MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA

BY

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CERTIFICATION

This is to certify that this research study titled "**MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA''** will be carried out by **OSASUMWEN OJO** with matriculation number **MED1706248** under my supervision in the Department of Public Health and Community Medicine, College of Medicine, University of Benin, Benin City as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS).

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DECLARATION

We hereby declare that this project work titled "**MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA"** will be conducted under supervision and has neither been presented nor published anywhere else in part or in full for any other purpose.

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DEDICATION

We dedicate this project to Almighty God for his grace towards us which sustained us and enabled us to successfully complete this project. We also dedicate this project to our respective families who relentlessly supported us spiritually, financially and morally. This work is also dedicated to our teacher who guided us throughout the course of this project, Prof O.A Adeleye.

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CI	Confidence Interval
DHS	Demographic and Health Survey
EBF	Exclusive Breastfeeding
GRA	Government Reserved Area
HAZ	Height-for-Age Z-score
IDP	Internally Displaced Persons
ISCO-08	International Standard Classification of Occupations, 2008 Edition
IYCF	Infant and Young Child Feeding
KAP	Knowledge, Attitude and Practice
LGA	Local Government Area
MAM	Moderate Acute Malnutrition
MBBS	Bachelor of Medicine, Bachelor of Surgery
MUAC	Mid-Upper Arm Circumference
NDHS	Nigeria Demographic and Health Survey
NGO	Non-Governmental Organization
NPC	National Population Commission
OR	Odds Ratio
PHC	Primary Health Centre
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SDG	Sustainable Development Goal
SPSS	Statistical Package for the Social Sciences

UBTH University of Benin Teaching Hospital

UNICEF United Nations Children's Fund

WASH Water, Sanitation and Hygiene

WAZ Weight-for-Age Z-score

WHO World Health Organization

WHZ Weight-for-Height Z-score

DEFINITION OF TERMS

Caregiver: Any adult aged 18 years or above who is primarily responsible for the daily care, feeding, and health-seeking of an under-five child. In this study, caregivers included mothers, fathers, grandmothers, aunts, uncles, siblings, and guardians.

Child Malnutrition: A broad term referring to deficiencies, excesses, or imbalances in a person's intake of energy and nutrients. In this study, malnutrition encompasses stunting, wasting, underweight, and moderate malnutrition as classified by WHO Z-score thresholds using the 2006 WHO Child Growth Standards.

Complementary Feeding: The process of introducing solid, semi-solid, or soft foods alongside continued breastfeeding to meet the growing nutritional needs of infants from six months of age. In this study, optimal complementary feeding was defined as introduction at exactly six months of age.

Dietary Diversity: The number of different food groups consumed by a child within a 24-hour period. Based on WHO IYCF guidelines, a minimum acceptable dietary diversity is defined as consumption of foods from at least four of seven food groups: grains, roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables.

Exclusive Breastfeeding (EBF): The practice of feeding an infant only breast milk including expressed breast milk for the first six months of life, with no other liquids or solids given except oral rehydration solution, drops, or syrups consisting of vitamins, minerals, or medicines. In this study, EBF was considered optimal when practiced for exactly six months.

Food Insecurity: A state in which consistent access to adequate food is limited or uncertain. In this study, food insecurity was measured using a single proxy indicator

whether the household reported worrying about running out of food in the four weeks preceding the survey.

Good Feeding Practices: A composite classification n derived from seven feeding indicators assessed in Section C of the study questionnaire. Caregivers were classified as having good feeding practices if they scored 70% or above (eight or more out of twelve points) on the composite feeding practices scoring framework, which incorporated exclusive breastfeeding duration, complementary feeding timing, dietary diversity, meal frequency, consumption of sugary drinks and packaged snacks, and feeding behaviour during illness.

Good Knowledge: A classification applied to caregivers who correctly answered 70% or more of the knowledge assessment items in Section B of the questionnaire. In this study, good knowledge corresponded to a score of 19 or more out of a maximum of 27 points derived from nine knowledge domains covering breastfeeding, complementary feeding, malnutrition recognition, food identification, hygiene, and dietary diversity.

Knowledge-Practice Gap: The observed discrepancy in which individuals possess adequate theoretical knowledge of recommended health behaviours but consistently fail to apply that knowledge in practice. In this study, the knowledge-practice gap is evidenced by the finding that caregivers with good knowledge were significantly less likely to exhibit good feeding practices (AOR = 0.625, p = 0.030).

Mid-Upper Arm Circumference (MUAC): A measurement of the circumference of the left upper arm at the midpoint between the tip of the shoulder and the tip of the elbow, used as an indicator of acute malnutrition. In this study, MUAC was

interpreted using WHO guidelines: ≥13.0 cm (normal), 11.5–12.9 cm (moderate acute malnutrition), and <11.5 cm (severe acute malnutrition).

Moderate Malnutrition: Nutritional impairment defined by a Z-score between -3 and -2 standard deviations from the WHO reference median for any of the three anthropometric indices: height-for-age (stunting), weight-for-height (wasting), or weight-for-age (underweight).

Nutritional Status: The physiological condition of an individual resulting from the relationship between nutrient intake, requirements, and utilisation. In this study, nutritional status was assessed objectively using anthropometric measurements and classified using WHO 2006 Child Growth Standards Z-scores.

Severe Malnutrition: Nutritional impairment defined by a Z-score below -3 standard deviations from the WHO reference median for any of the three anthropometric indices, or a MUAC below 11.5 cm, or the presence of bilateral pitting oedema.

Socioeconomic Status (SES): A composite measure of an individual's or household's economic and social position relative to others, assessed in this study through monthly household income, educational attainment, and occupational skill level classified according to the International Standard Classification of Occupations (ISCO-08).

Under-five Children: Children aged between zero and fifty-nine completed months (0–59 months) at the time of the study. This age group is considered the most nutritionally vulnerable due to rapid growth requirements, dependence on caregivers for feeding, and high susceptibility to infectious diseases.

Underweight: A composite indicator of malnutrition defined as a weight-for-age Z-score (WAZ) below -2 standard deviations from the WHO reference median. Underweight reflects both acute and chronic nutritional deficits and is used as a general measure of nutritional inadequacy.

ABSTRACT

Background: Malnutrition among children under five years remains a critical public health issue in Nigeria, contributing substantially to under-five morbidity and mortality. Despite various interventions, limited evidence exists on the specific determinants of malnutrition in semi-urban settings such as Egor Local Government Area, Edo State, Nigeria.

Objective: This study assessed the prevalence and determinants of malnutrition among children under five years in Egor LGA, specifically evaluating caregiver knowledge, feeding practices, sources of nutritional information, and socioeconomic factors influencing nutritional outcomes.

Methods: A descriptive cross-sectional study was conducted among 400 caregiver-child pairs selected through multi-stage stratified systematic random sampling from primary healthcare centres, immunization clinics, and child welfare services in Egor LGA between January and March 2026. Data were collected using a structured interviewer-administered questionnaire covering sociodemographic characteristics, caregiver knowledge (27-point scale), child feeding practices (12-point scale), information sources, and household factors. Anthropometric measurements (weight, height/length, mid-upper arm circumference) were taken following WHO standardized protocols. Nutritional status was classified using WHO 2006 Child Growth Standards (Z-scores). Data were analysed using IBM SPSS version 25, with chi-square tests and multivariate binary logistic regression ($p < 0.05$ significance level).

Results: The majority of caregivers were mothers (73.3%), aged 29–38 years (38.8%), with secondary (47.0%) or tertiary (41.5%) education. Good knowledge of child nutrition was demonstrated by 65.6% of caregivers, with 96.3% correctly identifying exclusive breastfeeding duration (6 months) and 91.3% knowing appropriate complementary feeding age (6 months). However, only 47.5% exhibited good feeding practices. A significant knowledge-practice gap was identified: caregivers with good knowledge were significantly less likely to have good feeding practices (AOR = 0.625, 95% CI: 0.409–0.955, p = 0.030). Health workers were the most utilized (94.5%) and trusted (44.8%) information source, yet only 13.0% had attended formal nutrition education. Overall malnutrition prevalence was 20.7% (underweight 14.5%, moderate malnutrition 4.0%, wasting 1.3%, stunting 1.0%). Recent child illness (AOR = 1.891, 95% CI: 1.101–3.250, p = 0.021) and good feeding practices (AOR = 2.042, 95% CI: 1.167–3.571, p = 0.012) were significant risk factors for malnutrition, while good caregiver knowledge (AOR = 0.419, 95% CI: 0.245–0.717, p = 0.001), male caregiver sex (AOR = 0.305, 95% CI: 0.112–0.831, p = 0.020), and household food insecurity (AOR = 0.382, 95% CI: 0.204–0.712, p = 0.002) were protective.

Conclusion: Despite relatively high caregiver knowledge and lower malnutrition prevalence than national averages in Egor LGA, a substantial knowledge-practice gap persists, and child feeding practices remain suboptimal with low dietary diversity and high consumption of sugary drinks and packaged snacks. Health workers are trusted information sources but structured nutrition education is underutilized. Interventions must address economic and structural barriers limiting knowledge translation, integrate practical skills-based nutrition counselling into routine health services, and target modifiable risk factors including childhood illnesses.

Keywords: Malnutrition, under-five children, caregiver knowledge, feeding practices, knowledge-practice gap, socioeconomic status, Egor LGA, Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 Background

Malnutrition in children under five years of age continues to pose a significant public health challenge, particularly in low- and middle-income countries, where it contributes to nearly half of all deaths in this age group globally. According to the World Health Organization, approximately 45 million children under five were wasted, 149 million were stunted, and 39 million were overweight as of 2022, highlighting a triple burden of malnutrition that includes under-nutrition, micro-nutrient deficiencies, and over-nutrition. [1]

In Nigeria, the burden is particularly severe. The 2018 Nigeria Demographic and Health Survey reported that 37% of Nigerian children under five were stunted, 7% were wasted, and 22% were underweight[2]. Malnutrition in early childhood can lead to irreversible damage, including impaired physical growth, poor cognitive development, weakened immune function, and increased susceptibility to infectious diseases[3,4]. These consequences not only affect the immediate survival and quality of life of the child but also reduce human capital and productivity later in life, perpetuating the cycle of poverty and poor health.

Egor Local Government Area in Edo State, Nigeria, is not exempt from these challenges. The region, like many others across the country, is characterized by diverse socioeconomic and cultural dynamics that affect the nutritional status of children. Many caregivers lack adequate knowledge of child nutrition, while factors such as maternal education, poverty, poor sanitation, food insecurity, and limited

access to quality healthcare services further contribute to the high rates of malnutrition[5,6].

Addressing child malnutrition in Egor LGA requires an understanding of both the immediate and structural determinants. Interventions must be context-specific, data-driven, and sensitive to the local realities of caregivers and their children. This study seeks to investigate the knowledge, practices, and socio-demographic influences on malnutrition among children under five in Egor LGA.

1.2 Statement of the Problem

Despite numerous government and non-governmental interventions, malnutrition continues to be a major cause of morbidity and mortality among under-five children in Nigeria, particularly in underserved communities. In Egor LGA, health records indicate a concerning prevalence of under nutrition-related conditions such as stunting, wasting, and micro-nutrient deficiencies, which often go under-reported or unrecognized at the community level. [7]

Several studies have pointed to gaps in caregiver knowledge, poor infant feeding practices, cultural beliefs, and socioeconomic disparities as critical factors contributing to this crisis[8,9]. Many caregivers lack awareness about exclusive breastfeeding, proper complementary feeding, and the nutritional value of local foods. Others are constrained by poverty, food insecurity, or limited access to healthcare services.[10] Furthermore, employment status have been found to significantly affect child-feeding decisions, yet these associations remain under-explored at the local government level.[11]

This study is necessary to identify and understand the unique combination of factors fueling malnutrition in Egor LGA, in order to inform targeted, evidence-based interventions that can mitigate this public health burden.

1.3 Justification of the Study

The first 1,000 days of a child's life from conception to age two represent a critical window for ensuring adequate nutrition. Interventions during this period are not only life-saving but also have long-term implications for a child's cognitive development, educational performance, and economic productivity in adulthood. [12]

Understanding the specific causes of malnutrition in Egor LGA will contribute to ongoing efforts to reduce under-five mortality and meet national and international nutrition targets, including the Sustainable Development Goal 2: Zero Hunger. [13] While much research has been conducted on malnutrition at the national level, there is a paucity of localized studies that examine how contextual factors such as caregiver knowledge, maternal education, socioeconomic status, and sources of nutritional information interact to influence child nutrition outcomes in semi-urban areas like Egor.

This study will fill that gap and provide stakeholders including policymakers, public health officials, and community leaders with the data needed to design culturally relevant and community-based nutrition interventions. It will also provide empirical evidence that could be used to advocate for policy changes or increased resource allocation to child health services in the LGA.

1.4 RESEARCH QUESTIONS

1. What is the level of knowledge among caregivers in Egor LGA regarding childhood nutrition and malnutrition prevention?

2. What is the association between caregivers' knowledge and childhood feeding practices of under-five children?

3. What are the common sources of nutritional information for caregivers of under-five children?

4. What role does socioeconomic factor play in determining the nutritional status of children?

General Objective

To assess the prevalence, causes, and contributing factors of malnutrition among children under five years old in Egor Local Government Area and propose recommendations to improve nutritional outcomes.

Specific Objectives

1. To assess the level of caregivers' knowledge regarding childhood nutrition and malnutrition prevention in Egor LGA

2. To determine the association between caregivers' knowledge and childhood feeding practices of under-five children

3. To evaluate the sources of nutritional information available to caregivers of under-five children.

4. To determine the impact of socioeconomic factors on the nutritional status of under-five children.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of existing literature relevant to the study of malnutrition among children under five years of age. The review is organized thematically in alignment with the four specific objectives of this study. It begins with a detailed examination of caregiver knowledge regarding child nutrition and malnutrition prevention. This is followed by an analysis of the association between caregiver knowledge and child feeding practices. The chapter then evaluates the sources of nutritional information available to caregivers. Finally, it examines the impact of socioeconomic status on the nutritional status of under-five children. The chapter concludes with a summary that identifies gaps in the existing literature and situates the present study within the broader body of research.

2.2 Caregiver Knowledge Regarding Childhood Nutrition and Malnutrition Prevention

A cross-sectional study conducted in 2025 examined maternal knowledge of stunting causes and consequences and its association with infant and young child feeding practices in Rwanda. The study population comprised mothers and caregivers of children under five years of age, with a total sample size of 2,286 participants selected across 10 districts using stratified cluster sampling. The objective of the study was to assess the level of maternal knowledge regarding the causes and consequences of stunting and to determine its influence on infant and young child feeding practices. Data were collected using a structured questionnaire based on WHO and UNICEF

guidelines, assessing knowledge of stunting causes using 19 items and knowledge of consequences using 12 items. The findings revealed that 46.4 percent of participants had low knowledge of the causes of stunting, particularly those related to infection, and 43.5 percent had an inappropriate understanding of its developmental consequences. Low knowledge was significantly associated with suboptimal infant and young child feeding practices, with caregivers possessing low knowledge being 2.43 times more likely to exhibit inadequate practices overall. Significant predictors of low knowledge included rural residence, lack of formal education, and lower socioeconomic status. A key strength of the study was its national representativeness and the use of multivariable logistic regression to adjust for potential confounders. However, the study was limited by its reliance on self-reported data and its cross-sectional design, which precluded causal inference.[14]

A cross-sectional study conducted in 2025 assessed mothers' knowledge of childhood malnutrition prevention practices at Ugbor Primary Health Centre in Benin City, Edo State, Nigeria. The study population comprised mothers attending the immunization clinic with their children, and data were collected using a structured questionnaire. The objective of the study was to evaluate the level of knowledge regarding malnutrition prevention and to identify factors associated with knowledge levels. The findings revealed high percentages of participants were aware of malnutrition, with information sourced mainly from hospitals and health workers. Key recognized causes of malnutrition included poor feeding practices, inadequate breastfeeding, and lack of balanced diets. However, despite this awareness, exclusive breastfeeding rates for the recommended six months remained suboptimal, at approximately 57 to 58 percent. Barriers to optimal practices included cultural beliefs and limited access to nutritious foods. Significant associations were found between education level and

knowledge, as well as between occupation and feeding practices. A key strength of the study was its integration with routine immunization services in a southern Nigerian urban setting, providing context-specific data. However, the study was limited by its reliance on self-reported data and its facility-based sample, which may have overrepresented caregivers with greater health-seeking behaviour.[15]

A cross-sectional study published in 2024 examined the nutritional status of primary school children and caregiver knowledge on malnutrition in rural and urban communities of Ekiti State, Southwest Nigeria. The study population comprised caregivers of school-aged children, and the objective was to compare knowledge levels and nutritional outcomes between rural and urban settings. The findings revealed that caregivers in urban areas demonstrated significantly higher levels of knowledge regarding malnutrition, with approximately 89.5 percent exhibiting good knowledge compared to 71.5 percent in rural areas. This urban-rural disparity was attributed to better access to education, health information, and healthcare services in urban settings. The study highlighted that knowledge levels were strongly influenced by place of residence and access to information. A key strength of the study was its comparative urban-rural design, which allowed for the identification of contextual differences. However, the study was limited by its focus on primary school children rather than the more vulnerable under-five population, and the potential for selection bias in the sampling approach.[16]

A cross-sectional study conducted in 2023 assessed knowledge and preventive practices regarding malnutrition among mothers of under-five children in Kaduna North Local Government Area, Northern Nigeria. The study population comprised mothers of children under five years, and the objective was to evaluate the level of

knowledge and its relationship with preventive practices. The findings indicated moderate to good basic knowledge of nutrition and feeding practices among the participants, but notable gaps in the application of this knowledge contributed to persistently high malnutrition prevalence in the region. Maternal literacy and access to information were identified as key influencers of knowledge levels. The study underscored the existence of a knowledge-practice gap, wherein awareness did not fully translate into appropriate preventive behaviours. A key strength of the study was its urban focus, which challenged assumptions of lower malnutrition risk in urban settings. However, the study was limited by its regional specificity and cross-sectional design, which precluded causal inference.[17]

A randomized controlled trial published in 2025 evaluated the effect of a mobile-based intervention on infant and young child feeding knowledge among teenage mothers in Nigeria. The study population comprised teenage mothers, and the objective was to determine whether a mobile application-based educational intervention could improve knowledge of key feeding practices. Participants were randomized to an intervention group, which received the mobile application, or a control group, which received standard care. The findings revealed that post-intervention, the intervention group demonstrated significantly higher knowledge scores in exclusive breastfeeding, complementary feeding, dietary diversity, and responsive feeding compared to controls. Notable improvements were observed in knowledge of expressed breast milk storage and minimum acceptable diet. The study demonstrated the potential of digital platforms to reach vulnerable populations with targeted nutrition education. A key strength of the study was its experimental design, which allowed for causal inference regarding the effectiveness of the intervention. However, the study was limited by its focus on teenage mothers, which may restrict

generalisability to older caregivers, and by the short-term follow-up period, which did not assess sustained knowledge retention.[18]

An intervention study conducted in 2023 assessed the effect of nutrition education on complementary feeding knowledge and practices among caregivers in orphanage homes in Ibadan, Nigeria. The study population comprised caregivers responsible for feeding young children in institutional care settings. The objective was to evaluate changes in knowledge and practices following a structured nutrition education programme. Baseline assessment revealed that good knowledge stood at 68.1 percent, which improved to 79.9 percent following the intervention. Correspondingly, WHO infant and young child feeding indicators including minimum meal frequency, dietary diversity, and minimum acceptable diet increased from a range of 37.5 to 52.5 percent at baseline to 60 to 80 percent post-intervention. The study underscored the potential of structured education to bridge the gap between knowledge and practice in vulnerable settings. A key strength of the study was its pre-post evaluation design, which allowed for the measurement of change over time. However, the study was limited by its small institutional sample and the absence of long-term follow-up to assess sustained behaviour change or child nutritional outcomes.[19]

Across the studies reviewed, caregiver knowledge regarding child nutrition and malnutrition prevention varies considerably by geographical location, educational attainment, and access to health information. Urban and southern Nigerian settings generally report higher levels of knowledge compared to rural and northern areas. However, even where knowledge is relatively high, a persistent knowledge-practice gap is evident, with awareness not consistently translating into optimal feeding behaviours. Educational interventions whether delivered through mobile platforms or

in-person sessions show promise in improving knowledge, but sustained behaviour change requires addressing structural barriers such as poverty, cultural norms, and food access.[14]

2.3 Association Between Caregiver Knowledge and Childhood Feeding Practices

A cross-sectional study conducted in 2025 examined the influence of maternal knowledge of stunting causes and consequences on infant and young child feeding practices in Rwanda. The study population comprised 2,286 mothers and caregivers across 10 districts, selected using stratified cluster sampling. The objective was to determine the association between knowledge levels and adherence to recommended feeding practices, using WHO and UNICEF guidelines as the standard. Data were collected using a structured questionnaire, and multivariable logistic regression was employed to adjust for potential confounders. The findings revealed that suboptimal infant and young child feeding practices persisted despite varying levels of knowledge, with only 29.6 percent of children achieving a minimum acceptable diet and 60.5 percent demonstrating inadequate practices overall. Low knowledge of stunting causes increased the odds of inadequate feeding practices by 2.43-fold, while poor understanding of consequences increased the odds by 2.31-fold. The study demonstrated a statistically significant association between knowledge and practice, but also highlighted that even among those with adequate knowledge, feeding practices remained suboptimal. A key strength of the study was its large, nationally representative sample and the use of robust statistical methods. However, the study was limited by its reliance on self-reported data and its cross-sectional design, which could not establish temporal relationships.[14]

A cross-sectional study conducted in 2025 at Ugbor Primary Health Centre in Benin City, Edo State, Nigeria, assessed mothers' knowledge of childhood malnutrition prevention practices and their actual feeding behaviours. The study population comprised mothers attending immunization clinics, and data were collected using a structured interviewer-administered questionnaire. The objective was to evaluate the relationship between knowledge and self-reported practices. The findings revealed high levels of awareness regarding malnutrition and its causes, with health workers and hospitals as the primary sources of information. Despite this awareness, exclusive breastfeeding rates for the recommended six months remained suboptimal at approximately 57 to 58 percent. Barriers to optimal practices identified included cultural practices and limited access to nutritious foods. The study demonstrated a clear knowledge-practice gap, wherein high awareness did not translate into recommended feeding behaviours. A key strength of the study was its integration with routine immunization services, providing data from a real-world healthcare setting. However, the study was limited by its reliance on self-reported data, which may be subject to social desirability bias, and its facility-based sample, which may not represent caregivers who do not regularly attend health services.[15]

A cross-sectional study published in 2023 examined knowledge and preventive practices regarding malnutrition among mothers of under-five children in Kaduna North Local Government Area, Nigeria. The study population comprised mothers of young children, and the objective was to assess the relationship between knowledge and the application of preventive practices. The findings indicated that while mothers demonstrated moderate to good basic knowledge of nutrition and feeding practices, notable gaps in application contributed to persistently high malnutrition prevalence. Maternal literacy and access to information were key influencers of knowledge, but

they were insufficient to guarantee optimal practices. The study highlighted the multifactorial nature of the knowledge-practice gap, suggesting that factors beyond awareness such as economic constraints and cultural beliefs impede the translation of knowledge into action. A key strength of the study was its focus on an urban population in a region with high malnutrition burden, challenging assumptions of lower risk. However, the study was limited by its regional specificity and cross-sectional design, which could not establish causality.[17]

A randomized controlled trial published in 2025 evaluated a mobile-based intervention to enhance infant and young child feeding knowledge among teenage mothers in Nigeria, and secondarily assessed changes in self-reported feeding practices. The study population comprised teenage mothers randomized to an intervention group receiving a mobile application or a control group receiving standard care. The objective was to determine whether improving knowledge through a digital platform would lead to corresponding improvements in feeding practices. The findings revealed that post-intervention, the intervention group demonstrated significantly higher knowledge scores across all domains assessed. However, the study noted that improvements in knowledge were not always accompanied by equivalent improvements in practices, and that structural barriers such as poverty and limited access to diverse foods remained significant constraints. The study demonstrated that knowledge enhancement is necessary but not sufficient for behaviour change. A key strength of the study was its experimental design, which allowed for causal inference regarding the effect of the intervention on knowledge. However, the study was limited by its focus on a specific demographic subgroup and the short-term follow-up, which did not assess the sustainability of knowledge gains or long-term practice changes.[19]

A cross-sectional study published in 2024 examined nutrition knowledge and health vulnerability among mothers of pre-school children in north-central Nigeria. The study population comprised mothers in Niger State, and the objective was to assess the relationship between knowledge sources, knowledge levels, and dietary practices. The findings revealed that online and social media were the most common sources of nutritional information, particularly among younger mothers aged 26 to 35 years. However, the study noted that reliance on digital sources did not always translate to better dietary practices, suggesting that the quality and accuracy of information obtained online may be variable. The study highlighted that the source of knowledge may be as important as the level of knowledge in determining its impact on practice. A key strength of the study was its exploration of modern information channels in a predominantly rural-urban context. However, the study was limited by its lack of direct linkage to child nutritional outcomes and its reliance on self-reported data.[20]

Across the studies reviewed, the association between caregiver knowledge and child feeding practices is complex and non-linear. While knowledge is a necessary prerequisite for optimal practices, it is not sufficient on its own. Multiple studies document a persistent knowledge-practice gap, wherein caregivers possess adequate awareness of recommended practices but fail to implement them consistently. This gap is attributed to a range of factors including economic constraints, limited food access, cultural beliefs, time pressures, and the variable quality of information sources. Interventions that focus solely on knowledge transfer are unlikely to achieve sustained behaviour change unless accompanied by efforts to address structural barriers and to build practical feeding skills and self-efficacy.

2.4 Sources of Nutritional Information for Caregivers

A cross-sectional study conducted in 2025 at Ugbor Primary Health Centre in Benin City, Edo State, Nigeria, examined the sources of nutritional information among mothers of under-five children attending immunization clinics. The study population comprised mothers seeking routine child health services, and the objective was to identify the primary sources of information regarding child nutrition and malnutrition prevention. The findings revealed that hospitals and health workers were the predominant sources of information, with approximately 50.6 percent of mothers citing hospitals and 50.0 percent citing health workers as their main sources. The study demonstrated that facility-based health services serve as critical platforms for nutrition communication in this urban southern Nigerian setting. A significant association was observed between education level and knowledge, suggesting that more educated mothers were better able to access and utilize health information. A key strength of the study was its integration with routine immunization services, capturing data from caregivers actively engaged with the health system. However, the study was limited by its reliance on self-reported data and its facility-based sample, which may overrepresent caregivers with greater health-seeking behaviour and underrepresent those with limited healthcare access.[15]

A cross-sectional study published in 2024 examined nutrition knowledge and health vulnerability among mothers of pre-school children in north-central Nigeria, with a specific focus on sources of nutritional information. The study population comprised mothers in Niger State, and the objective was to identify the channels through which caregivers access nutrition information and to assess their relative importance. The findings revealed that online and social media platforms were the most common sources of information, utilized by approximately 36.4 percent of mothers, followed

by traditional media including television, radio, and billboards. Only 19.6 percent of mothers reported using community health workers or women's gatherings as information sources, and family and relatives were among the least explored sources. Younger mothers, particularly those aged 26 to 35 years, were more likely to favour digital sources due to mobile phone access. However, the study noted that reliance on social media did not always translate to better dietary practices, raising concerns about the quality and accuracy of information obtained online. A key strength of the study was its exploration of modern information trends in a context where digital penetration is increasing. However, the study was limited by the absence of direct linkage between information sources and child nutritional outcomes.[20]

A cross-sectional study conducted in 2025 assessed knowledge of nutrition and feeding practices among mothers of under-five children attending nutrition units in Abakaliki, Ebonyi State, Nigeria. The study population comprised 261 mothers recruited from facility-based nutrition services, and the objective was to evaluate knowledge levels and the implied sources of information. The findings revealed high levels of nutrition knowledge, with 87.7 percent of participants demonstrating adequate knowledge. Health facilities and the health workers within them were implied as the key channels for information dissemination in this food-insecure context. Despite this access, misconceptions persisted, highlighting gaps in the effectiveness of information delivery even within formal healthcare settings. The study suggested that while health workers are trusted sources, the quality and consistency of the information they provide may vary. A key strength of the study was its focus on a low-income population in a food-insecure setting. However, the study was limited by its facility-based sample and reliance on self-reported data, which may be subject to social desirability bias.[21]

A cross-sectional study published in 2021 examined the impact of radio nutrition education programmes on vitamin A supplementation and complementary feeding practices among mothers in Benue State, Nigeria. The study population comprised mothers of young children exposed to radio-based health messaging. The objective was to evaluate the effectiveness of mass media as a channel for disseminating nutrition information and promoting behaviour change. The findings revealed that exposure to radio-based nutritional education programmes was associated with increased uptake of vitamin A supplementation and improved complementary feeding practices. The study demonstrated that mass media, particularly radio, can reach large audiences and serve as an effective complement to facility-based health communication. A key strength of the study was its focus on a scalable, low-cost intervention with broad population reach. However, the study was limited by its inability to isolate the specific effect of radio exposure from other concurrent health promotion activities.[22]

A cross-sectional study published in 2020 examined the effect of antenatal nutrition counselling on exclusive breastfeeding practices among mothers in south eastern Nigeria. The study population comprised mothers who had received antenatal care, and the objective was to compare exclusive breastfeeding rates between those who had received nutrition counselling and those who had not. The findings revealed that mothers who received nutrition counselling during antenatal visits were significantly more likely to practice exclusive breastfeeding, with rates of 67 percent in the counselled group compared to 32 percent in the non-counselled group. The study demonstrated the critical role of healthcare workers as trusted sources of nutrition information and the effectiveness of targeted counselling during routine care encounters. However, the study also noted that such counselling was not universally

available and was often poorly funded and inconsistently implemented. A key strength of the study was its clear demonstration of the impact of health worker communication on feeding behaviours. However, the study was limited by its observational design, which could not fully account for self-selection bias among mothers who sought and received counselling.[23]

Across the studies reviewed, healthcare workers including doctors, nurses, midwives, and community health extension workers consistently emerge as the most trusted and frequently utilized sources of nutritional information in Nigerian settings. Facility-based encounters, including antenatal care, immunization visits, and nutrition clinics, provide critical opportunities for nutrition communication. However, the reach, frequency, and quality of this communication vary considerably. Mass media, particularly radio, offers a complementary channel with broad population reach, while digital platforms are increasingly important among younger, more educated caregivers. The quality and accuracy of information from informal and online sources remain concerns. The effectiveness of information dissemination depends not only on the source but also on the consistency, clarity, and cultural appropriateness of the messaging.[15]

2.5 Impact of Socioeconomic Factors on the Nutritional Status of Under-Five Children

A multilevel logistic regression analysis published in 2024 examined socio-economic, demographic, and contextual predictors of malnutrition among children aged 6 to 59 months in Nigeria, using data from the 2018 Nigeria Demographic and Health Survey. The study population comprised a nationally representative sample of children under five, and the objective was to identify individual, household, community, and state-

level predictors of malnutrition, defined as a composite of stunting, wasting, underweight, and overweight. The findings revealed that 43.6 percent of children were poorly nourished, with significant predictors including older child age, small birth size, anaemia, recent diarrhoea, lower parental education, poorer household wealth, and maternal employment. Community-level factors such as ease of access to health facilities were protective, while state-level predictors included higher gender inequality and residence in northern states. The study demonstrated that socioeconomic status particularly household wealth and parental education was a consistent and powerful determinant of child nutritional outcomes. A key strength of the study was its use of hierarchical modelling, which accounted for community and state contexts and allowed for the examination of multi-level influences. However, the study was limited by its cross-sectional design, which precluded causal inference, and its reliance on data collected in 2018, which may not reflect current conditions.[23]

A secondary analysis published in 2025 examined determinants of child malnutrition in Northern Nigeria, with a specific focus on the influence of maternal education and socioeconomic indicators, using data from the 2013 and 2018 Nigeria Demographic and Health Surveys. The study population comprised 39,720 mother-child pairs from the north-central, north-east, and north-west zones. The objective was to examine trends in malnutrition and to assess the independent effects of maternal education and household wealth using logistic regression adjusted for confounders. The findings revealed stunting prevalence of 40.8 percent, wasting of 14.5 percent, and underweight of 29.3 percent. Children of uneducated mothers and those from the poorest households had significantly higher odds of all forms of malnutrition, with p-values less than 0.001. Regional disparities were marked, with the north-west zone exhibiting substantially higher risks than the north-central zone. Higher maternal

education was strongly protective, with secondary or higher education reducing the odds of stunting by up to 77 percent in adjusted models. A key strength of the study was its large, representative sample and robust adjustment for confounders using logistic regression. However, the study was limited by its cross-sectional nature, which precluded causal inference, and its restriction to data up to 2018.

A scoping review published in 2024 explored disparities in malnutrition among under-five children in Nigeria and potential solutions. The review synthesized evidence from multiple studies across all regions of Nigeria, with the objective of identifying key drivers of malnutrition and regional variations. The findings identified multiple risk factors including malaria, anaemia, respiratory and diarrhoeal infections, low antenatal care attendance, low maternal education and income, large family size, food taboos such as the restriction of eggs in some northern communities and insecurity and food insecurity in northern zones hindering agriculture and food access. Suboptimal complementary feeding quality contributed to micronutrient deficiencies. The review highlighted those socioeconomic factors particularly low household income, poverty, and low maternal education were among the most consistently identified predictors of poor nutritional outcomes. A key strength of the review was its comprehensive regional coverage and synthesis of disparate studies. However, the review was limited by the heterogeneity of study designs and methodologies across the included literature, which precluded meta-analysis.[26]

A community-based analytical cross-sectional study conducted in 2024 assessed the prevalence and determinants of malnutrition among under-five children in Obuama Community, Rivers State, Nigeria. The study population comprised 165 children selected through multi-stage sampling, and the objective was to determine the

prevalence of acute malnutrition, undernutrition, and overnutrition and to identify associated factors. Nutritional status was measured using mid-upper arm circumference, weight, height or length, and body mass index for age against WHO growth standards. The findings revealed low acute malnutrition, with 2.4 percent classified by MUAC, but emerging overweight of 0.6 percent and obesity of 1.2 percent, indicating a dual burden of malnutrition. All undernutrition cases occurred in children aged 36 months and older, and malaria was a significant predictor. Underlying factors identified included poverty, food insecurity, poor sanitation, and cultural practices limiting exclusive breastfeeding. A key strength of the study was the use of direct anthropometric measurements and multivariate analysis to identify independent predictors. However, the study was limited by its small sample size, single-community focus, and cross-sectional design, which limited generalizability and causal claims.[27]

A systematic review published in 2025 examined the determinants of malnutrition among children in internally displaced persons camps in Africa, including Nigerian contexts. The review synthesized evidence from multiple studies across various IDP settings, with the objective of identifying the predominant predictors of malnutrition in these vulnerable populations. The findings identified 11 thematic areas, with socioeconomic factors specifically household income, caregiver education, and occupation emerging as the predominant predictors of malnutrition. Low socioeconomic status amplified risks through multiple pathways, including displacement-related food insecurity, poor water and sanitation infrastructure, and severely limited dietary diversity. The review highlighted that in crisis-affected populations, the usual socioeconomic gradients in malnutrition are exacerbated by the breakdown of livelihoods and social support systems. A key strength of the review

was its thematic synthesis across multiple studies and conflict-affected settings. However, the review was limited by its focus on IDP camps, which may not be generalizable to stable community settings.[28]

A cross-sectional study conducted in 2025 at Ugbor Primary Health Centre in Benin City, Edo State, Nigeria, linked socioeconomic factors including employment status, household income, and maternal education to malnutrition prevalence among under-five children attending health services. The study population comprised mothers and children attending immunization and child welfare clinics. The objective was to examine the association between socioeconomic indicators and child nutritional status in an urban southern Nigerian setting. The findings revealed that lower socioeconomic status was significantly associated with poorer nutritional outcomes, despite generally high levels of awareness and facility-based service utilization. The study demonstrated that even in settings with relatively better overall health indicators, socioeconomic gradients in malnutrition persist. A key strength of the study was its relevance to the southern Nigerian urban context, providing data that complement the predominantly northern-focused literature. However, the study was limited by its reliance on self-reported socioeconomic data and its facility-based sample, which may not capture the most marginalized households with limited healthcare access.[15]

Across the studies reviewed, socioeconomic status encompassing household income, parental education, occupation, and access to resources emerges as one of the most consistent and powerful predictors of child nutritional outcomes in Nigeria. Children from poorer households and those with less educated mothers face substantially higher risks of stunting, wasting, and underweight compared to their more advantaged peers. These associations persist across different regions, although the magnitude of

disparity is more pronounced in northern states, where poverty, insecurity, and food access challenges are more acute. Socioeconomic status influences nutritional outcomes through multiple pathways, including household food security, dietary diversity, healthcare access, environmental hygiene, and maternal capacity to provide adequate care. The literature underscores that addressing child malnutrition requires not only nutrition-specific interventions—such as education and supplementation—but also nutrition-sensitive approaches that tackle the underlying socioeconomic determinants of poor health.

2.6 Summary of Literature Review

The literature reviewed in this chapter establishes that malnutrition among children under five years of age is a multidimensional problem with immediate, underlying, and basic causes. Caregiver knowledge regarding child nutrition varies considerably across Nigeria, with generally higher levels in urban and southern settings compared to rural and northern areas. However, a persistent knowledge-practice gap is evident across multiple studies, wherein awareness does not consistently translate into optimal feeding behaviours.[14-17]

Healthcare workers emerge as the most trusted and frequently utilized source of nutritional information, with facility-based encounters providing critical opportunities for nutrition communication. Mass media, particularly radio, and increasingly digital platforms offer complementary channels, but concerns remain regarding the quality and accuracy of information from informal and online sources.[15]

Socioeconomic status particularly household income and maternal education is a dominant predictor of child nutritional outcomes. Children from poorer households

and those with less educated mothers face substantially higher risks of all forms of malnutrition, with the strongest associations observed in northern Nigeria, where poverty and food insecurity are more prevalent.[24]

Despite the wealth of literature on child malnutrition in Nigeria, several important gaps remain. There is a paucity of localized studies examining the specific determinants of malnutrition in semi-urban settings like Egor LGA. Most existing research focuses on either large-scale national surveys or rural communities. Furthermore, few studies quantitatively examine the statistical association between caregiver knowledge and feeding practices while controlling for socioeconomic and demographic confounders. The sources of nutritional information available to caregivers in Egor LGA have not been systematically documented. Finally, while national data indicate that Edo State has lower malnutrition prevalence than many northern states, the specific impact of socioeconomic status on child nutritional outcomes within this relatively advantaged context requires further exploration.

This study aims to address these gaps by providing context-specific evidence on the knowledge, practices, information sources, and socioeconomic determinants of malnutrition among under-five children in Egor LGA.

CHAPTER THREE
METHODOLOGY

3.1 STUDY AREA

The study was conducted in Egor Local Government Area (LGA), one of the eighteen local government areas in Edo State, Nigeria. Egor LGA is located within Benin City, the capital of Edo State in the South-South geopolitical zone of Nigeria. It covers an approximate land area of 95–96 km² and is characterized by high population density typical of an urban setting.

The population of Egor LGA was estimated at approximately 537,000–550,000 based on recent projections from the 2006 census figure of about 340,000. The demographic composition includes a roughly balanced gender distribution, with a significant proportion of children under five years, working-age adults, and diverse socioeconomic groups comprising civil servants, traders, artisans, transport workers, students, and residents from peri-urban communities. Major communities include Uwelu,, uselu, Ugbor, and parts of GRA area.

Egor LGA hosts several primary healthcare centers, immunization clinics, child welfare corners, and community outreach programs where under-five children routinely access growth monitoring, vaccination, nutrition screening, and treatment for common childhood illnesses. The urban environment presents typical nutritional risk factors such as overcrowding, variable access to potable water and sanitation, diverse child-feeding practices influenced by maternal education and household income, and exposure to frequent infections. These characteristics, combined with documented evidence of childhood malnutrition in urban Benin City and Edo State,

make Egor LGA a suitable and representative setting for investigating malnutrition among under-five children.

3.2 STUDY DESIGN

A descriptive cross-sectional study design was adopted for this research. This quantitative observational design is appropriate for determining the prevalence of different forms of malnutrition including stunting, wasting, and underweight and for identifying associated sociodemographic, maternal, child-feeding, and environmental factors at a single point in time. Cross-sectional studies are widely used in nutritional epidemiology because they are relatively quick, cost-effective, and feasible in community and health facility settings. However, it is acknowledged that this design does not permit inference of causality; associations identified represent correlations rather than definitive causal pathways.

3.3 STUDY POPULATION

The study population comprised under-five children aged zero to fifty-nine months residing in Egor LGA and their mothers or primary caregivers. Under-five children constitute the target population most vulnerable to malnutrition due to rapid growth requirements, transition to complementary feeding, high susceptibility to infections, and dependence on caregiver practices. The sampling frame included under-five children attending primary healthcare facilities, immunization clinics, growth monitoring sessions, or community-based nutrition outreach programmes within the LGA.

3.4 SELECTION CRITERIA

3.4.1 Inclusion Criteria

For inclusion in the study, the following criteria were applied:

- Children aged 0 to 59 months permanently residing in Egor LGA.
- Mothers or primary caregivers aged 18 years and above who accompanied the child and provided written informed consent.
- Caregivers who were physically and mentally capable of providing reliable information and participating in the interview.

3.4.2 Exclusion Criteria

Children were excluded from the study if any of the following conditions applied:

- Critically ill children requiring immediate medical intervention.
- Children whose caregivers declined consent or withdrew during the process.
- Children who were not residents of Egor LGA.

3.5 SAMPLE SIZE DETERMINATION

The minimum sample size was determined using Cochran's formula for estimating prevalence in descriptive cross-sectional studies:

$$\mathbf{n = Z^2pq / d^2}$$

Where:

- n = minimum sample size
- Z = standard normal deviate at 95% confidence level = 1.96

- p = estimated prevalence of stunting (the primary outcome indicator)
- q = 1 – p
- d = margin of error set at 0.05

Based on relevant studies in urban Edo State, where stunting prevalence has been reported to range from 29.8 percent in some urban communities, and national data from the 2018 Nigeria Demographic and Health Survey reporting 37 percent stunting nationally with slightly lower figures in southern states, a conservative estimate was of p = 0.37 (37 percent) adopted.

Therefore, q = 1 – 0.37 = 0.63

$n = (1.96)^2 \times 0.37 \times 0.63 / (0.05)^2 \approx 356.5$

Thus, the minimum sample size was approximately **357 children**.

To account for potential non-response, incomplete data, or refusals, a 10 percent adjustment was applied:

Adjusted sample size = 357 / (1 – 0.10) = 357 / 0.90 ≈ **397**

The final sample size was rounded up to **400 under-five children** to ensure adequate statistical power and representativeness.

3.6 SAMPLING TECHNIQUE

A multi-stage stratified systematic random sampling technique was employed to select participants. This approach was chosen to ensure adequate representation across the diverse wards and health service delivery points within Egor LGA while minimizing selection bias.

Stage 1: Stratification of Egor LGA

Egor LGA was stratified into clusters based on major child health service delivery points. These included primary healthcare centres, immunization clinics, child welfare units, and selected community wards. This stratification reflected attendance patterns and ensured coverage across both urban and peri-urban areas of the LGA.

Stage 2: Proportionate Allocation

Proportionate allocation of the total sample size was performed based on the average under-five attendance or estimated population of under-five children in each stratum. This ensured that larger facilities with higher patient volumes contributed proportionately more participants to the study.

Stage 3: Systematic Random Sampling within Strata

Within each stratum, a sampling interval (k) was calculated using the formula:

k = Average daily or monthly under-five attendance in the stratum ÷ Number of participants allocated to the stratum

A random starting point was selected through balloting or a random number generator. Thereafter, every kth eligible child-caregiver pair presenting to the facility or outreach point was approached for recruitment. If the selected pair was ineligible or declined participation, the next eligible pair was recruited in accordance with standard systematic sampling procedures.

This multi-stage approach minimized selection bias, enhanced the representativeness of the sample across the LGA, and was logistically feasible within the study timeframe.

3.7 DATA COLLECTION INSTRUMENT

A structured interviewer-administered questionnaire was used as the primary data collection tool. The instrument was specifically designed for this study following a thorough review of established nutrition assessment tools, including modules from the Nigeria Demographic and Health Survey (NDHS), the WHO Infant and Young Child Feeding (IYCF) indicators, and validated knowledge, attitude, and practice (KAP) questionnaires on child nutrition. Relevant items were adapted and contextualised to suit the local setting of Egor Local Government Area while preserving conceptual alignment with international standards.

Additional items were developed based on findings from peer-reviewed studies on caregiver knowledge, feeding practices, and determinants of malnutrition in Nigeria and similar low-resource settings. The final questionnaire was organised into six thematic sections, each corresponding directly to one or more of the specific objectives of the study.

The questionnaire was pre-tested in a similar non-study community within Benin City to assess clarity, cultural appropriateness, comprehension, and reliability. Based on feedback from the pilot exercise, necessary adjustments were made to improve the instrument before the main data collection phase.

The six sections of the questionnaire were as follows:

Section A: Socio-demographic Characteristics of Respondents

This section captured background information necessary for contextualising the findings and exploring associations between socio-demographic factors and nutritional outcomes. It included items on the respondent's relationship to the child,

age, sex, highest level of education, occupation, monthly household income, as well as the child's age and sex.

Section B: Caregiver's Knowledge Regarding Child Nutrition and Malnutrition Prevention

This section assessed caregivers' knowledge of key nutrition concepts. Items covered included the recommended duration of exclusive breastfeeding, appropriate timing for introduction of complementary feeding, recognition of signs of malnutrition, identification of iron-rich and vitamin A-rich foods, understanding of dietary diversity, awareness of hygiene practices in food preparation, knowledge of diarrhoea prevention, and recognition of unhealthy foods. Most items were multiple-choice, with some allowing multiple responses to enable a comprehensive evaluation of knowledge levels. This section directly addressed Objective One.

Section C: Child Feeding Practices

This section evaluated actual infant and young child feeding practices. It included questions on history of breastfeeding, duration of exclusive breastfeeding, current breastfeeding status, age at introduction of complementary feeding, dietary diversity (foods consumed the previous day), meal frequency, person primarily responsible for feeding, encouragement during feeding, use of a separate plate, consumption of sugary drinks and packaged snacks, and changes in feeding during illness. This section provided data on practices and directly addressed Objectives Two

Section D: Sources of Nutritional Information

This section explored the sources from which caregivers obtain information about child nutrition. Items included the various sources used (e.g., health workers, family

and friends, radio and television, social media), the single most trusted source, the frequency of receiving nutrition information from health facilities, and attendance at formal nutrition education sessions. Multiple-response items were included to capture the full range of information channels. This section directly addressed Objective Three.

Section E: Socioeconomic Factors

This section assessed household-level determinants of nutrition. It included items on food insecurity (worry about running out of food in the preceding four weeks), main source of drinking water, type of toilet facility, type of housing, household size, number of under-five children in the household, access to a refrigerator for food storage, frequency of consumption of protein-rich foods, and history of recent child illness. These variables were essential for examining the role of socioeconomic and environmental factors in shaping nutritional outcomes, thereby addressing Objectives Four.

Section F: Anthropometric Measurements

This section recorded objective measurements of the child's nutritional status, including weight in kilograms, length or height in centimetres, and mid-upper arm circumference (MUAC) in centimetres. Measurements were taken by trained research assistants using standardized WHO protocols and calibrated equipment. Weight was measured using a SECA digital scale with children in minimal clothing. Length was measured in the recumbent position using an infantometer for children under 24 months, while standing height was measured using a stadiometer for children aged 24 months and above. MUAC was measured using colour-coded MUAC tapes at the midpoint of the left upper arm.

Nutritional status was classified using the WHO 2006 Child Growth Standards. Z-scores were calculated for height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight). Children with z-scores below minus two standard deviations from the reference median were classified as stunted, wasted, or underweight accordingly. This section provided the primary outcome data for Objective four.

3.8 QUESTIONNAIRE ADMINISTRATION

Data collection was conducted by trained research assistants with qualifications in public health, nutrition, community health nursing, or related fields. To minimize potential bias, the research assistants were not involved in routine health service delivery at the participating facilities.

All assistants underwent a comprehensive two- to three-day training workshop prior to the commencement of data collection. The training covered the following areas:

- Overview of the study objectives and design
- Ethical principles in research involving human subjects
- Procedures for obtaining informed consent
- Techniques for administering the questionnaire, including neutral probing
- Accurate anthropometric measurement following WHO standardized protocols
- Data recording and maintenance of confidentiality

Face-to-face interviews were conducted in English, Pidgin English, or local dialects as preferred by the caregiver. Interviews took place at primary healthcare centres, immunization clinics, child welfare sessions, or community outreach points. Each

interview lasted approximately 15 to 25 minutes, allowing sufficient time to cover all sections without causing respondent fatigue.

Anthropometric measurements were performed immediately after obtaining consent and completing the interview. Children were weighed in minimal clothing, and all measurements were taken twice to ensure accuracy, with the average value recorded.

3.9 DATA COLLATION AND MANAGEMENT

Raw data from completed questionnaires and measurement forms were checked for completeness and accuracy on-site by field supervisors. Any discrepancies or missing items were addressed immediately with the respondent where possible.

Data were entered into a pre-designed, password-protected database template in IBM SPSS Statistics version 25. Double data entry by two independent assistants was performed for a randomly selected subset of 10 to 20 percent of the questionnaires to verify entry accuracy. Range checks, consistency checks, and logic checks were applied to identify and correct any errors.

3.10 DATA ANALYSIS

Data analysis was conducted using IBM SPSS Statistics version 25. The analytical plan was structured specifically to address each of the four study objectives. The level of statistical significance was set at $\mathbf{p < 0.05}$ for all inferential tests. Odds ratios (OR) and adjusted odds ratios (AOR) were reported with 95 percent confidence intervals for all regression models.

The analytical plan for this study will be based on the specific objectives. To assess the level of caregiver knowledge regarding child nutrition and malnutrition prevention,

knowledge scores derived from Section B items will be analysed using descriptive statistics such as frequencies, percentages, mean, and standard deviation (Mean ± SD). Knowledge scores will further be categorised into good knowledge (≥70% correct responses) and poor knowledge (<70% correct responses).

To determine the association between caregiver knowledge and child feeding practices, caregiver knowledge level (good/poor) will serve as the independent variable, while feeding practices (good/poor) will serve as the dependent variable. Chi-square test will be used to assess the bivariate association between the variables. In addition, multivariate binary logistic regression analysis will be conducted to adjust for possible confounding variables such as caregiver age, sex, educational level, income, and child age.

To evaluate the sources of nutritional information available to caregivers, data obtained from Section D will be analysed using descriptive statistics including frequencies, percentages, and ranking of the various information sources.

To examine the impact of socioeconomic status on the nutritional status of under-five children, variables such as income bracket, educational level, and occupation will be treated as independent variables, while nutritional status (normal/malnourished) will be the dependent variable. Chi-square tests will be used to assess bivariate associations between socioeconomic variables and nutritional status. Furthermore, multivariate binary logistic regression analysis will be performed with nutritional status as the outcome variable while adjusting for child age, sex, and recent illness.

3.11 SCORING AND CLASSIFICATION SYSTEM

To facilitate quantitative analysis and enable meaningful comparisons across respondents, composite scores were derived for caregiver knowledge and child feeding practices. The scoring methodology for each domain is described in detail below.

3.11.1 Scoring of Caregiver Knowledge

Caregiver knowledge regarding child nutrition and malnutrition prevention was assessed using a series of questions contained in Section B of the questionnaire. The knowledge assessment covered the following domains:

- Recommended duration of exclusive breastfeeding
- Appropriate age for introduction of complementary feeding
- Recognition of signs of malnutrition
- Identification of iron-rich foods
- Identification of vitamin A-rich foods
- Number of food groups required for a balanced diet
- Effects of poor hygiene during food preparation
- Methods of preventing diarrhoea
- Recognition of unhealthy foods

A total of 12 core knowledge questions were included, several of which were multiple-response items. For multiple-response questions, each correct option selected contributed one point to the total score. Each incorrect option selected (e.g., identifying pawpaw as an iron-rich food or white rice as a vitamin A-rich food) received zero points.

The maximum achievable knowledge score was **27 points**. Each respondent's raw score was converted to a percentage using the formula:

Knowledge Score (%) = (Raw Score ÷ 27) × 100

Based on the percentage score, knowledge was classified into two categories:

- **Good Knowledge:** Score of **70 percent or greater** (≥19 out of 27 points)
- **Poor Knowledge:** Score of **less than 70 percent** (<19 out of 27 points)

The 70 percent threshold was selected as it represents a commonly used benchmark in health knowledge assessments and aligns with the approach used in similar studies of caregiver nutrition knowledge in Nigeria.

3.11.2 Scoring of Child Feeding Practices

Child feeding practices were assessed using a composite score derived from multiple indicators contained in Section C of the questionnaire. The scoring framework was adapted from the WHO Infant and Young Child Feeding (IYCF) indicators.

The maximum achievable feeding practices score was **12 points**. Each respondent's raw score was converted to a percentage using the formula:

Feeding Practices Score (%) = (Raw Score ÷ 12) × 100

Based on the percentage score, feeding practices were classified into two categories:

- **Good Feeding Practices:** Score of **70 percent or greater** (≥8 out of 12 points)
- **Poor Feeding Practices:** Score of **less than 70 percent** (<8 out of 12 points)

3.11.3 Classification of Nutritional Status

Nutritional status was classified using the WHO 2006 Child Growth Standards. Z-scores were calculated for the following anthropometric indices:

- **Height-for-age Z-score (HAZ):** Indicator of stunting (chronic malnutrition)
- **Weight-for-height Z-score (WHZ):** Indicator of wasting (acute malnutrition)
- **Weight-for-age Z-score (WAZ):** Indicator of underweight (composite measure)

For the purpose of bivariate and multivariate analyses examining predictors of malnutrition, children were classified into a binary outcome variable:

- **Well-nourished:** Normal nutritional status (all Z-scores ≥ -2)
- **Malnourished:** Presence of stunting, wasting, underweight, or moderate/severe malnutrition (any Z-score < -2)

Mid-upper arm circumference (MUAC) was also measured and interpreted according to WHO guidelines:

- **MUAC ≥ 13.0 cm:** Normal nutritional status
- **MUAC 11.5–12.9 cm:** Moderate acute malnutrition
- **MUAC < 11.5 cm:** Severe acute malnutrition

3.11.4 Classification of Socioeconomic Status Indicators

Household Monthly Income was categorised into four brackets based on the distribution of responses:

- Low income: < ₦50,000 per month

- Lower-middle income: ₦50,000 – ₦100,000 per month
- Upper-middle income: ₦101,000 – ₦200,000 per month
- High income: > ₦200,000 per month

Occupation was classified according to the International Standard Classification of Occupations (ISCO-08) skill levels:

- **Skill Level 1:** Elementary occupations (e.g., cleaners, labourers)
- **Skill Level 2:** Clerical support, service, and sales workers
- **Skill Level 3:** Technicians and associate professionals
- **Skill Level 4:** Professionals (e.g., teachers, nurses, civil servants)

3.12 DATA PRESENTATION

Descriptive results were presented using:

- **Frequencies and percentages** for categorical variables, including sociodemographic characteristics, knowledge levels, sources of information, feeding practices, and prevalence of malnutrition forms.
- **Means and standard deviations** for normally distributed continuous variables such as child age, caregiver age, and anthropometric measurements.
- **Medians and interquartile ranges** for non-normally distributed continuous variables.
- **Tables** for cross-tabulations, including knowledge by education level, feeding practices by income, and nutritional status by socioeconomic indicators.
- **Pie charts** for visual representation of prevalence rates, knowledge classifications, and attitudinal distributions.

3.13 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the University of Benin Teaching Hospital Ethics and Research Committee before commencement of fieldwork. All procedures adhered to the ethical principles of respect for persons, beneficence and justice. Participation was strictly voluntary. Eligible individuals were informed of the study objectives, procedures, benefits and minimal risks. Written informed consent was obtained before questionnaire administration. Participants were assured that refusal to participate would not affect the care they or their relatives received.

Confidentiality and anonymity were prioritized. Questionnaires did not collect names, hospital numbers or other personal identifiers. Unique codes were assigned to each participant. Completed questionnaires and electronic data files were securely stored, with access restricted to the research team. Interviews were conducted in a respectful and non-intrusive manner. Participants expressing discomfort were allowed to pause or discontinue without penalty. No aspect of the study interfered with clinical management.

3.14 STUDY LIMITATIONS

The cross-sectional design provides prevalence estimates at a single point in time and cannot establish temporal relationships or causality between risk factors and malnutrition outcomes.

Reliance on caregiver recall for feeding practices, morbidity history, and household characteristics may introduce recall bias or social desirability bias, although

interviewer administration, clear probing, and confidentiality measures were used to minimize this.

The facility and community-based sampling strategy may under-represent children who do not regularly attend health services, potentially introducing selection bias. Findings are specific to urban Egor LGA and may have limited generalizability to rural areas or other regions of Nigeria.

These limitations were mitigated through the use of standardized WHO protocols, rigorous training of research assistants, multi-stage stratified sampling, and pretesting of instruments.

3.15 ANTICIPATED STRENGTHS OF THE STUDY

The study employs internationally standardized WHO child growth standards and anthropometric protocols, ensuring comparability with national and global data.

Multi-stage stratified systematic random sampling enhances representativeness within the urban context of Egor LGA.

Comprehensive assessment of multiple determinants (sociodemographic, feeding, morbidity, household, and environmental factors) allows for a holistic understanding of malnutrition drivers.

The findings are expected to provide locally relevant evidence to guide targeted nutrition interventions, policy formulation, and program planning in Edo State and similar urban settings in Nigeria

CHAPTER FOUR

RESULTS

A total of 400 respondents participated in the study, giving a total response rate of 100%.

The results will be presented in line with the sections of the questionnaire used for the study, which are as follows:

Section A: Sociodemographic characteristics of respondents

Section B: Caregiver's knowledge regarding child nutrition and malnutrition prevention

Section C: Child feeding practices

Section D: Sources of nutritional information

Section E: socioeconomic factors

Section F: Anthropometric measurements

SECTION A

SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1: Sociodemographic characteristics of respondents (n=400)

Variable	Frequency	Percent
Respondent's relationship to child		
Mother	293	73.3
Father	74	18.5
Grandmother	17	4.3
Sister	5	1.3
Brother	4	1.0
Aunt	3	0.8
Guardian	2	0.5
Uncle	2	0.5
Age of caregiver (years)		
≤28	149	37.3
29–38	155	38.8
39–48	68	17.0
>48	28	7.0
Sex of caregiver		
Female	343	85.8
Male	57	14.2
Highest level of education of caregiver		
No formal education	4	1.0
Primary	42	10.5
Secondary	188	47.0
Tertiary	166	41.5
Occupation (ISCO skill level)		
Skill level 1	8	2.0
Skill level 2	337	84.3
Skill level 3	5	1.3
Skill level 4	40	10.0
Unemployed	10	2.5
Monthly household income (₦)		
<50,000	10	2.5
50,000–100,000	46	11.5
101,000–200,000	271	67.8
>200,000	73	18.3
Child's age (months)		
≤6	56	14.0
7–12	55	13.8
>12	289	72.3
Child's sex		
Male	229	57.3
Female	171	42.8

Majority of respondents were mothers 293 (73.3%), followed by fathers 74 (18.5%) and grandmothers 17 (4.3%). Other caregivers included sisters 5 (1.3%), brothers 4 (1.0%), aunts 3 (0.8%), guardians 2 (0.5%), and uncles 2 (0.5%).

With respect to age, 155 (38.8%) of caregivers were aged 29–38 years, while 149 (37.3%) were aged 28 years or younger. Caregivers aged 39–48 years accounted for 68 (17.0%), and those older than 48 years were 28 (7.0%). The majority of caregivers were female 343 (85.8%), while 57 (14.2%) were male.

In terms of educational attainment, 4 (1.0%) of caregivers had no formal education, 42 (10.5%) had primary education, 188 (47.0%) had secondary education, and 166 (41.5%) had tertiary education.

Regarding occupation, 8 (2.0%) of caregivers were in skill level 1, 337 (84.3%) were in skill level 2, 5 (1.3%) were in skill level 3, and 40 (10.0%) were in skill level 4 occupations. A further 10 (2.5%) were unemployed.

For monthly household income, 10 (2.5%) earned less than ₦50,000, 46 (11.5%) earned between ₦50,000 and ₦100,000, 271 (67.8%) earned between ₦101,000 and ₦200,000, and 73 (18.3%) earned above ₦200,000.

The age distribution of the children showed that 56 (14.0%) were aged 6 months or younger, 55 (13.8%) were between 7 and 12 months, and 289 (72.3%) were older than 12 months. With respect to sex, 229 (57.3%) of the children were male, while 171 (42.8%) were female.

SECTION B

CAREGIVER'S KNOWLEDGE REGARDING CHILD NUTRITION AND MALNUTRITION PREVENTION AMONG RESPONDENTS

Table 2: Caregiver's knowledge regarding child nutrition and malnutrition prevention among respondents (n=400)

Knowledge variable	Frequency	Percent
Duration for exclusive breastfeeding		
First 3 months	12	3.0
First 6 months	385	96.3
First 9 months	3	0.8
Age complementary feeding should start		
3 months	3	0.8
4–5 months	14	3.5
6 months	365	91.3
1 year	18	4.5
Signs of malnutrition*		
Swollen belly	348	87.0
Thin arms/legs	314	78.5
Frequent illness	257	64.3
Hair changes	164	41.0
Good weight gain	10	2.5
Iron-rich foods*		
Meat/Fish	358	89.5
Beans	267	66.8
Eggs	164	41.0
Leafy vegetables	84	21.0
Pawpaw	15	3.8
Vitamin A-rich foods*		
Carrot	372	93.0
Orange/yellow fruits	326	81.5
Liver	73	18.3
White rice	69	17.3
Milk	60	15.0
Ways malnutrition can be prevented		
Balanced diet	306	76.5
Healthy food	68	17.0
Adequate feeding	11	2.8
Breastfeeding	8	2.0
Feeding	7	1.8
Number of food groups for a balanced diet		
2	11	2.8
4	203	51.9
6	177	45.3
Effect of poor hygiene during food preparation		
Diarrhea and infection	391	97.8
Better digestion	6	1.5
No effect	3	0.8
Ways of preventing diarrhea*		
Handwashing before feeding	395	98.8
Proper waste disposal	347	86.8
Using clean water	322	80.5
Feeding uncovered food	58	14.5
Examples of unhealthy foods*		
Sugary drinks	367	91.8

Fried snacks	283	70.8
Processed foods	195	48.8
Fruits	8	2.0

*Multiple choice question

The majority of respondents reported that exclusive breastfeeding should be given for 6 months 3A85 (96.3%), while 12 (3.0%) indicated 3 months and 3 (0.8%) indicated 9 months.

Regarding complementary feeding, 365 (91.3%) reported that it should begin at 6 months, while 18 (4.5%) indicated 1 year, 14 (3.5%) indicated 4–5 months, and 3 (0.8%) indicated 3 months.

In relation to signs of malnutrition, 348 (87.0%) identified swollen belly, 314 (78.5%) thin arms or legs, 257 (64.3%) frequent illness, 164 (41.0%) hair changes, and 10 (2.5%) good weight gain.

For iron-rich foods, 358 (89.5%) identified meat or fish, 267 (66.8%) beans, 164 (41.0%) eggs, 84 (21.0%) leafy vegetables, and 15 (3.8%) pawpaw.

Regarding vitamin A-rich foods, 372 (93.0%) identified carrot, 326 (81.5%) orange/yellow fruits, 73 (18.3%) liver, 69 (17.3%) white rice, and 60 (15.0%) milk.

When asked about ways to prevent malnutrition, majority 306 (76.5%) reported by giving balanced diet, 68 (17.0%) by giving healthy food, 11 (2.8%) by adequate feeding, 8 (2.0%) by breastfeeding, and 7 (1.8%) reported just by feeding.

For dietary diversity, 203 (51.9%) reported at least four food groups, 177 (45.3%) six food groups, and 11 (2.8%) two food groups.

The majority indicated that poor hygiene leads to diarrhoea and infection 391 (97.8%), while 6 (1.5%) reported better digestion and 3 (0.8%) no effect.

For diarrhoea prevention, 395 (98.8%) identified handwashing, 347 (86.8%) proper waste disposal, 322 (80.5%) use of clean water, and 58 (14.5%) feeding uncovered food.

For unhealthy foods, 367 (91.8%) identified sugary drinks, 283 (70.8%) fried snacks, 195 (48.8%) processed foods, and 8 (2.0%) fruits.

Table 3: Correctness of caregiver knowledge regarding child nutrition and malnutrition prevention among respondents (n=400)

Variable	Correct n (%)	Incorrect n (%)
Knowledge on duration for exclusive breastfeeding		
First 3 months	388 (97.0)	12 (3.0)
First 6 months	385 (96.3)	15 (3.7)
First 9 months	397 (99.2)	3 (0.8)
Knowledge on age of commencement of complementary feeding		
3 months	397 (99.2)	3 (0.8)
4–5 months	386 (96.5)	14 (3.5)
6 months	365 (91.3)	35 (8.7)
1 year	382 (95.5)	18 (4.5)
Knowledge of signs of malnutrition*		
Swollen belly	348 (87.0)	52 (13.0)
Thin arms/legs	314 (78.5)	86 (21.5)
Frequent illness	257 (64.3)	143 (35.7)
Hair changes	164 (41.0)	236 (59.0)
Good weight gain	390 (97.5)	10 (2.5)
Knowledge of iron-rich foods*		
Meat/Fish	358 (89.5)	42 (10.5)
Beans	267 (66.8)	133 (33.2)
Eggs	164 (41.0)	236 (59.0)
Leafy vegetables	84 (21.0)	316 (79.0)
Pawpaw	385 (96.2)	15 (3.8)
Knowledge of vitamin A-rich foods*		
Carrot	372 (93.0)	28 (7.0)
Orange/yellow fruits	326 (81.5)	74 (18.5)
Liver	173 (18.3)	227 (81.7)
White rice	231 (82.7)	69 (17.3)
Milk	60 (15.0)	340 (85.0)
Knowledge on number of food groups for a balanced diet		
2	389 (97.2)	11 (2.8)
4	203 (51.9)	197 (48.1)
6	223 (54.7)	177 (45.3)
Knowledge of effect of poor hygiene during food preparation		
Diarrhoea and infection	391 (97.8)	9 (2.8)
Better digestion	394 (98.5)	6 (1.5)
No effect	397 (99.2)	3 (0.8)
Knowledge of prevention of diarrhoea*		
Handwashing before feeding	395 (98.8)	5 (0.2)
Proper waste disposal	347 (86.8)	53 (13.2)
Using clean water	322 (80.5)	78 (19.5)
Feeding uncovered food	342 (85.5)	58 (14.5)
Knowledge of unhealthy foods*		
Sugary drinks	367 (91.8)	33 (8.2)
Fried snacks	283 (70.8)	117 (29.2)
Processed foods	195 (48.8)	205 (51.2)
Fruits	392 (98.0)	8 (2.0)

*Multiple choice question

For knowledge on the duration of exclusive breastfeeding, the majority of caregivers correctly identified 6 months 385 (96.3%) as the appropriate duration. Only a small proportion incorrectly selected 3 months 12 (3.0%) and 9 months 3 (0.8%).

Regarding the age of commencement of complementary feeding, most caregivers correctly identified 6 months 365 (91.3%). A few respondents incorrectly selected 3 months 3 (0.8%), 4–5 months 14 (3.5%), and 1 year 18 (4.5%).

In terms of knowledge of signs of malnutrition, most caregivers correctly identified swollen belly 348 (87.0%), thin arms/legs 314 (78.5%), frequent illness 257 (64.3%), and hair changes 164 (41.0%) as signs of malnutrition. A small proportion incorrectly identified good weight gain 10 (2.5%) as a sign of malnutrition.

For knowledge of iron-rich foods, most caregivers correctly identified meat/fish 358 (89.5%), beans 267 (66.8%), eggs 164 (41.0%), and leafy vegetables 84 (21.0%) as iron-rich foods. Only a small proportion incorrectly identified pawpaw 15 (3.8%) as an iron-rich food.

Regarding knowledge of vitamin A–rich foods, most caregivers correctly identified carrot 372 (93.0%) and orange/yellow fruits 326 (81.5%), while fewer correctly identified liver 173 (18.3%) and milk 60 (15.0%). A notable proportion incorrectly identified white rice 69 (17.3%) as a vitamin A–rich food.

With respect to knowledge of the number of food groups required for a balanced diet, just over half of caregivers correctly identified at least 4 food groups 203 (51.9%),

while a substantial proportion incorrectly selected 6 food groups 177 (45.3%) and a small proportion incorrectly selected 2 food groups 11 (2.8%).

Knowledge of the effects of poor hygiene during food preparation was high, as most caregivers correctly identified diarrhoea and infection 391 (97.8%). Only a few incorrectly selected better digestions 6 (1.5%) and no effect 3 (0.8%).

Regarding knowledge of diarrhoea prevention, most caregivers correctly identified handwashing before feeding 395 (98.8%), proper waste disposal 347 (86.8%), and use of clean water 322 (80.5%). However, a notable proportion incorrectly identified feeding uncovered food 58 (14.5%) as a preventive measure.

For knowledge of unhealthy foods, the majority correctly identified sugary drinks 367 (91.8%), fried snacks 283 (70.8%), and processed foods 195 (48.8%) as unhealthy foods. Only a small proportion incorrectly identified fruits 8 (2.0%) as unhealthy foods

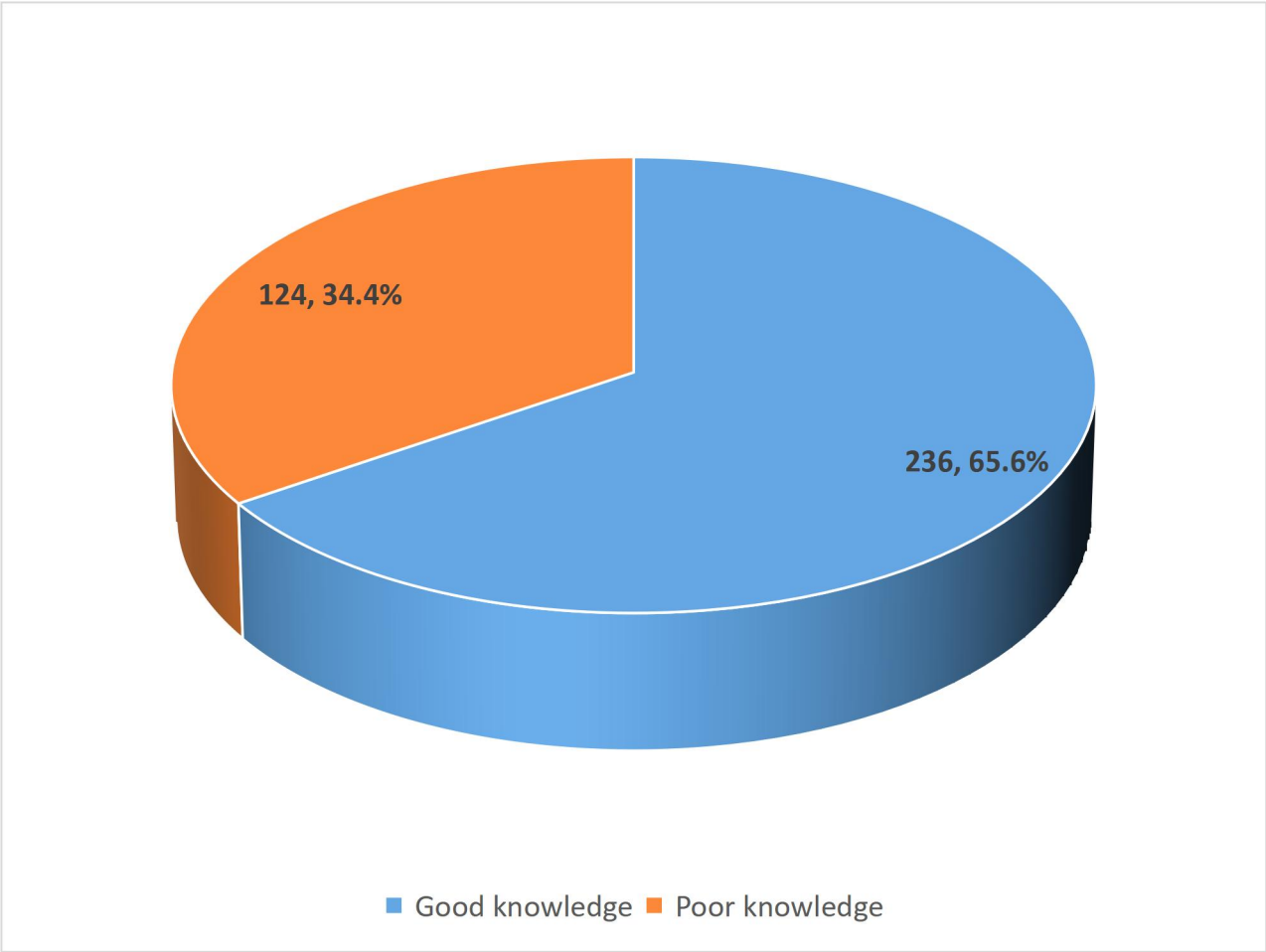

Figure 1: Overall knowledge of caregiver knowledge regarding child nutrition and malnutrition

About two-third of caregivers, 236 (65.6%), had good knowledge regarding child nutrition and malnutrition while 124 (34.4%) had poor knowledge.

Table 4: Caregiver's knowledge regarding child nutrition and malnutrition prevention; and sociodemographic characteristics of respondents (n=400)

Variable	Knowledge		Test Statistic (χ^2)	p-value
	Good (n=236) n (%)	Poor (n=124) n (%)		
Age of caregiver			3.734*	0.067
<33	115 (54.5)	96 (45.5)		
≥33	121 (64.0)	68 (36.0)		
Sex of caregiver			0.961*	0.327
Female	199 (58.0)	144 (42.0)		
Male	37 (64.9)	20 (35.1)		
Highest level of education			4.274	0.233
No formal	2 (50.0)	2 (50.0)		
Primary	29 (69.0)	13 (31.0)		
Secondary	102 (54.3)	86 (45.7)		
Tertiary	103 (62.0)	63 (38.0)		
Occupation of caregiver			6.279	0.179
Skill level 1	3 (37.5)	5 (62.5)		
Skill level 2	195 (57.9)	142 (42.1)		
Skill level 3	3 (60.0)	2 (40.0)		
Skill level 4	30 (75.0)	10 (25.0)		
Unemployed	5 (50.0)	5 (50.0)		
Monthly income (₦)			0.712	0.870
<50,000	5 (50.0)	5 (50.0)		
50,000–100,000	28 (60.9)	18 (39.1)		
101,000–200,000	162 (59.8)	109 (40.2)		
>200,000	41 (56.2)	32 (43.8)		
Child age group			4.858	0.088
≤6 months	39 (69.6)	17 (30.4)		
7–12 months	27 (49.1)	28 (50.9)		
>12 months	170 (58.8)	119 (41.2)		
Child sex			0.001*	>0.999
Female	101 (59.1)	70 (40.9)		
Male	135 (59.0)	94 (41.0)		

χ^2-Chisqure, * Fischer's Exact

Among caregivers aged less than 33 years, 115 (54.5%) had good knowledge compared to 96 (45.5%) with poor knowledge, while among those aged 33 years and above, 121 (64.0%) had good knowledge and 68 (36.0%) had poor knowledge. As age increased, a higher proportion of caregivers had good knowledge, although this association was not statistically significant (p = 0.067).

Among female caregivers, 199 (58.0%) had good knowledge and 144 (42.0%) had poor knowledge, while among males, 37 (64.9%) had good knowledge and 20 (35.1%) had poor knowledge. There was no statistically significant association between sex and knowledge level (p = 0.327).

Regarding highest level of education, caregivers with no formal education had equal proportions of good and poor knowledge 2 (50.0%) each. Among those with primary education, 29 (69.0%) had good knowledge and 13 (31.0%) had poor knowledge; among those with secondary education, 102 (54.3%) had good knowledge and 86 (45.7%) had poor knowledge; while among those with tertiary education, 103 (62.0%) had good knowledge and 63 (38.0%) had poor knowledge. There was no consistent increasing or decreasing pattern across educational levels, and the association was not statistically significant (p = 0.233).

For occupation, caregivers in skill level 1 had 3 (37.5%) with good knowledge and 5 (62.5%) with poor knowledge; skill level 2 had 195 (57.9%) with good knowledge and 142 (42.1%) with poor knowledge; skill level 3 had 3 (60.0%) with good knowledge and 2 (40.0%) with poor knowledge; skill level 4 had 30 (75.0%) with good knowledge and 10 (25.0%) with poor knowledge; while unemployed caregivers had equal proportions of good and poor knowledge 5 (50.0%) each. As occupational skill level increased, a higher proportion of caregivers had good knowledge, although this association was not statistically significant (p = 0.179).

In terms of monthly income, caregivers earning less than ₦50,000 had equal proportions of good and poor knowledge 5 (50.0%) each; those earning ₦50,000–100,000 had 28 (60.9%) with good knowledge and 18 (39.1%) with poor knowledge; those earning ₦101,000–200,000 had 162 (59.8%) with good knowledge and 109

(40.2%) with poor knowledge; and those earning above ₦200,000 had 41 (56.2%) with good knowledge and 32 (43.8%) with poor knowledge. There was no consistent trend with increasing income, and the association was not statistically significant ($p = 0.870$).

Among children aged ≤6 months, 39 (69.6%) of caregivers had good knowledge and 17 (30.4%) had poor knowledge; among those aged 7–12 months, 27 (49.1%) had good knowledge and 28 (50.9%) had poor knowledge; while among those aged above 12 months, 170 (58.8%) had good knowledge and 119 (41.2%) had poor knowledge. There was no consistent increase or decrease in good knowledge with increasing child age, and the association was not statistically significant ($p = 0.088$).

Among female children, 101 (59.1%) of caregivers had good knowledge and 70 (40.9%) had poor knowledge, while among male children, 135 (59.0%) had good knowledge and 94 (41.0%) had poor knowledge. There was no statistically significant association between child sex and caregiver knowledge ($p > 0.999$).

Table 5: Predictors of good knowledge of child nutrition and malnutrition

Variable	B	AOR	95% CI (Lower)	95% CI (Upper)	p-value
Age (years)	0.011	1.011	0.987	1.037	0.372
Sex					
Female (Ref)		1			
Male	0.339	1.404	0.755	2.610	0.283
Highest level of education					
No formal (Ref)		1			
Primary	0.657	1.930	0.208	17.916	0.563
Secondary	0.004	1.004	0.114	8.853	0.997
Tertiary	0.304	1.356	0.153	12.000	0.784
Average monthly income					
<₦50,000 (Ref)		1			
₦101,000–200,000	0.374	1.454	0.351	6.023	0.606
₦50,000–100,000	0.452	1.572	0.346	7.149	0.558
>₦200,000	0.135	1.144	0.255	5.130	0.860
Child sex					
Female (Ref)		1			
Male	0.019	1.019	0.671	1.547	0.930
Child age (months)	-0.010	0.990	0.976	1.004	0.150
Occupation					
Skill level 1 (Ref)		1			
Skill level 2	0.927	2.527	0.573	11.152	0.221
Skill level 3	1.140	3.126	0.297	32.874	0.342
Skill level 4	1.628	5.093	0.992	26.152	0.051
Unemployed	0.983	2.672	0.370	19.289	0.330

R^2=3.7%-5.0%

Increasing age of caregiver was not a significant predictor of knowledge regarding child nutrition and malnutrition prevention (AOR = 1.011, 95% CI: 0.987–1.037, p = 0.372).

Male caregivers were more likely to have good knowledge compared to female caregivers (AOR = 1.404, 95% CI: 0.755–2.610, p = 0.283), although this association was not statistically significant.

With respect to educational status, caregivers with primary education were more likely to have good knowledge compared to those with no formal education (AOR = 1.930, 95% CI: 0.208–17.916, p = 0.563). Similarly, those with secondary education (AOR = 1.004, 95% CI: 0.114–8.853, p = 0.997) and tertiary education (AOR = 1.356, 95% CI: 0.153–12.000, p = 0.784) had higher odds of good knowledge compared to those with no formal education; however, none of these associations were statistically significant.

In terms of income, caregivers earning more than ₦200,000 were more likely to have good knowledge compared to those earning less than ₦50,000 (AOR = 1.144, 95% CI: 0.255–5.130, p = 0.860). Likewise, those earning ₦101,000–200,000 (AOR = 1.454, 95% CI: 0.351–6.023, p = 0.606) and ₦50,000–100,000 (AOR = 1.572, 95% CI: 0.346–7.149, p = 0.558) had increased odds of good knowledge compared to the reference group, but these associations were not statistically significant.

Male children were slightly more likely to have caregivers with good knowledge compared to female children (AOR = 1.019, 95% CI: 0.671–1.547, p = 0.930), although this was not statistically significant.

Increasing child age was associated with a slight reduction in the odds of good knowledge (AOR = 0.990, 95% CI: 0.976–1.004, p = 0.150), but this relationship was also not statistically significant.

Regarding occupation, caregivers in skill level 2 were more likely to have good knowledge compared to those in skill level 1 (AOR = 2.527, 95% CI: 0.573–11.152, p = 0.221). Similarly, those in skill level 3 (AOR = 3.126, 95% CI: 0.297–32.874, p = 0.342), skill level 4 (AOR = 5.093, 95% CI: 0.992–26.152, p = 0.051), and unemployed caregivers (AOR = 2.672, 95% CI: 0.370–19.289, p = 0.330) all had higher odds of good knowledge compared to those in skill level 1. However, none of these associations reached statistical significance, although skill level 4 approached statistical significance (p = 0.051).

SECTION C: CHILD FEEDING PRACTICES

Objective 2: To determine the association between caregiver knowledge and child feeding practices among caregivers of under-five children in Egor

Table 6: Child feeding practices among caregivers (n=400)

Variable	Frequency	Percent
Child was ever breastfed		
Yes	390	97.5
Duration child was exclusively breastfed (n=369)		
<6 months	82	22.2
6 months	227	61.5
>6 months	60	16.3
Child currently breastfeeding (n=390)		
Yes	193	49.5
Age complementary feeding was introduced (n=353)		
<6 months	54	15.3
6 months	173	49.0
>6 months	126	35.7
Food child ate yesterday (n=353)		
Grains/roots/tubers	298	84.4
Legumes/nuts	105	29.7
Vitamin A-rich fruits/vegetables	83	23.5
Flesh food	20	5.7
Dairy	19	5.4
Eggs	18	5.1
Number of times child ate solid/semi-solid food yesterday (n=353)		
Once		
Twice	62	17.6
Thrice	196	55.5
Four times	77	21.8
Person who primarily feeds the child	18	5.1
Mother		
Siblings	347	86.8
Father	28	7.0
Aunt	16	4.0
Grandmother	3	0.8
Guardian	3	0.8
Caregiver actively encourages the child to eat	3	0.8
Yes		
Child eats from separate plate	317	79.3
Yes		
Child consumes sugary drink	264	66.8
Yes		
Child consumes packaged snacks	227	56.8
Yes		
Changes in feeding during illness	247	61.8
Reduced		
Same	378	94.5
Stopped	16	4.0
	6	1.5

Almost all children had ever been breastfed, with 390 (97.5%) reported to have been breastfed. Regarding exclusive breastfeeding duration (n = 369), 82 (22.2%) were breastfed for less than 6 months, 227 (61.5%) for exactly 6 months, while 60 (16.3%)

were breastfed for more than 6 months, indicating that the majority practiced the recommended duration of 6 months. Among those ever breastfed (n = 390), 193 (49.5%) were still being breastfed at the time of the study.

Concerning the age at which complementary feeding was introduced (n = 353), 54 (15.3%) introduced it before 6 months, 173 (49.0%) at 6 months, and 126 (35.7%) after 6 months, showing that about half of the respondents introduced complementary feeding at the recommended age.

With respect to foods consumed by the child the previous day (n = 353), a large proportion consumed grains, roots, and tubers 298 (84.4%). Fewer children consumed legumes and nuts 105 (29.7%), vitamin A-rich fruits and vegetables 83 (23.5%), flesh foods 20 (5.7%), dairy products 19 (5.4%), and eggs 18 (5.1%), indicating low dietary diversity in protein- and micronutrient-rich foods.

Regarding feeding frequency (n = 353), 62 (17.6%) of children were fed once, 196 (55.5%) twice, 77 (21.8%) three times, and 18 (5.1%) four times in the previous day, with the majority being fed twice daily.

Most children were primarily fed by their mothers 347 (86.8%), while smaller proportions were fed by siblings 28 (7.0%), fathers 16 (4.0%), aunts 3 (0.8%), grandmothers 3 (0.8%), and guardians 3 (0.8%).

A majority of caregivers actively encouraged their children to eat, with 317 (79.3%) reporting encouragement. Additionally, 264 (66.8%) of children ate from a separate plate.

However, suboptimal feeding practices were observed, as 227 (56.8%) of children consumed sugary drinks and 247 (61.8%) consumed packaged snacks.

During illness, most caregivers reported changes in feeding, with 378 (94.5%) indicating that feeding was stopped, while 16 (4.0%) reduced feeding and 6 (1.5%) maintained the same feeding pattern.

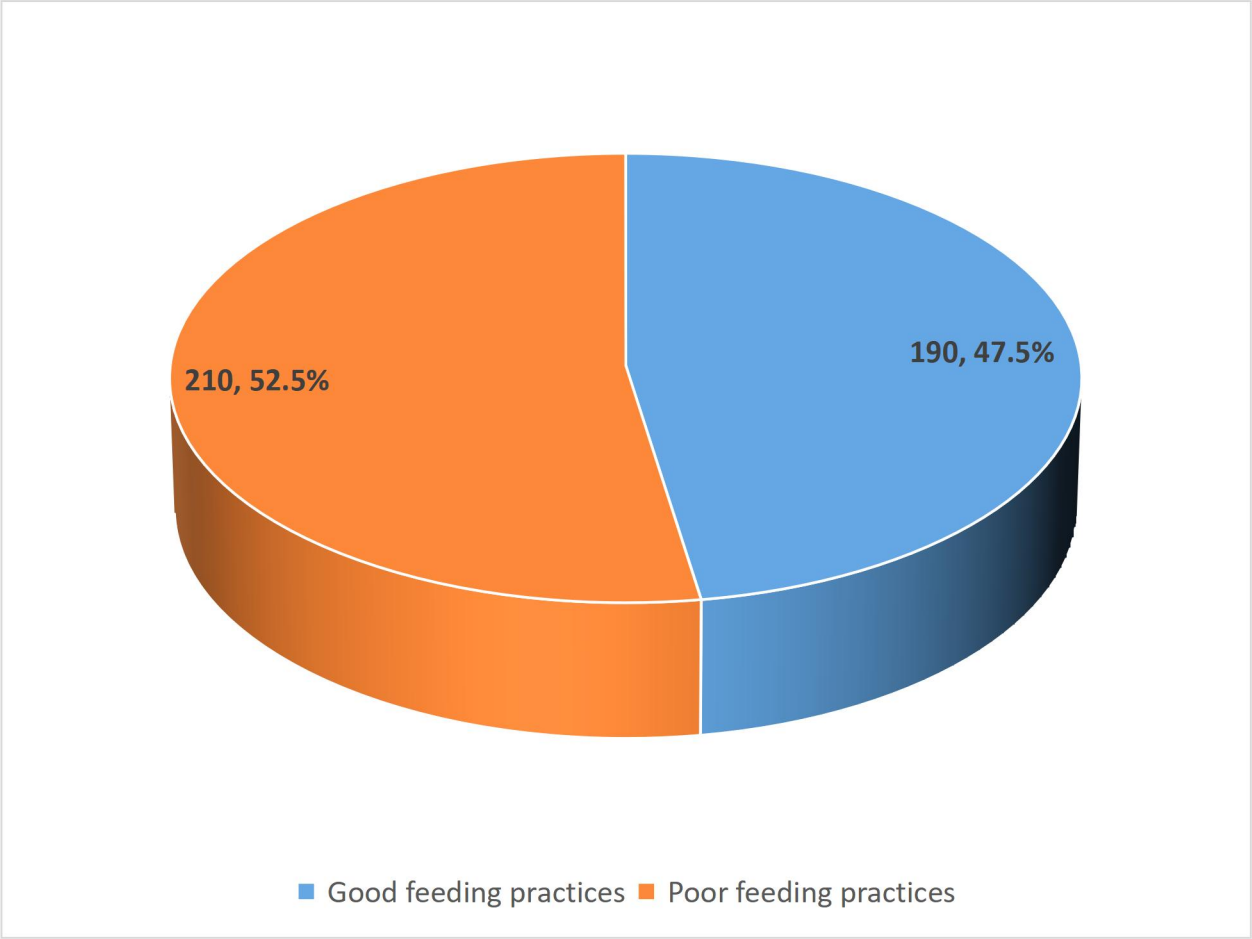

Figure 2: Feeding practices of under five children among caregivers

A lower proportion of caregivers had good feeding practices, 190 (47.5%), while a substantial proportion 210 (52.5%) had poor feeding practices.

Table 7: Association between caregiver knowledge level and child feeding practices (n=400)

Variable	Feeding practices		Test Statistic (χ^2)	p-value
	Good (n=190) n (%)	Poor (n=210) n (%)		
Knowledge level			37.88	**0.001**
Good	97 (41.1)	139 (58.9)		
Poor	93 (75.0)	31 (25.0)		

Caregivers with good knowledge were significantly less likely to have good feeding practices (41.1%) compared to those with poor knowledge (75.0%). The chi-square test showed a highly significant association ($\chi^2 = 37.88$, df = 1, $p < 0.001$). The crude odds ratio was 0.233 (95% CI: 0.143–0.379), indicating that caregivers with good knowledge had about 77% lower odds of good feeding practices.

This inverse relationship is surprising but consistent with the commonly reported knowledge-practice gap in child nutrition. Possible explanations include structural barriers such as poverty, food availability, and time constraints that prevent knowledgeable caregivers from translating knowledge into practice. Additionally, caregivers with better knowledge may be more self-critical and accurate when reporting their actual practices.

Table 8:Child feeding practices and sociodemographic characteristics of caregivers

Variable	Feeding practices		Test Statistic (χ^2)	p-value
	Good (n=190) n (%)	Poor (n=210) n (%)		
Age of caregiver			2.100*	0.161
<33	93 (44.1)	118 (55.9)		
≥33	97 (51.3)	92 (48.7)		
Sex of caregiver			0.702*	0.402
Female	160 (46.6)	183 (53.4)		
Male	30 (52.6)	27 (47.4)		
Highest level of education			5.586	0.134
No formal	0 (0.0)	4 (100.0)		
Primary	16 (38.1)	26 (61.9)		
Secondary	91 (48.4)	97 (51.6)		
Tertiary	83 (50.0)	83 (50.0)		
Occupation of caregiver			4.882	0.300
Skill level 1	2 (25.0)	6 (75.0)		
Skill level 2	157 (46.6)	180 (53.4)		
Skill level 3	4 (80.0)	1 (20.0)		
Skill level 4	21 (52.5)	19 (47.5)		
Unemployed	6 (60.0)	4 (40.0)		
Monthly income (₦)			8.013	**0.046**
<50,000	1 (10.0)	9 (90.0)		
50,000–100,000	19 (41.3)	27 (58.7)		
101,000–200,000	138 (50.9)	133 (49.1)		
>200,000	38 (43.8)	41 (56.2)		
Child age group			39.426	**<0.001**
≤6 months	7 (12.5)	49 (87.5)		
7–12 months	20 (36.4)	35 (63.6)		
>12 months	163 (56.4)	126 (43.6)		
Child sex			0.934*	0.334
Female	86 (50.3)	85 (49.7)		
Male	104 (45.5)	125 (54.6)		

χ^2-Chisqure, * Fischer's Exact

Among caregivers aged <33 years, a higher proportion had poor child feeding practices 118 (55.9%) compared to those aged ≥33 years 92 (48.7%), although this was not statistically significant (p = 0.161), indicating that poor feeding practices decreased with increasing caregiver age.

Female caregivers had a slightly higher proportion of poor feeding practices 183 (53.4%) compared to males 27 (47.4%), though this difference was not statistically significant (p = 0.402).

With increasing level of education, the proportion of caregivers with poor feeding practices decreased from 4 (100.0%) among those with no formal education to 26 (61.9%) in primary education, 97 (51.6%) in secondary education, and 83 (50.0%) in tertiary education, although this was not statistically significant (p = 0.134).

Across occupational categories, poor feeding practices were highest among skill level 1 caregivers 5 (75.0%) and decreased across higher skill levels, with 180 (53.4%) in skill level 2, 1 (20.0%) in skill level 3, and 19 (47.5%) in skill level 4, while unemployed caregivers had 4 (40.0%) poor practices; however, this was not statistically significant (p = 0.300).

Monthly income was significantly associated with feeding practices (p = 0.046). The proportion of caregivers with poor feeding practices was highest among those earning <₦50,000 9 (90.0%), decreased to 27 (58.7%) among ₦50,000–100,000 earners, further decreased to 133 (49.1%) among ₦101,000–200,000 earners, and slightly increased among those earning >₦200,000 41 (56.2%).

Child age group was significantly associated with feeding practices (p < 0.001), as poor feeding practices were highest among children aged ≤6 months 49 (87.5%), decreased among those aged 7–12 months 35 (63.6%), and further decreased among children older than 12 months 126 (43.6%). Child sex was not significantly associated with feeding practices (p = 0.334), although a slightly higher proportion of poor feeding practices was observed among male children 125 (54.6%) compared to females 85 (49.7%).

Table 9: Predictors of good child feeding practices

Variable	B	AOR	95% CI (Lower)	95% CI (Upper)	p-value
Age (years)	<0.001	1.000	0.976	1.024	0.974
Sex					
Female (Ref)		1			
Male	0.277	1.319	0.725	2.400	0.365
Occupation					
Skill level 1 (Ref)		1			
Skill level 2	0.756	2.131	0.396	11.478	0.379
Skill level 3	2.003	7.414	0.451	121.960	0.161
Skill level 4	1.227	3.411	0.569	20.447	0.179
Unemployed	0.938	2.556	0.296	22.059	0.394
Average monthly income					
<₦50,000 (Ref)		1			
₦101,000–200,000	2.228	9.281	1.113	77.375	**0.039**
>₦200,000	1.822	6.184	0.704	54.351	0.100
Child sex					
Female (Ref)		1			
Male	-0.226	0.798	0.524	1.214	0.292
Child age (months)	0.027	1.027	1.013	1.042	**<0.001**
Knowledge level					
Poor knowledge (Ref)		1			
Good knowledge	-0.469	0.625	0.409	0.955	**0.030**

R^2=8.7%-11.6%

Increasing caregiver age was not a significant predictor of child feeding practices (AOR = 1.000, 95% CI: 0.976–1.024, p = 0.974).

Male caregivers were more likely to have good child feeding practices compared to female caregivers (AOR = 1.319, 95% CI: 0.725–2.400, p = 0.365), although this association was not statistically significant.

Regarding occupation, caregivers in skill level 2 were more likely to have good child feeding practices compared to those in skill level 1 (AOR = 2.131, 95% CI: 0.396–11.478, p = 0.379). Similarly, those in skill level 3 (AOR = 7.414, 95% CI: 0.451–121.960, p = 0.161) and skill level 4 (AOR = 3.411, 95% CI: 0.569–20.447, p = 0.179) had higher odds of good feeding practices compared to the reference group, while unemployed caregivers were also more likely to have good feeding practices (AOR = 2.556, 95% CI: 0.296–22.059, p = 0.394). However, none of these associations were statistically significant.

In terms of income, caregivers earning more than ₦200,000 were more likely to have good feeding practices compared to those earning less than ₦50,000 (AOR = 6.184, 95% CI: 0.704–54.351, p = 0.100). Caregivers earning ₦101,000–200,000 were significantly more likely to have good feeding practices compared to those in the reference group (AOR = 9.281, 95% CI: 1.113–77.375, p = 0.039). Similarly, those earning ₦50,000–100,000 had higher odds of good feeding practices (AOR = 7.209, 95% CI: 0.803–64.700, p = 0.078), although this was not statistically significant.

Male children were less likely to have good feeding practices compared to female children (AOR = 0.798, 95% CI: 0.524–1.214, p = 0.292), though this was not statistically significant.

Increasing child age was a significant predictor of good feeding practices, with older children being more likely to have good feeding practices (AOR = 1.027, 95% CI: 1.013–1.042, p < 0.001).

Caregivers with good knowledge were significantly less likely to have good feeding practices compared to those

SECTION D

SOURCES OF NUTRITIONAL INFORMATION

Table 10: Sources of nutritional information (n=400)

Variable	Frequency	Percent
Source of information about child nutrition**	378	94.5
Health workers	346	86.5
Family/friends	281	70.3
Radio/Tv	161	40.3
Social media	120	30.0
Community groups	66	16.5
Books/pamphlet	17	4.3
School		
Source of information trusted the most	179	44.8
Health workers	140	35.0
Radio/Tv	64	16.0
Social media	10	2.5
Family/friends	3	0.8
Books/pamphlet	2	0.5
Community groups	2	0.5
School		
Frequency of receiving nutrition health information from health facilities	23	5.8
Always	50	12.5
Often	171	42.8
Sometimes	71	17.8
Rarely	85	21.3
Never		
Attended any nutrition education session		
Yes	52	13.0
Place attended (n=52)		
Health facility	42	87.0
Media	7	10.5
Community	3	0.8

**Multiple choice question

A large proportion of caregivers reported obtaining information about child nutrition from health workers 378 (94.5%), followed by family and friends 346 (86.5%) and radio/television 281 (70.3%). Fewer caregivers obtained information from social media 161 (40.3%) and community groups 120 (30.0%), while only a small

proportion reported books/pamphlets 66 (16.5%) and school 17 (4.3%) as sources of information.

When asked about the most trusted source of information, health workers were most frequently reported 179 (44.8%), followed by radio/television 140 (35.0%) and social media 64 (16.0%). Only a small proportion trusted family and friends 10 (2.5%), books/pamphlets 3 (0.8%), community groups 2 (0.5%), and school 2 (0.5%) the most.

Regarding the frequency of receiving nutrition health information from health facilities, 23 (5.8%) reported always receiving such information, 50 (12.5%) often, 171 (42.8%) sometimes, 71 (17.8%) rarely, and 85 (21.3%) never, indicating that most caregivers received information intermittently rather than consistently.

Only 52 (13.0%) of caregivers reported attending any nutrition education session. Among those who attended (n = 52), the majority attended sessions at health facilities 42 (87.0%), while fewer attended through media 7 (10.5%) and community settings 3 (0.8%).

SECTION E

HOUSEHOLD AND SOCIOECONOMIC FACTORS

Table 11: Household and socioeconomic factors (n=400)

Variable	Frequency	Percent
Worried about running out of food in the last 4 weeks		
Yes	139	34.8
Main source of drinking water		
Borehole	205	51.2
Sachet water	143	35.8
Well	32	8.0
Boiled water	12	3.0
Treated water	3	0.8
Table water	3	0.8
Rain water	2	0.5
Type of toilet facility		
Water closet	343	85.8
Pit toilet	57	14.2
Type of housing		
Temporary	197	49.3
Permanent	121	30.2
Semi-permanent	82	20.5
Number of people in household		
<5	158	39.5
≥5	242	60.5
Number of under five children		
1	212	53.0
≥2	188	47.0
Access to refrigerator for food storage		
Yes	346	86.5
Frequency of consumption of protein-rich foods		
Daily	295	73.8
Weekly	101	25.3
Rarely	4	1.0
Child falling ill in the past 2 weeks		
Yes	166	41.5

A total of 139 (34.8%) caregivers reported being worried about running out of food in the last four weeks.

Regarding the main source of drinking water, the majority relied on borehole water 205 (51.2%), followed by sachet water 143 (35.8%). Smaller proportions reported

using well water 32 (8.0%) and rainwater 12 (3.0%), while only a few used boiled water 3 (0.8%), treated water 3 (0.8%), and table water 2 (0.5%).

In terms of toilet facilities, most households used water closet systems 343 (85.8%), while a smaller proportion used pit toilets 57 (14.2%).

Concerning type of housing, nearly half of the respondents lived in temporary housing 197 (49.3%), followed by permanent housing 121 (30.2%) and semi-permanent housing 82 (20.5%).

For household size, 158 (39.5%) households had fewer than five members, while the majority 242 (60.5%) had five or more members.

With respect to the number of under-five children, 212 (53.0%) households had one child under five, while 188 (47.0%) had two or more.

A large proportion of households had access to a refrigerator for food storage 346 (86.5%).

Regarding the frequency of consumption of protein-rich foods, most households consumed these foods daily 295 (73.8%), while 101 (25.3%) consumed them weekly and only 4 (1.0%) rarely consumed protein-rich foods.

Finally, 166 (41.5%) caregivers reported that their child had fallen ill in the past two weeks.

SECTION F

ANTHROPOMETRIC MEASUREMENTS

Table 12: Anthropometric measurements of under five children (n=400)

Variable	Frequency	Percent
Weight (kg)		
3-15	306	76.5
16-25	85	21.3
26-35	5	1.3
36-45	4	1.0
Length/height (cm)		
11-50	11	2.8
51-90	256	64.0
>90	133	33.3
Mid-upper arm circumference (cm)		
<11	27	6.8
11-12	126	31.5
≥13	247	61.8

The majority of children had weights between 3–15 kg 306 (76.5%), followed by 16–25 kg 85 (21.3%), while only a small proportion fell within 26–35 kg 5 (1.3%) and 36–45 kg 4 (1.0%).

For length/height, most children were within 51–90 cm 256 (64.0%), while 133 (33.3%) were above 90 cm and only 11 (2.8%) were between 11–50 cm.

Regarding mid-upper arm circumference, the majority of children had measurements ≥13 cm 247 (61.8%), followed by 11–12 cm 126 (31.5%), while a smaller proportion had <11 cm 27 (6.8%).

Table 13: Classification of nutritional status among under-five children (n=400)

Class	Frequency	Percent
Normal	317	79.3
Moderate malnutrition	16	4.0
Underweight	58	14.5
Wasting	5	1.3
Stunting	4	1.0

Most children were classified as normal 317 (79.3%), while 58 (14.5%) were underweight. Moderate malnutrition was observed in 16 (4.0%), while wasting 5 (1.3%) and stunting 4 (1.0%) were less common.

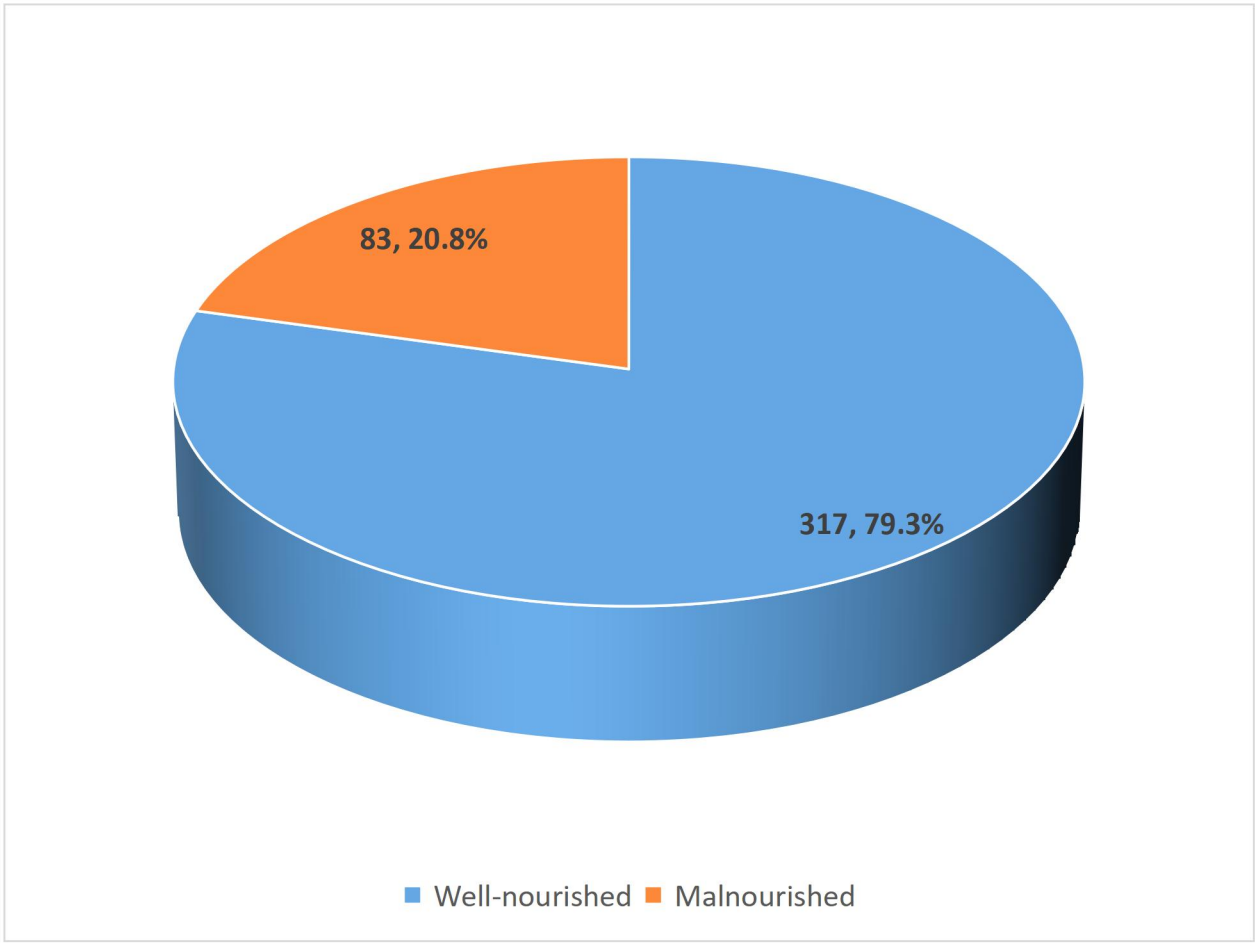

Figure 3: Nutritional status of under-five children

Table 14: Nutritional status of under-fives and sociodemographic characteristics

Variable	Nutritional status		Test Statistic (χ^2)	p-value
	Well-nourished (n=317) n (%)	Malnourished (n=83) n (%)		
Age of caregiver			0.631*	0.460
<33	164 (77.7)	47 (22.3)		
≥33	153 (81.0)	36 (19.0)		
Sex of caregiver			5.800*	**0.014**
Female	265 (77.3)	78 (22.7)		
Male	52 (91.2)	5 (8.8)		
Highest level of education			2.362	0.501
No formal	4 (100.0)	0 (0.0)		
Primary	34 (81.0)	8 (19.0)		
Secondary	144 (76.6)	44 (23.4)		
Tertiary	135 (81.3)	31 (18.7)		
Occupation of caregiver			4.396	0.355
Skill level 1	7 (87.5)	1 (12.5)		
Skill level 2	270 (80.1)	67 (19.9)		
Skill level 3	3 (60.0)	2 (40.0)		
Skill level 4	28 (70.0)	12 (30.0)		
Unemployed	9 (90.0)	1 (10.0)		
Monthly income (₦)			1.445	0.695
<50,000	9 (90.0)	1 (10.0)		
50,000–100,000	37 (80.4)	9 (19.6)		
101,000–200,000	211 (77.9)	60 (22.1)		
>200,000	60 (82.2)	13 (17.8)		
Child age group			8.070	**0.018**
≤6 months	52 (92.9)	4 (7.1)		
7–12 months	40 (72.7)	15 (27.3)		
>12 months	225 (77.9)	64 (22.1)		
Child sex			0.143*	0.710
Female	134 (78.4)	37 (21.6)		
Male	183 (79.9)	46 (20.1)		

χ^2-Chisqure, * Fischer's Exact

Among caregivers aged <33 years, a higher proportion of children were malnourished 47 (22.3%) compared to those aged ≥33 years 36 (19.0%), although this was not statistically significant (p = 0.460), indicating that malnutrition decreased with increasing caregiver age.

Sex of caregiver was significantly associated with nutritional status (p = 0.014), with a higher proportion of malnourished children among female caregivers 78 (22.7%) compared to male caregivers 5 (8.8%).

Level of education was not significantly associated with nutritional status (p = 0.501), although malnutrition was highest among caregivers with secondary education 44 (23.4%), followed by tertiary education 31 (18.7%) and primary education 8 (19.0%), while no malnutrition was observed among those with no formal education 0 (0.0%).

Across occupational categories, malnutrition was highest among caregivers in skill level 3 2 (40.0%) and skill level 4 12 (30.0%), compared to skill level 2 67 (19.9%) and skill level 1 1 (12.5%), although this was not statistically significant (p = 0.355).

Monthly income was not significantly associated with malnutrition (p = 0.695), although higher proportions were observed among caregivers earning ₦101,000–200,000 60 (22.1%) compared to <₦50,000 1 (10.0%).

Child age group was significantly associated with nutritional status (p = 0.018), as the proportion of malnourished children increased from 4 (7.1%) among those aged ≤6 months to 15 (27.3%) among those aged 7–12 months, before slightly decreasing to 64 (22.1%) among children older than 12 months.

Child sex was not significantly associated with nutritional status (p = 0.710), although slightly higher malnutrition was observed among females 37 (21.6%) compared to males 46 (20.1%).

Table 15: Predictors of malnourishment among under-five children

Variable	B	AOR	95% CI (Lower)	95% CI (Upper)	p-value
Age (years)	-0.003	0.997	0.967	1.027	0.832
Sex					
Female (Ref)		1			
Male	-1.186	0.305	0.112	0.831	**0.020**
Occupation					
Skill level 1 (Ref)		1			
Skill level 2	0.915	2.497	0.276	22.562	0.415
Skill level 3	1.780	5.932	0.324	108.554	0.230
Skill level 4	1.550	4.710	0.462	48.063	0.191
Unemployed	-0.177	0.838	0.038	18.478	0.911
Average monthly income					
<₦50,000 (Ref)		1			
₦101,000–200,000	0.895	2.447	0.269	22.222	0.427
₦50,000–100,000	0.903	2.467	0.245	24.818	0.443
>₦200,000	0.751	2.120	0.213	21.064	0.521
Child sex					
Female (Ref)		1			
Male	-0.057	0.944	0.555	1.608	0.833
Child age (months)	-0.004	0.996	0.978	1.015	0.700
Knowledge level					
Poor knowledge (Ref)		1			
Good knowledge	-0.869	0.419	0.245	0.717	**0.001**
Feeding practice					
Poor practice (Ref)		1			
Good practice	0.714	2.042	1.167	3.571	**0.012**
Household food insecurity					
No (Ref)		1			
Yes	-0.964	0.382	0.204	0.712	**0.002**
Number of people in household					
<5 (Ref)		1			
>=5	0.004	1.004	0.562	1.793	0.990
Number of under-five children					
>=2 (Ref)		1			
1	0.535	1.708	0.978	2.981	0.060
Child illness in past 2 weeks					
No (Ref)		1			
Yes	0.637	1.891	1.101	3.250	**0.021**

R^2=11.5%-18.0%

Increasing caregiver age was not significantly associated with malnourishment among respondents (AOR = 0.997, 95% CI: 0.967–1.027, p = 0.832).

Male caregivers were significantly less likely to have malnourished children compared to female caregivers (AOR = 0.305, 95% CI: 0.112–0.831, p = 0.020).

Regarding occupation, caregivers in skill level 2 were more likely to have malnourished children compared to those in skill level 1 (AOR = 2.497, 95% CI: 0.276–22.562, p = 0.415). Similarly, those in skill level 3 (AOR = 5.932, 95% CI: 0.324–108.554, p = 0.230) and skill level 4 (AOR = 4.710, 95% CI: 0.462–48.063, p = 0.191) had higher odds of malnourishment compared to the reference group, while unemployed caregivers were less likely to have malnourished children (AOR = 0.838, 95% CI: 0.038–18.478, p = 0.911). However, none of these associations were statistically significant.

In terms of income, caregivers earning more than ₦200,000 were more likely to have malnourished children compared to those earning less than ₦50,000 (AOR = 2.120, 95% CI: 0.213–21.064, p = 0.521). Likewise, those earning ₦101,000–200,000 (AOR = 2.447, 95% CI: 0.269–22.222, p = 0.427) and ₦50,000–100,000 (AOR = 2.467, 95% CI: 0.245–24.818, p = 0.443) also had higher odds of malnourishment compared to the reference group, although these associations were not statistically significant.

Male children were less likely to be malnourished compared to female children (AOR = 0.944, 95% CI: 0.555–1.608, p = 0.833), and increasing child age was associated with a slight reduction in the odds of malnourishment (AOR = 0.996, 95% CI: 0.978–1.015, p = 0.700); however, both variables were not statistically significant predictors.

Caregivers with good knowledge were significantly less likely to have malnourished children compared to those with poor knowledge (AOR = 0.419, 95% CI: 0.245–0.717, p = 0.001). In contrast, respondents with good feeding practices were significantly more likely to have malnourished children compared to those with poor feeding practices (AOR = 2.042, 95% CI: 1.167–3.571, p = 0.012).

Households that reported worrying about running out of food in the last four weeks were significantly less likely to have malnourished children compared to those who did not report such concerns (AOR = 0.382, 95% CI: 0.204–0.712, p = 0.002).

Respondents from households with five or more members were slightly more likely to have malnourished children compared to those with fewer than five members (AOR = 1.004, 95% CI: 0.562–1.793, p = 0.990), although this was not statistically significant.

Caregivers with one under-five child were more likely to have malnourished children compared to those with two or more under-five children (AOR = 1.708, 95% CI: 0.978–2.981, p = 0.060), but this did not reach statistical significance.

Children who had experienced illness in the past two weeks were significantly more likely to be malnourished compared to those who had not been ill (AOR = 1.891, 95% CI: 1.101–3.250, p = 0.021).

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This study assessed the prevalence and determinants of malnutrition among 400 children under five years of age in Egor Local Government Area, Edo State, Nigeria. The specific objectives were to evaluate caregiver knowledge regarding child nutrition, determine the association between knowledge and feeding practices, identify sources of nutritional information, and examine the impact of socioeconomic status on nutritional outcomes. This chapter discusses the key findings in the context of existing literature, highlights the study's strengths and limitations, and draws conclusions with implications for policy and practice.

5.2 Sociodemographic Characteristics of the Study Population

The study population comprised predominantly mothers (73.3%), with a mean caregiver age of 31.2 years, and a majority having completed secondary or tertiary education (88.5%). Household income was concentrated in the middle-income bracket of ₦101,000 to ₦200,000 (67.8%). These characteristics are reflective of an urban, semi-educated population in southern Nigeria and differ markedly from the predominantly rural, less-educated populations described in studies from northern Nigeria.[17] The relatively high educational attainment in Egor LGA may partly explain the favourable nutritional indicators observed, as maternal education is a well-established protective factor against child malnutrition.[26]

5.3 Caregiver Knowledge Regarding Child Nutrition and Malnutrition Prevention

The study found that a substantial proportion of caregivers (65.6%) demonstrated good knowledge of child nutrition and malnutrition prevention. Key knowledge strengths included awareness of the recommended duration of exclusive breastfeeding (96.3%) and the appropriate age for introduction of complementary feeding (91.3%). Recognition of major signs of malnutrition, such as swollen belly (87.0%) and thin arms or legs (78.5%), was also high. These findings are consistent with other facility-based studies conducted in southern Nigeria. Dania and Dada, in their 2025 study at Ugbor Primary Health Centre in Benin City geographically proximate to the present study reported similarly high levels of awareness regarding malnutrition and its causes among mothers attending immunization clinics.[15] Likewise, Abaribe and colleagues in Sagamu, Ogun State, documented high knowledge levels (approximately 91.8%) regarding malnutrition and its effects.[20]

In contrast, lower knowledge levels have been reported in other settings. Mporanyi and colleagues in Rwanda found that 46.4% of caregivers had low knowledge of stunting causes, particularly infection-related causes.[14] The disparity between the present findings and those from Rwanda may be attributable to differences in educational attainment and healthcare access. The relatively high knowledge in Egor LGA likely reflects the urban advantage of better access to health facilities and health workers, who were identified as the primary and most trusted source of nutritional information in this study.

Despite the overall high knowledge scores, specific knowledge gaps were identified. Only 18.3% of caregivers correctly identified liver as a vitamin A-rich food, and only 21.0% identified leafy vegetables as iron-rich foods. These gaps are concerning given

the importance of these micronutrients for child growth and immune function. Similar deficits in micronutrient knowledge have been documented in the 2018 National Nutrition and Health Survey, highlighting the need for targeted education on food sources of essential vitamins and minerals.

5.4 Association Between Caregiver Knowledge and Child Feeding Practices

A central finding of this study was the paradoxical inverse association between caregiver knowledge and child feeding practices. Despite 65.6% of caregivers demonstrating good knowledge, only 47.5% exhibited good feeding practices. In the multivariate logistic regression model, caregivers with good knowledge were significantly less likely to have good feeding practices compared to those with poor knowledge (AOR = 0.625, 95% CI: 0.409–0.955, p = 0.030). This finding provides quantitative evidence of the well-documented "knowledge-practice gap" in child nutrition.[15]

Several explanations may account for this gap. First, economic constraints may prevent caregivers from translating knowledge into action. A caregiver may know that her child should consume animal-source proteins and fruits daily, but if household income is insufficient to purchase these items, knowledge alone cannot improve dietary diversity.[25] This interpretation is supported by the finding that household income was a strong, independent predictor of good feeding practices, with middle-income caregivers having nine-fold higher odds of optimal practices compared to the poorest group.

Second, time constraints particularly for working mothers may limit the ability to prepare diverse meals or to practice responsive feeding. In urban settings, where many

women engage in income-generating activities outside the home, time poverty is a significant barrier to optimal child feeding.[26]

Third, cultural beliefs and social norms may override scientific knowledge. In some Nigerian communities, food taboos restrict the consumption of certain nutritious foods by young children. For example, eggs may be withheld due to beliefs that they promote stealing behaviour, or meat may be reserved for adult males.[26]

Fourth, social desirability bias may have inflated self-reported knowledge scores. Caregivers may have learned the "correct" answers through health education but lack the resources, skills, or motivation to apply this knowledge in daily practice. The cross-sectional design also precludes determination of the temporal relationship between knowledge acquisition and behaviour change.

The persistence of the knowledge-practice gap across multiple Nigerian studies underscores the need for interventions that go beyond information dissemination.[15] Practical, skills-based approaches including cooking demonstrations, peer support groups, and facilitated access to nutritious foods may be more effective than didactic health talks alone.[18]

5.5 Sources of Nutritional Information for Caregivers (Objective 3)

Health workers emerged as the dominant and most trusted source of nutritional information in this study, utilized by 94.5% of caregivers and trusted most by 44.8%. This finding is consistent with the Ugbor Primary Health Centre study, where hospitals and health workers were the primary sources of information.[15] It also aligns with broader Nigerian literature documenting the critical role of healthcare providers in disseminating nutrition information.[21,23]

Family and friends were the second most utilized source (86.5%), reflecting the importance of social networks in shaping child-feeding decisions. Radio and television were utilized by 70.3% of caregivers, suggesting that mass media remains a relevant channel for nutrition communication in this setting. Social media was used by 40.3% of caregivers, with younger mothers more likely to favour digital platforms, consistent with findings from Omachi and colleagues in north-central Nigeria.[20]

Despite the high utilization and trust in health workers, only 13.0% of caregivers had ever attended a formal nutrition education session. This represents a significant missed opportunity for reinforcement and skills-building. Similar low uptake of structured education has been noted in studies examining antenatal care nutrition counselling and community-based programmes in Nigeria.[23] The finding suggests that while health workers are accessible, the delivery of nutrition education may be opportunistic, inconsistent, or poorly documented.

5.6 Socioeconomic Status and Nutritional Outcomes

The overall prevalence of malnutrition in this study was 20.7%, with underweight being the most common form (14.5%), followed by moderate malnutrition (4.0%), wasting (1.3%), and stunting (1.0%). This prevalence is substantially lower than national figures from the 2018 NDHS, which reported stunting at 37%, wasting at 7%, and underweight at 22%.[2] It is also lower than estimates from northern Nigeria, where Sanni and colleagues reported stunting prevalence of 40.8% and underweight of 29.3%.[25]

The relatively favourable nutritional status in Egor LGA is consistent with regional disparities documented in the scoping review by John and colleagues, which

highlighted lower malnutrition burdens in southern Nigerian states compared to northern zones.[26] The urban advantage of better healthcare access, higher maternal education, and improved water and sanitation infrastructure likely contributes to these better outcomes.[24]

In the multivariate regression model, socioeconomic status indicators including income and education were not significant predictors of malnutrition. This contrasts with national and northern Nigerian studies where poverty and low maternal education are dominant predictors.[24] The absence of a significant socioeconomic gradient in Egor LGA may reflect the relative economic homogeneity of the study population (67.8% in the middle-income bracket) or the overriding influence of other factors such as recent child illness.

Recent child illness emerged as a significant risk factor for malnutrition (AOR = 1.891, p = 0.021), reinforcing the classic infection-malnutrition cycle. Children who had been ill in the two weeks preceding the survey were nearly twice as likely to be malnourished. This finding aligns with studies from Obuama Community in Rivers State, where malaria was a significant predictor of undernutrition.[27]

Good caregiver knowledge was protective against malnutrition (AOR = 0.419, p = 0.001), suggesting that while knowledge may not fully translate into optimal feeding practices, it may confer protection through other pathways such as improved healthcare-seeking behaviour or better hygiene practices. The protective effect of male caregiver sex (AOR = 0.305, p = 0.020) is an interesting finding that warrants further exploration, possibly reflecting differential resource allocation or caregiving patterns in male-headed households.

5.7 Strengths and Limitations of the Study

This study has several strengths. First, it employed internationally standardized WHO Child Growth Standards and anthropometric measurement protocols, ensuring comparability with national and global data. Second, the multi-stage stratified systematic random sampling technique enhanced representativeness within the urban context of Egor LGA. Third, the comprehensive assessment of multiple determinants including sociodemographic factors, feeding practices, knowledge, information sources, and household characteristics allowed for a holistic understanding of malnutrition drivers. Fourth, the study addresses a gap in the literature by providing locally relevant data from a semi-urban southern Nigerian setting, complementing the predominantly northern-focused research.

Several limitations must be acknowledged. The cross-sectional design precludes causal inference; associations identified represent correlations rather than definitive causal pathways. Reliance on caregiver recall for feeding practices and morbidity history may introduce recall bias, and social desirability bias may have influenced responses. The facility-based sampling strategy may under-represent children from the most marginalized households who do not regularly attend health services. Finally, findings are specific to Egor LGA and may have limited generalizability to rural areas or other regions of Nigeria.

5.8 Conclusion

This study found relatively high caregiver knowledge on child nutrition (65.6% good knowledge) and a favourable nutritional status among under-five children in Egor LGA (79.3% normal). However, child feeding practices were suboptimal (only 47.5% good), characterized by low dietary diversity and high consumption of sugary drinks

and packaged snacks. Health workers were the most important and trusted source of nutritional information, yet participation in structured nutrition education was low. A significant knowledge-practice gap was identified, with good knowledge paradoxically associated with lower odds of optimal feeding practices after adjusting for confounders. Socioeconomic status, particularly household income, was a strong predictor of feeding practices, while recent child illness emerged as a significant risk factor for malnutrition.

These findings underscore the need for multi-component interventions that address not only knowledge deficits but also the economic and structural barriers that limit caregivers' ability to act on their knowledge. The lower malnutrition prevalence compared to national and northern figures suggests contextual advantages in Egor LGA, but continued efforts are required to optimize feeding practices, bridge the knowledge-practice gap, and prevent the emerging double burden of malnutrition characterized by persistent undernutrition alongside increasing consumption of unhealthy foods.

RECOMMENDATIONS

To the Federal and Edo State Governments / Ministry of Health

1. Strengthen national and state-level Infant and Young Child Feeding (IYCF) guidelines with clear targets for dietary diversity and reduction of sugary/packaged foods, and ensure their implementation at LGA level.

2. Allocate dedicated funding for community-based nutrition education programs, including radio campaigns and mobile applications (e.g., similar to Baby Thrive), to complement facility-based services.

3. Integrate practical nutrition counselling and growth monitoring into all routine immunization and child welfare clinics, with emphasis on complementary feeding and responsive feeding techniques.

4. Support research and surveillance systems that routinely monitor local malnutrition trends in urban LGAs like Egor to guide resource allocation.

To Egor Local Government Area and Primary Health Care Authorities

1. Appoint nutrition focal persons in all primary health centers to conduct regular hands-on education sessions for caregivers on dietary diversity using locally available foods.

2. Improve access to nutrition education by organizing community outreaches and partnering with religious and women's groups, given the high trust in health workers.

3. Ensure consistent availability of growth monitoring tools and referral pathways for children showing signs of underweight or poor feeding practices.

4. Collaborate with agricultural extension services to promote household production of nutrient-rich foods (e.g., vegetables, legumes, eggs) to address dietary diversity gaps.

To Health Workers and Clinical Staff

1. Provide consistent, practical nutrition counselling during every child welfare visit, moving beyond general advice to demonstrate meal preparation and responsive feeding.

2. Serve as role models by actively promoting optimal IYCF practices and documenting counselling sessions.

3. Participate in continuous training on updated WHO/UNICEF IYCF guidelines and strategies to bridge the knowledge-practice gap.

To Caregivers and the Community

1. Actively apply acquired knowledge by practicing exclusive breastfeeding for 6 months, introducing diverse complementary foods at 6 months, and limiting sugary drinks and packaged snacks.

2. Seek timely advice from health workers when facing feeding challenges or noticing signs of poor growth.

3. Participate in available nutrition education sessions and share correct information within family and community networks.

For Further Research

1. Conduct qualitative studies to explore barriers to translating knowledge into optimal feeding practices in Egor LGA.

2. Evaluate the effectiveness of targeted interventions (e.g., mobile apps or intensified counselling) on dietary diversity and nutritional outcomes through randomized trials.

3. Compare urban Egor LGA with rural areas of Edo State to better understand contextual differences and design region-specific programs

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APPENDIX I

INFORMED CONSENT FORM

TITLE OF STUDY: MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA

INVESTIGATORS: OSASUMWEN OJO

SUPERVISOR: PROF. O.A. ADELEYE

FINANCIAL SPONSORSHIP: This research project is self-sponsored

PURPOSE OF THE RESEARCH: The purpose of this study is to assess the prevalence and determinants of malnutrition among children under five years of age in Egor Local Government Area. Specifically, the study seeks to evaluate the nutritional status of under-five children using appropriate anthropometric indicators and to examine factors associated with malnutrition such as socio-demographic characteristics, infant and young child feeding practices, household conditions, and access to health services. In addition, the study aims to identify caregiver-related knowledge and practices influencing child nutrition and to generate evidence-based recommendations that may support interventions and policies aimed at improving child nutritional outcomes in the study area.

PROCEDURES AND PROTOCOL INVOLVED IN THE STUDY: You are kindly invited to participate in this study by completing a structured questionnaire designed to assess factors related to the nutritional status of children under five years of age. The questionnaire will be administered to caregivers or parents of eligible children residing in Egor Local Government Area who meet the study's inclusion criteria.

Participation will involve responding to questions covering socio-demographic characteristics, household factors, child feeding practices (including breastfeeding and complementary feeding), caregiver knowledge of child nutrition, and health-related practices. In addition, simple anthropometric measurements such as weight, height/length, and mid-upper arm circumference (MUAC) of the child may be taken using standard measurement tools to assess nutritional status.

COMPENSATION

There will be no financial compensation for participating in this study.

VOLUNTARY PARTICIPATION: Your participation in this research is completely voluntary. There will be no discrimination or penalty if you choose not to participate. You are free to decline participation or withdraw from the study at any time, even after initially agreeing to take part.

SIDE EFFECTS: There are no anticipated adverse effects associated with participating in this study. The procedures involved, including the questionnaire and anthropometric measurements, are simple and non-invasive.

BENEFIT: The findings from this study will contribute to a better understanding of the magnitude and determinants of malnutrition among under-five children in Egor Local Government Area. The results may assist public health authorities, healthcare providers, and policymakers in identifying risk factors and designing targeted interventions aimed at improving child nutrition, feeding practices, and overall child health within the community. The study will also contribute to existing scientific literature on childhood malnutrition in similar settings.

CONFIDENTIALITY: All information and data obtained during this study will be treated with strict confidentiality. Participant names will not be recorded on the questionnaires, and all collected information will be securely stored in a password-protected file on the researcher's personal computer. Any physical documents will be kept in a locked personal document cabinet and will only be accessible to the researcher. No information that could identify participants will be disclosed in any report or publication arising from this study.

CONTACT INFORMATION

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Ethics and Research Committee

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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 hereby 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 the 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 this study revoke this consent and withdraw myself from the study without prejudice.

Name of Participant: ----------

Signature of participant: ----------

Date: ----------

APPENDIX II

DEPARTMENT OF PUBLIC HEALTH AND COMMMUNITY MEDICINE

COLLEGE OF MEDICINE, UNIVERSITY OF BENIN

MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA

Dear Respondent,

I am a 600-level student of the University of Benin, Benin City. This study is being conducted to assess the prevalence and determinants of malnutrition among children under five years of age in Egor Local Government Area. The research aims to evaluate the nutritional status of under-five children, examine child feeding practices, and identify socio-demographic, environmental, and health-related factors associated with malnutrition. In addition, the study seeks to explore caregivers' knowledge and practices regarding child nutrition, as well as to provide evidence that may guide interventions and strategies for improving the nutritional status and overall health of under-five children in the community.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Respondent's relationship to the child:

□ Mother □ Father □ Grandmother □ Other (specify): _____

2. Age of caregiver (in years): _____

3. Sex of caregiver:

□ Male □ Female

4. Highest level of education completed:

□ No formal education □ Primary □ Secondary □ Tertiary □ Others (specify): _____

5. Occupation of caregiver:

□ Civil servant □ Trader/Business □ Artisan □ Unemployed □ Farming □ Other: _____

6. Estimated average monthly household income (₦):

□ <50,000 □ 50,000–100,000 □ 101,000–200,000 □ >200,000

7. Child's age (in months): _____

8. Child's sex:

□ Male □ Female

SECTION B: CAREGIVER KNOWLEDGE REGARDING CHILD NUTRITION AND MALNUTRITION PREVENTION

9. Exclusive breastfeeding should be given for the first:

a) 3 months b) 6 months c) 9 months d) 12 months

10. At what age should complementary feeding start?

a) 3 months b) 4–5 months c) 6 months d) After 1 year

11. Which of the following is a sign of malnutrition in children? (Select all that apply)

□ Swollen belly □ Frequent illness □ Good weight gain □ Thin arms/legs □ Hair changes

12. Iron-rich foods important for preventing anemia include: (Select all that apply)

□ Beans □ Meat/Fish □ Pawpaw □ Leafy greens □ Eggs

13. Vitamin A-rich foods include: (Select all that apply)

□ Carrot □ Orange/yellow fruits □ Liver □ Milk □ White rice

14. How can malnutrition be prevented in under-five children?

15. A balanced diet for a child 6–23 months should include foods from at least how many food groups daily?

a) 2 b) 4 c) 6 d) Don't know

16. Poor hygiene during food preparation can lead to:

a) Better digestion b) diarrhea and infections c) Faster growth d) No effect

17. Which of the following helps prevent diarrhea? (Select all that apply)

□ Handwashing before feeding □ Using clean water □ Feeding uncovered food □ Proper waste disposal

18. Which nutrient is mainly responsible for growth?

a) Carbohydrates b) Proteins c) Fats d) Vitamins

19. Which foods are unhealthy if taken excessively? (Select all that apply)

□ Sugary drinks □ Fried snacks □ Fruits □ Processed foods

20. A child with severe malnutrition may present with:

a) Excess weight b) Oedema of feet c) Increased energy d) Rapid height gain

SECTION C: CHILD FEEDING PRACTICES

21. Was the child ever breastfed?

□ Yes □ No

22. How long was the child exclusively breastfed? _____ months

23. Is the child still breastfeeding?

□ Yes □ No

24. At what age was complementary feeding introduced? _____ months

25. Yesterday, did the child eat the following? (Tick if Yes)

• Grains, roots, tubers □ Yes

• Legumes/nuts □ Yes

• Dairy □ Yes

• Flesh foods □ Yes

• Eggs □ Yes

• Vitamin A-rich fruits/vegetables □ Yes

• Other fruits/vegetables □ Yes

26. How many times did the child eat solid/semi-solid foods yesterday? _____ times

27. Who primarily feeds the child?

□ Mother □ Father □ Grandparent □ Sibling □ Other: _____

28. Does the caregiver actively encourage the child to eat?

□ Yes □ No

29. Does the child eat from a separate plate?

□ Yes □ No

30. Does the child consume sugary drinks?

□ Never □ Occasionally □ Frequently

31. Does the child consume packaged snacks?

□ Never □ Occasionally □ Frequently

32. During illness, how is feeding affected?

□ Reduced □ Same □ Increased □ Stopped

SECTION D: SOURCES OF NUTRITIONAL INFORMATION

33. Where do you usually get information about child nutrition? (Select all that apply)

□ Health workers □ Family/friends □ Radio/TV □ Social media

□ Community groups □ Books/pamphlets □ School □ Other: _____

34. Which source do you trust the most?

35. How often do you receive nutrition information from health facilities?

□ Never □ Rarely □ Sometimes □ Often □ Always

36. Have you attended any nutrition education session?

□ Yes □ No

37. If yes, where?

□ Health facility □ Community □ School □ Media □ Other: _____

SECTION E: HOUSEHOLD AND SOCIOECONOMIC FACTORS

38. In the last 4 weeks, did your household worry about running out of food?

□ Yes □ No

39. Main source of drinking water: _____

40. Type of toilet facility: _____

41. Type of housing:

□ Permanent □ Semi-permanent □ Temporary

42. Number of people in the household: _____

43. Number of children under five: _____

44. Access to refrigeration for food storage:

□ Yes □ No

45. How often does the household consume protein-rich foods?

□ Daily □ Weekly □ Rarely □ Never

46. In the past 2 weeks, has the child had any illness?

□ Yes □ No

If yes, specify: _____

SECTION F: ANTHROPOMETRIC MEASUREMENTS (To be completed by trained assistant)

47. Weight (kg): _____

48. Length/Height (cm): _____

49. Mid-Upper Arm Circumference (MUAC) (cm): _____

50. Classification (based on WHO z-scores):

• Normal : □ Yes □ No

• Stunting: □ Yes □ No

• Wasting: □ Yes □ No

• Underweight: □ Yes □ No

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

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Registration Number: NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1488549137

PROPOSAL TITLE: "MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS OLD IN EGOR LOCAL GOVERNMENT AREA"

PRINCIPAL INVESTIGATOR(S): OSASUMWEN OJO, OBINNA ZION ONWUELU

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

DATE CONSIDERED: MARCH 31ST, 2026

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 31/03/2026 TO 19/03/2027. 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: 31/3/2026

SUPERVISOR (S): PROF. O. A. ADELEYE

DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates and you **are to furnish the committee with the research activities at the completion of the study.** 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 report 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: 31/3/2026