WOLKITE UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PEDIATRIC AND CHILD HEALTH

PREVALENCE OF MINIMUM DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG CHILDREN AGED 6-23 MONTHS, IN WOLKITE, ETHIOPIA, 2026

BY: DR. BINIYAM GESSESE (PEDIATRICS AND CHILD HEALTH RESIDENT)

A RESEACH THESIS TO BE SUBMITTED TO DEPARTMENT OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCES, WOLKITE UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR IN PEDIATRIC AND CHILD HEALTH PROGRAM SPECIALITY.

JANUARY, 2026

WOLKITE, ETHIOPIA

School Medicine

Department of Pediatrics and Child Health

Prevalence of Minimum Dietary Diversity and Associated Factors Among Children Aged 6-23 Months, in Wolkite, Ethiopia, 2026

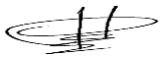
Name of the investigator	Biniyam Gessese (MD) Phone +251912831921 Email biniyamg89y@gmail.com
Name of advisor(s)	Dr. Agize A. (PHD) Dr. Nuredin Sadik (MD)
Title	Prevalence of minimum dietary diversity and associated factors among children aged 6-23 months, in Wolkite, central Ethiopia, 2026
Study period	January 1to January 30/2026
Study Area	Wolkite
Budget	28,500 ETB

APPROVAL SHEET

WOLKITE UNIVERSITY

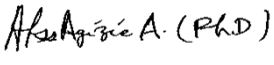
DIRECTORATE FOR POSTGRADUATE PROGRAMS

Submitted by:

Name: Dr Biniyam Gessese (MD) Signature  Date: 30/01/2026

Approved by

Major advisor

Name: Dr Agize A (PHD) Signature  Date: 10/02/2026

Co-advisor

Name: Dr Nuredin Sadik (MD) Signature  Date: 10/02/2026

Examiner 1:

Name: Dr. Teshome Gensa (PhD) Signature:  Date: 17/02/2026

Examiner 2:

Name: Dr. Numeri Hussen (MD) Signature:  Date: 17/02/2026

Head, Department

Name: Dr. Numeri Hussen (MD) Signature:  Date: 17/02/2026

College/Institute Dean

1. _____ _____ _____

Name Signature Date

Director, School of Graduate studies

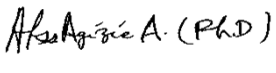
1. _____ _____ _____

Name Signature Date

CERTIFICATION SHEET

We hereby certify that we have read and evaluated this thesis titled " **Prevalence of minimum dietary diversity and associated factors among children aged 6-23 months: A community based Cross-sectional study** " prepared under our guidance by **Dr. Biniyam Gessese**. We recommend that the Thesis shall be submitted as fulfilling the requirements for the award of **Certificate of Specialty in pediatrics and child health.**

Advisor 1:

Name: Dr Agize A (PHD) Signature  Date: 10/02/2026

Advisor 2:

Name: Dr Nuredin Sadik (MD) Signature  Date: 10/02/2026

As a member of the Board of Examiners for the residence Thesis Open Defense Examination, I hereby certify that I have read and thoroughly evaluated the thesis submitted by **Dr Biniyam Gessese** and have participated in the examination of the candidate. Based on the quality of the work presented and the defense provided, I recommend that the thesis be accepted as fulfilling the requirements for **certificate of specialty in pediatrics and child health.**

Examiner 1:

Name: Dr. Teshome Gensa (PhD) Signature:  Date: 17/02/2026

Examiner 2:

Name: Dr. Numeri Hussen (MD) Signature:  Date: 17/02/2026

Department head

Name: Dr. Numeri Hussen (MD) Signature:  Date: 17/02/2026

Chair man

Name _____ Signature: _____ Date: _____

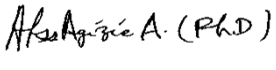
DECLARATION

By my signature below, I declare and confirm that this specialty thesis entitled "Prevalence of minimum dietary diversity and associated factors among children aged 6- 23 months, in wolkite, Ethiopia, 2026" is my own work and I declare that this thesis has not been submitted to any other university anywhere for the award of any academic degree and I have cited and referenced all sources and material used in this document.

Investigator:

Name: Dr Biniyam Gessese (MD) Signature  Date: 30/01/2026

Advisor 1:

Name: Dr Agize A (PHD) Signature  Date: 10/02/2026

Advisor 2:

Name: Dr Nuredin Sadik (MD) Signature  Date: 10/02/2026

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to all those who contributed to the successful completion of this study.

Sincere appreciation goes to the community participants, whose cooperation and openness provided invaluable insights into infant and young child feeding practices.

Special thanks are extended to the data collectors, health extension workers, and field supervisors, whose dedication and professionalism ensured the accuracy and reliability of the information gathered.

I am grateful to the local health authorities, policy makers, and health professionals for their support, guidance, and technical expertise, which facilitated access to the study sites.

I also thank the Wolkite University Specialized Hospital, Department of Pediatrics and Child Health, and the Department of Public Health for granting me the opportunity to prepare and carry out this research project.

Heartfelt gratitude is given to my advisors, Dr. Agize A. (PhD) and Dr. Nuredin Sadik (MD), for their clear guidance, constructive comments, and supportive environment throughout the development of this proposal.

Finally, I extend my appreciation to my colleagues, mentors, and research team members for their encouragement, feedback, and collaboration.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

ANC: Ante natal Care

DD: Dietary Diversity

EDHS: Ethiopian Demography Health Survey

ETB: Ethiopian Birr

IYCF: Infant and Young Child Feeding

MD: Medical doctor

MDD: Minimum Dietary Diversity

MUAC: Mid upper arm circumference

PHD: Doctor of philosophy

PNC: Postnatal Care

WHO: World Health Organization

ABSTRACT

Background: *Dietary diversity is a key of high-quality diets and an important indicator of appropriate complementary feeding. Minimum Dietary Diversity (MDD) is defined as the consumption of foods from at least five of the eight recommended food groups within a 24-hour period. Globally, only a small proportion of children receive nutritionally adequate and diversified diets, and more than two-thirds of malnutrition-related child deaths are linked to inappropriate feeding practices during the first two years of life. In Ethiopia, the prevalence of minimum dietary diversity among children aged 6–23 months remains low. Therefore, this study aimed to determine the level of minimum dietary diversity practice and identify associated factors among children aged 6–23 months in Wolkite Town, Ethiopia.*

Objective: *To determine the prevalence of minimum dietary diversity and identify associated factors among children aged 6–23 months in Wolkite Town, Ethiopia, 2026.*

Methods: *A community-based cross-sectional study was conducted from January 1 to January 30/ 2026 among 192 children aged 6–23 months selected using simple random sampling. Data were collected using a structured questionnaire based on World Health Organization infant and young child feeding (IYCF) indicators by google forms. Data were cleaned in Microsoft Excel and analyzed using SPSS version 27. Bivariable logistic regression identified candidate variables ($p < 0.25$) for multivariable analysis. Adjusted odds ratios (AOR) with 95% confidence intervals were calculated, and statistical significance was declared at $p < 0.05$.*

Results: *The prevalence of minimum dietary diversity was 26.6%. The most commonly consumed food groups were grains, roots, tubers, and plantains (90.6%) and legumes, nuts, and seeds (72.9%). Maternal postnatal care attendance (AOR = 9.96; 95% CI: 4.74–20.93) and adequate maternal knowledge of IYCF (AOR = 6.07; 95% CI: 2.06–17.83) were significantly associated with achieving minimum dietary diversity. Children born with a birth interval of less than two years were significantly less likely to receive diversified diets (AOR = 0.13; 95% CI: 0.03–0.66).*

Conclusion: *Minimum dietary diversity among children aged 6–23 months in Wolkite Town remains low. Maternal knowledge of IYCF, postnatal care utilization, and optimal birth spacing play critical roles in improving dietary diversity.*

Keywords: *Minimum dietary diversity, complementary feeding, infant and young child feeding, Ethiopia*

1. INTRODUCTION

1.1 Background

Dietary diversity (DD) is a cornerstone of high-quality diets and is globally recognized as a key indicator of nutritional adequacy, particularly for vulnerable populations such as infants and young children (1). For children aged 6–23 months, the period of complementary feeding is critical; it requires not only continued breastfeeding but also the introduction of safe, nutritious, and diverse foods to meet their high energy and micronutrient requirements (2) (3).The World Health Organization (WHO) defines minimum dietary diversity (MDD) as the consumption of foods from at least five out of eight defined food groups within a 24-hour period, strongly associated with improved nutrient intake and reduced undernutrition (4,5).

Eight food groups used for tabulation of this indicator are: 1. breast milk; 2. grains, roots, tubers and plantains; 3. pulses (beans, peas, lentils), nuts and seeds; 4. dairy products (milk, infant formula, yogurt, cheese); 5. flesh foods (meat, fish, poultry, organ meats); 6. eggs; 7. vitamin-A rich fruits and vegetables; and 8. other fruits and vegetables. Denominator: children 6–23 months of age (5). Despite this guidance, achieving MDD remains a significant challenge in low-income countries like Ethiopia, where diets are often dominated by starchy staples with limited access to animal-source foods, fruits, and vegetables (5,6).

The consequences of inadequate dietary diversity are severe. It is a primary driver of micronutrient deficiencies, stunting, wasting, and impaired cognitive development, contributing substantially to child mortality (7). Recent evidence underscores this: a 2023 systematic review confirmed that low dietary diversity is a strong predictor of stunting and anemia among children aged 6–23 months in sub-Saharan Africa, highlighting the urgent need for targeted interventions (8,9).

1.2 Statement of the Problem

Child malnutrition remains one of the most serious public health problems in Ethiopia, contributing substantially to child morbidity, mortality, and impaired growth and development. Nationally representative data from the 2019 Ethiopian Mini Demographic and Health Survey (EDHS) indicate that undernutrition remains highly prevalent, with 37% of children under five years of age stunted, 7% wasted, and 21% underweight (10,11). These indicators reflect both chronic and acute nutritional deprivation and remain above internationally accepted public health thresholds.

Poor dietary diversity during infancy and early childhood has profound short- and long-term consequences. Inadequate intake of essential micronutrients, including iron, zinc, vitamin A, and iodine, increases susceptibility to infections, weakens immune function, and contributes to elevated child morbidity and mortality (4). Chronic nutritional deprivation during the first 1,000 days of life leads to irreversible stunting, impaired cognitive development, delayed school performance, and reduced adult economic productivity (7,11).

At the population level, childhood malnutrition imposes a significant economic burden through increased health-care costs and diminished human capital formation. Evidence indicates that countries with a high prevalence of childhood stunting experience substantial losses in gross domestic product due to reduced workforce productivity and increased dependency ratios (12). In Ethiopia, where livelihoods are largely dependent on agriculture and manual labor, the long-term developmental impact of childhood malnutrition poses a serious challenge to sustainable socioeconomic development (11,13).

The burden of inadequate dietary diversity is unevenly distributed across Ethiopia, disproportionately affecting rural and peri-urban communities. These settings are often characterized by household food insecurity, seasonal food shortages, limited market access, and inadequate nutrition information (14). Wolkite and the surrounding Gurage Zone exemplify such contexts, where mixed rural–urban livelihoods and variable agricultural productivity influence household food availability.

National and regional averages often obscure important local variations in child feeding practices. Cultural beliefs, food taboos, intra-household food allocation, and caregiving practices may significantly influence dietary diversity at the community level (15). Without

localized data, nutrition interventions may fail to address context-specific barriers and facilitators.

Evidence from multiple Ethiopian studies demonstrates that dietary diversity among children aged 6–23 months is influenced by a complex interplay of socioeconomic, maternal, health service–related, and environmental factors. The study done in Awi zone found that only 192 (47.6%) children aged 6–23-month-old had adequate dietary diversity. In this study, variables such as maternal education, birth interval, and food insecurity] were strongly significant variables for the minimum dietary diversity of the child(16).

Similarly, a study in Bale Zone found that only 18.5% of children met the MDD criteria, with maternal educational level, nutritional knowledge on IYCF during PNC playing key roles (18)(19).

A community-based cross-sectional study design was done in children aged 6–23 months in Enebsie Sar Midir Woreda, East Gojjam, North West Ethiopia a 2023 study reported an MDD prevalence of 18.2%, with maternal employment status and exposure to mass media emerging as important enabling factors. (17). Additional determinants identified across studies include household food insecurity, maternal workload, limited access to health services, and poor integration of nutrition counseling into routine maternal and child health care (21,22).

Despite growing national efforts to improve child nutrition, there is a clear lack of recent, localized data on dietary diversity among children aged 6–23 months in Wolkite and the wider Gurage Zone. Most available studies in this area were conducted before 2015 and may not reflect current conditions influenced by economic changes, climate variability, urbanization, and evolving health service delivery systems (23).

Furthermore, studies from other regions of Ethiopia demonstrate substantial sessional variability in both the prevalence and determinants of dietary diversity, limiting the generalizability of their findings to Wolkite (18,20,24). This evidence gap hinders effective program planning and resource allocation at the local level

Given the high prevalence, severe consequences, and context-specific nature of inadequate dietary diversity, there is an urgent need to generate up-to-date evidence in Wolkite. Assessing the current prevalence of dietary diversity and identifying its key determinants were provide essential information for designing targeted, evidence-based nutrition interventions.

Although previous studies have provided useful information on infant and young child feeding practices in Ethiopia and similar settings, several important limitations remain. Many studies focused broadly on complementary feeding practices rather than specifically on minimum dietary diversity, and some used outdated definitions that did not align with the updated World Health Organization indicators. Several studies did not explore factors directly associated with minimum dietary diversity and failed to include caregivers beyond biological mothers, despite their important role in child feeding.

The findings of this study were support local health authorities and policymakers in strengthening infant and young child feeding programs, improving nutrition counseling services, and addressing household-level barriers to dietary diversity. Ultimately, this evidence will contribute to improved child nutritional status, enhanced developmental outcomes, and progress toward national and global nutrition targets (23).

1.3 Significance of the Study

The findings of this study were provided timely and essential information for the Wolkite Town Health Office and Wolkite administrators to design targeted interventions, such as community-based nutrition education programs and agricultural initiatives promoting diverse food production. By identifying key modifiable factors (e.g., maternal knowledge, health service utilization), the study was supporting the development of interventions that improve the dietary quality of children aged 6–23 months, enhance long-term quality of life, and reduce child mortality, morbidity, and healthcare costs.

The findings of this study were support local health authorities and policymakers in strengthening infant and young child feeding programs, improving nutrition counseling services, and addressing household-level barriers to dietary diversity. Ultimately, this evidence will contribute to improved child nutritional status, enhanced developmental outcomes, and progress toward national and global nutrition targets (23)

Furthermore, this research was contributing to the national and regional evidence on IYCF practices, serving as a benchmark for monitoring progress toward Sustainable Development Goal (SDG) targets for reducing child malnutrition. It was also providing a robust baseline for future research and program evaluation in Central Ethiopia.

2.LITERATURE REVIEW

2.1 Magnitude of Minimum Dietary Diversity

Minimum dietary diversity (MDD) is widely recognized indicator of adequate complementary feeding practices in children aged 6–23 months. It reflects the consumption of foods from at least five or above out of eight recommended food groups within a 24-hour period, serving as a proxy for micronutrient adequacy (1). Globally, MDD prevalence is highly variable, with substantial disparities between and within regions. Progress has been slow and uneven; a 2021 global report indicated that only 29% of children met the MDD standard, highlighting a decade of stagnation in improvement rates (2).

Evidence from the Sri Lanka Demographic and Health Survey (2006–2007) revealed that 71% of children aged 6–23 months achieved MDD (5). In contrast, the Zambia Demographic and Health Survey (2007) reported a prevalence of 37% (25). Findings from Indonesia's 2012 Demographic and Health Survey showed that 58.2% of children met the recommended diversity (6), whereas in East Delhi, India, the prevalence was 32.6% (7). These findings highlight wide inter-country differences influenced by food availability, cultural feeding practices, socioeconomic conditions, and maternal knowledge of child feeding.

In Ethiopia, MDD remains critically low in both urban and rural settings but relatively higher in Addis Ababa. A 2016 a health facility based cross sectional study was undertaken in the three sub-cities of Addis Ababa reported that 59.9% of children met the MDD standard(26), while a study in Gorche District, Southern Ethiopia, found an even lower prevalence of 10.6% (27). Rural disparities are further reflected in a 2016 study across agro-ecological zones, which reported an MDD prevalence of 22.2% (28). Similarly, a 2013 study in Northern Ethiopia indicated that only 17.8% of mothers provided their children with four or more food groups on the day prior to the survey (29). The Ethiopia Demographic and Health Survey (EDHS) 2019 reported a nationwide MDD prevalence of only 14% (10,30). More recent data from the 2021 PMA survey suggests a slight improvement, reporting 19% nationally, though still far below global targets (31). A 2022 study in the Amhara region reported an MDD prevalence of 17.5%, reinforcing significant geographical disparities within the country (32). Global shocks, such as the COVID-19 pandemic, have further disrupted food supply chains and access to health services, negatively affecting dietary quality for young children (28,29).

2.2 Factors Associated with Minimum Dietary Diversity

2.2.1 Child Factors

Child age is consistently one of the strongest predictors of minimum dietary diversity. A study conducted in Chelia District reported that children aged 12–23 months were 2.6 times more likely to meet MDD compared with those aged 6–11 months (AOR = 2.6; 95% CI: 1.4–4.8) (33). Similarly, research in Gorche District demonstrated nearly threefold increased odds among older children (AOR = 2.9; 95% CI: 1.6–5.3) (34). A national meta-analysis confirmed this association, reporting a pooled odds ratio of 2.7 (95% CI: 2.1–3.5) (35).

Child sex also influenced dietary diversity in some settings. In Debrelibanos District, female children were more likely to achieve MDD compared with males (AOR = 1.8; 95% CI: 1.1–3.0) (36). History of child illness was identified as a negative factor in the national meta-analysis, where children without recent illness were more likely to achieve MDD (37)

2.2.2 Maternal Factors

Maternal knowledge of infant and young child feeding (IYCF) practices is a major determinant of dietary diversity. In Addis Ababa, children of mothers with good IYCF knowledge were 3.1 times more likely to meet MDD (AOR = 3.1; 95% CI: 1.8–5.4) (26). A study in Gorche District reported 2.1 times than (AOR = 2.6; 95% CI: 1.4–4.9) (27), while Debrelibanos District observed nearly threefold higher odds (AOR = 2.9; 95% CI: 1.6–5.1) (36).

Maternal age also showed significant influence. In Chelia District, mothers aged 25–44 years had higher odds of providing diversified diets (AOR = 2.3; 95% CI: 1.3–4.1) (33). The pooled estimate from the national meta-analysis was 2.1 (95% CI: 1.6–2.8) (38). Women's involvement in household decision-making improved dietary diversity, as shown in the Sinan Woreda study(39).

2.2.3 Socioeconomic and Household Factors

Maternal education demonstrated a strong positive association with MDD. In Awi Zone, children of educated mothers were 4.5 times more likely to meet MDD (AOR = 4.5; 95% CI: 2.3–8.7) (16). In Addis Ababa, maternal education increased the odds nearly sixfold (AOR = 5.9; 95% CI: 3.1–11.2) (26). The national meta-analysis reported a pooled odds ratio of 3.8 (95% CI: 2.9–5.0) (38).

Household wealth also strongly influenced dietary diversity. EDHS secondary analysis showed children from the richest households were 3.4 times more likely to achieve MDD (AOR = 3.4; 95% CI: 2.1–5.6) (38) . In Chelia District, wealthier households had increased odds (AOR = 2.8; 95% CI: 1.6–4.9) (33).

Food security also played a major role. The Awi zone study indicated that food-secure households were more than twice as likely to provide diversified diets (16).

Media exposure, including radio, television, and newspapers, significantly improved feeding practices, as shown by EDHS 2016 analysis, Sinan Woreda, and Debrelibanos district studies (35,39,40).

Household wealth and access to food resources substantially influence dietary practices. In Northwest Ethiopia, maternal education, child age, birth order, area of residence, home gardening, and media exposure significantly predicted dietary diversity, even after adjusting for confounders (41). Access to cow's milk doubled the likelihood of children meeting MDD in Southern Ethiopia (42). Larger family sizes and poverty often constrain household food availability, resulting in monotonous cereal-based diets. Climate change and economic instability further reduce the availability and affordability of diverse foods (43)

2.2.4 Health Service–Related Factors

Utilization of maternal and child health services has consistently demonstrated a significant association with minimum dietary diversity among children aged 6–23 months across Ethiopian and sub-Saharan African studies.

Postnatal care (PNC) follow-up was one of the strongest predictors of achieving minimum dietary diversity. A community-based study conducted in Goba Town reported that children whose mothers attended postnatal care services were 3.6 times more likely to receive diversified diets compared with those who did not attend PNC (AOR = 3.6; 95% CI: 2.0–6.5) (44). Similarly, in Chelia District, postnatal care attendance increased the likelihood of meeting minimum dietary diversity by nearly threefold (AOR = 2.9; 95% CI: 1.7–5.1) (33). The Ethiopian national meta-analysis further confirmed this strong association, reporting a pooled odds ratio of 3.2 (95% CI: 2.4–4.3) (35).

Antenatal care (ANC) utilization also played a crucial role in improving complementary feeding practices. In Chelia District, mothers who attended four or more ANC visits were more

likely to provide diversified diets to their children (AOR = 2.4; 95% CI: 1.3–4.5) (33). Similarly, a study conducted in Sinan Woreda found that children born to mothers who received ANC services had 2.7 times higher odds of achieving minimum dietary diversity compared with those whose mothers had no ANC follow-up (AOR = 2.7; 95% CI: 1.5–4.8) (45). This association was attributed to nutrition counseling and health education delivered during routine maternal visits.

Institutional delivery was another significant determinant of dietary diversity. In Chelia District, children delivered in health facilities were more likely to meet minimum dietary diversity requirements (AOR = 2.3; 95% CI: 1.2–4.2) (33). Similarly, EDHS secondary analysis showed institutional birth increased the odds of adequate dietary diversity by more than twofold (AOR = 2.5; 95% CI: 1.6–3.9) (46). Health facility delivery offers opportunities for immediate postnatal nutrition counseling, early breastfeeding initiation, and feeding guidance.

Growth monitoring and promotion (GMP) programs also positively influenced dietary diversity outcomes. In Awi Zone, children who participated in regular growth monitoring sessions were more likely to receive diversified diets (AOR = 2.1; 95% CI: 1.2–3.6) (16). These programs provide continuous education, early identification of feeding problems, and personalized nutrition counseling.

Nutrition counseling during health facility visits showed independent positive associations with dietary diversity. In Goba Town, mothers who received specific infant feeding counseling were 2.8 times more likely to provide diversified diets (AOR = 2.8; 95% CI: 1.6–4.9) (44). Similar findings were observed in Sinan Woreda (AOR = 2.5; 95% CI: 1.4–4.4) (45).

In summary, MDD is influenced by a combination of child age, maternal education and knowledge, paternal involvement, socioeconomic resources, food access, engagement with health services, and broader challenges such as climate change. Addressing these factors requires integrated, multi-sectoral approaches involving health systems, education, agriculture, and community-level interventions.

2.*3 Conceptual Framework of Dietary Diversity*

The conceptual framework for this study (Figure 1) synthesizes the evidence from recent literature, illustrating the multidimensional factors that influence a child's diet (3,9,17,19,22,25,27,33,35,36,38–40,44–54)

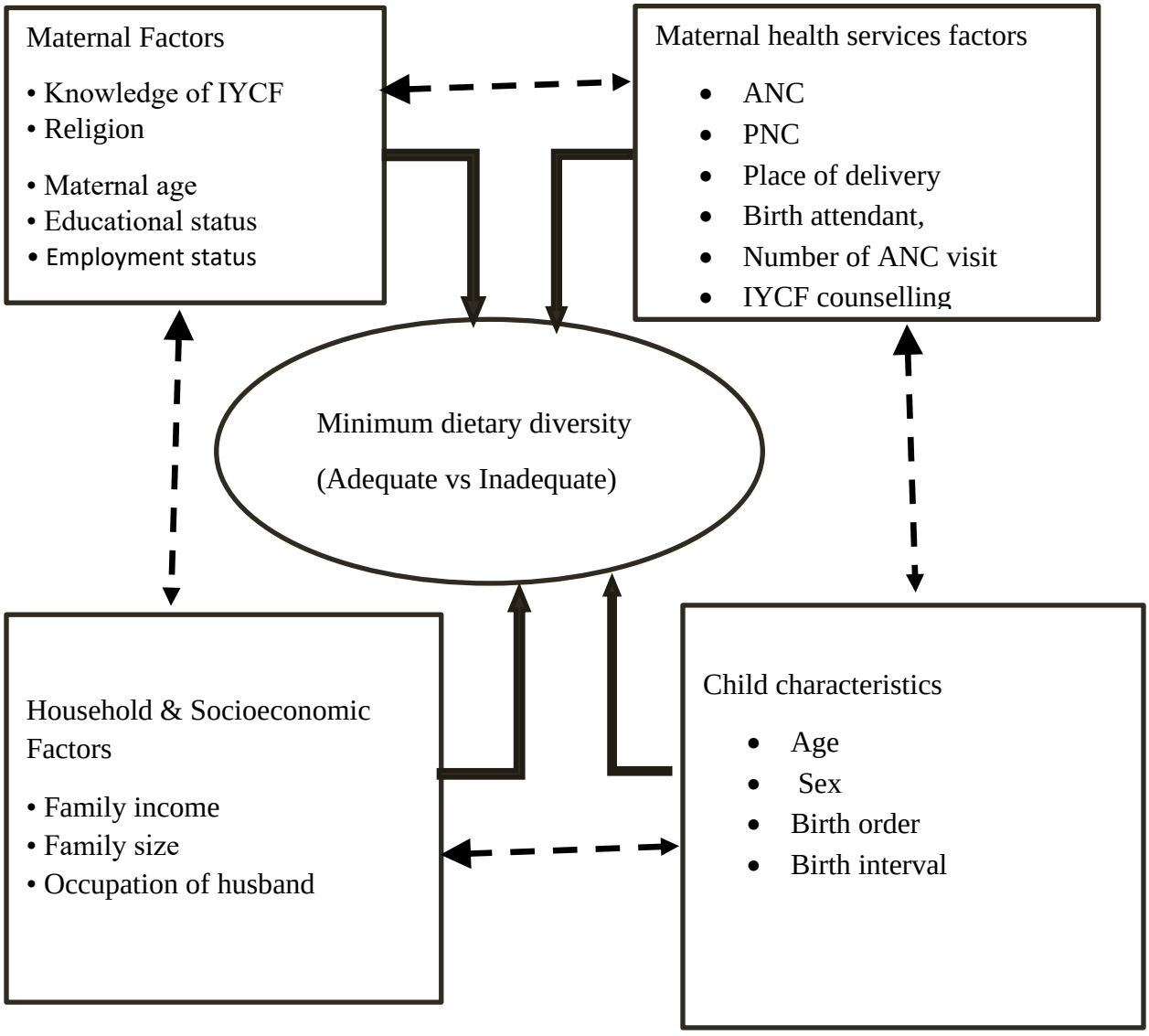


Figure 1:Conceptual framework of factors affecting dietary diversity among children 6–23 months

3.OBJECTIVES

3.1 General Objective

To assess the prevalence of minimum dietary diversity and associated factors among children aged 6-23 months, in Wolkite, Ethiopia, from January 1 to January 30/2026.

3.2 Specific Objectives

- ✓ To determine the prevalence of minimum dietary diversity among children aged 6-23 months, in Wolkite Ethiopia, from January 1 to January 30/2026.
- ✓ To explore factors associated with dietary diversity among children aged 6-23 months, in Wolkite, Ethiopia, from January 1 to January 30/2026.

4.METHOD AND MATERIALS

4.1 Study Area and period

The study was conducted in Wolkite, Wolkite town approximately 158 km southwest of Addis Ababa, the capital city of Ethiopia, serves as the capital city of Gurage Zone. Wolkite town has three sub-city and seven Keeble's boasting an average annual temperature of 18.6°C and an average rainfall of 1244 mm (55). According to the 2007 Census conducted by the Central Statistics Agency of Ethiopia, Wolkite town has a total population of 28,856, with 15,068 males and 13,788 females (56). Recent administrative data from the Wolkite Town Health Office (2025), the town has an estimated total population of 90,166. It is estimated that children aged 6-23 months constitute approximately 4.5% of the total population, yielding a target population of roughly 4057 children in this age group (55,57).

Wolkite has a predominantly agrarian livelihood, with most households engaged in farming and petty trading. There is three health center and one referral hospital serving the Maternal and child health services (ANC, delivery, immunization, growth monitoring) are available at the health center, hospital and through health extension workers in the community (57)

The study was taken place from January 1 /2026 to January 30 /2026 covering the period of data collection and analysis.

4.2 Study design

A community-based cross-sectional study design was applied.

4.3 Source Population

The source population of this study were all infant and young children 6–23 months who live in Wolkite town.

4.4 Study Population

All children aged 6-23 months along with mothers or care givers drawn from the each kebeles during data collection period.

4.5 Inclusion and Exclusion Criteria

4.5.1 Inclusion Criteria

Infants and young children aged 6-23 months during data collection time.

4.5.2 Exclusion Criteria

Infant and young child aged 6 -23 months were excluded from the study if they met any of the following conditions:

- children who were severely ill.
- Children diagnosed with severe acute malnutrition (SAM).
- Children experiencing loss of appetite.
- Children whose caregivers (mothers) were unwilling or unable to provide consent

4.6 Sample Size Determination

A single population proportion formula used to determine the sample size considering the following assumptions:

Given:

- Estimated prevalence of minimum dietary diversity (MDD) p=0.14(14%)
- Confidence level = 95% (Z=1.96)
- Margin of error d=0.05
- Population size N=4057
- Contingency for non-response = 10%
- By using the following formula

$\frac{n=Z\frac{\alpha^2}{2}P(1-P)}{d^2}$ = $\frac{n=(1.96^2)0.14(1-0.14)}{0.05^2}$ = 185

Since the study population is less than 10,000, correctional formula was applied:

nf $= n/(1 + n/N)$ = 177

A non-response of 10%. Therefore, sample size was 195.

To determine the sample size required to assess factors associated with minimum dietary diversity (MDD), the two-population proportion formula was applied as follows

Given:

- Confidence level = 95% (Zα/2=1.96)
- Power = 80% (Zβ=0.84)

- Key predictors from the literature: maternal knowledge of IYCF, postnatal care attendance (PNC), maternal education and ANC
- Non-response adjustment = 10%

The formula for two-population proportion:

$$n = \frac{(Z_{\alpha/2} + Z_{\beta})^2 [p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2}$$

p1 = proportion of outcome among exposed group

p2 = proportion of outcome among unexposed group

Table 1. Sample size by double Population Proportion

Variable (Exposure)	p_1 (Exposed)	p_2 (Unexposed)	n / group	Total n	nf (FPC)	+10% Final n	Power	Study Area
knowledge IYCF (Poor vs Good)	0.385	0.674	46	92	90	100	80%	Addis Ababa (26)
Informal vs Formal education	0.129	0.327	68	136	137	150	80%	Awi zone (16)
ANC counseling (yes vs no)	0.371	0.192	86	172	172	190	80%	Sinan Woreda (45).
PNC follow-up (yes vs no)	0.733	0.267	94	188	188	208	80%	Goba town (44)

Therefore, the final sample size was 208.

4.7 Sampling Procedure

A community-based simple random sampling technique was used to select study participants. Households were considered as the sampling units. A complete list of households with children aged 6–23 months in each kebele was obtained from health extension workers and kebele records. Wolkite town is administratively divided into seven kebeles, all of which were included in the study. The total sample size (n = 208) was proportionally allocated to each kebele based on the number of households.

In each kebele, eligible households were identified and assigned unique identification numbers. Households were then selected using the lottery method until the required sample size for each kebele was achieved.

If a selected household did not have an eligible child, or if the mother or child was not available at the time of data collection, the next household was selected using the same lottery method. In households with more than one eligible child, one child was chosen by lottery.

4.8 Operational definition and definition term

Knowledgeable: participants who were scoring 70 % and above value from the provided ten closed ended question about infant and young child feeding (26).

Not knowledgeable: participants who were scoring below 70 % of the provided ten closed ended question about infant and young child feeding (26).

Nutrient adequacy: refers to the extent to which the diet provides sufficient energy, protein, and essential micronutrients (3,9,11)

Minimal Dietary diversity: Proportion of children 6-23 months of age who receive foods from five or more food groups during the previous day (3,9)

Adequate dietary diversity: five or more food groups (3,9)

Inadequate dietary diversity: less than five food groups (3,9)

Severely ill: If the Child clinically presented with any of the following danger sign; inability to drink or breast feed; vomiting everything; history or observed convulsion and lethargy or unconsciousness (13).

Severe acute malnutrition: child has meet any of the following criteria; visible wasting or bipedal edema; MUAC <11.5 centimeter (13)

4.9 Variables of the Study

4.9.1 Dependent Variable

Minimum dietary diversity (Adequate/inadequate).

4.9.2 Independent Variables

Socio demographic/economic characteristics: Age of mother, occupation of mother, education status of mother, husband education status, husband occupation, family size; religion of the mother, number of under five children

Child characteristics: Age, birth order, birth interval, sex,

Maternal Health service factors: ANC, PNC, place of delivery, birth attendant, number of ANC visit, Mother's knowledge on IYCF.

4.10 Data Collection methods and Measurement tool

Trained data collectors using a structured and pretested questionnaire was collected data. The questionnaire was prepared based on WHO and Ethiopian Demographic and Health Survey (EDHS) standards, covering socio-demographic characteristics, child characteristics, maternal health service utilization, and maternal knowledge of IYCF. The dietary diversity components were used the WHO eight food groups to assess the child's diet over the previous 24 hours. The questionnaire was prepared in English and translated into Amharic.

The tool was converted into a Google Forms survey to facilitate efficient and accurate data capture in the community. Trained data collectors administered the questionnaire through face-to-face interviews and recorded responses electronically using mobile devices.

Prior to the actual data collection, a pretest was conducted on 5% of the total sample size (10 households) in Agena town, which was not included in the main study area. The pretest was used to assess the clarity, consistency, and reliability of the data collection tool, and necessary modifications were made accordingly.

Daily supervision and real-time review of submitted responses were conducted to minimize missing and inconsistent data

During data collection, interviews was conducted in the household setting. Data collectors were obtaining verbal informed consent and administer the questionnaire through face-to-face interview with to the mother or primary caretaker. A mother of a child aged 6–23 months was considered the respondent. Standard procedures were used to ensure privacy and confidentiality

4.11 Data Quality Assurance

To assure data quality, the following measures were taken:

- Data collectors and supervisors were received one day of training on the study objectives, questionnaire content, interviewing techniques, and ethical conduct
- The Amharic version of the questionnaire was pretested, and any necessary revisions was made before actual data collection.

- Supervisors were monitored the data collection process, checking completed questionnaires daily for completeness and consistency.
- Principal investigators were reviewed questionnaires and provide feedback to data collectors. Any incomplete or unclear responses were clarified promptly

4.12 Data Processing and Analysis

After completion of data collection, responses from Google Forms were exported to Microsoft Excel for initial data cleaning and coding. The cleaned dataset was then imported into Statistical Package for Social Sciences (SPSS) version 27 for statistical analysis.

Data were checked for completeness, outliers, and inconsistencies before analysis. Categorical variables were coded numerically, and continuous variables were appropriately categorized where necessary.

Descriptive statistics (frequencies, proportions, means, and standard deviations) was summarize socio-demographic characteristics and prevalence of adequate dietary diversity. Bivariate analysis (Chi-square tests and crude odds ratios) was identified candidate variables ($p < 0.25$) for multivariable logistic regression. Multivariable logistic regression was then be performed to identify factors independently associated with adequate dietary diversity, controlling for potential confounders. Adjusted odds ratios (AOR) with 95% confidence intervals was reported, a p-value < 0.05 was considered statistically significant.

4.13 Ethical Consideration

Ethical clearance was obtained from the Institutional Review Board of Wolkite University College of Medicine and Health Science. Permission was secured from the Wolkite Town Health Office and Wolkite administration.

Data collectors were explaining the purpose and procedures of the study to the mothers/caretakers, and verbal informed consent was obtained before conducting interviews. Participants were assured that their responses were confidential and used only for research purposes. The questionnaire was not including any personal identifiers, and all data was stored securely.

Immediately refer the child who meet the exclusion criteria for being severely ill or having severe acute malnutrition was referred along with parents /guardian, to the nearest facility for appropriate medical management.

4.14 Dissemination of the Results

The results of the study were shared with Wolkite Town health authorities and Wolkite administrators. Findings were presenting at local and national nutrition and public health forums. A manuscript was prepared for publication in a peer-reviewed journal. The insights from this study will help inform policymakers and program planners to improve child nutrition in Central Ethiopia to local health authorities and community leaders.

5.RESULT

5.1 Socio-Demographic Characteristics of parents and children

5.1.1 parental characteristics

A total of 192 infants and young children aged 6 to 23 months along with their mothers were enrolled in the study, with a response rate of 92%. The respondents were predominantly age of 20-24 years (26.6%), Orthodox follower (46.9%), Married (88%), primary education (47.4% for mother) secondary and above (48.5%) for husband, housewife (64.6%), monthly income above 10,000 ETB (44.8%). For all parental characteristics see Table 2.

Table 2:Parental Characteristics, Wolkite, Ethiopia, 2026(N=192)

Variable	category	Frequency(n)	Frequency (%)
Mother age	>35	31	16.1%
	15-19	12	6.3%
	20-24	51	26.6%
	25-29	50	26.0%
	30-34	48	25.0%
Marital status of mother	Divorced	15	7.8%
	Married	169	88.0%
	Unmarried	5	2.6%
	Widowed	3	1.6%
Religion of mother	Catholic	6	3.1%
	Muslim	79	41.1%
	Orthodox	90	46.9%
	Protestant	17	8.9%
Occupation of mother	Civil servant	16	8.3%
	House wife	124	64.6%
	Merchant	17	8.9%
	Private work	35	18.2%
Occupation of husband	Civil servant	29	17.2%
	Daily worker	20	11.8%
	Farmer	18	10.7%
	Merchant	56	33.1%
	Private employed	46	27.2%
Family income	2500-4999	20	10.4%
	5000-7499	29	15.1%
	7500-9999	49	25.5%
	Above10000	86	44.8%
	Below 2500	8	4.2%
	1-3	55	28.6%

Family members	4-6	102	53.1%
	7 and above	35	18.2%
Number of children	1	51	26.6%
	2	65	33.9%
	3 and above	76	39.6%
Husband educational status	Cannot read and write	11	6.5%
	Primary education (1-8)	76	45.0%
	Secondary and above	82	48.5%
Educational status of mother	Cannot read and write	36	18.8%
	Primary education (1-8)	91	47.4%
	Secondary and above	65	33.9%

5.1.2 Child Characteristics

Ninety-nine (51.6%) were females. The mean age of a child was 14.17 months ± 4.92 (SD). By the age group (39.1%) were between the age of 12 to17 months and 33.9% of the participant also found between the age group of 6 to 11 months. About 26 % of children were first birth order and 38 % was 3 and above (See table 3).

Table 3:Characteristics of children aged 6–23 months, in Wolkite, Ethiopia, 2026 (N=192)

Variable		Frequency(N)	Percentage (%)
Age of child	6-11	65	33.9%
	12-17	75	39.1%
	18-23	52	27.1%
Gender of child	Female	99	51.6%
	Male	93	48.4%
Birth order	1st	50	26.0%
	2nd	69	35.9%
	3rd and above	73	38.0%
Interval of birth	Above 2 years	49	34.5%
	Within 2 years	93	65.5%

5.2 Maternal Health Service Factors

Majority 94.8% of mothers had ANC follow up from this (37.5%) had four and above times ANC follow up. Almost all mothers (99) were delivering at health institution.

For all maternal characteristics see Table 4.

Table 4: Maternal Health service factors, Wolkite, Ethiopia, 2026(N=192)

variable		frequency	Percentage (9%)
ANC	Yes	182	94.8%
	NO	10	5.2%
Number of ANC	1	52	27.1%
	2 and 3	58	30.2%
	4 and above	72	37.5%
PNC have	Yes	70	36.5%
	No	122	63.5%
Birth place	Health facility	190	99.0%
	Home	2	1.0%
IYCF counselling	No	66	36.1%
	Yes	117	63.9%

5.3 Maternal knowledge of infant and young child feeding

To assess knowledge about infant and young child feeding of the respondents 10 closed ended questions were provided 72.9% were knowledgeable and 27.1% of the respondents were not knowledgeable. (See table 5 and 6).

Table 5: Maternal Knowledge of infant and young child feeding, in Wolkite, Ethiopia, 2026(N=192)

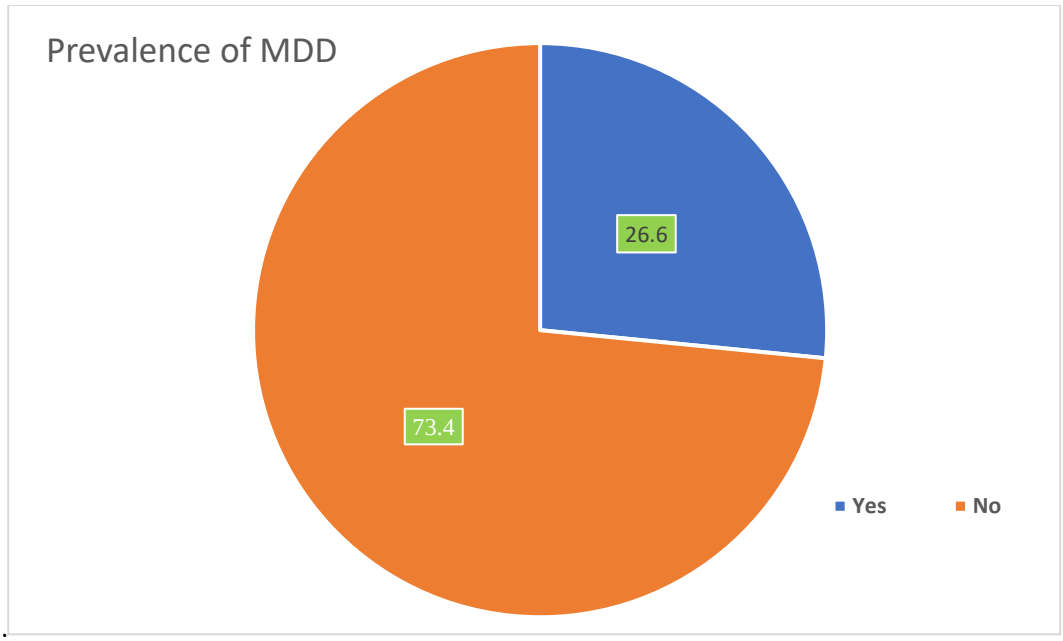
Knowledge of mother	Frequency	Percentage (%)
Knowledgeable	140	72.9%
Not knowledgeable	52	27.1%

Table 6: Frequency of Correct Responses on Dietary Diversity and IYCF Knowledge Among Mothers in Wolkite, Ethiopia. (N=192).

Questions to asses knowledge on IYCF	Answer	Frequency (N)	Percentage (%)
Heard about feeding complementary foods to child	Yes	171	89.10%
Complementary food started at 6 months of age	Yes	155	80.70%
Heard about feeding different foods to child	Yes	171	89.10%
Eat five or more types of food a day	Yes	162	84.40%
Not advisable to give meat for a child aged 6-23 month	No	68	35.40%
Not having diversified food is one cause of child malnutrition	Yes	164	85.40%
Not feel hungry, we can say his nutritional need is fulfilled.	No	59	30.70%
Not starting complementary feeding after 6 months may cause malnutrition.	Yes	154	80.20%
Breastfeeding should continue until the age of minimum 2 years	Yes	150	78.10%
Feeding only animal products is not enough/adequate for 6–23month child	Yes	152	79.20%

5.4. Prevalence of Dietary Diversity and Type of Diversified Food Items

Among mothers who took part in the study, i.e., 51 (26.6%) fed their child ≥5 food items within 24 hours preceding the survey based on WHO IYCF indictors on minimal dietary diversity. The dominant food Items were Grains, roots, tubers and plantains (90.6%) and Pulses (beans, peas, lentils) nuts and seeds (72.9%). Low feeding practice was observed on Vitamin A rich fruits and vegetables (31.3%), other fruits and vegetables (24%) and Flesh foods 15.6% (see Fig 3).



...

Figure 2: Prevalence of minimal dietary diversity in Wolkite, Ethiopia ,2026(N=192)

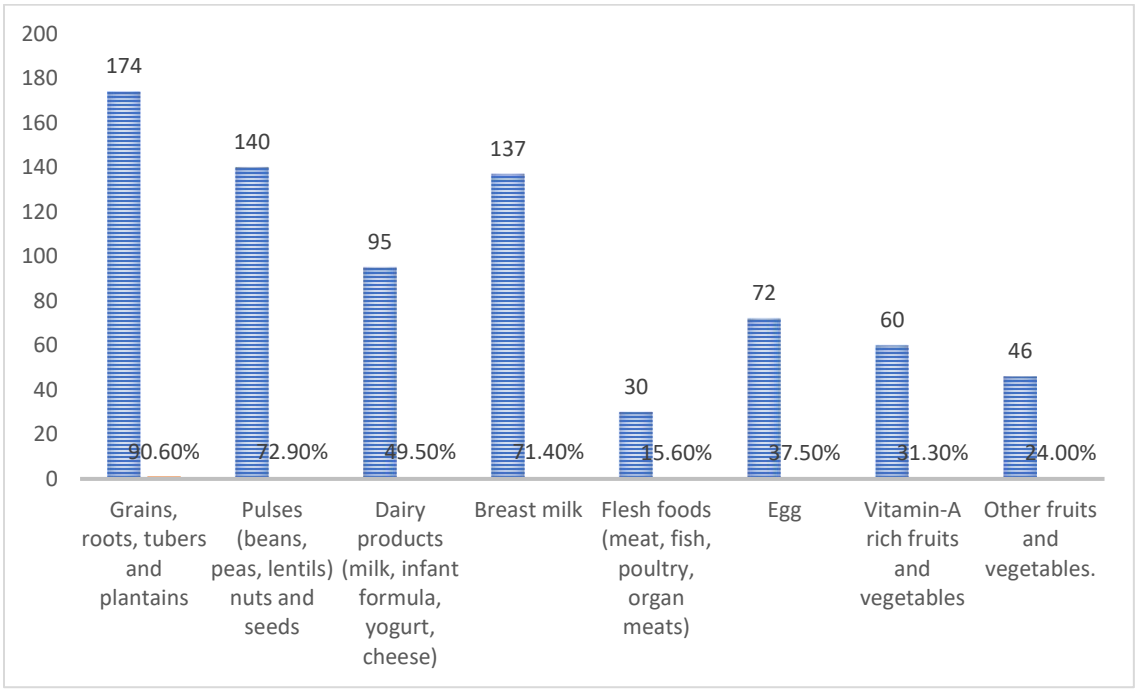


Figure 3: Type of food groups consumed by children age 6-23 months in Wolkite, Ethiopia,2026(N=192)

5.5. Factors Affecting Dietary Diversity

Multivariable logistic regression analysis identified maternal knowledge of infant and young child feeding (IYCF) practices, postnatal care (PNC) attendance, and birth interval as significant independent predictors of minimum dietary diversity among children aged 6–23 months in Wolkite town.

Children whose mothers had good knowledge of IYCF practices were 6 times higher odds of achieving minimum dietary diversity compared with children whose mothers had poor knowledge (AOR = 6.07; 95% CI: 2.06–17.83; p = 0.01). This indicates that maternal knowledge is a strong determinant of dietary diversity. Mothers with adequate knowledge are more likely to understand the importance of providing foods from multiple food groups, plan meals appropriately, and implement recommended complementary feeding practices.

Children whose mothers attended postnatal care services had approximately 10 times higher odds of achieving minimum dietary diversity compared with children whose mothers did not attend PNC (AOR = 9.96; 95% CI: 4.74–20.93; p < 0.01). This emphasizes the importance of postnatal follow-up visits, which provide mothers with counseling on child feeding, early detection of feeding difficulties, and guidance on meal planning for young children.

Birth interval was inversely associated with minimum dietary diversity. Children born with a birth interval of less than two years had 87% lower odds of achieving minimum dietary diversity compared with children born after an interval of two years or more (AOR = 0.13; 95% CI: 0.03–0.66; p < 0.01). Short birth intervals may reduce the mother's capacity to provide diverse meals due to limited time, energy, and household resources. Closely spaced births may also divide attention among children, compromising the quality of complementary feeding.

Table 7: Bivariate and Multivariable Logistic Regression Analysis of Factors Associated with Minimum Dietary Diversity among Children Aged 6–23 Months in Wolkite, Ethoipia,2026

Variable	Category	Minimum Dietary Diversity		Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
		yes (n, %)	No (n, %)		
Mother's age (years)	<24	29 (56.9)	31 (22.0)	1	1
	25–34	19 (37.3)	82 (58.2)	8.73 (2.39–31.84) **	1.40 (0.73–2.67)
	>35	3 (5.9)	28 (19.9)	2.16 (0.60–7.86)	1.26 (0.65–2.45)
Educational status of mother	Cannot read & write	1 (2.0)	35 (24.8)	1	1
	Primary education	12 (23.5)	79 (56.0)	5.32 (0.67–42.49)	0.65 (0.05–8.66)
	Secondary & above	38 (74.5)	27 (19.1)	49.26(6.35–381.90) ***	6.49 (0.45–93.82)
Occupation of mother	Housewife	21 (41.2)	103(73.0)	1	1
	Merchant	11 (21.6)	7 (5.0)	7.71 (2.68–22.19) **	2.58 (0.35–18.82)
	Private employed	10 (19.6)	24 (17.0)	2.04 (0.85–4.90)	0.91 (0.24–3.43)
	Civil servant	9 (17.6)	7 (5.0)	6.31 (2.11–18.82) **	1.00 (0.16–6.07)
Knowledge of IYCF	No	4 (7.8)	48 (34.0)	1	1
	Yes	47 (92.2)	93 (66.0)	6.06 (2.06–17.83) **	6.07 (2.06–17.83) **
Birth order	≥3rd	8 (15.7)	65 (46.1)	1	1
	2nd	17 (33.3)	52 (36.9)	2.66 (1.06–6.64) *	0.19 (0.01–2.93)
	1st	26 (51.0)	24 (17.0)	8.80 (3.51–22.10) **	0.20 (0.01–6.57)
Number of children	≥3	7 (13.7)	69 (48.9)	1	–
	<3	44 (86.3)	72 (51.1)	6.02 (2.54–14.28) **	3.08 (0.21–45.82)
Birth interval	≥2 years	46 (32.4)	96 (67.6)	1	1
	<2 years	5 (3.5)	88 (62.0)	0.08 (0.03–0.22) ***	0.13 (0.03–0.66) *
Postnatal care (PNC)	No	13 (25.5)	109(77.3)	1	1
	Yes	38 (74.5)	32 (22.7)	9.96 (4.74–20.93) ***	9.96(4.74–20.93) ***

Footnotes**:** *p-value <0.05, **p-value <0.01, ***p-value <0.001

6. DISCUSSION

The study revealed that the prevalence of minimum dietary diversity (MDD) among children aged 6–23 months in Wolkite town was 26.6%, indicating that only about one-quarter of children met the WHO-recommended minimum dietary diversity. This finding is higher than the national estimates reported by the Mini Ethiopian Demographic and Health Survey (EDHS) 2019, which showed that approximately 14 % of children met MDD(30) . It is also higher than findings from rural districts such as Chelia (17.3%), East Gojjam (18.2%), Sinan Woreda (13%), and Gorche district (10.6%) (27,33,45). The higher prevalence in Wolkite town may reflect relatively better access to urban health services, maternal education, and exposure to nutrition information compared with rural settings.

However, the prevalence observed in Wolkite town is lower than reports from other area done, including Addis Ababa (59.9%), Debrelibanos district (65.8%), Goba town (39.8%) and Wolaita Sodo (27.3%) (26,36,40,44). These variations may be attributed to differences in urbanization, maternal education, access to health services, and exposure to nutrition information. Despite being relatively higher than many rural areas, the low overall prevalence in Wolkite town suggests that minimum dietary diversity remains a public health concern.

In this study, the dominant food groups consumed were grains, roots, and tubers (90.6%) and legumes and nuts (72.9%), while consumption of vitamin A–rich fruits and vegetables (31.3%) and other fruits and vegetables (24%) was low. This pattern is Aline with several Ethiopian studies that reported heavy reliance on staple foods and limited intake of micronutrient-rich foods (27,33,46). Persistent staple-based dietary patterns are common in low- and middle-income settings and contribute to micronutrient gaps even when caloric needs are met.

Maternal knowledge of infant and young child feeding (IYCF) practices was a strong predictor of adequate MDD. Children whose mothers had good knowledge were 6.07 times higher odds of achieving adequate dietary diversity compared with children whose mothers' lacked knowledge. Comparable findings from Addis Ababa reported that children of knowledgeable mothers were 3.1 times higher odds of achieving minimum dietary diversity, while a study in Goba town showed a 2.8 times higher odds likelihood. In Debrelibanos district, maternal knowledge increased the likelihood of achieving MDD by 2.9 times higher odds. Similarly, a national systematic review and meta-analysis found that maternal knowledge of dietary diversity and IYCF practices increased the odds of achieving adequate MDD by3.52

times(27,33,36,44,51). Mothers who are knowledgeable are more likely to understand the importance of including various food groups and to apply recommended feeding practices, even when household resources are limited.

Postnatal care (PNC) attendance was another strong predictor of minimum dietary diversity. In Wolkite town, children whose mothers attended PNC services were 9.96 times higher odds of achieving adequate dietary diversity compared with those whose mothers did not attend PNC. In Sinan Woreda, PNC attendance was also significantly associated with dietary diversity, with children being 2.07 times higher odds more to meet MDD. In Addis Ababa, children of mothers who attended PNC were 2.5 times higher odds of achieving MDD) (26,33,44,45).The national meta-analysis reported that PNC follow-up increased the odds of adequate dietary diversity by 3.16 times (38). The larger effect observed in Wolkite town may reflect better maternal engagement during PNC visits, stronger reinforcement of nutrition education, or higher maternal responsiveness. Across all contexts, PNC provides a critical opportunity for promoting complementary feeding and improving child nutrition. Birth interval was significantly associated with dietary diversity in this study.

Children born with a birth interval of less than two years had 87% lower odds of achieving adequate dietary diversity compared with those born after an interval of two years or more. Similarly, studies conducted in Awi Zone and Chelia District reported that children with short birth intervals had 68% and 72% lower odds, respectively, of achieving adequate dietary diversity(16,33).

Short birth intervals may limit maternal time, energy, and household resources available for child care and feeding, thereby reducing the likelihood of providing a diversified diet.

Promoting optimal birth spacing through family planning services may therefore contribute to improved dietary diversity among young children.

7. STRENGTHS AND LIMITATION

7.1 Strengths

1. Community-based design**:** The study was conducted at the community level, providing findings that are representative of children aged 6–23 months in Wolkite town and reducing the potential bias associated with facility-based studies.
2. Use of standardized tools**:** Data collection was based on validated WHO-recommended indicators for minimum dietary diversity, ensuring comparability with national and international studies.

7.2 Limitations

1. Cross-sectional design: The study's cross-sectional nature limits the ability to establish causal relationships between predictors (e.g., maternal knowledge, PNC attendance, birth interval) and dietary diversity.
2. Recall bias**:** Information on child feeding practices relied on maternal recall of the previous 24 hours, which may be subject to memory errors or social desirability bias.
3. Generalizability**:** The findings may be specific to Wolkite town and may not be fully generalizable to all rural or urban areas in Ethiopia, particularly regions with differing socioeconomic or cultural contexts.
4. Limited dietary assessment period: The study assessed dietary diversity based on a single 24-hour recall, which may not capture habitual intake patterns or seasonal variations in food consumption.

8. CONCLUSION AND RECOMMENDATION

8.1 Conclusion

The study reveals that adequate dietary diversity among children aged 6–23 months is low. reflecting a significant gap in complementary feeding practices. Factors positively associated with dietary diversity include PNC attendance, and maternal knowledge of IYCF. while short birth intervals were associated with inadequate dietary diversity.

8.2 Recommendation

For Policy Makers and Health Authorities

1. Strengthen maternal nutrition education programs**:** Integrate targeted infant and young child feeding (IYCF) counseling into existing maternal and child health services, emphasizing the importance of dietary diversity.
2. Enhance postnatal care (PNC) utilization**:** Expand coverage and accessibility of PNC services, ensuring that nutrition counseling is consistently delivered during visits.
3. Promote optimal birth spacing**:** Implement and scale up family planning interventions to encourage birth intervals of two years or more, which can improve child feeding practices and overall child nutrition.
4. Support community-level interventions**:** Develop locally appropriate nutrition programs, such as community-based growth monitoring and food demonstrations, to increase awareness and practical knowledge about diverse diets.

For Health Professionals

1. Counsel mothers during routine visits**:** Health extension workers, nurses, and midwives should provide practical guidance on including diverse food groups, using locally available and affordable foods.
2. Monitor and follow up**:** Identify children at risk of inadequate dietary diversity, especially those with mothers having limited IYCF knowledge or short birth intervals, and provide individualized support.

For Researchers

1. Conduct longitudinal studies**:** Future research should explore causal relationships between maternal knowledge, health service utilization, and dietary diversity.

2. Assess habitual dietary patterns**:** Use repeated 24-hour recalls or food frequency questionnaires to capture seasonal variations and habitual intake among children.
3. Evaluate interventions**:** Assess the effectiveness of nutrition education, PNC counseling, and family planning programs in improving dietary diversity at the community level.

For Communities

1. Promote home gardening and diverse food production**:** Encourage households to grow a variety of vegetables and fruits to improve accessibility of micronutrient-rich foods.
2. Enhance community awareness**:** Conduct local campaigns to increase understanding of the benefits of diversified diets for child growth and development

9.REFERENCES

1. Ruel MT. Operationalizing dietary diversity: a review of measurement issues and research priorities. J Nutr. (v;133(11 Suppl 2):3911S–3926S).
2. Pan American Health Organization / World Health Organization. Guiding principles for complementary feeding of the breastfed child. Washington, D.C: PAHO/WHO;
3. PA N A M E R I C A N H E A LT H O R G A N I Z AT I O N W O R L D H E A LT H O R G A N I Z AT I O N Celebrating 100 Years of Health.
4. Organization WH. Complementary feeding of young children in developing countries: A review of current scientific knowledge. Geneva: World Health Organization;
5. World Health Organization UNICEF. Indicators for assessing infant and young child feeding practices: definitions and measurement methods. Geneva: World Health Organization;
6. Gebru KF, Haileselassie WM, Temesgen AH, Seid AO, Mulugeta BA. Food insecurity and associated factors among households in Gubalafto District, Northeast Ethiopia. BMC Public Health. 3;19(1):1–10.
7. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, Onis M. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 382(9890):427–51.
8. Gatica-Domínguez G, Neves PAR, Barros AJD, Victora CG. Complementary feeding practices in children aged 6–23 months: an updated review of the literature. Curr Opin Clin Nutr Metab Care. May;26(3):261–267.
9. Indicators for assessing infant and young child feeding practices Definitions and measurement methods.
10. Ethiopian Public Health Institute (EPHI) [Ethiopia], ICF. Ethiopia Mini Demographic and Health Survey 2019. Ethiopia and Rockville, Maryland, USA: Addis Ababa;
11. Ethiopia: Food-Based Dietary Guidelines-2022.
12. Hoddinott J, Alderman H, Behrman JR H, L H, S. The economic rationale for investing in stunting reduction. Matern Child Nutr. 9(Suppl 2):69–82.
13. Ministry of Health National Guideline for the Management of Acute Malnutrition in Ethiopia. 2019.
14. Central Statistical Agency (CSA) [Ethiopia] ICF. Ethiopia Demographic and Health Survey 2016. Ethiopia and Rockville, Maryland, USA: Addis Ababa;
15. Pelto GH, Armar-Klemesu M. Balancing nurturance, cost and time: Complementary feeding in Accra, Ghana. Matern Child Nutr. 7(Suppl 3):66–81.

16. Mulatu S, Ejigu LJ, Dinku H, Tadesse F, Gedif A, Salah F, et al. Dietary diversity and associated factors among children aged 6–23 months attending a public health hospital in Awi zone, Ethiopia, 2023. Front Nutr. 2024;11.

17. Assefa D, Belachew T. Minimum dietary diversity and associated factors among children aged 6-23 months in Enebsie Sar Midir Woreda, East Gojjam, North West Ethiopia. BMC Nutr [Internet]. 2022 Dec 1 [cited 2026 Jan 26];8(1). Available from: https://pubmed.ncbi.nlm.nih.gov/36539901/

18. Tessema M, Belachew T, Ersino G. Feeding patterns and nutritional status of infants and young children in Bale Zone, Southeast Ethiopia. BMC Nutr. 7(23).

19. Tegegne M, Sileshi S, Benti T, Teshome M, Woldie H. Factors associated with minimal meal frequency and dietary diversity practices among infants and young children in the predominantly agrarian society of Bale zone, Southeast Ethiopia: A community based cross sectional study. Archives of Public Health. 2017 Nov 13;75(1).

20. Mekonnen TC, Workie SB, Yimer TM, Mersha WF. Minimum dietary diversity and associated factors among children aged 6–23 months in East Gojjam Zone, Northwest Ethiopia. Archives of Public Health. 81(56).

21. United Nations Children's Fund (UNICEF). Improving young children's diets during the complementary feeding period. New York: UNICEF;

22. WHO UNICEF. Indicators for assessing infant and young child feeding practices: Part 2—Measurement. Geneva: World Health Organization;

23. Federal Ministry of Health (FMoH) [Ethiopia. In: National Nutrition Programme. Addis Ababa: FMoH; p. 2016–20.

24. Abebe Z, Gebremedhin S, Mesfin F. Dietary diversity and associated factors among children aged 6–23 months in South Gondar Zone, Northwest Ethiopia. BMC Pediatr. 22(412).

25. WHO UNICEF, USAID AED, UCDavis IFPRI. Indicators for assessing infant and young child feeding practices – Part I: Definitions. Washington, D.C: World Health Organization;

26. Solomon D, Aderaw Z, Tegegne TK. Minimum dietary diversity and associated factors among children aged 6–23 months in Addis Ababa, Ethiopia. Int J Equity Health [Internet]. 2017 Oct 12 [cited 2026 Jan 26];16(1):181. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC5639776/

27. Dangura D, Gebremedhin S. Dietary diversity and associated factors among children 6-23 months of age in Gorche district, Southern Ethiopia: Cross-sectional study. BMC Pediatr. 2017 Jan 9;17(1).

28. Heidkamp RA. Mobilising evidence, data, and resources to achieve global maternal and child undernutrition targets and the Sustainable Development Goals: an agenda for action. Lancet. 397(10282):1400–18.

29. Arimond M, Ruel MT. Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys. J Nutr. Oct;134(10):2579–85.

30. Ethiopian Public Health Institute (EPHI) [Ethiopia], ICF. Ethiopia Mini Demographic and Health Survey 2019. Ethiopia and Rockville, Maryland, USA: Addis Ababa;

31. U.N.I.C.E.F. The State of the World's Children 2021: On My Mind – Promoting, protecting and caring for children's mental health. New York: UNICEF;

32. Beyene M, Worku AG, Wassie MM. Dietary diversity, meal frequency and associated factors among infant and young children in Northwest Ethiopia: a cross- sectional study. BMC Public Health.

33. Keno S, Bikila H, Shibiru T, Etafa W. Dietary diversity and associated factors among children aged 6 to 23 months in Chelia District, Ethiopia. BMC Pediatrics 2021 21:1 [Internet]. 2021 Dec 11 [cited 2026 Jan 26];21(1):565-. Available from: https://link.springer.com/article/10.1186/s12887-021-03040-0

34. Dangura D, Gebremedhin S. Dietary diversity and associated factors among children 6–23 months of age in Gorche district. Vol. 17;17(1):6. Southern Ethiopia: Cross-sectional study. BMC Pediatr;

35. Eshete T, Kumera G, Bazezew Y, Mihretie A, Marie T. Determinants of inadequate minimum dietary diversity among children aged 6-23months in Ethiopia: Secondary data analysis from Ethiopian Demographic and Health Survey 2016. Agric Food Secur. 2018 Sep 19;7(1).

36. Mekonnen M, Kinati T, Bekele K, Tesfa B, Hailu D, Jemal K. Infant and young child feeding practice among mothers of children age 6 to 23 months in Debrelibanos district, North Showa zone, Oromia region, Ethiopia. PLoS One [Internet]. 2021 Sep 24 [cited 2026 Jan 26];16(9):e0257758–e0257758. Available from: https://europepmc.org/articles/PMC8462673

37. Mulatu S, Mekonnen GB, Tsehay YT, Mamo ST, Messelu MA, Belay AE, et al. Dietary Diversity and Associated Factors among Children 6-23 Months Old in Ethiopia: Systematic Review and Meta-Analysis. Discov Med [Internet]. 2024 [cited 2026 Jan 26];36(186):1527. Available from: https://pubmed.ncbi.nlm.nih.gov/39054722/

38. Mulatu S, Mekonnen GB, Tsehay YT, Mamo ST, Messelu MA, Belay AE, et al. Dietary Diversity and Associated Factors among Children 6–23 Months Old in Ethiopia: Systematic Review and Meta-Analysis. Discov Med. 2024;36(186):1527.

39. Complementary feeding practices and associated factors among mothers of children aged 6-23 months in Ethiopia: Secondary data analysis of Ethiopian mini demographic and health survey 2019 Sewunet Sako Shagaro * , Be'emnet Tekabe Mulugeta and Temesgen Dil…. [cited 2026 Jan 26]; Available from: https://doi.org/10.1186/s13690-021-00725-x

40. Mekonnen TC, Workie SB, Yimer TM, Mersha WF. Meal frequency and dietary diversity feeding practices among children 6–23 months of age in Wolaita Sodo town, Southern Ethiopia. Journal of Health, Population and Nutrition 2017 36:1 [Internet]. 2017 May 19 [cited 2026 Jan 26];36(1):18-. Available from: https://link.springer.com/article/10.1186/s41043-017-0097-x

41. Wondafrash M, Huybregts L, Lachat C, Bouckaert KP, Kolsteren P. Dietary diversity predicts dietary quality regardless of season in 6–12-month-old infants in south-west Ethiopia. Public Health Nutr. Oct;19(14):2485–94.

42. Kassa T, Meshesha B, Haji Y, Ebrahim J. Appropriate complementary feeding practices and associated factors among mothers of children age 6–23 months in Southern Ethiopia. BMC Pediatr. 16(131).

43. Bai Y. Climate shocks and nutritional adequacy in rural Ethiopia: A panel data analysis. Food Policy. 118(102496).

44. Gezahegn H, Tegegne M. Magnitude and Its Predictors of Minimum Dietary Diversity Feeding Practice Among Mothers Having Children Aged 6–23 Months in Goba Town, Southeast Ethiopia, 2018: A Community-Based Cross-Sectional Study . Nutr Diet Suppl. 2020 Oct;Volume 12:215–22.

45. Temesgen H, Yeneabat T, Teshome M. Dietary diversity and associated factors among children aged 6-23 months in Sinan Woreda, Northwest Ethiopia: A cross-sectional study. BMC Nutr [Internet]. 2018 Dec 27 [cited 2026 Jan 26];4(1). Available from: https://www.researchgate.net/publication/323244080_Dietary_diversity_and_associated_factors_among_children_aged_6-23_months_in_Sinan_Woreda_Northwest_Ethiopia_A_cross-sectional_study

46. Temesgen H, Negesse A, Woyraw W, Mekonnen N. Dietary diversity feeding practice and its associated factors among children age 6-23 months in Ethiopia from 2011 up to 2018: A systematic review and meta-analysis. Ital J Pediatr. 2018 Sep 17;44(1).

47. Shagaro SS, Mulugeta BT, Kale TD. Complementary feeding practices and associated factors among mothers of children aged 6-23 months in Ethiopia: Secondary data analysis of Ethiopian mini demographic and health survey 2019. Archives of Public Health 2021 79:1 [Internet]. 2021 Nov 22 [cited 2026 Jan 26];79(1):205-. Available from: https://link.springer.com/article/10.1186/s13690-021-00725-x

48. Arimond M, Ruel MT. Dietary Diversity Is Associated with Child Nutritional Status: Evidence from 11 Demographic and Health Surveys. J Nutr [Internet]. 2004 Oct 1

[cited 2026 Jan 26];134(10):2579–85. Available from: https://www.sciencedirect.com/science/article/pii/S0022316623030912

49. PA N A M E R I C A N H E A LT H O R G A N I Z AT I O N W O R L D H E A LT H O R G A N I Z AT I O N Celebrating 100 Years of Health.

50. Indicators for assessing infant and young child feeding practices Definitions and measurement methods.

51. Solomon D, Aderaw Z, Tegegne TK. Minimum dietary diversity and associated factors among children aged 6-23 months in Addis Ababa, Ethiopia. Int J Equity Health. 2017 Oct 12;16(1).

52. Indicators for assessing infant and young child feeding practices PArt 3 Country Profiles.

53. Geda NR, Feng CX, Janzen B, Lepnurm R, Henry CJ, Whiting SJ. Infant and young child feeding practices in Ethiopia: analysis of socioeconomic disparities based on nationally representative data. Archives of Public Health. 2021 Dec 1;79(1).

54. WHO UNICEF. Indicators for assessing infant and young child feeding practices: Part 2—Measurement. Geneva: World Health Organization;

55. Welkite (Town, Ethiopia) - Population Statistics, Charts, Map and Location [Internet]. [cited 2026 Feb 6]. Available from: https://www.citypopulation.de/en/ethiopia/admin/southern/ET070114__welkite/

56. Population-and-Housing-Census-2007-National_Statistical | Ethiopian Statistics Services [Internet]. [cited 2026 Feb 6]. Available from: https://ess.gov.et/download/population-and-housing-census-2007-national_statistical-2/

57. ዋናው ገጽ - የወልቂጤ ከተማ አስተዳደር [Internet]. [cited 2026 Feb 6]. Available from: https://wolkitecityadministration.gov.et/

10.ANNEXES

English version questionnaire

To identify dietary diversity scores and associated factors among 6 -23 months, in Wolkite, central Ethiopia, 2025.

INTRODUCTION*:*

Greeting: Good morning/Good afternoon*?*

CONFIDENCIALITY AND CONSENT

My name is _____ I am working as data collector in a study conducted by Wolkite university comprehensives hospital.

I am requesting your permission to answer my questions in the study of investigating dietary diversity and associated factors among 6 -23 months, in Wolkite, Ethiopia. In order to generate information necessary for the planning of appropriate strategies (interventions) to prevent malnutrition among 6-23 months' children. The purpose of this study and its findings is purely academic. Your willingness to answer the questions is very much appreciated. We assure that whatever information we obtained from you used for the purpose of research only and will not be made available to anyone outside the research team.

- Do you agree to provide information on the issue? Make (x) mark agreement or disagreement and level if disagreed.

A. Agree----------

B. Disagree----------

Thank you

Kebele: _____Household No _____ Date __/ __/ __ respondent ID_____

Section I Basic mother/care taker information and father

101 Age of mother _____years

102 Marital statuses

1. Married
2. Unmarried
3. Divorced
4. Widowed
5. Separated

103 Religion

1. Orthodox
2. Muslim
3. Protestant
4. Catholic
5. None believer
6. Others (specify_____

104 Educational statuses of mothers

1. cannot read and write
2. can read and write
3. primary (1-8)
4. secondary
5. Diploma and above

105 Occupation?

1. Private employed
2. student
3. Civil servant
4. merchant
5. House wife
6. Other, specify_____

106 Occupation of father?

1. Private employed
2. student
3. Civil servant
4. merchant
5. Daily worker
6. Other, specify_____

107 Educational statuses of father

1. Cannot read and write
2. Can read and write
3. Primary (1-8)
4. Secondary
5. Diploma and above

108 Family monthly income_____

109 How many family members do you have_____

110 How many children do you have _____

Section II child basic information

201 Child age [____|____] Year/Month

202 Sex Male ……1 Female ……...2

203 Birth order _____

204 birth Interval _____

Section III knowledge of mother on dietary diversity

301 Have you ever heard about feeding complementary foods to child? Yes_____No_____

302 complementary food started at 6 months of age Yes ------ no--------

303 Have you ever heard about feeding different foods to child? Yes_____No _____

304 A child should eat five or more types of food a day after 6 months. yes____no__

305. It's not advisable to give meat for a child aged 6-23 month Yes _____No_____

306. Not having diversified food is one cause of child malnutrition. Yes_____No

307. If a child does not feel hungry, we can say his nutritional need is fulfilled. Yes_____No_____

308 Not starting complementary feeding after 6 months may cause malnutrition. Yes _____No_____

309. Breastfeeding should continue until the age of 2. Yes----- no===

310. feeding only animal products is not enough/adequate for 6–23-month child yes --- no--

Section IV dietary diversity?

Next, I will ask you about food items that you child fed on yesterday day and night

	Dietary group	yes	no
401	Cereals, roots, tubers		
402	pulses (beans, peas, lentils), nuts and seeds		
403	dairy products (milk, infant formula, yogurt, cheese)		
404	flesh foods (meat, fish, poultry, organ meats)		
405	Egg		
406	Vitamin A rich fruits and vegetables		
407	others fruits and vegetables		
408	Breast milk		

Section V maternal health service factors

501 Do you have ANC follow up? Yes_____ No_____

502 If answer is yes how many ANC contact do you have? _____

503 Do you have PNC follow up Yes ……No …….

504 Place of delivery at home……... at health facility…….

505 Do you have IYCF information during ANC? Yes ……No …….

506 Do you have birth attendant? Yes …… No …….

አማርኛ መጠይቅ

መግቢያ

ሚስጥራዊነት እና ስምምነት

ስሜ _____ እባላለሁ፤ በወልቂጤ ዩኒቨርሲቲ ኮምፕረንስቭ ሆስፒታል በሚደረገው ጥናት ውስጥ መረጃ ሰብሳቢ ሆኜ እየሰራሁ ነው።

በአመጋገብ ልዩነት እና ተያያዥ ምክንያቶች መካከል ያለውን ጥናት በተመለከተ ለጥያቄዎቼ መልስ ለመስጠት ፈቃድዎን እጠይቃለሁ። ከ6-23 ወር ዕድሜ ላይ ባሉ ህጻናት ላይ የተመጣጠነ ምግብ እጥረትን ለመከላከል ተገቢ የሆኑ ስልቶችን (ጣልቃገብነቶችን) ለማቀድ አስፈላጊ የሆነውን መረጃ ለማመንጨት ነው። የዚህ ጥናት ዓላማ እና ግኝቶቹ ሙሉ በሙሉ ትምህርታዊ ናቸው። ለጥያቄዎቹ መልስ ለመስጠት ያሎት ፍላጎት በጣም አድናቆት አለው። ከእርስዎ የምናገኘው ማንኛውም መረጃ ለምርምር ዓላማ ብቻ ጥቅም ላይ እንደሚውል እና ከምርምር ቡድኑ ውጭ ላሉ ሰዎች እንደማይቀርብ እናረጋግጣለን።

በጉዳዩ ላይ መረጃ ለመስጠት ተስማምተዋል? (x) ስምምነቱን ወይም አለመግባባቱን ምልክት ያድርጉበት

ሀ. እስማማለሁ----------

ለ. አልስማማም----------

አመሰግናለሁ

ቀበሌ ፡ __ _____የቤ/ቁጥር _____ ቀን _____/ _____/_____

ምላሽ ሰጪ መለያ_____

ክፍል 1 መሰረታዊ የእናት/ተንከባካቢ እና አባት መረጃ

101 የእናት ዕድሜ _____(በአመት)

102 የጋብቻ ሁኔታ ?

1. ያገባች
2. ያላገባች
3. የተፋታች
4. መበለት

103 ሃይማኖት

1. ኦርቶዶክስ
2. ሙስሊም
3. ፕሮቴስታንት
4. ካቶሊክ
5. የማያምን
6. ሌሎች (ይግለጹ_____)

104 የእናቶች የትምህርት ደረጃ

1. ማንበብና መጻፍ አይችሉም
2. ማንበብና መጻፍ ይችላሉ
3. የመ/ደረጃ (1-8)
4. ሁለተኛ ደረጃ
5. ዲፕሎማ እና ከዚያ በላይ

105 የሚተዳደሩበት ስራ

1. የግል ሰራተኛ
2. የመንግስት ሰራተኛ
3. ነጋዴ
4. ተማሪ
5. የቤት እመቤት
6. የግል ድርጅት ሰራተኛ
7. ሌላ፣ ይግለጹ_____

106 የባለቤትሽ ስራ ምንድነው

1. የግል ሰራተኛ
2. የመንግስት ሰራተኛ
3. ነጋዴ
4. ተማሪ
5. የግል ድርጅት ሰራተኛ
6. ሌላ፣ ይግለጹ_____

107 የባለቤትሽ የትምህርት ደረጃ

1. ማንበብና መጻፍ አይችሉም
2. ማንበብና መጻፍ ይችላሉ
3. የመ/ደረጃ (1-8)
4. ሁለተኛ ደረጃ
5. ዲፕሎማ እና ከዚያ በላይ

108 የቤተሰብ ወርሃዊ ገቢ _____

109 የቤተሰብ አባላት ስንት ናቸው ? (_____)

110 ስንት ልጆች አሉሽ _____

ክፍል II የሕፃናት መሠረታዊ መረጃ

201 የህፃኑ/ኗ እድሜ [_____|_____] አመት/ወር

202 ዖታ ወንድ ……ሴት ……

203 ስንተኛ ልጅሽ ነው_____

204 ከቀድሞ ልጅሽ በስንት ግዜ ልዩነት ወለድሽ _____

ክፍል III የእናቶች ስለተመጣጠነ ምግብ ያላቸው ግንዛቤ

301 ተጨማሪ ምግቦችን ለልጆች ስለመመገብ ሰምተሽ ታውቃለሽ? አዎ_____አይ _____

302 የተመጣጠነ ምግብ ለልጆች መቼ ምጀመር አለበት ብለሽ ታስቢያለሽ

303 ተጨማሪ ምግብ መቼ ተጀመረ? በወራት ዕድሜ [_____|_____]

303 የተለያዩ ምግቦችን ለልጆች ስለማቅረብ ሰምተሽ ታውቃለሽ? አዎ_____አይ _____

305. አንድ ህፃነ ከ6 ወር በኋላ በአንድ ቀን ውስጥ ስንት የምግብ አይነቶች መመገብ አለበት ? _____

306. ከ6-23 ወር እድሜ ላለው ልጅ ስጋ መስጠት አይመከርም? አዎ _____አይ_____

307. የተለያየ ምግብ አለመመገብ የህፃናት የምግብ እጥረት አንዱ ምክንያት ነው። አዎ_____አይደለም

308. አንድ ልጅ ካልተራበ፣ የአመጋገብ ፍላጎቱ ተሟልቷል ማለት እንችላለን። አዎ_____ አይ_____

309 ከ6 ወራት በኋላ ተጨማሪ ምግብ አለመጀመር የተመጣጠነ ምግብ እጥረት ሊያስከትል ይችላል። አዎ _____አይ_____

ክፍል IV የአመጋገብ ልዩነት?

ቀጥሎ፣ ልጅዎ ትላንትና ማታ ስለመገባቸው የምግብ አይነቶች እጠይቅዎታለሁ

	የአመጋገብ ቡድን	አዎ	አይ
401	እህሎች(ጤፍ፣ማሽላ፣ዳጉሳ፣ሩዝ፣ገብስ፣ስንዴ)ሥሮች(ካሮት፣ ድንች፣ቀይስር፣ እንሰት፣		
402	ጥራጥሬዎች(አተር፣ባቄላ፣ሽንብራ)እና ለውዝ		
403	የወተት እና የወተት ምርቶች		
404	ቀይ ሥጋ፣ ፣ ዶሮ፣ ጉበት፣ ኩላሊት፣ ዓሳ		
405	እንቁላል		
406	በቫይታሚን ኤ የበለጸጉ አትክልት እና ፍራፍሬ ማንጎ፣ ፓፓያ		
407	ሌሎች አትክልት እና ፍራፍሬ		
408	የእናት ጡት ወተት		
	ጠቅላላ ድምር		

ክፍል V ስለ እናቶች የጤና አገልግሎት

501 ቅድመወሊድ ክትትል አለዎት? አዎ_____ አይደለም_____

502 መልሱ አዎ ከሆነ ስንት ግዜ ቅድድመውሊድ ክትትል አድርገዋል? _____

503 የድህረውሊድ ክትትል አለዎት? አዎ ……አይ ……

504 የት ቦታ ነው የወለዱት

1. በቤት ውስጥ……
2. በጤና ተቋም……

505 በቅድመወሊድ ግዜ የህፃናት አመጋገብ መረጃ አልወዎት? አዎ ……አይ ……

506 በጤና ባለሙያ ነው የወልዱት? አዎ …… አይ ……