20unveils%204%2Dyear,to%20economic%20and%20social%20development>. [Accessed 20 April 2026]

APPENDIX I

Task	Ja n- 25	Fe b- 25	Mar -25	Ap r- 25	May -25	Ju n- 25	Ju l- 25	Aug -25	Se pt- 25	Oc t- 25	No v- 25	De c- 25	Ja n- 26	Fe b- 26	Ma r- 26	Ap r- 26
Decision on topics																
Concept Paper																
Introdu ction																
Literatu re review																
Material s and methods																
Pretesti ng																
Data collectio n/Analy sis																

Figure 4: Gantt chart showing the work plan of the one-year project

APPENDIX II

INFORMED CONSENT FORM

TITLE OF STUDY

COMPLEMENTARY FEEDING KNOWLEDGE AND PRACTICES AMONG MOTHERS OF
CHILDREN 6-23 MONTHS IN BENIN CITY, NIGERIA

INSTITUTION

Department of Public Health and Community Medicine, College of Medical Sciences, University
of Benin, Benin City.

PRINCIPAL INVESTIGATORS

Joan Oghenerukevwe Agbaohwo

Jamiu Iyanulolorun Adisa

SUPERVISOR

Prof. Vivian Omuemu

FINANCIAL SPONSORSHIP

This research work is financially sponsored by the principal investigators.

PURPOSE OF RESEARCH

The purpose of this research work is to assess the Knowledge and Practice of Complementary Feeding among mothers of Children aged 6-23 months in Benin City.

PROCEDURES TO BE FOLLOWED

If respondents agree to participate, they will receive a google form containing a questionnaire to assess the assess the Knowledge and Practice of Complementary Feeding among mothers of children aged 6-23 months in Benin City.

PARTICIPATION

Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue your participation at any time without penalty or loss of benefits. The principal investigators may decide to withdraw you from the study if we are unable to obtain the necessary information.

CONFIDENTIALITY

All information collected would be kept confidential and stored securely. Data collected would be anonymized and only accessible to the research team.

COMPENSATION

Participants will not receive any financial compensation for their participation.

RISKS

There are no risks associated with participation in this study.

BENEFITS

Participants will contribute to important research that may help in developing support services for complementary feeding practice among mothers in Benin City.

CONTACT INFORMATION

If you have any questions or concerns regarding this research work please contact:

Joan Oghenerukevwe Agbaohwo

Email: joanagbaohwo@gmail.com

Phone number: 08144868193

Or

Jamiu Iyanulolorun Adisa

Email: jeremiahianulolorun96@gmail.com

Phone number: 07062737501

OR

Ethics and Research Committee,
University of Benin Teaching Hospital,
Benin City.

Email: ubthresearchethics@gmail.com

Phone number: 07063331337

IF THERE IS ANY PORTION OF THIS CONSENT AGREEMENT THAT YOU DO NOT UNDERSTAND, ASK THE FIELD WORKER OR INVESTIGATOR BEFORE SIGNING.

Please, sign below if you have agreed to participate in the study.

CERTIFICATION OF CONSENT

I, _____ having full capacity to consent for myself do thereby consent to my participation in the research study.

The methods and means by which the study will be conducted have been explained to me by Ethical Committee. I have been given the opportunity to ask questions concerning this investigational study, and any such questions have been answered to my full and complete satisfaction.

I understand that I may at any time during the course of this study revoke this consent and withdraw myself from the study without prejudice.

Participant's Signature: _____

Date: _____

APPENDIX III
STUDY QUESTIONNAIRE
COMPLEMENTARY FEEDING KNOWLEDGE AND PRACTICES AMONG
MOTHERS OF CHILDREN 6-23 MONTHS IN BENIN CITY

We are 600 Level medical students of the University of Benin, Benin City, conducting research on the knowledge and practices of complementary feeding among mothers of children 6-23 months in Benin city. The aim of this study is to assess the level of awareness, understanding and feeding practices of mothers regarding complementary feeding.

Kindly provide true and correct answers to each of the questions in this questionnaire. Please be rest assured that all information provided will be treated with the utmost confidentiality. Thank you for your cooperation.

SECTION A: SOCIO – DEMOGRAPHICS OF RESPONDENT

1. Mother's Age (as at last birthday). _____
2. Marital status. Single ☐ Cohabiting ☐ Married ☐ Separated/Divorced ☐ Widowed ☐

3. Ethnic group. Benin () Esan () Afemai () Yoruba () Igbo () Hausa () Ijaw () Igbanke () Isoko ()
Ukwuani () Ika () Urhobo () Itsekiri () Other ()

4. Religion. Christian () Muslim () ATR ()

5. Highest level of education. No formal education () Primary () Junior secondary () Senior
secondary () NCE/OND () University Degree/HND () Postgraduate education ()

6. Occupation _____

7. Employment status Employed () Unemployed ()

8. Spouse's highest level of education. No formal education () Primary () Junior secondary ()
Senior secondary () NCE/OND () University Degree/HND () Postgraduate education ()

9. Spouse's Occupation _____

10. Spouse's Employment status Employed () Unemployed ()

11. Monthly household income (₦) _____

12. Number of Children _____

Number of under-five children _____

13. Age of index child _____ months

14. Sex of index child. Male () Female ()

15. Birth order of index child _____

SECTION B - KNOWLEDGE OF COMPLEMENTARY FEEDING.

16. What is complementary feeding?

The addition of solids only to breastfeeding ()

Introduction of semi-solids and solids to a child's diet with continued breastfeeding ()

Adding Infant formula to a child's meal ()

I don't know ()

17. How did you know about complementary feeding? (Tick all that apply)

Health workers () Family members () Friends () TV () Radio () Social media[e.g WhatsApp, Facebook, X, YouTube, TikTok] Newspaper () Others please specify_____

18. What age should complementary feeding be introduced? _____ months

19. When should breastfeeding stop? _____ months

20. How frequently should a child breast feed after they start on other feeds?

2 times () 3 times () as often as the child desires () I don't know ()

21. How often should you give complementary foods in a day?

(i) 6 - 8 months: <2 times () 2 - 3 times () 3 - 5 times () I don't know ()

(ii) 9 - 11 months: <3 times () 3 - 4 times () 4 - 6 times () I don't know ()

(iii) >12 months: <3 times () 3 - 4 times () 4 - 6 times () over 6 times () I don't know ()

22. A child aged 6-23 months should have a diet consisting of.?

Food Types	Yes	No
Infant formula (cerelac, nutrend, frisocream, golden morn)		

Usual family foods (rice, yam, bread, beans, garri, fish) in their usual consistency		
Varieties of family foods made softer with addition of proteinous foods		
Herbal tea (agbo)		
Tea, sweets, chocolates and soft drinks, flavoured drink, other sweet beverages		
Normal adult milk		
Breast milk		

Food Types	Yes	No
Milk, yogurt, cheese		
Fruits and vegetables		
Plain Pap/ Plain pap with salt		
Pap mixed with groundnut/crayfish/egg/soya bean		
Pastries, cake, fries		

23. What is the risk of starting complementary feeding late? Better development () Malnutrition
 () Increased height () No risk () I don't know () Others (specify)

24. What is the best option to give a normal healthy infant if available?

Fortified locally available adult food – Mashed yam and boiled fish, soft rice and crayfish. ☐

Processed packaged cereals (Nutrend, Cerelac, Frisocream) ☐

I don't know ☐ Others (specify) _____

25. Which of the items listed is appropriate in giving complementary feed to a child?

Cup and spoon ☐ Cup ☐ Feeding bottle ☐ Others (specify) _____

SECTION C - COMPLEMENTARY FEEDING PRACTICE OF MOTHERS

26. Do you still breastfeed your child? Yes ☐ No ☐

27. How many times do you breastfeed your child in a day? 2 times ☐ 3 times ☐ On demand ☐ > 3 times ☐ I don't breastfeed daily ☐

28. if no, what age did you stop breastfeeding? _____ months

29. Why? _____

30. Have you introduced semi-solid and solid foods to your child's diet while continuing breastfeeding? Yes ☐ No ☐

If yes, go to question 31.

If no, skip. to question 41.

31. When did you introduce semi-solid and solid foods to your child's diet? _____ months

32. How often do you feed your child at the following ages?

i) 6-8 months < 2 times ☐ 2-3 times ☐ 3-5 times ☐ > 5 times ☐

ii) 9-12 months < 3 times ☐ 3- 4 times ☐ 4-6 times ☐ > 6 times ☐

iii) >12 months < 3 times () 3-4 times () 4-6 times () >6 times ()

33. When do you feed your child?

At scheduled times ()

Anytime the child gives a cue ()

When family is eating ()

Others 'please specify' _____

34. Tick the groups from which you fed your child yesterday during the day or night, whether at home or somewhere else. Please think about snacks and small meals as well as main meals. Please do not answer 'yes' for any food or ingredient only used in a small amount to add flavor to a dish yesterday during the day or at night.

Food	
Breastmilk	
Grains, roots, tubers and plantains (Rice, bread, pasta, maize, pap (ogi), Yam, potatoes, porridge, abacha, manioc, cassava (garri)	
Beans, groundnut, soyabeans, peas, lentils, nuts, seeds, other common foods derived from these (e.g akara, moi-moi)	
Dairy products (Milk, cheese, yoghurt, Infant formula like, Nan, Cerelac)	
Flesh foods (Fish, dried fish, shellfish, meat, meat organ (liver, kidney), poultry, wild games, snails, insects)	
Eggs	

Vitamin A rich fruits and vegetables (Banana, oranges, ripe mango, ripe papaya, pineapple, water-melon, carrots, sweet potatoes that are yellow or orange inside, Spinach, ugu, tomato, onion, green pepper)	
Other fruits and vegetables	
Sweet or flavored drinks; Fruit juice, flavored water, sodas, malt drinks, sports drink, or energy drinks, Tea, coffee, or herbal drinks	
Chocolates, candies, pastries, cakes, biscuits, or frozen treats like ice cream and popsicles, pastries, Chips, crisps, puffs, French fries, fried dough, instant noodles, Or other commonly consumed sentinel sweet foods	

35. Do you add salt to your child's food? Yes ☐ No ☐

36. What do you use to feed your child? Feeding bottle ☐ Cup and spoon ☐ Hand feeding ☐

Others _____

37. Describe the thickness of your child's food?

Same as other people in the family ☐

Thick enough to stay on a spoon ☐

Watery, similar to breast milk ☐

Others, please specify _____

38. Do you wash your hands with soap and water, dry it with a clean towel before feeding your child? Sometimes ☐ Always ☐ Never ☐

39. Do you wash and sterilize feeding utensils after use? Sometimes ☐ Always ☐ Never ☐

40. How do you feed your child when sick and has lost appetite?

Feed slowly and patiently ☐ Give favorite foods ☐ Feed the child forcefully ☐

Reprimand the child ☐ Others 'please specify' _____

41. Why haven't you introduced complementary feeding?

Child is not of age ☐ Breast milk alone is sufficient ☐ Inadequate fund ☐ Others 'please specify' _____

APPENDIX IV

	HEALTH RESEARCH ETHICS COMMITTEE (HREC)	
UNIVERSITY OF BENIN TEACHING HOSPITAL P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org		
CHIEF MEDICAL DIRECTOR Prof. (Mrs) I.N Ize-Iyamu	DIRECTOR OF ADMINISTRATION Jlm Uwadle, Esq	CHAIRMAN Prof. (Mrs.) Antoinette N. Ofili
 HREC OFFICE: Committee email: ubthresearchethics@gmail.com Registration Number: NHREC-UBTH-HREC/24/12/2022B		

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1486549127260

PROPOSAL TITLE: "COMPLEMENTARY FEEDING KNOWLEDGE AND PRACTICES AMONG MOTHERS OF CHILDREN AGED 6-23 MONTHS IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): ADISA JAMIU IYANULOLORUN, AGBAOHWO JOAN OGHENERUKEVWE

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

DATE CONSIDERED: JANUARY 12TH, 2026

DECISION OF THE COMMITTEE: APPROVED

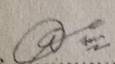
THIS APPROVAL DATES 12/1/2026 TO 11/1/2027. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE:  12/1/2026

SUPERVISOR (S): PROF. VIVIAN OMEUMU

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant aernal or activity related to this research may be conducted outside of these dates. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification

Signature & Date:  12/1/2026

 ubthresearchethics@gmail.com	Registration Number: NHREC/24/01/2020
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APPENDIX V

INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria



CLEARANCE FORM

DATE: 24-04-2026

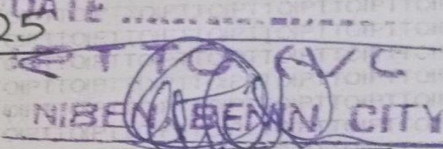
NAME: ADISA JAMLU IYANULOLORUN

MATRIC NO: MED1807354

DEPARTMENT: MEDICINE AND SURGERY

FACULTY: MEDICINE

SESSION OF GRADUATION: 2024/2025

DIRECTOR

IPTTO VC
BENIN CITY
Head Of Unit (IPTTO)

INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria



CLEARANCE FORM

DATE: 24-04-2026

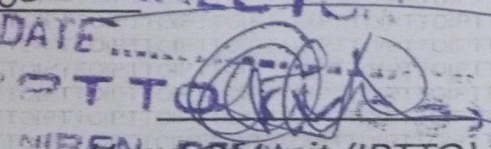
NAME: AGBAOHWO JOAN OGHENERUKEVWE

MATRIC NO: MED1807355

DEPARTMENT: MEDICINE AND SURGERY

FACULTY: MEDICINE

SESSION OF GRADUATION: 2024/2025

DIRECTOR

IPTTO VC
BENIN CITY
Head Of Unit (IPTTO)