



**INSTITUTE OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY
DEPARTMENT OF PEDIATRICS AND NEONATAL**

**MINIMUM ACCEPTABLE DIET AND ASSOCIATED FACTORS AMONG
CHILDREN AGED 6–23 MONTHS IN NEKEMTE TOWN, EAST WALLAGA ZONE,
WESTERN OROMIA, ETHIOPIA, 2025.**

**A THESIS SUBMITTED TO WALLAGA UNIVERSITY, INSTITUTE OF HEALTH
SCIENCES, SCHOOL OF NURSING AND MIDWIFERY, DEPARTMENT OF
PEDIATRICS AND NEONATAL NURSING IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCES IN
PEDIATRICS AND CHILD HEALTH NURSING.**

**JANUARY, 2026
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**A THESIS PROPOSAL SUBMITTED TO WALLAGA UNIVERSITY, INSTITUTE
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APPROVAL SHEET FOR SUBMITTING FINAL RESEARCH PROPOSAL

As members of the examining the final MPH thesis open defense, we certify that we have read and evaluated the thesis prepared by Almaz Seketa (Your full name) under the title “minimum acceptable diet and associated factors among children aged 6–23 months in nekemte town, east wallaga zone, western oromia, ethiopia 2025” and recommend-end that the thesis be accepted as fulfilling the requirement of the degree of Master of Pediatrics and Neonatal

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Abbreviations and Acronyms

ANC	Antenatal Care
CSA	Central Statistics Agency
EDHS	Ethiopia Demographic and Health Survey
IYCF	Infant and Young Child Feeding
LMICs	Low Middle-Income Countries
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MMF	Minimum Meal Frequency
MUAC	Mid-Upper Arm Circumference
NNP II	Ethiopia's National Nutrition Program II
PNC	Postnatal Care
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
WFL	Weight-for-Length
WFH	Weight-for-Height
WHO	World Health Organization

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Abstract

Background: Adequate infant and young child feeding is vital for healthy growth and development. However, achieving the minimum acceptable diet, which combines dietary diversity and meal frequency, remains a challenge in many low- and middle-income countries. Major causes of inadequate MAD include low maternal education, poverty, food insecurity, cultural practices, and limited access to health services. These poor practices lead to growth faltering, micronutrient deficiencies, increased infection risk, impaired cognitive development, and higher child morbidity and mortality. This study assessed the prevalence of MAD and its associated factors among children aged 6–23 months in Nekemte town.

Objective: To assess MAD and associated factors among children aged 6–23 months in Nekemte town, Western Oromia, Ethiopia, in 2025.

Methods: A community-based cross-sectional study was conducted in Nekemte town among 530 mother/caregiver–child pairs, with children aged 6–23 months. A systematic random sampling technique was used to select participants. Interview data were collected, entered into EpiData version 3.1, and exported to SPSS version 25 for analysis. Descriptive statistics summarized the data. Bivariable logistic regression was performed first to identify candidate variables with $p < 0.25$. Variables meeting this criterion were included in a multivariable binary logistic regression model to control for potential confounders and determine independent predictors of achieving a minimum acceptable diet. Model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test, and multicollinearity among independent variables was evaluated using the variance inflation factor (VIF). Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were reported to indicate the strength and precision of associations, and p -values < 0.05 were used to determine statistical significance.

Results: The study showed the level of minimum acceptable diet is 62.5% (95% CI: 58.5, 66.6). Most children were breastfed (94.3%) from the overall data and consumed staple foods, legumes, dairy, fruits, and vegetables. Multivariable logistic regression analysis showed that mother/caregivers employed in the government office: (AOR = 4.28, 95% CI, 1.63, 11.28); rely on daily laborers: (AOR = 0.20, 95% CI, 0.11, 0.36); ; merchants: AOR = 0.28, 95% CI, 0.14, 0.58), family size ≥ 4 (AOR = 2.06, 95% CI; 1.24, 3.41), access to information on child feeding (AOR = 2.05, 95% CI; 1.17, 3.60), higher family income (AOR for >9001 birr = 0.22, 95% CI; 0.10, 0.52), maternal education (grades 1–8: AOR = 0.28, 95% CI; 0.10, 0.74), degree or higher: AOR = 0.31, 95% CI; 0.10, 1.83), postnatal care follow-up (AOR = 0.59, 95% CI; 0.35, 0.99), bottle feeding (AOR = 0.17, 95% CI; 0.08, 0.36), and child illness in the past two weeks (AOR = 2.36, 95% CI; 1.14, 3.18) were significantly associated with achieving MAD.

Conclusion: The proportion of children aged 6–23 months who achieved the minimum acceptable diet in Nekemte town was below WHO recommendations. Maternal education, occupation, family size, access to feeding information, postnatal care, bottle feeding, household income, and recent child illness were key influencing factors. Strengthening maternal education, improving access to nutrition information, promoting postnatal care, and community-based counseling are feasible strategies to improve infant and young child feeding practices.

Keywords: Minimum acceptable diet, Children, Nekemte, Oromia, Ethiopia

1. Introduction

1.1. Background of the Study

The Minimum Acceptable Diet (MAD) measures infant and young child feeding practices introduced by the World Health Organization (WHO) and UNICEF (1-3). It combines two key components: Minimum dietary diversity (MDD): It combines two key components: MDD and minimum meal frequency (MMF). Inadequate MAD places children at high risk of multiple micronutrient deficiencies, particularly vitamin A, zinc, iron, iodine, and vitamin D, which are essential for immunity, growth, and cognitive development. Besides, MDD, a key component of the Minimum Acceptable Diet (MAD), refers to the consumption of foods from at least five out of eight recommended food groups for children aged 6–23 months (4). These groups include grains, roots, and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A-rich fruits and vegetables; other fruits and vegetables; and breastmilk (5). Achieving MDD ensures adequate intake of essential nutrients and helps prevent deficiencies in critical micronutrients such as vitamin A, iron, zinc, iodine, and vitamin D, which are crucial for growth, immunity, and cognitive development. (6). Moreover, it is a measure of adequate micronutrient intake, defined as children consuming five or more of the eight food groups (7). Minimum Meal Frequency (MMF): A measure of meeting energy requirements, determined by age and breastfeeding status, as for 6–8 months, at least 2 meals daily; 9–23 months, at least 3 meals daily; and non-breastfed children, at least 4 meals daily (8, 9).

Breastfeeding provides both immediate and lasting advantages for children. It lowers the risk of infections and infant mortality, supports cognitive and motor development, and helps prevent obesity and metabolic disorders later in life. However, after six months, breast milk alone is insufficient to meet the growing nutritional needs and demands of infants and children (10, 11).

At six months of age, an infant's energy and nutrient requirements surpass what breast milk alone can provide, making it necessary to introduce complementary foods in line with the MAD feeding guidelines (12). Complementary feeding involves incorporating liquid, solid, and semi-solid foods alongside breast milk, as breast milk alone is insufficient to meet the baby's nutritional demands beyond six months. This practice plays a crucial role in reducing stunting during the first two years of life (13).

Given the rapid growth and development of infants and young children, the World Health Organization (WHO) recommends monitoring Infant and Young Child Feeding (IYCF) indicators. These include the introduction of soft, solid, or semi-solid foods and MAD during the first two years of life (1). Similarly, Ethiopia's National Nutrition Program II (NNP II) incorporates MAD as one of the key indicators for evaluating progress in IYCF practices (8, 14).

Adhering to acceptable dietary standards offers numerous advantages, such as promoting linear growth, improving cognitive development, enhancing academic performance, reducing the risk of non-communicable diseases, strengthening the immune system, and boosting productivity in adulthood. Ensuring a minimum acceptable diet is crucial for addressing macronutrient and micronutrient deficiencies, which contribute to better linear growth outcomes (9, 15, 16).

The Ethiopian government has introduced the Sekota Declaration, a multi-sectoral nutrition intervention plan designed to tackle the immediate, underlying, and root causes of malnutrition, to eliminate child undernutrition in Ethiopia by 2030 (17). Notably, nutrition-sensitive interventions within the food and agriculture sector are considered crucial in complementing nutrition-specific strategies (18). Initiatives such as biofortification, crop diversification, and value-added processing are among the agricultural interventions with significant potential to enhance nutritional outcomes (19-21).

1.2. Statement of the problem

Even with optimal breastfeeding, children are at risk of stunting if they do not receive adequate dietary diversity and frequency after the age of six months (22). Globally, only 18% of children met the minimum acceptable diet standard, with rates as low as 12% in South Asia and 13% in Sub-Saharan Africa (22-25). In addition, a study conducted in 32 African Countries revealed that the proportion of children aged 6–23 months who received a minimum acceptable diet was 8.6%, with the lowest rates in Guinea (3.7%) and the highest in Kenya (21.8%) (26).

Poor breastfeeding and complementary feeding, combined with frequent infections, can lead to early-life malnutrition that leads to stunted growth, impaired brain development, reduced

adult height, lower educational achievement, decreased productivity, and often permanent consequences.(10, 27-31). Similarly, a community-based cross-sectional study in Dera town, Oromia, reported a 36.5% prevalence of MAD, highlighting associations with maternal education, child age, antenatal care visits, and breastfeeding practices (32). A systematic review and meta-analysis further indicated that the pooled prevalence of MAD in Ethiopia was approximately 22%, with maternal education, child age, nutrition information, media exposure, and maternal knowledge identified as significant factors (33).

In many low- and middle-income countries (LMICs), inappropriate complementary feeding is a widespread practice. A study across 80 LMICs found that only 10.1% of these countries had a prevalence of more than 50% for meeting the minimum acceptable diet (MAD) standards. The lowest prevalence was observed in Western and Central Africa, at 9.4%, while Latin America and the Caribbean had the highest prevalence of MAD at 43.7% (34). Failure to meet the recommended minimum acceptable diet standard has severe, long-lasting, and often irreversible health consequences, including stunted growth. Additionally, children who experience stunting usually grow into smaller adults and face various negative health impacts throughout their lives (35).

Improper feeding practices pose the greatest risk for malnutrition, illness, and death in infants and young children under 24 months. Over two-thirds of child deaths linked to malnutrition are associated with inadequate feeding practices during this critical period (36).

The potential effects of malnutrition during this critical period extend beyond childhood, reducing individual productivity in adulthood (37). This, in turn, hinders future social and economic development at the national level and perpetuates a cycle of intergenerational malnutrition(3).

Parental education status, household wealth index, household family size, child sex, number of under-five children in the household, household decision-making, ANC, place of delivery, PNC, birth order, vaccination status, and maternal knowledge of IYCF practice are associated with MAD (3, 38, 39). Several studies have examined the prevalence of MAD and its associated factors among children aged 6–23 months in various regions of Ethiopia. For instance, a study in Aleta Wondo District, Sidama Region, found that only 13.8% of children

met the MAD requirements, with factors such as maternal age, household wealth, and food preparation training being significant determinants(40).

Despite these insights, there is a notable lack of localized data specific to Nekemte Town, East Wallaga Zone, Oromia. The socio-cultural, economic, and environmental contexts of Nekemte Town may differ from other regions, potentially influencing feeding practices and determinants of MAD adherence uniquely. This gap underscores the need for community-based studies in Nekemte Town to inform targeted interventions and policies aimed at improving infant and young child feeding practices in this specific setting.

1.3. Significance of the Study

Ensuring children aged 6–23 months receive a MAD is crucial for their optimal growth, development, and overall health. However, in many low-resource settings, including Ethiopia, achieving adequate infant and young child feeding (IYCF) practices remains challenging. This study aims to assess the prevalence of MAD and its associated factors in Nekemte Town, East Wallaga Zone, Western Oromia, providing valuable insights into the local context of child nutrition.

The findings of this research were significant in several ways. First, it was generate evidence-based data on the dietary practices of young children in Nekemte Town, filling a critical gap in localized research. By identifying key factors influencing MAD adherence, such as maternal education, socioeconomic status, and food availability, the study was provide essential information for healthcare providers, NGOs, and community-based organizations. Furthermore, the present work was provide highlighted implications for future research.

2. LITERATURE REVIEW

2.1. Magnitude of Minimum Acceptable diet

The magnitude of children receiving a minimum acceptable diet varies across the world. A cross-sectional study conducted in China among infants and young children aged 6-23 months in poor rural areas revealed that the percentage of children who received the minimum acceptable diet was 49.0% (41). In addition, a cross-sectional study conducted in Indonesia among children 6-23 months old showed that the percentage of children who received a minimum acceptable diet was 40% (42).

A community-based cross-sectional study conducted in Nepal among children aged 6-23 months revealed that the percentage of children who received the minimum acceptable diet was 44.3% (43). A community-based cross-sectional study conducted in the Philippines among children aged 6-23 months revealed that the proportion of children who received the minimum acceptable diet was 6.7% (44).

The study conducted in 32 African Countries revealed that the proportion of children aged 6–23 months who received a minimum acceptable diet was 8.6%, among the lowest in Guinea (3.7%), and highest in Kenya (21.8%) (26). A cross-sectional study conducted in Burkina Faso showed that only 13% benefited from the minimum acceptable diet (45). A cross-sectional study conducted in Southwestern Nigeria revealed that 9.2% received a minimum acceptable diet (46).

A study on complementary feeding practices in 80 Low- and Middle-Income Countries found that only 10.1% of these countries had prevalence rates exceeding 50% (47). Western and Central Africa reported the lowest prevalence at 9.4%, while the highest rate, 43.7%, was observed in Latin America and the Caribbean (34).

A community-based cross-sectional study conducted in the Democratic Republic of Congo, among children aged 6–23 months, revealed that 33% of infants had a minimum acceptable diet (48). A study in Kenya showed that children who received minimum acceptable care were 34.1% (49). In Ghana, one study revealed that 17% of the children received a minimum acceptable diet (50).

Different studies conducted in Ethiopia showed a low prevalence of a minimum acceptable diet among children. According to the EDHS 2016 results, the feeding practices of only 7% of children in Ethiopia aged 6-23 months meet the minimum acceptable diet (10). An Institution-based cross-sectional study conducted in the city of Addis Ababa, Ethiopia, among children revealed that 74.6% of the children aged 6-23 months met the recommended MAD (51). The other institution-based cross-sectional study carried out in North Shoa, Oromia Region, revealed that the proportion of children who received a composite indicator minimum acceptable diet was 13.3% (52).

A community-based cross-sectional study conducted in Haramaya showed that 12% of them received the minimum acceptable diet (53). Similarly, a community-based cross-sectional study in Mareka District, Southern Ethiopia, among children aged 6-23 months revealed that the proportion of children who received the minimum acceptable diet was 35.5% (20). A study conducted in Arsi Negele, Southern Ethiopia, reported that a minimum acceptable diet was 12.3 % (54).

A community-based cross-sectional study conducted in communities of Goncha district, Northwest Ethiopia, showed that only 12.6% of children aged 6–23 months received the recommended minimum acceptable diet (55). A similar study conducted in rural areas of Dembecha, Northwest Ethiopia, during the fasting season, showed that about 8.6% of infants and young children aged between 6 and 23 months received a minimum acceptable diet (39). The other community-based cross-sectional study conducted in Debre Berhan revealed that the prevalence of MAD was 31.6% (3).

2.2 Factors Associated with Minimum Acceptable Diet

2.2.1 Socio-Demographic and Economic Factors

Mothers who had a formal education are significantly associated with providing minimum acceptable diets for their children compared to mothers who had no formal education (3, 43, 52). Likewise, children whose fathers had primary education are significant predictors of receiving higher MAD practice than children whose fathers had no formal education (3, 39). The mother's occupational status was also a significant predictor of feeding a minimum acceptable diet to the child. Children who have employed mothers are positive predictors of feeding a minimum acceptable diet (34, 43). Children born to mothers involved in household

decision-making are positively associated with receiving MAD when compared with children of mothers who are not involved in decision-making (39).

Children born to mothers with a high wealth index are significantly associated to receive the recommended minimum acceptable diet than children born from mothers with a low wealth index (55). Among 623-month-old children, having more than five household members had lower odds of meeting the MAD compared to those with five or fewer household members (44).

Children born in the first to fourth orders are negatively associated with receiving a MAD when compared with children born in the above fourth order (39). Children having mothers with more than three children are significantly associated with meet the MAD than children having mothers with three or fewer children (44).

2.2.3 Maternal Health Service-Related Factors

Mothers who attained four or above ANC have a positive relationship to providing MAD to their children (3, 48). Similarly, children born in a health facility are significantly associated with receive a minimum acceptable diet than those who are born at home (20, 39, 55).

Mothers/caregivers who had postnatal care visits are more likely to provide MAD to their children than those who did not visit (43, 48, 52). Mothers who have good knowledge about child feeding practice are more likely to practice a MAD compared to mothers with poor knowledge (39, 52).

2.2.4 Child Health Services-Related Factors

According to reports from WHO, breastfeeding practices (early initiation and continued breastfeeding) were significantly associated with a minimum acceptable diet in infants aged from 6- 23 months of age (56).

Moreover, the Introduction of complementary foods at 6 months is critical to ensuring an adequate minimum acceptable diet (57). Likewise, micronutrient supplementation (Zinc, Iron, and Vitamin A), and vaccination also had their contribution a MAD (58).

According to a cross-sectional study done in Malaysia, diarrhea and infectious diseases were significantly associated with MAD (59). Children in the age range of 12-23 months are more likely to meet the MAD than children aged 6-11 months (20, 41, 44).

2.3. Conceptual Framework

This conceptual framework of minimum acceptable diet among 6-23-month infants in Nekemte town, Western Oromia, Ethiopia was developed by reviewing various articles (1, 3, 14, 19, 21, 23, 24, 33, 34, 38, 40, 52, 56, 59).

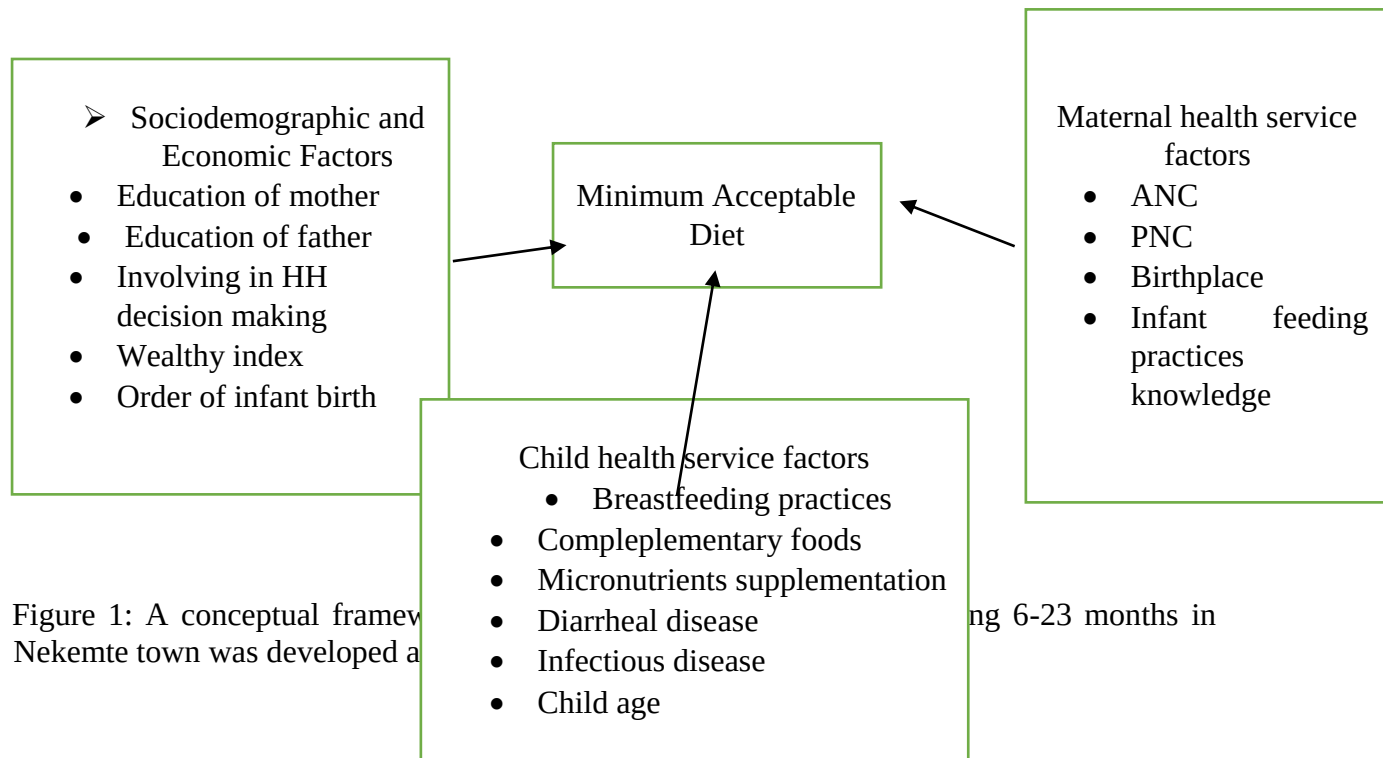


Figure 1: A conceptual framework of minimum acceptable diet among 6-23 months in Nekemte town was developed a

3. Objective of the Study

3.1. General Objective

To assess the prevalence and associated factors of MAD among children aged 6–23 months in Nekemte town, Western Oromia, Ethiopia, in 2025.

3.2. Specific Objective

To determine the prevalence of MAD among children 6-23 months in Nekemte town, Western Oromia, Ethiopia, in 2025.

To identify factors associated with the MAD among children 6-23 months in Nekemte town, Western Oromia, Ethiopia, 2025.

4. Methods and materials

4.1. Study Area, design and Period

The cross-sectional study was conducted in Nekemte Town, East Wallaga Zone, Western Oromia, Ethiopia, from March 31 to April 30, 2025. The town is 331km west of the capital city, Addis Ababa. There are 65,458 households and a total population of 335,628, of whom 175,002 are males and 160,626 are females, 5,818 (under one year), 20,930 (under five years), and 9,420 (pregnant women). It is administratively subdivided into seven administrative kebele, namely Darge (5740 households and 669 <1year child), Kesso (598 households and 623 <1year child), Beke Jama (4186 households, 806 <1year child), Sarga (946 households, 504 <1year child), Bekenisa Kesso (43193 households, 1648 <1year child), Chalalaki (5571 households, 859 <1year child), and Burka Jato (5224 households, 709 <1year child) (11). The roads cross the city in four directions: Addis Ababa to the East, Asosa to the West, Jimma to the South, and Bure to the North.

4.2. Populations

4.2.1 Source population

All mothers/caretakers with children aged 6-23 months in Nekemte Town.

4.2.2 Study population

Mothers/caretakers with children aged 6-23 months in randomly selected Kebeles

4.3. Eligibility criteria

4.3.1. Inclusion criteria

Mothers/caretakers with children aged 6-23 months who were residents in the selected kebele for at least 6 months

4.3.2 Exclusion criteria

The infants who were exclusively breastfed (beyond 6 months) or still not consuming any solid foods.

4.4 Variables

4.4.1. Dependent variable

Minimum acceptable diet

4.4.2. Independent variable

➤ **Socio-demographic and economic factors:** Maternal education, paternal education, maternal occupation, household decision-making, wealth index, and order of birth.

➤ **Maternal-related factors:** ANC follow-up, place of delivery, PNC follow-up, maternal

Knowledge of child feeding practice.

➤ **Child health-related characteristics:** breastfeeding practices, complementary foods, diarrheal disease, infectious diseases

4.5. Operational definition

Household wealth index: A proxy measure of living standards derived from information on ownership of available assets and household characteristics, and households are classified into five categories (30).

Minimum acceptable diet: The percentage of breastfed children 6-23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day, and non-breastfed children 6-23 months of age who received at least two milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day (48).

Minimum diversity diet: Percentage of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day (20).

Minimum meal frequency: Is the child receiving solid, semi-solid, or soft foods (but also includes milk for non-breastfed children) a minimum number of times or more over the previous day? The minimum number of times is 2 times for breastfed infants 6-8 months, 3 times for breastfed children 9-23 months, and 4 times for non-breastfed children 6-23 months in the last 24 hours (52).

4.6. Sample size determination and sampling procedure

4.6.1 Sample size determination

The sample size is calculated using a single population proportion estimation formula. Considering a precision (d) of 3%, a confidence level of 95% ($z = 1.96$), and an expected prevalence of an acceptable minimum diet of 13% (60). $n = Z^2 (\alpha/2)^2 * P (1-P) / d^2$, n = the required sample size. $n = 482$. Considering the 10% non-response rate, the final sample size was 530.

4.6.2 Sampling procedure

Systematic random sampling was used to select the study subjects in the community. Out of 7 kebeles in the town, 60% of them (4 kebeles such as Bekenisa Kesso, Darge, Burka Jato, and Beke Jama) are selected by the lottery method. As households are sampling units, the sampling interval was obtained by dividing the total number of households by the sample size. The sampling interval (k) for each kebele was determined using the formula $k = N_i / n_i$,

yielding approximately 7 in all kebeles. The first household was randomly selected within the interval of ten using the lottery method. Then, a bottle was tossed in the middle of each kebele after deciding to follow the head of the bottle. Then, the households are counted in the direction of the head of the household to identify the first household. After that, the next households are selected by adding the interval. If there is no eligible person within the selected household, the immediate next household is visited, and this will continue until the whole sample size is fulfilled.

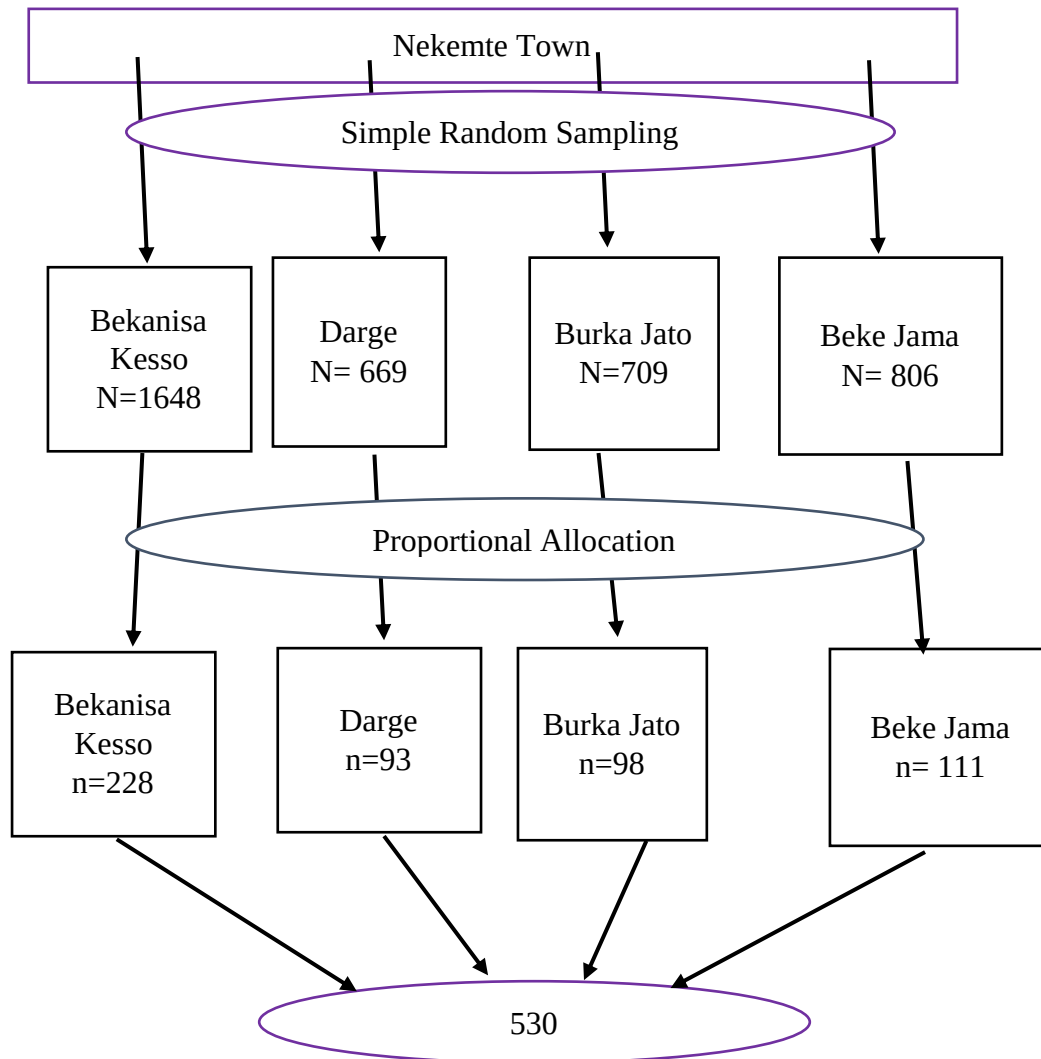


Figure 2: The Sampling Procedure of MAD and associated factors among 6-23 months of infants in Nekemte town, 2025.

4.7 Data Collection Procedure

A structured questionnaire was used and prepared for face-to-face interviews to collect data from the study participants. The questionnaire was contain all the variables included in this study. The structured interview questionnaire was adapted from WHO IYCF indicators and

other related scholars to the specific settings, considering the objective of the study. The data collection tool was a structured interview questionnaire that had factors for a minimum acceptable diet. The data collection procedure was started by identifying the study subjects and selecting randomly who was included in the study. The data collection was conducted by using the 24-hour recall method in the community with mothers or caregivers. All participants who fulfilled the criteria participated. Then, oral informed consent was obtained. The questionnaire was modified according to the study variables included and the specific context. The questionnaire was prepared in English first and then translated into Afan Oromo by experts who work in this area before data collection.

The data collectors were health extension workers who had previous data collection experience in healthcare program areas. Before the data collection, the principal investigators will give basic training about the questionnaire. Therefore, all data collectors was know about the objectives of the study, the data collection approach, the discipline needed during data collection, and other important issues related to the problem.

The health extension workers were recruited by the supervisor purposely. A nurse who had MSc degree was a supervisor. These data collectors were familiar with the overall information needed, the purpose of this research, and as a supervisor, I was to guide the data collectors about the time of collection, how to manage the study subjects during the data collection procedure, and fix the time from when the completed questionnaire was received. The principal investigator was closely follow the data collection procedure. Completed questionnaires were rechecked for completeness and consistency, starting from the beginning of the data collection, to provide feedback for the next steps of the data collection throughout the data collection time.

4.8. Data Quality Assurance

A pretest was done on 5 % of the total sample in the Arjo Awuraja to ensure that the language and contents were culturally suitable, acceptable, and understandable for the participants. Before data collection took place, necessary corrections were made to the questionnaire to ensure quality. During data collection, double-checking the questionnaires was employed by the principal investigator. A one-day training was conducted for all research team members on data collection methods, tool pretesting, and reflection. The contents of the training was include privacy assurance, confidentiality, interview techniques, and reviews of the study protocol and questionnaire. Cronbach's alpha (0.98) was checked for reliability, and face validity was checked by experts in the field.

4.9 Data Management and Analysis

The data was entered in Epi INFO version 7 and transferred into a statistical package for social sciences (SPSS) Version 25. The data was cleaned and analyzed using SPSS version 25. The frequency distribution table was used to show the distribution of variables. Percentages and tables were used to describe the results of the study. Bivariable and multivariable logistic regression analyses were used to examine the relationship between a minimum acceptable diet and associated factors. Variables that had a P value less than 0.25 in the bivariable model were entered into the multivariable regression model. Finally, $P < 0.05$ was considered statistically significant. Different factors are regressed with minimum acceptable diet as the dependent variable to isolate their independent predictors. Model fitness was checked using the Hosmer-Lemeshow test at $P > 0.05$. Multicollinearity was checked using the standard error ≥ 2.0 . The results were presented using adjusted Odds Ratios and 95% confidence intervals. The reliability of the questionnaire was assessed using Cronbach's alpha, which measures internal consistency among items assessing similar constructs. The computed Cronbach's alpha value was 0.84, indicating good internal reliability of the instrument.

4.10 Ethical Consideration

Ethical approval was obtained from the Institutional Review Board (IRB) of Wallaga University (WU), Institute of Health Science, Department of Pediatrics and Child Health. Formal written requests were presented to the leader of the selected kebeles to gain their consent before initiating data collection. Participants were sign a written consent form after the purpose of the study is explained to them, confirming their willingness to participate. To ensure confidentiality, personal identifiers were excluded from the questionnaires, and the collected data were securely stored to prevent unauthorized access, with only the principal investigators having access. Participants were informed that their participation was voluntary and that the data would be used solely for this study.

4.11. Dissemination of the Result

The result or report of this study was submitted and presented to the School of Nursing and Midwifery research committee of the Institute of Health Science, Wallaga University. Moreover, the result of the study will be communicated to Nekemte town. Presentations at professional, local, national, and international meetings and publication in peer-reviewed national or international journals were attempted

5. Results

5.1 Socio-demographic characteristics of the respondent

Among the 530 respondents, the majority of mothers or caregivers were aged 26–30 years (67%) and were predominantly female (95.1%). Most of the children were also female (56.6%). The leading religion among participants was Protestant (53.8%), and the dominant ethnic group was Oromo (84.9%). Nearly all respondents were married (95.7%) and had completed secondary education (Grade 9–12) (34.5%).

The most common occupation was being a housewife (47%), and the majority of households had four or fewer members (68.9%). Most families had one child under five years (81.5%), and children were most commonly aged 12–17 months (54.7%). Access to media was reported by 82.1% of mothers, and 81.5% had received information about child diets and feeding, primarily from mass media (46.2%). The most frequently reported monthly household income ranged between 3001–6000 birr (37.5%), although a majority (64.9%) indicated that their income was not sufficient to meet household needs.

Table 1: Sociodemographic characteristics of children from 6-23 months in Nekemte town, Oromia, Ethiopia, 2025.

Variables	Caterory	Frequency	Percentage
Maternal age	20-25 years	54	10.2
	26-30 years	355	67.0
	31-35 years	121	22.8
	Total	530	100.0
Sex of caregivers	Female	504	95.1
	Male	26	4.9
	Total	530	100.0
Sex of the child	Female	300	56.6
	Male	230	43.4
	Total	530	100.0
Religion	Protestant	285	53.8
	Orthodox	152	28.7
	Muslim	93	17.5
	Total	530	100.0
Ethnicity	Oromo	450	84.9
	Amhara	62	11.7
	Tigrai	18	3.4
	Total	530	100.0
Marital status	Married	507	95.7
	Single	2	.4
	Divorced	4	.8
	Widowed	17	3.2
	Total	530	100.0
Educational status	Can not read or write	54	10.2

	Grade 1-8	72	13.6
	Grade 9-12	183	34.5
	Diploma/TVET	146	27.5
	Degree and above	75	14.2
	Total	530	100.0
Occupations	House wife	249	47.0
	Gov't workers	71	13.4
	Daily labor	121	22.8
	Merchants	77	14.5
	Farmer	12	2.3
	Total	530	100.0
Household family size	≤4	365	68.9
	>4	165	31.1
	Total	530	100.0
Number of < 5 years children	One Child	432	81.5
	Two Child	98	18.5
	Total	530	100.0
Child age	6-11 Months	172	32.5
	12-17 Months	290	54.7
	18-23 Months	68	12.8
	Total	530	100.0
Family size	<4	365	68.9
	≥4	165	31.1
	Total	530	100.0
Availability of Media Sources	No	95	17.9
	Yes	435	82.1
	Total	530	100.0
Information about childhood diets and feeding	No	98	18.5
	Yes	432	81.5
	Total	530	100.0
Sources of information	Mass media	200	46.2
	Health workers	136	31.5
	Society	95	22.0
	Social Media	1	2.3
	Total	432	100.0
monthly income	≤3000	105	19.8
	3001-6000	199	37.5
	6001-9000	168	31.7
	>9001	58	10.9
	Total	530	100.0
Adequacy of monthly income	Enough	11	2.1
	Average	175	33.0
	Not Enough	344	64.9
	Total	530	100.0

5.2. Maternal and Child Service Related Characteristics

Among the 530 respondents, nearly all mothers had antenatal care (ANC) follow-up during pregnancy (97.7%), with the majority attending four or more contacts (67.6%). Most births occurred in health facilities (94%), while postnatal care (PNC) service utilization was

relatively low (29.1%); among those who received PNC, more than half accessed it within 1–2 days (53.2%). Pre-lacteal feeding was not practiced by most mothers (90.9%), and a large proportion initiated breastfeeding within one hour of birth (70.4%). Bottle feeding was widely practiced (79.1%). All children were vaccinated, with 47.9% currently on schedule and 42.8% fully vaccinated. Regarding Vitamin A supplementation, 75.3% of children received it after six months of age. In the two weeks preceding the survey, 29.8% of children had been sick, with fever (42.4%) being the most commonly reported illness

Table 2: Maternal and Child Service-Related Characteristics of Children from 6 to 23 Months in Nekemte Town, Oromia, Ethiopia, 2025.

Variables	Category	Frequency	Percentage
ANC follow-up	No	12	2.3
	Yes	518	97.7
	Total	530	100.0
How many times has ANC follow-up	1-3 contacts	168	32.4
	≥4 Contacts	350	67.6
	Total	518	100.0
Place of birth	Health facility	498	94.0
	Home	32	6.0
	Total	530	100.0
PNC service	No	376	70.9
	Yes	154	29.1
	Total	530	100.0
When do you get the PNC service	Within 1-2 days	82	53.2
	Within 3-6 days	55	35.7
	After 7 days	17	11.1
	Total	154	100.0
pre-lacteal feeding	No	482	90.9
	Yes	48	9.1
	Total	530	100.0
breastfeeding	Within 1 hr	373	70.4
	After 1 hr	127	24.0
	Not breastfeeding	30	5.7
	Total	530	100.0
bottle for feeding	No	111	20.9
	Yes	419	79.1
	Total	530	100.0
Vaccination	Yes	530	100.0
Vaccination status of the child	Currently	254	47.9
	Fully vaccinated	227	42.8
	Defaulter	49	9.2
	Total	530	100.0
Vit A since age 6 months	No	131	24.7
	Yes	399	75.3
	Total	530	100.0
Was the child sick	No	372	70.2

in the last two weeks	Yes	158	29.8
	Total	530	100.0
What is his/her illness	Fever	67	42.4
	Vomiting	41	25.9
	Cough	44	27.8
	Constipation	6	3.8
	Total	158	100.0

5.3. Minimum Dietary Diversity, Minimum Meal Frequency, and Minimum Acceptable Diet

Among the 530 children, the vast majority were breastfed (94.3%) and consumed staple foods such as grains, roots, or tubers (79.2%). Most children also consumed legumes and nuts (78.1%), dairy products (76.0%), vitamin A–rich fruits and vegetables such as oranges and bananas (75.5%), and other vegetables like kale and cabbage (77.0%). More than half (54.0%) had access to flesh foods like meat, fish, or organ meat, and 62.5% ate eggs. Regarding dietary diversity, 75.5% of children met the minimum dietary diversity requirement. In terms of feeding frequency, over half (51.1%) ate more than four times per day, and 85.5% reached the minimum meal frequency. Overall, 62.5% (95% CI: 58.5%, 66.6%) of the children met the minimum acceptable diet standard.

Table 3: Minimum Dietary Diversity, Minimum Meal Frequency, and Minimum Acceptable Diet of children in Nekemte Town, Oromia, Ethiopia, 2025.

Types of dietary diversity	Category	Frequency	Percentage
Breast milk	No	30	5.7
	Yes	500	94.3
	Total	530	100.0
Grains, roots, and tubers/staple source of food: Gruels/bread/rice/other carbs	No	110	20.8
	Yes	420	79.2
	Total	530	100.0
Legumes and nuts are a source of food. Peas/beans (dried, pureed, flour)	No	116	21.9
	Yes	414	78.1
	Total	530	100.0
Dairy products	No	127	24.0
	Yes	403	76.0
	Total	530	100.0
Flesh foods such as meat, fish, chicken (organ food, liver, kidney, etc.	No	244	46.0
	Yes	286	54.0
	Total	530	100.0
Eggs	No	199	37.5
	Yes	331	62.5
	Total	530	100.0
Vitamin-A rich fruits and vegetables, non-dark/yellowish/ sources like orange, banana	No	130	24.5
	Yes	400	75.5
	Total	530	100.0

Other fruits and vegetables like kale, cabbage, salad, etc	No	122	23.0
	Yes	408	77.0
	Total	530	100.0
Minimum dietary diversity	Not achieved	130	24.5
	Achieved	400	75.5
	Total	530	100.0
How many times did your child eat solid, semi-solid, or soft foods	2x per day	118	22.3
	3x per day	141	26.6
	>4x per day	271	51.1
	Total	530	100.0
Minimum meal frequency	Not achieved	77	14.5
	Achieved	453	85.5
	Total	530	100.0
Minimum Acceptable Diet	Not achieved	199	37.5
	Achieved	331	62.5
	Total	530	100.0

5.4 Bi-Variable and Multi-Variable Logistic Regression Analysis

5.4.1 Bi-variable logistic regression analysis results

To select candidate variables, bi-variable logistic regression was conducted. From all variables, maternal/caregiver's age, marital status, occupation of mother/caregiver, family size, child age, information about childhood diets and feeding, family income, educational status of mother/caregiver, ANC follow-up, PNC care, Pre-lacteal feeding, breastfeeding, bottle feeding, vitamin A after 6 months, and history of child illness in the past 2 weeks were considered candidate variables for multivariable logistic regression since their p-value was <0.25.

Table 4: Bi-variable logistic regression analysis results of MAD among children from 6-23 months in Nekemte Town, Oromia, Ethiopia, 2025.

Variables	Category	MAD		COR(95%CI)	p-value
		Not achieved	Achieved		
Maternal/caregiver age	20-25 years	25	29	1	0.174*
	26-30 years	130	225	1.492(0.838, 2.656)	
	31-35 years	44	77	1.509(0.787, 2.892)	
Maternal/caregiver sex	Female	189	315	1	0.921
	Male	10	16	1.042(0.463, 2.343)	
Marital status	Married	185	322	2.176(0.844, 5.609)	0.108*
	Divorced	4	1	0.313(0.029, 3.378)	
	Widowed	10	8	1	
Occupation of mother/caregiver	House wife	64	180	1	< 0.001*
	Gov't workers	16	55	1.222(0.654, 2.285)	
	Daily labor	74	45	0.216(0.135, 0.345)	
	Merchants	40	37	0.329(0.194, 0.559)	

	Farmer	5	14	0.996(0.345, 2.874)	0.129*
Family size	<4	126	239	1	0.033*
	≥4	73	92	0.664(0.456, 0.967)	
Number of <5 child	1	165	267	1	
	2	34	64	1.163(0.735, 1.841)	0.518
Child age	6-11 Months	58	114	1	0.491
	12-17 Months	107	183	0.870(0.586, 1.293)	
	18-23 Months	34	34	0.509(0.287, 0.900)	0.020*
Media source in the household	No	34	61	1	0.696
	Yes	165	270	0.912(0.575, 1.448)	
Information about childhood diets and feeding	No	46	52	1	0.001*
	Yes	285	147	0.456(0.293, 0.711)	
Family income	≤3000	26	79	1	
	3001-6000	86	113	0.432(0.256, 0.731)	0.002*
	6001-9000	59	109	0.608(0.353, 1.048)	0.073*
	>9001	28	30	0.353(0.179, 0.696)	0.003*
Sex of child	Female	109	191	1	0.510
	Male	90	140	0.888(0.623, 1.265)	
Educational status of mother/caregiver	Can not read and write	12	42	1	
	Grade 1-8	41	31	0.216(0.098, 0.478)	<0.001*
	Grade 9-12	75	108	0.411(0.203, 0.833)	0.014*
	Diploma/TVET	45	101	0.641(0.309, 1.333)	0.234*
	Degree and above	26	49	0.538(0.242, 1.197)	0.129*
ANC follow-up	No	2	10	1	0.151*
	Yes	197	321	0.326(0.071, 1.503)	
Place of delivery	Health facility	188	310	0.864(0.407, 1.832)	0.702
	Home	11	21	1	
PNC care	No	130	246	1	
	Yes	69	85	0.651(0.444, 0.954)	0.028*
Pre-lacteal feeding	No	188	294	1	0.031*
	Yes	11	37	2.151(1.071, 4.321)	
Breastfeeding	Within 1 hr	126	247	1	
	After 1 hr	60	67	0.570(0.378, 0.858)	0.007*
	Not breastfeeding	13	17	0.667(0.314, 1.417)	0.292
Bottle feeding	No	12	99	1	<0.001*
	Yes	187	232	0.150(0.080, 0.282)	
Vaccine status of child	Currently	108	146	0.856(0.458, 1.601)	0.627
	Fully vaccinated	72	155	1.363(0.720, 2.583)	0.342
	Defaulter	19	30	1	
Vitamin A after 6 months	No	55	76	1	
	Yes	144	255	1.282(0.857, 1.917)	0.227*
Sick in the past 2 weeks	No	153	219	1	0.009*
	Yes	46	112	1.701(1.140, 2.539)	

5.4.2 Multivariable logistic regression analysis results

The multivariable logistic regression analysis identified several variables significantly linked to achieving the outcome. Maternal occupation was a strong predictor: compared to housewives, mothers employed by the government had higher odds of meeting the MAD (AOR = 4.281; 95% CI: 1.625–11.281; $p = 0.003$), while daily laborers (AOR = 0.203; 95% CI: 0.114–0.361; $p < 0.001$) and merchants (AOR = 0.280; 95% CI: 0.138–0.570; $p < 0.001$) had significantly lower odds. Family size of four or more was positively associated with the MAD (AOR = 2.055; 95% CI: 1.238–3.409; $p = 0.005$), and caregivers who received information about child diets and feeding were more likely to achieve MAD (AOR = 2.053; 95% CI: 1.172–3.598; $p = 0.012$). Family income displayed a significant association compared to income of ≤ 3000 , households earning 3001–6000 (AOR = 0.194; 95% CI: 0.097–0.386; $p < 0.001$), 6001–9000 (AOR = 0.332; 95% CI: 0.164–0.694; $p = 0.002$), and over 9001 (AOR = 0.223; 95% CI: 0.095–0.522; $p < 0.001$) had significantly better outcomes. Maternal education also influenced the results: grades 1–8 (AOR = 0.276; 95% CI: 0.103–0.740; $p = 0.011$) and a degree or higher (AOR = 0.309; 95% CI: 0.103–0.928; $p = 0.036$) were significantly associated with increased achievement compared to those who could not read or write. Postnatal care follow-up was positively linked (AOR = 0.588; 95% CI: 0.351–0.985; $p = 0.040$), whereas bottle feeding showed a negative association (AOR = 0.172; 95% CI: 0.084–0.356; $p < 0.001$). Additionally, children who were ill in the past two weeks were more likely to miss the outcome (AOR = 2.364; 95% CI: 1.139–3.172; $p = 0.004$).

Table 5: Multivariable logistic regression analysis results of MAD among children from 6-23 months in Nekemte Town, Oromia, Ethiopia, 2025.

Variables	Category	MAD		COR(95%CI)	AOR(95%CI)	p-value
		Not achieved	Achieved			
Maternal/caregiver age	20-25 years	25	29	1	1	0.469
	26-30 years	130	225	1.492(0.84, 2.66)	1.342(0.64, 2.98)	
	31-35 years	44	77	1.509(0.79, 2.89)	0.581(0.23, 1.48)	
Marital status	Married	185	322	2.176(0.84, 5.61)	1.825(0.55, 6.03)	0.324
	Divorced	4	1	0.313(0.03, 3.38)	0.238(0.02, 3.34)	0.287
	Widowed	10	8	1	1	
Occupation of mother/caregiver	House wife	64	180	1	1	0.003*
	Gov't workers	16	55	1.222(0.65, 2.29)	4.281(1.63, 11.28)	
	Daily labor	74	45	0.216(0.14, 0.35)	0.203(0.11, 0.36)	
	Merchants	40	37	0.329(0.20, 0.56)	0.280(0.14, 0.57)	
	Farmer	5	14	0.996(0.35, 2.87)	3.147(0.86, 11.58)	
Family size	<4	126	239	1	1	

	≥4	73	92	0.664(0.46, 0.97)	2.055(1.24, 3.41)	0.005*
Child age	6-11 Months	58	114	1	1	0.333
	12-17 Months	107	183	0.870(0.59, 1.29)	1.324(0.75, 2.34)	
	18-23 Months	34	34	0.509(0.29, 0.90)	0.938(0.42, 2.65)	
Information on diets and feeding a child	No	46	52	1	1	0.012*
	Yes	285	147	0.456(0.29, 0.71)	2.053(1.17, 3.60)	
Family income	≤3000	26	79	1	1	<0.001*
	3001-6000	86	113	0.43(0.26, 0.73)	0.19(0.10, 0.39)	
	6001-9000	59	109	0.61(0.353, 1.048)	0.33(0.164, 0.69)	
	>9001	28	30	0.35(0.179, 0.696)	0.22(0.10, 0.52)	
Educational status of mother/caregiver	Can not read or write	12	42	1	1	0.011*
	Grade 1-8	41	31	0.25(0.10, 0.48)	0.28(0.10, 0.74)	
	Grade 9-12	75	108	0.41(0.20, 0.83)	0.83(0.46, 2.72)	
	Diploma/TVE T	45	101	0.64(0.31, 1.33)	1.12(0.31, 1.83)	
	Degree and above	26	49	0.54(0.24, 1.20)	0.40(0.10, 0.93)	
ANC follow-up	No	2	10	1	1	0.896
	Yes	197	321	0.33(0.07, 1.503)	0.88(0.13, 5.94)	
PNC care	No	130	246	1	1	0.040*
	Yes	69	85	0.65(0.44, 0.95)	0.59(0.35, 0.99)	
Pre-lacteal feeding	No	188	294	1	1	0.169
	Yes	11	37	2.151(1.07, 4.321)	1.89(0.76, 4.67)	
Breastfeeding	Within 1 hr	126	247	1	1	0.890
	After 1 hr	60	67	0.57(0.38, 0.86)	0.96(0.51, 1.80)	
	Not breastfeeding	13	17	0.67(0.31, 1.42)	1.78(0.39, 8.14)	
Bottle feeding	No	12	99	1	1	<0.001*
	Yes	187	232	0.15(0.08, 0.28)	0.17(0.08, 0.36)	
Vitamin A after 6 months	No	55	76	1	1	0.065
	Yes	144	255	1.28(0.86, 1.92)	1.692(0.97, 2.96)	
Sick in the past 2 weeks	No	153	219	1	1	0.004*
	Yes	46	112	1.70(1.14, 2.40)	2.36(1.14, 3.17)	

6. Discussion

The aim of this study was to assess the magnitude and associated factors of MAD among 6-23 children in Nekemte town, East Wallaga, Oromia, Ethiopia.

This study found that 62.5% of children aged 6–23 months received a diet that met the minimum acceptable diet standards. This finding aligns with studies conducted in China (41), Indonesia(42), Nepal (43), and Kenya (49). While the contexts differ significantly, for example, China has higher levels of maternal education and broader access to healthcare services, Ethiopia's recent community-based nutrition interventions and the Health Extension Program may have contributed to similar outcomes. Thus, although the prevalence appears aligned, the underlying determinants may differ across countries. In contrast, the proportion of children receiving the minimum acceptable diet in this study was higher than that reported in studies conducted in the Philippines (44), Ghana (50), and Nigeria (46). Several factors may explain these differences. In the Philippines, persistent poverty and regional disparities in access to diverse foods have been identified as barriers to adequate infant feeding, particularly in rural communities. In Ghana, studies have linked low maternal literacy and limited decision-making power among women to suboptimal infant and young child feeding practices. Similarly, in Nigeria, cultural preferences for staple-based diets and inadequate awareness of dietary diversity recommendations contribute to lower adherence to the minimum acceptable diet. By comparison, Ethiopia has, in recent years, expanded its Health Extension Program and implemented community-based nutrition strategies that emphasize maternal counseling and infant feeding education. These efforts may have contributed to the relatively higher proportion of children in this study receiving a minimum acceptable diet, despite economic challenges comparable to those in other low- and middle-income countries. This study found that higher family income was associated with an increased likelihood of meeting the minimum acceptable diet, which aligns with findings from other studies, such as those in India (27), Australia (61), Senegal (62), and Ethiopia (63). This may be because families with higher incomes can afford a more diverse and nutritious diet, have improved access to health and nutrition information, and are more likely to meet their children's dietary needs due to reduced financial constraints (64).

Moreover, postnatal care decreases the odds of a minimum acceptable diet when compared with a child who has no postnatal care. This finding was supported by studies done in India (27), Ghana (65), and Ethiopia (66-68). Postnatal care provides an opportunity for health

professionals to educate mothers on infant and young child feeding practices, including the importance of dietary diversity and meal frequency. Mothers who attend postnatal care are more likely to receive counseling on child nutrition, breastfeeding, and complementary feeding, which can lead to improved feeding practices and higher chances of meeting the minimum acceptable diet (69).

This study revealed a significant association between maternal occupation and the likelihood of achieving a minimum acceptable diet for children. These findings are in line with studies conducted in Addis Ababa (66). Mothers who were government employees were less likely to achieve MAD compared to housewives, possibly due to long working hours, limited time for meal preparation, or reduced involvement in daily child feeding. Conversely, mothers working as daily laborers and merchants were more likely to achieve MAD, potentially because of greater flexibility in time management, direct involvement in food purchasing, or better access to a variety of food items through market interactions.

Moreover, having a family size greater than four was associated with higher odds of achieving a minimum acceptable diet (MAD) compared to families with fewer than four members. This finding is consistent with studies conducted in Sub-Saharan Africa (63). A possible explanation is that larger households may have more adults contributing to income generation, increased food purchasing capacity, or older siblings assisting in child feeding and care.

Additionally, having information on children's diet and feeding practices increased the likelihood of achieving a minimum acceptable diet compared to mothers without such information. This finding is supported by studies conducted in Sub-Saharan Africa (63), Northwest Ethiopia (67), and East Gojjam (70). Access to appropriate feeding knowledge may improve dietary diversity, meal frequency, and responsiveness to children's nutritional needs.

Moreover, bottle feeding was associated with reduced odds of achieving a minimum acceptable diet compared to children who were not bottle-fed. This may be due to the tendency for bottle-fed children to receive less diverse complementary foods, increased risk

of infections from poor bottle hygiene, or a reliance on milk/formula that displaces other nutrient-rich foods.

Besides, children who had been sick in the past two weeks had lower odds of achieving a minimum acceptable diet (MAD) compared to their healthy counterparts. This finding is consistent with a study conducted in Debre Birhan town. Illness can reduce appetite, limit food intake, and impair nutrient absorption, while caregivers may also restrict certain foods during a child's illness (71).

7. Conclusion and Recommendation

7.1 Conclusion

The study found that 62.5% of children aged 6–23 months met the MAD criteria, indicating *moderate compliance* compared to the mini EDHS national average of approximately 11%. Although this proportion is higher than the national figure, it still reflects suboptimal feeding practices that require continued attention to ensure all children receive nutritionally adequate diets.

Key determinants of achieving MAD included maternal occupation, maternal education, household income, family size, access to information on child feeding, postnatal care (PNC) follow-up, bottle feeding practices, and recent child illness. These findings emphasize that both socioeconomic and behavioral factors influence young children's dietary adequacy.

7.2 Recommendations

Health Professionals and Community Health Workers

- Strengthen maternal education and counseling programs focused on complementary feeding, dietary diversity, and proper meal frequency.
- Utilize PNC visits and home visits as platforms for providing tailored nutrition counseling and support.
- Monitor and follow up with families, particularly in low-resource or high-risk communities, to reinforce recommended feeding practices.

Employers and Workplace Planners

- Develop workplace support initiatives to assist employed mothers in providing adequate child feeding despite time constraints, such as flexible working hours or on-site childcare facilities.

Government and Policy Makers

- Implement policies and programs to improve household food security, including increasing family income and access to diverse, nutritious foods.
- Promote and expand community-based nutrition interventions that target mothers and caregivers with practical feeding guidance.
- Support campaigns that encourage postnatal care attendance as a routine platform for child nutrition education.

Mothers and Caregivers

- Participate in postnatal care visits to receive counseling on infant and young child feeding practices.

- Ensure dietary diversity and appropriate meal frequency for children aged 6–23 months.
- Maintain adequate nutrition during and after a child’s illness to support continued growth and recovery.
- Apply guidance received through community programs or health extension services to improve feeding practices.

8.Strengths and Limitations of the Study

8.1 Strengths of the study

First, it included a large, community-based sample of 530 mother–child pairs, which enhances the representativeness of the findings and provides reliable estimates of the prevalence of minimum acceptable diet (MAD) among children aged 6–23 months in the study area. Second, the study collected comprehensive data on socio-demographic characteristics, maternal and child health service utilization, and feeding practices, allowing for a thorough analysis of factors associated with MAD. Third, the study used standardized WHO guidelines to assess dietary diversity, meal frequency, and MAD, ensuring that the results are comparable to other studies and aligned with international standards. Finally, identifying modifiable factors such as maternal education, occupation, access to feeding information, and postnatal care offers practical guidance for public health interventions and nutrition programs.

8.2 Limitations of the Study

Recall bias is another limitation, as mothers/caregivers were asked to report feeding practices and child illnesses over the past two weeks, which may have affected the accuracy of the data. Social desirability bias may have also influenced responses, with participants potentially over-reporting recommended feeding practices or health service utilization. Additionally, some important factors, such as socio-cultural influences, food availability, seasonal variations, and detailed household food security measures, were not fully assessed, which may have affected feeding practices. Finally, while the study is community-based, its findings may have limited generalizability to other regions with different cultural, economic, or environmental contexts.

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10. Annexes

Annex I: English version of the Information sheet and consent form

Wallaga University

School of Nursing and Midwifery

Department of pediatrics and Child health

Annex I: Information sheet and informed consent

Title of the project: Minimum acceptable diet and associated factors among children aged 6-23 months in Nekemte town.

Name of investigator: Almaz Seboka

The information sheet and consent form are prepared by the investigator to explain the research project that you are asked to join by the group of research investigators. The main aim of this research project is to assess the Minimum acceptable diet and associated factors among children aged 6-23 months in Nekemte town. Decisions on your involvement were made by you and only you.

Purpose: The main aim of this study is to assess the Minimum acceptable diet and associated factors among children aged 6-23 months in Nekemte town and recommend possible interventions based on the findings.

Procedure: To assess the Minimum Acceptable Diet and associated factors among children aged 6-23 months, you are invited to participate in the project. If you are willing to participate in this project, you need to understand and sign the agreement form. Then you were requested to give a response to some questions that will take a few minutes (about 30 minutes).

All the responses given by you were kept confidential by using a coding system whereby no one would have access to your response.

Risk:

By participating in this study you may feel that it has some discomfort especially on wasting your time (20-30 mints) to respond questions but this may not be too much as you are one of the member of the communities, your response will help as important input to assess Minimum acceptable diet and associated factors among children aged 6-23 months.

However, there is no physical or psychological risk expected to be involved in the study.

Benefits: If you participate in this study, you may not gain direct benefit, but your participation will help us to assess the minimum acceptable diet and associated risk factors and to take measures based on the findings.

Confidentiality: Information about you was collected without your name, but a code number assigned to it was stored in a file and kept locked. Your personal information will only be used for the study. Your responses were aggregated to yield summary data, but your responses will not be reported.

Participation: You have to know that your participation is largely based on your willingness and approval. There are questions to be answered by you. You are expected to answer all of the questions, but you have the right to say “no” and not participate in the study (you can choose not to respond to some or all of the questions). You also have the full right to withdraw from this study at any time you wish without losing any of your rights and without any penalty.

Are you willing to participate in the study?

Yes No

Annex II. English version of the questionnaire

PART I INFORMATION ABOUT SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF MOTHERS HAVING CHILDREN AGED 6–23 MONTHS IN NEKEMTE TOWN.

S.No	Questions	Possible answers	Skip pattern
1	How old are you?	_____ Years	
2	Sex?	1. Male 2. Female	
3	What is your religion?	1. Protestant 2. Orthodox 3. Muslim 4. Others	
4	What is your Ethnicity?	1. Oromo 2. Amhara 3. Tigriy 4. Others	
5	What is your current marital status?	1. Unmarried 2. Married 3. Divorced 4. Windowed 5. Separated	
6	Where is your residence?	1. Urban 2. Rural	
7	What is your education? Status?	1. Illiterate 2. Elementary 3. Secondary 4. TVET 5. Higher education	
8	What is your current occupation?	1. housewife 2. Office worker 3. Daily laborer 4. Merchant 5. Farmer 6. Others	
10	Household family size	1. <4 2. ≥4	

11	Number of < 5 years children	1. < 2 2. $\geq$ 2	
12	Child age (in months)	1. 6–11 months 2. 12–17 months 3. 18–23 months	
13	Availability of Media sources at the household	1. Yes 2. No	
14	Exposure to available media sources	1. Yes 2. No	

15	Available farmland	1. Yes 2. No	
16	Cultivating vegetables	1. Yes 2. No	
17	Available livestock	1. Yes 2. No	
18	Having cow milk and feeding the child	1. Yes1 2. No	
19	Mother is involved in decision-making	1. Yes 2. No	

PART II- MATERNAL AND CHILD SERVICE-RELATED FACTORS

No	Questions	Answers	Skip
1.	Did you have antenatal care follow-up during the pregnancy of the current child?	1. Yes 2. No	
2.	If the above question is yes, how many times have you used the service?	1. 1-3 2. 4+ 3. Don't know	
3.	Where did you give birth to the child?	1. Health facility 2. Home 3. Other specify....	
4.	Have you had a history of PNC service after Delivery of the current child?	1. Yes 2. No	
5.	When do you get the service after delivery?	1. Within 1-2 days 2. Within 3-6 days 3. After 7 days	
6.	Have you given pre-lacteal feeding to a child?	1. Yes 2. No	
7.	When do you start breastfeeding a child?	1. Within 1 hour 2. After 1 hour 3. Not breastfed	
8.	When did you start adding food for a child?	1. 6 months after 2. Delivery	

		3. At 6 months 4. After 6 months 5. Not started	
9.	Do you use the bottle for feeding the child?	1. Yes 2. No	
10.	Did the child ever receive vaccines?	1. Yes 2. No	
11.	What is the vaccination status of the child? Check the card	1. Up to date 2. Fully vaccinated 3. Defaulter	
12.	Does the child get Vitamin A since age 6 months?	1. Yes 2. No	
13.	Has the child been sick in the last Two weeks?	1. Yes 2. No	
14.	If yes, what is his/her illness?	1. Fever 2. Diarrhea 3. Cough 4. Other specify-----	

PART III Dietary diversity and meal frequency-related questions

Next, I will ask you Yesterday/within 24 hrs. /, during the day or at night, did the child receive any of the following foods?

No	Question	Possible answer	Skip
1.	Breast milk	1. yes 2. No	
2.	Grains, roots, and tubers are/staple source of food Gruels/bread/rice/other carbs	1. Yes 2. No	
3.	Legumes and nuts source of food. Peas/beans (dried, pureed, flour)	1. Yes 2. No	
4.	Dairy products	1. Yes 2. No	
5.	Flesh foods such as meat, fish, chicken (organ food liver, kidney, etc.	1. Yes 2. No	
6.	Eggs	1. Yes 2. No	
7.	Vitamin-A rich fruits and vegetables, Non-dark/yellowish/ sources like orange, banana, etc.	1. Yes 2. No	
8.	Other fruits and vegetables like kale, cabbage, salad, etc.	1. Yes 2. No	

Now I would like to ask you the Number of feeds for your child in the last 24 hours.

9.	How many times did your child eat solid, semi-solid, or soft foods other than liquids yesterday during the day or at night?	_____ times	
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Identification _____

Name of data collector _____ signature _____

Name of Supervisor _____ signature _____

Date of data collection ____/____/2025

Thank you for your participation!!!

Anex I: Hiikni Ingiliffa Odeeffannoo fi Foomii Hayyamaa

Yuunivarsiitii Wallaggaa

Kolleejjii Wal'ansa Fayyaa

Kutaalee Kunuunsa Daa'immanii fi Fayyaa Daa'immanii

Anex I: Galmee Odeeffannoo fi Hayyama Beeksisaa

Mata-duree Pirojeektii: Nyaata madaalawaa fi rakkoolee isa qunnaman daa'imman umrii ji'a 6-23 qaban magaalaa Naqamtee keessatti qorachuun.

Maqaa qorataa: Almaz Sebokaa

Galmeen odeeffannoo fi foomii hayyamaa qorataa qopheessuu dhaan pirojeektii qorannoo isin irratti hirmaachuuf gaafatan ibsuuf kan qophaa'eedha. Kaayyoon qorannoo kanaa nyaata madaalawaa fi rakkoolee isa qunnaman daa'imman umrii ji'a 6-23 qaban magaalaa Naqamtee keessatti qorachuu dha. Hirmaachuuf murteessuu kan danda'an atumti.

Kaayyoo: Kaayyoon qorannoo kanaa nyaata madaalawaa fi rakkoolee isa qunnaman daa'imman umrii ji'a 6-23 qaban magaalaa Naqamtee keessatti qorachuun, furmaata kennuuf karoora dhiheessuu dha.

Tarsiimoo: Daa'imman umrii ji'a 6-23 qaban irratti qorannoo geggeessuuf isin affeerreerra. Yoo pirojeektii kana keessatti hirmaachuu barbaaddan, foomii waliigaltee hubachuun mallattee gochuu qabdu. Ergasii, gaaffilee tokko tokko deebisuu akka qabdan isin gaafanna. Kunis daqiiqaa 30 ta'uu danda'a.

Deebii kennitan hundi sirriitti eegamee, naamusa eeguun kan tursiifamu yoo ta'u, lakkoofsa moggaafameen waan tursiifamuuf maqaa keessan hin hammatamu.

Rikisi: Qorannoo kana keessatti hirmaachuun keessan yeroo keessan fudhachuu danda'a (daqiiqaa 20-30) garuu baay'ee hin ulfaatu. Haa ta'u malee, rakkoo qaamaa yookaan sammuu hamaatuu kan fidu hin jiru.

Faayidaa: Hirmaachuun keessan bu'aa ifa ta'e yoo isin hin argamsiisne illee, qorannoo kana keessatti hirmaachuun keenya akka furmaanni kennamu gargaara.

Itti gaafatamummaa fi iccitii eeguu: Odeeffannoo keessan maqaa malee waan galmeeffamuuf, lakkoofsa moggaafameen eegama. Odeeffannoon keessan qorannoo kanaaf qofa kan oolu yoo ta’u, maqaa keessan ibsuu hin danda’u.

Hirmaachuu: Hirmaachuun keessan fedhii keessaniin kan murtaa’u yoo ta’u, gaaffilee qabaattaniif deebii kennuuf dirqamaa hin qabdan. Yoo barbaaddan, yeroo kamiyyuu qorannoo kana keessaa bahuu ni dandeessu. Kunis mirga keessan hin dhabu.

Qorannoo kana keessatti hirmaachuu barbaaddaa?

Eeyyee Lakki

Kutaa I: Odeeffannoo Dhimma Haala Hawaasummaa fi Dinagdee

Lakk 1.	Gaaffii	Deebii
1.	Umuriin keessan meeqa?	_____
2.	Saala?	1. Dhiira / 2. Dubartii
3.	Amantii keessan maali?	1. Pirotestaantii / 2. Ortodoksii / 3. Musliimaa / 4. Kan biro
4.	Saba keessan maali?	1. Oromoo / 2. Amaaraa / 3. Tigree / 4. Kan biro
5.	Haala heerumaa keessan?	1. Hin heerumne / 2. Heerumte-Heerume 3. Gargar ba’e / 4. Abbaa-Maatii dhabeessa / Qoodame
6.	Iddoo jiraattan?	1. Magaalaa / 2. Baadiyyaa
7.	Sadarkaa barnootaa keessan?	1. Hin baranne / 2. Mana barnootaa sad.1ffaa / 3. Sadarkaa 2ffaa / 4. TVET / 5. Barnoota ol’aanaa
8.	Ogummaa keessan maali?	1. Haadha-manaa / 2. Hojjetaa Biiroo / 3. Hojjetaa guyyaa guyyaa / 4. Daldalaa / 5. Qotee bulaa / 6. Kan biro
9.	Baay’ina maatii mana keessaa?	1. <4 /

		2. >4
10.	Baay'ina daa'imman umrii 5 gadi qaban?	1. <2 / 2. >2
11.	Umrii daa'ima (ji'oota keessa)	1. 6–11 ji'a / 2. 12–17 ji'a / 3. 18–23 ji'a
12.	Qabeenya miidiyaa maatii keessatti argamuu?	1. Eeyyee / 2. Lakki
13.	Miidiyaa jiran irra odeeffannoo argattanii jirtuu?	1. Eeyyee / 2. Lakki
14.	Qabeenya lafa qonnaa jira?	1. Eeyyee / 2. Lakki
15.	Albuuda biqiltuu qotattanii jirtuu?	1. Eeyyee / 2. Lakki
16.	Horii mana keessa jira?	1. Eeyyee / 2. Lakki
17.	Aannan horii qabdanii daa'ima tajaajilaa jirtuu?	1. Eeyyee / 2. Lakki
18.	Haati manaa murteeffama keessatti qooda qabdi?	1. Eeyyee / 2. Lakki
19.	Sadarkaa qabeenyaa maatii	1. Raadiyoo/TV / 2. Istiifoo / 3. Mootarii / 4. Bilbila harkaa / 5. Soofaa / 6. Kaarra harkaatiin harkifamu / 7. Mashiina qotisaa / 8. Matiraasii / 9. Barcuma / 10. Generaatorii

Kutaa II: Dhimma Tajaajila Fayyaa Haadholii fi Daa'immanii

Lakk	Gaaffii	Deebii
1	Tajaajila qorannoo ulfaa argattanii jirtuu?	1. Eeyyee / 2. Lakki
2	Yoo eeyyee ta'e, hangam tajaajila argattanii jirtu?	1. 1-3 / 2. 4+ / 3. Hin yaadadhu
3.	Iddoo daa'ima kana dhalchite?	1. Mana fayyaa 2. Manaa / 3. Kan biro...
4.	Erga dhalchitee booda tajaajila fayyaa argatte?	1. Eeyyee / 2. Lakki
5.	Yoo eeyyee ta'e, yeroo meeqa booda tajaajila argatte?	1. Guyyaa 1-2 keessatti / 2. Guyyaa 3-6 keessatti 3. Guyyaa 7 booda
6.	Daa'ima pre-lacteal nyaachiftee jirtaa?	1. Eeyyee / 2. Lakki
7.	Daa'ima keessan yeroo meeqa booda hama	1. Sa'aatii 1 keessatti /

	kennite?	2. Sa'aatii 1 booda / 3. Hin harmeeffanne
8.	Daa'ima keessan yeroo meeqa booda nyaata dabalatte?	1. Ji'a 6 dura / 2. Guyyaa dhalootaa booda / 3. Ji'a 6 irratti / 4. Ji'a 6 booda / 5. Hin jalqabne
9.	Dhungoo nyaachisuuf fayyadamtaa?	1. Eeyyee / 2. Lakki
10	Daa'imni keessan talaallii argatee jiraa?	1. Eeyyee / 2. Lakki
11	Sadarkaa talaallii daa'ima maal fakkaata?	1. Yeroo isaa guutuu / 2. Guutummaan talaallii argatee / 3. Talaallii addaan kutaa argatee
12	Daa'imni keessan Vitamin A argatee jiraa?	1. Eeyyee / 2. Lakki
13	Daa'imni keessan torban lama keessatti dhukkubsatee?	1. Eeyyee / 2. Lakki
14	Yoo dhukkubsate, dhukkubni isaa maali?	1. Qoricha / 2. Duffisa / 3. Haxxifannaa / 4. Kan biro

Kutaa III: Nyaata Fayyadamuu fi Akkaataa Nyaataa Daa'immanii

Kaleessa/yeroo 24 dura /, guyyaa ykn halkan keessatti, mucaan nyaata armaan gadi keessaa tokko argateeraa?"

Lakk	Gaaffii	Deebii
1.	Harma hadhaa (Breast milk)	1. Eeyyee / 2. Lakkii
2.	Qoricha muka/riisi/bread (Grains, roots, and tubers/staple food)	1. Eeyyee / 2. Lakkii
3.	Foon fi aduu (Legumes and nuts, such as peas/beans)	1. Eeyyee / 2. Lakkii
4.	Meeshaa Daayirii (Dairy products)	1. Eeyyee / 2. Lakkii
5.	Fooni fi kuccee (Flesh foods such as meat, fish, ¹ chicken)	1. Eeyyee / 2. Lakkii
6.	Aannan (Eggs)	1. Eeyyee / 2. Lakkii
7.	Faayidawwan A-V (Vitamin A-rich 1. Eeyyee / 2. Lakkii fruits/vegetables)	1. Eeyyee / 2. Lakkii
8.	Kudaree fi muduraa kan biroo (Other fruits/vegetables like kale, cabbage, salad)	1. Eeyyee / 2 2. . Lakkii

Amma immoo gaaffii, sa'aatii 24 darban keessatti daa'ima kee yeroo meeqa nyaata aakka kenniteef gaaffii jedhuttan darba

9.	Har'a guyyaa ykn halkan keessatti, mucaan kee nyaata soogidda, soogidda walitti makame, yookaan nyaata mi'aawaa dhangala'aa ta'ee osoo hin ta'in, yeroo meeqa nyaate?	_____yeroo
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Yeroo gaarii!

Guyyaa odeeffannoo walitti qabdan: ____/____/2025

Maqaa nama odeeffannoo walitti qabu: _____

Maqaa to'annaa geggeessitu: _____

Mallattoo: _____

Galatoomaa hirmaachuus keessaniif!