DIETERY DIVERSITY AND ASSIOCETED FACTORS AMONG HIGH SCHOOLS ADOLESCENT GIRLS IN KEDIDA GAMELA WOREDA, SOUTHERN, ETHIOPIA.

BY: - ASKALE LODAMO (BSc)

A THESIS RESULT SUBMITTED TO JIMMA UNIVERSITY, INSTITUTE OF HEALTH, AND FACULTY OF PUBLIC HEALTH, DEPARTMENT OF HUMAN NUTRITION AND DIETETICS FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN HUMAN NUTRITION.

AUGUST, 2022

JIMMA, ETHIOPIA

DIETERY DIVERSITY AND ASSIOCETED FACTORS AMONG HIGH SCHOOLS ADOLESCENT GIRLS IN KEDIDA GAMELA WOREDA, SOUTHERN, ETHIOPIA.

By:

ASKALE LODAMO (BSc)

ADVISORS:

1. BEYENE WONDEFRASH (MD, PH.D, ASSOCIATE PROFESSOR)

2. BEAKAL ZINAB (MSc, ASSISTANT PROFESSOR)

AUGUST, 2022

JIMMA, ETHIOPIA

Abstract

Introduction: Inadequate dietary diversity is one of public health problem among adolescent girls, especially school –going adolescent girls. There are few of studies on dietary diversity among adolescent girls' in Ethiopia, particular in Kedida Gamela woreda. Therefore, the aim of this study was to assess dietary diversity and associated factors among adolescent girls in Kedida Gamela Woreda high schools.

Objective: To assess the dietary diversity and associated factors among high schools adolescent girls in Kedida Gamela Woreda, Southern Ethiopia, 2022.

Methods: Institutional based cross-sectional study was conducted among 347 high schools adolescent girls in Kedida Gamela Woreda from May 27-June 24, 2022. Simple random sampling technique was used to select study participants. Data was collected through face-to-face interviews using a semi structured questionnaire. Epi-data version 4.6 was used to enter data, which was then exported to SPSS version 23 for analysis. In simple binary logistic regression analysis variables with $p<0.25$ was considered as a candidate for multivariable logistic regression. Variables with a p-value of<0.05 in the final model were declared statistically significant with inadequate dietary diversity.

Result: The proportion of inadequate dietary diversity was (61.4%) with [95% CI: 56.4-66.6]. Being late adolescent (AOR=**1.8** 95% CI: 1.07-3.08). Adolescents from mother with no formal education (AOR=**2.9** 95% CI: 1.36-6.46), living with more than five family members (AOR=**2.0** 95% CI: 1.16-3.65), having poor nutritional knowledge (AOR=**2.3** 95% CI: 1.39-3.79) were significantly associated with inadequate dietary diversity.

Conclusion: The magnitude of inadequate dietary diversity among adolescent girls was high. Age of adolescent, educational status of mother, family size and nutritional knowledge were factors significantly associated with inadequate dietary diversity.

Keywords: Dietary diversity, Adolescent girl, High school, Kedida Gamela, Ethiopia

Acknowledgment

First of all, I would like to thank Almighty God for giving me peace to live life, write and complete this thesis. Next I would like to express my sincere gratitude and deep regards to my advisors Dr. Beyene wondafrash and Mr. Beakal Zinab for their constant guidance and encouragement during the work of this thesis.

Next, I would like to acknowledge Jimma University, department of human nutrition and dietetics for giving me opportunity to conduct this study. Also I would like to extend thanks to Damboya health office for sponsoring my postgraduate study. I am also grateful to data collectors, supervisors, and respondents for their full commitment and support during the work of this thesis.

Last but not least, I would like to thank my family and close friends for their continuous encouragement, affection, and moral support throughout the work of this thesis

Table of Contents

Lists of Tables

List of Figure

Acronyms and Abbreviations

AOR …… Adjusted Odd Ratio

ANK…… Adolescent Nutritional Knowledge

CI ……Confidence Interval

DD ……Dietary Diversity

DDS……Dietary Diversity score

DGLV……Dark Green Leafy Vegetables

FAO …… Food and Agriculture Organization

LDDS……Low Dietary Diversity Score

LIC…… Low-Income Country

NGO…… Non-Governmental Organization

SD……. Standard Deviation

SPSS……. Statistical Package for Social Sciences

WHO……. World Health Organization

Chapter one: Introduction

1.1 Background

Adolescence is the phase of life between childhood and adulthood, from ages 10 to 19. This age is a stage of growth and development in the lifespan that needs a balanced diet of micronutrients to ensure their own healthy growth, development, sexual maturation, and the health of individual (1,2).

Adolescence girls are a very important unit of our society since they could be mothers and also plays various roles in the family and the community. In addition, adolescent girls are a timely of preparation for future childbearing and breastfeeding that needs diversified diet (3,4).

Dietary diversity is the consumption of an adequate micronutrient intake and healthy diet. Healthy growth needs a balanced diet and adequate micronutrients which includes a variety of foods from different food groups and is associated with better lives and with potential intergenerational benefits (5,6).

Nutrients gained from balanced diet are most importantly in cognition and growth for adolescents. Weight(50%), height (20%) and skeletal mass(50%) of adult are gained in during this period and 45–60% of adolescent girls are found with suboptimal dietary intake, resulting in development of varied micronutrient deficiencies and the main nutrition problems affecting adolescent populations worldwide include malnutrition, iron deficiency and anemia; iodine deficiency; Vitamin A deficiency; calcium deficiency and other specific nutrient deficiencies like zinc and foliate (7,8,9,10).

Dietary diversity assessment is advised by World Health Organization and Food and Agricultural Organization (FAO) because it is critical to know the diet quality of adolescent girls in school (11). Diet diversity especially during adolescence are critical for their cognitive, growth and development (12,13). In addition, healthy diet and food choice during adolescence are critical to full growth, improving health, potential and proper body composition (3,14).

Adolescence represents a window of opportunity to prepare nutritionally healthy food for their adult life so, early intervention is mainly important for adolescent girls whose not get diversified diets, which are determinants of academic achievement and maintain good health (15).

1.2 Statement of the Problem

There are around 1.2 billion adolescents in the world, accounting for nearly one fifth of the global population, with approximately 90% of them living in low and middle income countries, (16,17).

Globally, only 17% of adolescents had diversified diet. adolescents getting diversified diet were 23.5–50% in the Iran(10),11.2% in the Zimbabwe (18), and similarly, in Ethiopia Gurage zone 26.8% of adolescents was reported as having diversified diet (15). In other, study done in Jimma Town, South West Ethiopia 61.3% of them was having inadequate dietary diversity. Similarly study done in Addis Abeba, Woldia and Wolayita Sodo reported 43.3%,49.1% and 72.4% were getting inadequate dietary diversity respective (11,19,20,21).

Dietary consumption and food selection of adolescents are influenced by many factors ; including poor household, socioeconomic condition, and unequal intra-familial distribution of food like specific food taboos, dietary restrictions during menstruation, peer influences, food preferences, personal and cultural beliefs, mass media, and body image perception (19,22).

Adolescents are mostly suffer to poor quality of essential micronutrients which could has been attributed by many factors, including low meal frequency, low intakes of whole fruits, total vegetables, and bean, increased consumption of energy-dense foods, and also many adolescents do not eat with their family every day because fear from late from school, particularly breakfast (a regular breakfast consumption in adolescents has been associated with a higher micronutrient intake) (23,24).

Inadequate dietary diversity is major public health problem among adolescent girl, especially among school adolescent girls, result in decreased learning ability, delayed sexual maturity, a lack of concentration, increasing irregular menstruation, impaired physical, low interest in learning, less energy and also since adolescent is the period of the second catch up growth, inadequate diet during this time cause slower linear growth faltering., and intellectual development (7,22,25).

According to studies done in different region of Ethiopia, several factors such as nutritional knowledge, residence, wealth status, maternal education, maternal occupation and family size were among identified factors associated with dietary diversity of adolescent girls (11,19,20) .

The normal growth and development of adolescent girls need a healthy diet so, low dietary diversity lead to anatomical and physiological disturbance, less achievement in an academic area, impaired physical, reproductive maturity, and micronutrient deficiencies which adversely affect their health and empowerment. The major reason for focusing on adolescent girls is that this period of a child's life is a unique opportunity to break a range of vicious cycles of structural problems that are transmitted from one generation to the next, such as, gender discrimination and violence, poor health and nutrition, and Early intervention is particularly critical in adolescent girls, whose nutritional status marginal to begin with, so improving adolescent girls' nutrition and delaying their first pregnancy is a promising intervention point to break this intergenerational cycle of malnutrition(2,21,26,27).

However, in developing countries including Ethiopia, there are few of studies on dietary diversity school-based studies, assessment and interventions regarding to dietary diversity of adolescent girls. There are few of studies in Ethiopia, in particular no studies on Kedida Gamela woreda. Therefore, the aim of this study was to assess dietary diversity and associated factors among adolescent girls in Kedida Gamela Woreda high schools.

1.3 Significance of Study

If adolescent girls nutritional needs are not met, they are less success in academicals area, impaired physical growth and development and also they will be giving birth of undernourished children, thus transmit to future generations so they need more energy and nutrient greater than at any other time of life.

Despite school feeding program have been launched in Ethiopia, this service did not reached the marginalized areas of the community including Kedida Gamela Woreda high schools. Therefore, the finding of this study will alarm the stakeholders to design appropriate policy and plan that

will help to promote the consumption of diversified diet. This study will also serve as baseline for future studies.

Chapter Two: Literature Review

2.1 Magnitude of inadequate dietary diversity among high schools adolescent girls

Dietary diversity is defined as the simple count of food groups consumed over a given reference period. It reflects the concept that increasing the variety of foods and food groups in the diet helps to ensure adequate intake of essential nutrients (28).

School based cross-sectional study conducted among 455 school adolescent in Jimma town reported 61.3% proportion of them were getting of inadequate dietary diversity. Another community based cross sectional study conducted in Jimma zone on the sample of 2084 adolescents in the age group of 13–17 years revealed that 80.5% of them were having inadequate dietary diversity. A school-based cross-sectional study conducted at Dembia district, northwest Ethiopia on total of 474 participants reported 67.3% were having inadequate dietary diversity (19,29,30).

An institution-based cross-sectional study was conducted among adolescent students in Woldia town on sample of 411, found that 49.1% proportion of adolescent girls with inadequate dietary diversity. Another community based cross sectional study done in Wolayita Zone Southern Ethiopia that include 843 adolescent girls revealed 72.4% of them were getting inadequate dietary diversity. A community based cross sectional study conducted in Tigray northern Ethiopia on a sample of 828 adolescent girls showed that the 54% proportion of the adolescent were having low dietary diversity (11,31,32).

A facility based cross sectional study done in Gondar town northwest Ethiopia on a sample of 778 adolescent school girls revealed that 26.6% of them were getting inadequate dietary diversity. Another study conducted in Adama city on a sample of 726 school adolescent girls, 41.2% of them had low dietary diversity. Similarly study conducted in Awash town , Afar region that included 340 adolescent girls was found 49% of them had poor dietary diversity Another community based cross sectional study done in Bangladesh on a total of 4865 adolescent girls and 4907 adolescent boys reported, the prevalence of inadequate dietary diversity among female (55·4 %) (7,33,34,35).

A community based study conducted in Bagladesh on a sample of 300 subjects of which 150 male and 150 female, reported the mean dietary diversity score(DDS) 4.28 ± 1.2, Similarly study conducted on sample of 506 high school girls aged 15 to 18in Iran has reported the mean dietary diversity score(DDS) 6.81±1.75.Another study conducted among Tehran adolescent girls reported Mean ± SD of dietary diversity score (DDS) 6.25 ± 1.08(27,36,37).

2.2 Factors Associated with inadequate dietary diversity

2.2.1 Socio-demographic factors

According to study done in Jimma Zone, residence (P= 0.001), household income (P = 0.013) were positively associated with inadequate dietary diversity. Study done in Addis Abeba revealed school type, educational status of mother and occupation of the mother were statistically associated with low dietary diversity score(LDDS)(20,29).

Another study done in Woldia Northern Ethiopia showed that adolescent from mothers with secondary and above education level was 73% less likely to have inadequate dietary diversity. Adolescents living in a family size five and above were 2 times more likely to have inadequate dietary diversity. The study done in Wolayita Sodo, Southern Ethiopia also reported that family monthly income, fathers and mothers' educational status were associated with dietary diversity (11,31).

Study conducted in Bangladesh reported that, poor educational attainment, poor maternal education, female-headed household, household food insecurity and poor household wealth were associated with increased chances of having inadequate dietary diversity (DD) in both sexes, Study conducted in Dembi district northern Ethiopia found that inadequate dietary diversity was significantly associated with religion, self-employment and household wealthy status. Another study conducted in Uganda also reported age of the adolescent and family household wealthy status were factors associated with inadequate dietary diversity(30,35,38).

2.2.2 Nutritional knowledge of high schools adolescent girls

According to study done in Woldia northern Ethiopia, found that adolescents who had poor nutritional knowledge were 4.56 times more likely to have inadequate dietary diversity than those with good nutritional knowledge. Another study done in Taiwanese elementary school children also reported that student who had poor nutritional knowledge were more likely to have poor dietary diversity(11,39).

2.2.3 Meal pattern of high schools adolescent girls

Study conducted in Addis Abeba shown that adolescent girls those consuming more sweet food were 3.6 times more likely to have inadequate dietary diversity. Another study conducted in Uganda showed that adolescents who never eat from restaurant were more likely to have in adequate dietary diversity compared to those eat at least ones per week from restaurant(20,38).

2.3 Conceptual Framework

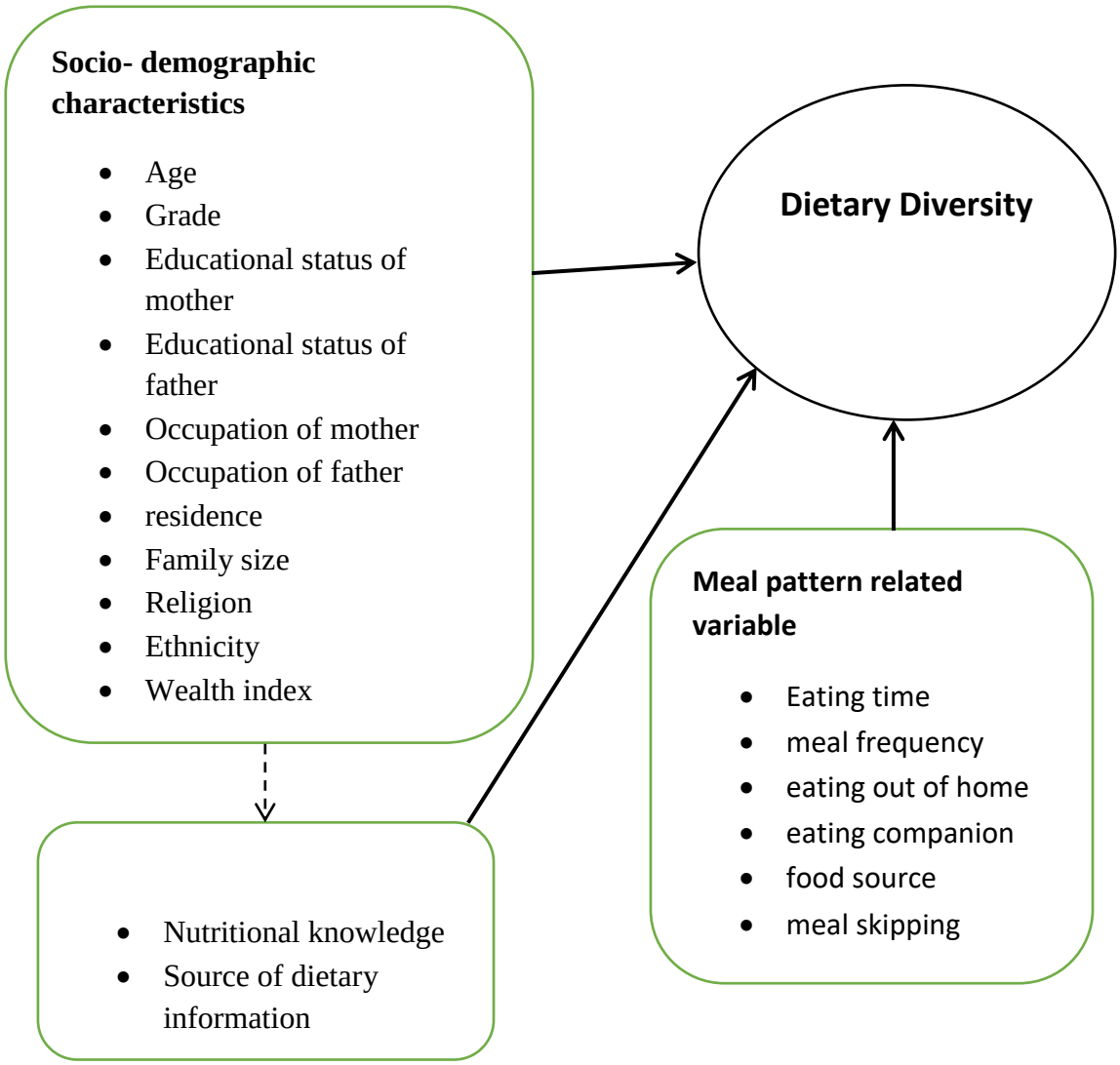

Figure 1: Conceptual Frame Work on Dietary Diversity and Its Associated Factors Among High School Adolescent Girls in Kedida Gamela Woreda, Southern Ethiopia, 2022. adapted from different literatutres mainly (15,19,21) and *EDHS 2019* guideline

Chapter Three: Objective of Study

3.1 General objective

- ❖ To assess dietary diversity and associated factors among high school adolescent's girls in Kdida Woreda, Southern Ethiopia, 2022.

3.2 Specific objectives

- ✓ To determine dietary diversity among high school adolescent girls in Kdida Woreda, Southern Ethiopia
- ✓ To identify factor associated with dietary diversity among high school adolescent girls in Kdida Woreda, Southern Ethiopia

Chapter Four: Methods and Materials

4.1 Study Area and period

The study was conducted from May 27-June 24, 2022 in Kedida Gamela woreda high schools. It is located at 4 Km northwest of Durame town which is capital city of Kambata Tembaro zone. Kedida Gamela Woreda is located at 125 Km from Hawassa, Capital of SNNPR, and 360 Km from Addis Ababa, capital city of Ethiopia. The woreda has three governmental high schools. The woreda is known is suitable for the cultivation of Enset, Godere, Maize, Wheat, vegetable and fruits. Kocho bulla, amicho, sweats potato and, godere are common food eaten in the Kedida gamela woreda.

4.2 Study design

In this study, an institutional-based cross-sectional study design was applied.

4.3 Source and study population

4.3.1 Source population

All high schools adolescent girls found in the study area in 2022 academic year

4.3.2 Study population

All randomly selected adolescent girls from the three high schools in the Kedida Gamela woreda high school in 2022 academic year

4.3.3 Study units

Directly participated adolescent girls

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion criteria

All adolescent girls in the selected high schools, was included in the study, 2022.

4.4.2 Exclusion criteria

All Adolescent girls who were on fast time, according to his/her religion are not included,

4.5 Sample size determination and sampling technique

4.5.1 Sample size determination

The sample size for the study was calculated using single population proportion formula considering the following assumptions: proportion of inadequate dietary diversity score (<5) 0.53 among adolescent girls students was taken from the study conducted in the Gurage Zone, Southwest Ethiopia (15). Margin of error as 5 %, confidence level at 95 %

The sample size for objective one calculated using single population proportion formula

$$N = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

Where, N = minimum required sample size from the population

Z=1.96 **α** = 5%

p =53%=0.53 **q** = 1-P= 1-0.53=0.47

d=0.05

$$N = \frac{1.96^2 * 0.53(1-0.53)}{(0.05)^2} = \mathbf{382}$$

Since source of population size are less than 10,000 so using correction formula below

$$N_f = \frac{n}{1 + \frac{n}{N}}$$

Where, **N f** = final sample size, n= Original sample size

N= size of source population

N= Total number of adolescents of three high school =1981

$$382/1+\frac{382}{1981} = \mathbf{320} \text{ sample size}$$

By adding non-response 10% then the sample size was =**352**

Final sample size for objective one= **352**

Sample size determination for the second objective

The sample size for second objective also calculated by using Epi info version 7 in the following table

Table 1: sample size determination for the second objective (factors associated with inadequate dietary diversity)

Variable	Magnitude (%)		Power, CI	AOR	Totalsamplesizewith10%nonresponse	Ref
	Exposed	Unexposed				
Residence	62.7	47.00	80,95	2.00	**346**	(7).
School	36.9	68.9	80,95	5.2	**68**	(19).
Family size	30.1	64.4	80,90	2.09	**347**	(11).

The Calculated sample size for objectives one and objective two above are not the same that the larger sample size is selected. Accordingly, the final sample size is **352.**

4.5.2 Sampling technique

In kedida gamela woreda, there are three high schools and all the three high schools were selected for this study namely Roman, Teza, and Jore. In the three high school's 1981 students attended their education of which: 1045 students were adolescent girls. Before data collection the list of students who were collected from each high schools directors, then combined student data set list contains formation about age, grade level, and school name. A sampling frame was prepared and the required number of adolescent girls who were selected

from each high school was determined based on proportion student size allocation finally, through a simple random sampling technique, 352 students were selected through computer generator random table.

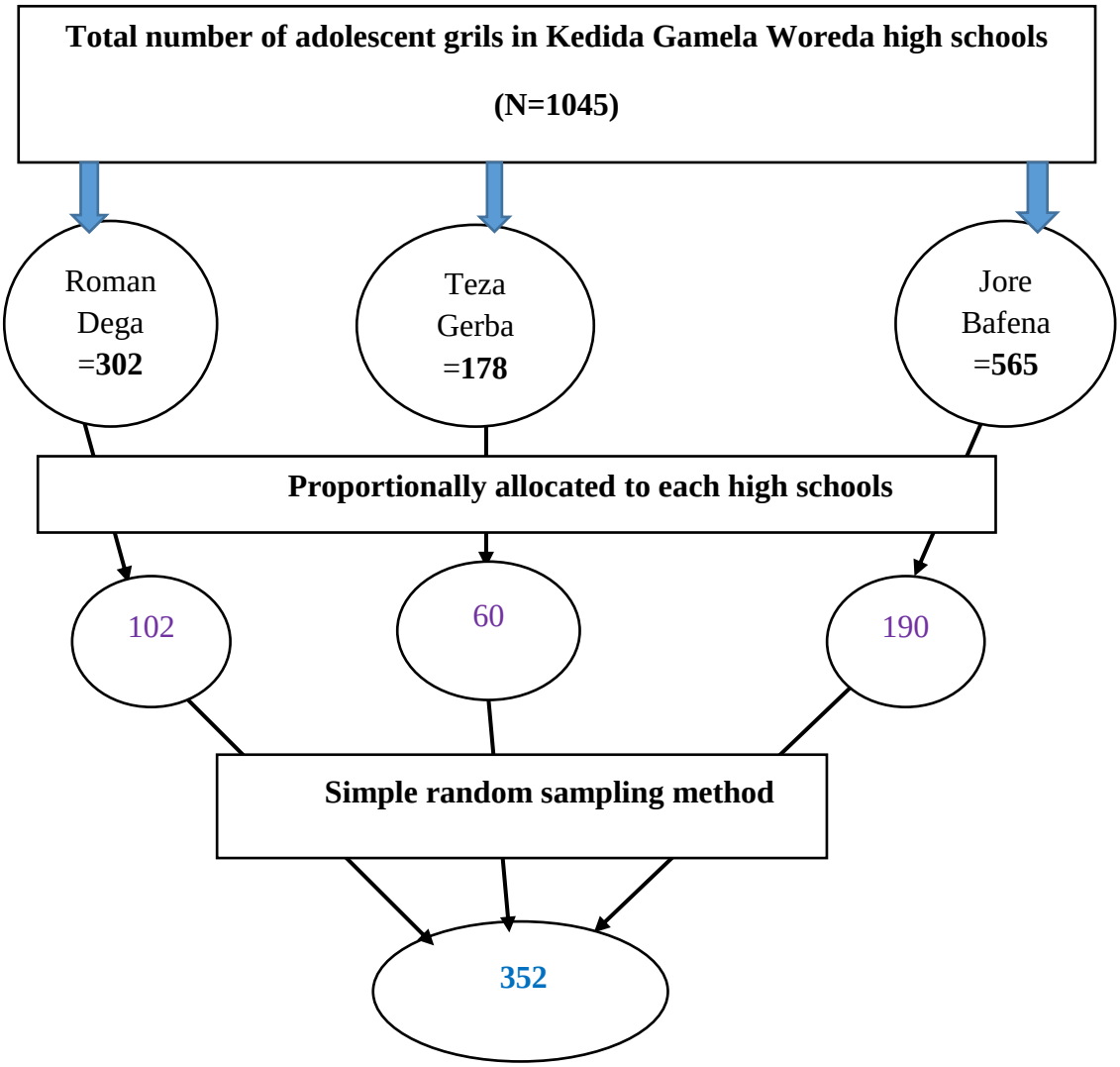

Figure 2: Schematic diagram of sampling procedure to select adolescent girl students from high schools in Kedida Gamela Woreda in 2022.

4.6 Study variables

4.6.1 Dependent variable

Dietary diversity Score

4.6.2 Independent variables

- ✓ Socio demography/ Socio-economic variables **(**age, grade ,residence , ethnicity, religion, educational status of father**,** occupation of father, educational status of mother, Occupation of Mather, family size and household wealth status)
- ✓ Meal pattern of adolescents (Meal frequency, source of food, skip meal, eating champion, Meal consumption, skipping meal)
- ✓ Nutritional knowledge, Source of dietary information

4.7 Operational definitions

Adolescent: were those found in the group of 10-19 years' age and According to world health organization classified on the three categories are early (10-13), middle (14-16), late adolescent (17-19) (21).

Dietary diversity Score :measures the number of food groups consumed over a 24 hours' period and assessed using dietary diversity score, adolescent girls who consumed less than five food groups out of ten (10) were categorized as inadequate dietary diversity whereas those consumed five and above food group were categorized as adequate dietary diversity(21).

Adolescent nutritional knowledge: Respondent whose their knowledge scores equal to mean and above were categorized as having good knowledge whereas respondent whose their knowledge scores below the mean score were categorized as having poor nutritional knowledge(11).

Meal pattern: is an overarching construct that is used to describe individuals' eating patterns at the level of a 'meal', such as a main meal (for example, break- fast, lunch or dinner)(40).

4.8 Data collection tools and procedure

4.8.1 Data collection tools

Data were collected by face-to-face interview using a structured and pre-tested questionnaire. The questionnaires had five (5) parts. Socio-demographic characteristics was measured by using 11(eleven) variables, the adolescents meal pattern was measured by using six(6) variables, Household wealthy status was measured by using twenty-two (21) items adapted from EDHS2019,(41). Nutritional knowledge was measured by using 10(ten) variables that was constructed from previous studies(19,42,43) . Dietary diversity score was measured by using 10 (ten) food groups that was adopted from FAO 2021(44). Participants were asked to recall24 hours all foods eaten and beverages they consumed.

4.8.2 Data collection procedure

Data were collected by trained four diploma nurse and one supervisor (experienced BSc Nurse) who had previous exposure to supervise skills, supervising during the data collection period. Data were collected by a school to school visit of adolescent girls who attend their classes, in high school, after explaining the purpose of the study, informed consent was obtained from each respondent. The data were collected through face-to-face interview using structured questionnaire collected by was supervising the whole process of data collection. Data collectors and supervisors are fluent in local language familiar with local customs.

4.9 Data Quality assurance

Data were collected using pre-tested and properly designed questionnaires. To assure data quality the Questionnaires were translated first translated into Amharic and then to English to check the consistency.

Pre-testing of the questionnaires was performed using 5% of the sample size on school adolescent girls with similar socio-demographic characteristics educated in Damboya woreda high school which is not the actual data collection area. Based on the pre-test some modifications were done to the questionnaire.

Training was given to data collectors and supervisor on data the collection tools, data collection techniques, approach to interviews and maintaining of confidentiality of the

respondent for two days. During the actual data collection every day after data collection questioners were reviewed, checked for completeness, word errors, unclear questions and consistency by the supervisor and principal investigator and the necessary feedback was given to data collectors each morning.

4.10 Ethical consideration

An ethical approval was being obtained from Jimma University Institutional ethical review committee and submitted Kadida Gamela woreda Education office. Letter of permission was obtained from Kedida Gamela education office and distributed to the three high schools in the woreda. Before the start of data collection, was permission obtained from the study participants and written consent obtained from their parents for participants less than 18 years old. All study participants were informed about the purpose and objective of the study. Participants were informed that they had full right to discontinue or refuse to participate in the study. They were also informed that all data obtained from them would be kept confidential

4.11 Data analysis

All data were checked visually, coded, and entered into Epi-data version 4.6 and exported into SPSS version 23 software packages for analysis. Descriptive statistics (frequency and cross tab, mean and standard deviation) were calculated. The results were presented in the form of tables and text using frequencies and summary statistics such as mean, standard deviation, and percentage to describe the study population with relevant variables.

Before performing Principal Components Analysis (PCA) for variables explaining household wealth index, all the necessary assumptions and prerequisites were checked. The degree of association between independent and dependent variables was assessed using odds ratio with 95% confidence interval. Simple binary logistic regression analysis was performed to select candidate variables for multivariable analysis. Variables with *P*-value< 0.25 was taken as a cutoff point to select eligible variables for the multiple regression analysis and *p*-value< 0.05 was declared as statistically significant in the final model.

Pseudo regression was performed to check multi-collinearity between independent variables, the minimum tolerance and maximum variance inflation (VIF) factor was found to be 0.70 and 1.79 respectively. For the finally fitted multivariable logistic regression model,

the adequacy of the model to predict the outcome variables was checked by Hosmer-Lemeshow goodness-of-fit and the *P*-value > 0.05 (this study Hosmer Lemeshow p- value-0.216)

4.12 Dissemination result

The final result of the study will be submitted to Jimma university faculty of public health, department of human nutrition and dietetics and school of postgraduate studies. The final report will be communicated to Kadida Gamela woreda education office, Kadida Gamela woreda health office, and other stakeholders working on adolescent health. Finally, an effort was made to publish in a peer-reviewed journal

Chapter Five: Result

5.1 Socio-demographic characteristics of participant

From total sample size of 352, 347 adolescent girls provided response, yielding a response rate of 98.6%. The study participants included in this study were an adolescent girl who was in the range of 14 to 19 years and, the mean age of the respondents was (16.94 SD ±1.238). By residence the majority of the participant 276 (79.5 %) were living in the rural. Of the study participants 273(78.7%) of adolescents live in a family size greater than 5 family members.

Regarding the educational status of parents, about 171(49.3%) of their fathers had attended secondary and above and while only 131(37.8%) their mothers did so. Concerning the occupation of the parents, about half 169(48.7%) of adolescents' mothers were housewives and 149(42.9%) of adolescent's fathers were farmer. table (2).

Table 2: Socio-demographic characteristics of school adolescent girls in Kadida Gamela woreda High school 2022

Variable(n=347)	Category	Frequency (%)
Age of student	14-16	107 (30.8)
	17-19	240 (69.2)
Grade Level	9-10	212 (61.1)
	11-12	135 (38.9)
Residence	Urban	71 (20.5)
	Rural	276 (79.5)
Ethnicity	Kembata	318 (91.6)
	Hadiya	17 (4.9)
	Other[a]	14 (4.0)
Religion	Orthodox	25 (7.2)
	Muslim	47 (13.2)
	Protestant	228 (65.7)

	Catholic	47	(13.7)
Family size	<5 family members	74	(21.3)
	>=5 family members	273	(78.7)
Father educational status	No formal education	76	(21.9)
	Primary education	100	(49.3)
	Secondary and above	171	(28.8)
Mather educational status	No formal education	103	(29.7)
	Primary education	113	(37.8)
	Secondary and above	131	(32.6)
Occupation of Mather	Housewife	169	(48.7)
	Merchant	112	(32.3)
	Government employee	55	(15.9)
	Daily labor	11	(3.2)
Occupation of father	Farmer	149	(42.9)
	Merchant	90	(25.9)
	Government employee	87	(6.1)
	Daily labor	21	(25.1)
Wealthy status	Poor	113	(32.6)
	Medium	118	(34.0)
	Rich	116	(33.4)

Note; **a=** Oromo, Sidama, Gurage and Amhara

5.2 Meal pattern of school adolescent girls in Kadida Gamela woreda high schools

Regarding food sources of the participants, about two-third (67.4) obtain their food by purchasing from market, whereas 44(12.7%) from food aid. More than half (55.6%) of the participants eat 3-4 times per day while only (26.8%) eat breakfast before going to school.

Preferring eating out 96(37.8%) was the most common reason for missing eating breakfast before school. With the 24hrs more than two-third (73.2%) of the participants had missed at least one meal, while the lunch accounts half (50.4%) of missed meal (table 3).

Table 3: Meal pattern of adolescent girls in Kadida Gamela woreda high schools

Variable(n=347)	Category	Frequency (%)
Source of food	Own production	69 (1.9)
	Food aid	449 (12.7)
	Purchase	234 (67.4)
Meal frequency	Two times per day	154 (44.4)
	3-4 times per day	193 (55.6)
Eating companions	with family member	154 (44.4)
	Alone	141 (40.6)
	Peer	52 (15.00)
Eating breakfast before going to school	Yes	93 (26.8)
	No	254 (73.2)
What are the reason for missing your breakfast before school	Breakfast not prepared at home	77 (30.3)
	Prefer eating out	96 (37.8)
	Fear of being late	81 (31.9)
Have ever missed your meal in the last 24 hours	Yes	254 (73.2)
	No	93 (26.8)
Which one is did not eat	Breakfast	93 (36.6)
	Lunch	128 (50.4)

	Dinner	33 (12.9)

5.3 Nutritional knowledge of adolescent girls in Kadida Gamela woreda High school

Regarding the source of dietary information, more than one third (38.9%) heard from family while, only 53(15.3%) from school. 166(48.7%) of participants responded that eating fruit and vegetables are good to prevent certain diseases. 138(39.8%) of the participants know the dietary sources of carbohydrate, 148(42.7%) of the participants know the dietary sources of proteins, 112(32.3%) knows the dietary source of vitamin, 111(32.0%)of the participants know the consequence of the health consequences of too much consumption of fatty foods whereas, only71(20.5%) of the participants know the dietary source of fiber.

The mean knowledge score of the participant was 5.45±1.95. Thus, 190(54.8%) of the participants were categorized as having a poor knowledge of nutrition and 157(45.2%) as having a good knowledge of nutrition (table 4).

Table 4: Nutritional knowledge of adolescent girls in Kadida Gamela woreda High school

Variables	Category	Frequency (%)
Dietary information source	mass media	60 (17.3)
	Friends	99 (28.5)
	Family	135 (38.9)
	School	53 (15.3)
Do you know eating fruit and vegetables every day is good to prevent the occurrence of a certain disease	Yes	166 (47.8)
	No	181 (52.2)
Do you know the dietary sources of carbohydrates	Yes	138 (39.8)
	No	208 (60.2)
Do you know the dietary source of fat	Yes	71 (20.5)
	No	276 (79.5)
Do you know the dietary sources of proteins?	Yes	148 (42.7)

	No	199	(57.3)
Do you know the dietary sources of fiber?	Yes	71	(20.5)
	No	275	(79.3)
Do you know the dietary sources of vitamins?	Yes	112	(32.3)
	No	235	(67.7)
Do you know the health consequences of too much consumption of fatty foods?	Yes	111	(32.0)
	No	236	(67.7)
Do you know a low intake of fruit and vegetables Will cause health problems?	Yes	161	(46.4)
	No	186	(53.4)
Do you know the health consequence of much consumption of salt?	Yes	206	(59.4)
	No	141	(40.6)
Nutritional knowledge	Poor knowledge	190	(54.8)
	Good knowledge	157	(45.2)

5.4 The Types of food group consumed among adolescent girl in kedida gamela woreda high schools

In this study, all 347(100%) of adolescent girls had consumed cereal groups while only 27(7.7) of them consumed flash meat, fish and poultry over the 24 hours. The mean dietary diversity score was 4.38 (SD±1. 449) that ranged from 2 to 9 food groups.

Table 5: The Types of food group consumed among adolescent girls in kedida gamela woreda high schools

Type of food group	Category	Frequency%
Cereals(Grain and White roots tubers and plantains	Yes	347 (100)
Pulses (beans, peas and lentils)	Yes	120 (34.6)
	No	227 (65.4)

Nuts and seeds	Yes	73 (21.0)
	No	274 (79.0)
Milk and milk products	Yes	125 (36.0)
	No	222 (64.0)
Flash Meat and fish	Yes	27 (7.7)
	No	320 (92.3)
Egg	Yes	96 (27.6)
	No	251 (72.3)
Dark green leafy vegetable	Yes	148 (42.7)
	No	199 (57.3)
Other vitamin A-rich fruits and vegetable	Ye	214 (61.7)
	No	133 (38.3)
Other vegetables	Yes	200 (57.6)
	No	147 (42.4)
Other fruits	Yes	214 (61.7)
	No	133 (38.3)

6.6 Dietary diversity score among adolescent girls in kedida gamela woreda high schools

The proportion of inadequate dietary diversity among adolescents in kedida gamela woreda high school was 213(61.4%) with [95%CI: 56.4-66.6] (fig.3).

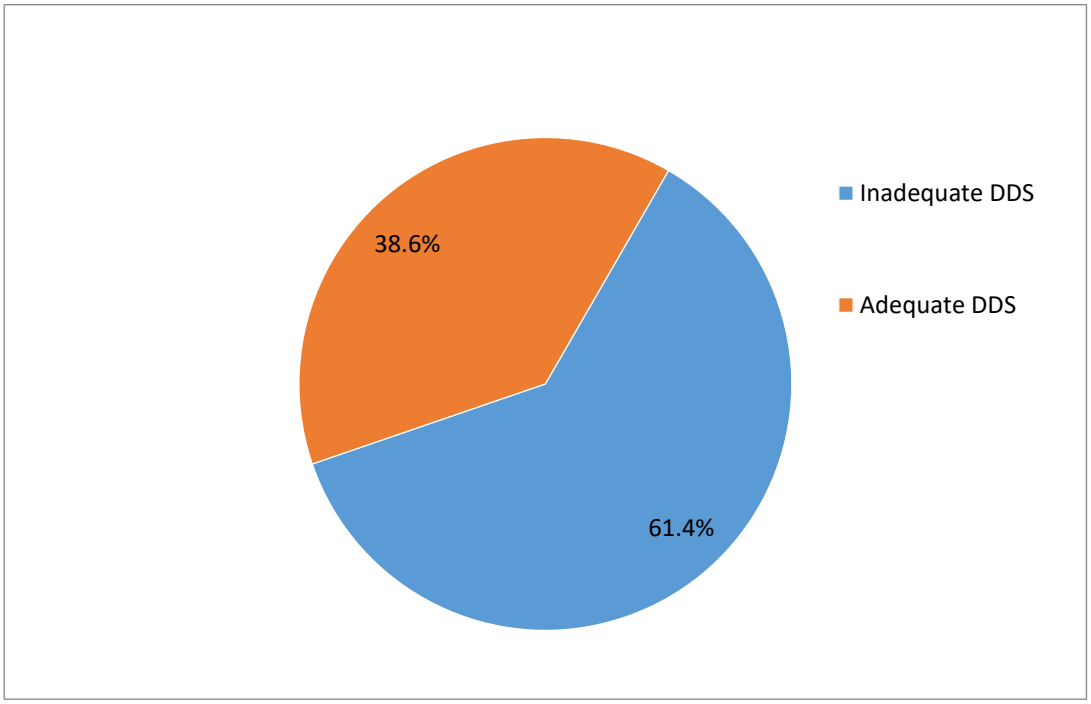

Figure 3: Dietary diversity score among high schools adolescent girls in kedida gamela.

5.5 Binary *and Multivariable* logistic regression analysis of factors associated with inadequate dietary diversity among adolescents girls in Kedida Gamela woreda high schools.

Binary logistic regression was performed to assess the association of each independent variable with inadequate dietary diversity. In binary logistic regression variables that had an association with the dependent variables were identified with a *P*-value of less than 0.25 to include important variables in the multivariable analysis.

On bivariate analysis, adolescent age, mother's education status, father's education status, family size, mother's employment status, sources of food, sources of dietary information, eating breakfast before school and nutritional knowledge were significant at *P*-value< 0.25. All these independent variables were analyzed in multivariable logistic regression and from nine independent variables, four variables were significant association *p*-value <0.05.

Therefore, the final predictors of inadequate dietary diversity were age of the adolescent, family size, maternal; education status and nutritional knowledge.

Compared to adolescents in the category of 14-16, adolescent in the age category of 17-19 were 1.8 times more likely to have inadequate dietary diversity(AOR=1.8(95% CI:1.07-3.08). Adolescents from mother with no formal education were 2.9 times more likely to have inadequate dietary diversity than those with secondary and above education (AOR=2.9 (95% CI: 1.36-6.46).Adolescent living with more than five family members were 2 times more likely to have inadequate dietary diversity compared to those from less than five family members (AOR=2.0 (95% CI: 1.16-3.65).Compared to adolescent with good nutritional knowledge, those having poor nutritional knowledge were 2.3 times more likely to have inadequate dietary diversity (AOR=2.3 (95% CI:1.39-3.79)(table 6).

Table 7: Multivariable logistic regression analysis of factors associated with inadequate dietary diversity among high schools adolescent's girls in Kedida Gamela woreda high schools

Variable (n=347)	**Dietary diversity score**				
	Inadequate	**Adequate**	**COR (95%CI)**	**AOR (95%CI)**	***P-Value***
Age of the student14-16	50(46.7)	57(53.2)	1	1	
17-19	163(67.9)	77(32.1)	2.4(1.51-3.84)	1.8(1.07-3.08)*****	0.025
Education status of the Mather:					
No formal edu	79(76.7)	24(23.3)	3.6(2.06 –6.48)	2.9(1.36-6.46)*	0.006
Primary education	72(63.7)	41(36.3)	1.9(1.16-3.20)	2.0(1.07-3.86)*	0.029
Secondary and above	62(61.9)	69(52.7)	1	1	

Educational Status of					
Father					
No formal education	61(80.3)	15(19.7)	3.17(1.67-6.02)	1.0(0.43-2.40)	0.9
Primary education	56(56)	44(44)	1.2(0.67_1.8)	0.6(0.33-1.12)	0.11
Secondary and above	96(56.1)	75(43.1)	1	1	
Mather occupation					
Government employed	23(41.8)	32(58.2)	1	1	
Un employed	190(65.1)	102(34.9)	2.5(1.44-4.66)	1.3(0.64-2.71)	0.4
Family size					
Less than five member	34(49.9)	40(54.1)	1	1	
Greater than five member	179(65.6)	94(34.4)	2.2(1.33-3.77)	2.0(1.16-3.65)*	0.013
Eating breakfast before yes	48(51.6)	45(48.4)	1	1	
going to no school	165(64.9)	89(35.03)	1.7(1.07-2.81)	0.7(0.43-1.29)	0.305
Source of food					
Own produ	45(65.2)	24(34.8)	1.4(0.81-2.49)	1.1(0.53-1.93)	0.95
Food aid	35(79.5)	9(20.5)	2.9(1.35-6.42)	1.6(0.65-3.88)	0.306
Purchase	133(56.80	101(43.2)	1	1	

Source of information about diet diversity					
Mass media	31 (51.7)	29(48.3	1	1	
Friends	59(59.6)	40(40.4)	1.3(0.72-2.63)	0.7(0.77-1.60)	0.48
Family	85(62.9)	50(37.03)	1.5(0.86-2.94)	0.8(0.41-1.67)	0.61
School	38(71.7)	15(28.3)	2.3(1.08-5.18)	1.2(0.48-2.84)	0.72
Nutritional knowledge					
poor know	138(72.6)	52(27.4)	2.9(1.85-4.66)	2.3(1.39-3.79)*	0.001
good know	75(47.8)	82(52.2)	1		

Note: ** denote statistically significant variables in multivariable logistic regression at *p-value* <0.05, COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio, 1= reference variable.

Chapter six: discussion

This study has attempted to assess the magnitude of inadequate dietary diversity and associated factors among school adolescent girls in Kadida Kamela Woreda. Accordingly, the study found that 61.4% of school adolescent girls in the study area were not consumed adequate dietary diversity with mean score of dietary diversity (DDS) 4.38±1.45 SD. Age of adolescent girl, maternal education, family size and nutritional knowledge were factors significantly associated with inadequate dietary diversity.

The magnitude of inadequate dietary diversity score among school adolescent girls in this study was consistent with study conducted on school adolescent in Jimma town (61.3%)(19).But this finding is lower compared to study conducted in southern Ethiopia(72.4%)(21)and Jimma zone(80.5%)(29) . Thus, the inconsistency might be due to difference in study period, difference in the classification of dietary diversity score (DDS), study area and difference in number of food groups included. However, this finding is higher compared to study conducted in Dambi Distirict Northern Ethiopia (32.3%)(30), Tigray Northern Ethiopia(54%) (45) Gondar town (24.6%)(7) Adama town(41.2%) (46), Awash town Afar Region (49%) (34), Addis Abeba (43.3%)(20), Bagladesh (42.3%) (47). The variation might be due to difference in socio-demographic characteristics and study period.

Moreover, the mean score of dietary diversity score (DDS) in current study was consistent with study done in Pakistan (3.35 ± 1.03)(48), Bangladesh (4.28 ± 1.2)(45), Adama 4.2 (SD 2.01) (46), Addis Abeba (4.9±1.47)(20), Woldia Northern Ethiopia(4.73±1.186)(11), Sodo southern Ethiopia(3.56 (±1.2)(21) and Tigray Northern Ethiopia 3.5 (32).The mean score in this study was higher compared to study done in Awash town Afar region (2.81± 0.501)(34), but lower than study done in Iran(6.81±1.75)(36) ,in Tehran (6.25 ± 1.08.This disparity might occurred due to socio-economic differences and the presence of food-based dietary guidelines in some countries which promote consumption of diversified diet.

In this study, maternal education status was significantly associated with inadequate dietary diversity score. Adolescent from mothers who had no formal education were 2.9 times more likely to have inadequate dietary diversity compared with those from mothers with secondary education and above. This finding is in line with study conducted in Addis Abeba

(20),Jimma town (19),Gurage Zone (15), Adama town (46), Wolayita Zone Southern Ethiopia (21). This could be because uneducated mothers have inadequate information on the importance of having a locally available diversified food. In addition, educated mothers can easily convert the nutrition knowledge to practice while purchasing and preparing food because of the majority of the home activities are dominated by mothers in the Ethiopia context .This finding was more supported by study conducted in Woldia Northeast Ethiopia that reported, adolescent girls from mother education secondary and above were 73% less likely to get inadequate dietary diversity than mother with no formal education (11).

Compared to adolescents living with family size less than five, those living with greater than five families were 2 times more likely to have inadequate dietary diversity. This finding was consistent with study done in Woldia North east Ethiopia (11), Evidence from the 2011 Welfare Monitoring Survey, Ethiopia (49). It is an undeniable reality that as a family member increases; it becomes more difficult for them to provide adequate and diversified food to meet for everyone's need. Because of this, the parent prioritizes and gave attention only to fulfill the daily necessities rather than dietary quality.

In this study, adolescents having poor knowledge of nutrition were 2.3 more likely to have inadequate dietary diversity compare to those who have a good knowledge of nutrition. This finding was consistent with study done in Woldia Northeast Ethiopia(11), Luxembourg(50).This implies that those adolescents with poor nutritional knowledge have less probability to consume nutritious and diversified food .This finding was more supported by study done in Taiwanese elementary school in which ,students' nutritional knowledge were positively correlated with dietary diversity score (39).

Age of the adolescent was statistically associated with inadequate dietary diversity, adolescent whose age 17-19 were 1.8 more likely to have inadequate dietary diversity compared to those adolescent 14-16 age group. This might be due to as age of a child increases the family's care and attention to the children decreases, especially in Ethiopian context, thus late adolescents are vulnerable to have inadequate dietary diversity. In addition late adolescents are higher probability of having eating disorder that hinders their food selection (51). Contrary to this finding, study conducted in Eastern Uganda reported that adolescent whose in the age interval 10-14 were more likely to have inadequate dietary

diversity than 15-19 (38). This variation might be due to difference in study design, culture and way of life across the study population.

Limitation of the study

This study has its own limitations such as:-

- ✓ First the cross-sectional nature of the study limits the strength of determining associated factors.
- ✓ Second, the study assessed individual dietary diversity only for the last 24 hr.; hence, there might be lack of a correct reflection of the usual dietary habits of adolescent's girls
- ✓ Leads to social disability bias
- ✓ Recall bias

Strength of the study:

- ✓ All high schools found in kedida gamela woreda were included in this study's

Chapter Seven: Conclusion and recommendation

7.1 Conclusion

The magnitude of inadequate dietary diversity in this study was high; while adolescent age, maternal education status, family size and nutritional knowledge were factors significantly associated factors with inadequate dietary diversity score among adolescent girls in Kadida Gamela Woreda high schools

7.2 Recommendations

In order to break intergenerational cycle of malnutrition, promoting diversified food consumption is a good opportunity, since today adolescents are tomorrow mothers. Hence, based on the finding the following recommendations are suggested.

Kedida Gamela Woreda Health Office:

- ✓ Nutrition education should be designed and provided for adolescent girls both at the facility and community level, (like gardening, home economics (baltina), food demonstration, agric extension workers, and health extension worker).
- ✓ Promotion and utilization of family planning methods so as to have small family size should be encouraged
- ✓ Specific attention should be given for in the late adolescent's girl concerning their dietary diversity.

Kedida Gamela Educational Office

- ✓ Scheduling appropriate time for nutrition education in the school with collaboration with relevant stakeholders such as Woreda health office and NGOs
- ✓ Encouraging females for further education should be mobilized at school and community level.

Researchers or future perspective

- ✓ Furthers studies need to be conducted including qualitative aspects regarding factors associated with inadequate dietary diversity.

References

1. Rah JH, Chalasani S, Oddo VM, Sethi V. Adolescent Health and Nutrition. Nutr Heal a Dev World. 2017;(August 2019).
2. Pratibha Patanwar KS. Nutritional Status of Kurmi Adolescent Girls of Raipur. Int J Sci Res Publ. 2013;3(11):1–6.
3. Bhandari VK. Nutritional Status, Dietary Practices and Nutrition Related Beliefs of High School Girls in Urban Area of Bangalore City. IOSR J Nurs Heal Sci. 2014;3(3):01–6.
4. Brown JE, Lechtenberg E, Murtaugh MA, Splett PL, Stang J, Wong R, et al. 6th Ed Nutrition Through the Life Cycle [Internet]. 2017. 1–610 p. Available from: www.cengage.com/highered
5. Kennedy GL, Pedro MR, Seghieri C, Nantel G, Brouwer I. Dietary diversity score is a useful indicator of micronutrient intake in non-breast-feeding Filipino children. J Nutr. 2007;137(2):472–7.
6. Black MM. Animal source foods to improve micronutrient nutrition and human function in developing countries: micronutrient deficiencies and cognitive functioning. J Nutr. 2003;133:3927S–3931S.
7. Birru SM, Tariku A, Belew AK. Improved dietary diversity of school adolescent girls in the context of urban Northwest Ethiopia: 2017. Ital J Pediatr. 2018;44(1):48.
8. Paper A. Correlation between Dietary Patterns and Academic Performance of Secondary School Students in the Western Division. 2019;10.
9. Nithya DJ, Bhavani R V. Dietary diversity and its relationship with nutritional status among adolescents and adults in rural India. J Biosoc Sci. 2018;50(3):397–413.
10. N Ghasemifard MASF. Diet quality of adolescents in shiraz, southern Iran needs moderate to severe improvement. International journal of nutrition. Sciences.

2017;2(2):66–72.

11. Endalifer ML, Andargie G, Mohammed B, Endalifer BL. Factors associated with dietary diversity among adolescents in Woldia, Northeast Ethiopia. BMC Nutr. 2021;7(1):1–8.

12. Benetou, V.; Kanellopoulou, A.; Kanavou, E.; Fotiou, A.; Stavrou, M.; Richardson, C.; Orfanos, P.; Kokkevi A. Diet-Related Behaviors and Diet Quality among. Nutrients [Internet]. 2020;12:3804. Available from: https://doi.org/10.3390/nu12123804

13. GEAS, Population Council. Gender Equality Among Adolescents in Ethiopia. 2019;

14. MacGarty D, Nott D. Disaster medicine: A case based approach. Disaster Medicine: A Case based Approach. 2013. 1–390 p.

15. Worku M, Hailemicael G, Wondmu A. Dietary Diversity Score and Associated Factors among High School Adolescent Girls in Gurage Zone, Southwest Ethiopia. World J Nutr Heal [Internet]. 2017;5(2):41–5. Available from: http://pubs.sciepub.com/

16. Regasa RT. Assessment of Nutritional Status and Dietary Diversity among in-school Adolescents of East wollega Zone , Ethiopia. 2017;61(May 2016):1–6.

17. Keats EC, Rappaport AI, Shah S, Oh C, Jain R, Bhutta ZA. The dietary intake and practices of adolescent girls in low-and middle-income countries: A systematic review. Nutrients. 2018;10(12).

18. Gwete RA. THE DOUBLE BURDEN OF MALNUTRTION IN CHILDREN UNDER 5 YEARS IN ZIMBABWE. 2019;

19. Melaku Y, Dirar A, Feyissa GT, Tamiru D. Optimal dietary practices and nutritional knowledge of school adolescent girls in Jimma Town, South West Ethiopia. Int J Adolesc Youth [Internet]. 2018;23(3):299–307. Available from: http://doi.org/10.1080/02673843.2017.1369889

20. Worku L, Mamo K, Elema TB, Atlaw D. Dietary diversity score and associated factors among high school adolescent girls in a selected school of Yeka Sub-city , Addis Ababa. 2022;(April).

21. Halala Handiso Y, Belachew T, Abuye C, Workicho A. Low dietary diversity and its determinants among adolescent girls in Southern Ethiopia. Cogent Food Agric [Internet]. 2020;6(1). Available from: https://doi.org/10.1080/23311932.2020.1832824

22. Dalky HF, Al-drabaah TK. Eating Habits and Associated Factors Among Adolescent Students in Jordan. Clin Nurs Res. 2016;

23. Overcash F, Davey C, Zhang Y, Reicks M. Evening meal types and family meal characteristics: Associations with demographic characteristics and food intake among adolescents. Nutrients. 2020;12(4).

24. Clemens D, Klaus G. Associations between Maturity Status and Dietary Intake in Austrian Adolescents. Int J Pediatr Res. 2018;4(2).

25. Tegegne M, Sileshi S, Assefa T, Kalu A. Nutritional Status and Associated Factors of Adolescent School Girls , Goba Town , Southeast Ethiopia NutritionalStatusandAssociatedFactorsofAdolescentSchoolGirlsGobaTownSoutheast Ethiopia. 2019;(October).

26. Salam RA, Das JK, Lassi ZS, Bhutta ZA. Adolescent Health and Well-Being: Background and Methodology for Review of Potential Interventions. J Adolesc Heal [Internet]. 2016;59(2):S4–10. Available from: http://dx.doi.org/10.1016/j.jadohealth.2016.07.023

27. Saima Alam S, Rahman N, Mia A, Haque M, Islam K. Dietary Diversity and Nutritional Status of Adolescent Girls in Selected Urban Slum of Dhaka City in Bangladesh. Nutr Food Sci Int J [Internet]. 2018;7(3):1–5. Available from: https://juniperpublishers.com/nfsij/pdf/NFSIJ.MS.ID.555711.pdf

28. Winpenny EM, Greenslade S, Corder K, van Sluijs EMF. Diet quality through adolescence and early adulthood: Cross-sectional associations of the dietary approaches to stop hypertension diet index and component food groups with age. Nutrients. 2018;10(11).

29. Belachew T, Lindstrom D, Gebremariam A, Hogan D, Lachat C, Huybregts L, et al. Food Insecurity, Food Based Coping Strategies and Suboptimal Dietary Practices of

Adolescents in Jimma Zone Southwest Ethiopia. PLoS One. 2013;8(3):1–9.

30. Gonete KA, Tariku A, Wami SD, Akalu TY. Dietary diversity practice and associated factors among adolescent girls in Dembia district, northwest Ethiopia, 2017. Public Health Rev. 2020;41(1):1–13.

31. Kabero TH, Bosha T, Feleke FW, Weldegebreal DH, Stoecker B. Nutritional Status and Its Association with Cognitive Function among School Aged Children at Soddo Town and Soddo Zuriya District , Southern Ethiopia : Institution Based Comparative Study. 2021;8:15.

32. Mulugeta A, Tessema M, H/sellasie K, Seid O, Kidane G, Kebede A. Examining means of reaching adolescent girls for iron supplementation in Tigray, Northern Ethiopia. Nutrients. 2015;7(11):9033–45.

33. KT R, M A. Nutritional Status and Its Associated Factors among School Adolescent Girls in Adama City, Central Ethiopia. J Nutr Food Sci. 2016;06(03):4–11.

34. Kahssay M, Mohamed L, Gebre A. Nutritional Status of School Going Adolescent Girls in Awash Town, Afar Region, Ethiopia. J Environ Public Health. 2020;2020.

35. Akter1 F, , Md Mokbul Hossain1, Abu Ahmed Shamim1, Md Showkat Ali Khan1 MH, Hanif1 AAM, , Moyazzam Hossaine1 NJU, Mohammad Aman Ullah2, Samir Kanti Sarker2, S. M. Mustafizur Rahman2 DKM, Mridha MMIB and MK. RESEARCH ARTICLE Prevalence and socio-economic determinants of inadequate dietary diversity among adolescent girls and boys in Bangladesh: findings from a nationwide cross-sectional survey. 2021;1–12.

36. Vakili M, Abedi P, Sharifi M, Hosseini M. Dietary Diversity and Its Related Factors among Adolescents : A Survey in Ahvaz-Iran. 2013;5(2):181–6.

37. Mirmiran P, Azadbakht L, Esmaillzadeh A, Azizi F. Dietary diversity score in adolescents - A good indicator of the nutritional adequacy of diets: Tehran lipid and glucose study. Asia Pac J Clin Nutr. 2004;13(1):56–60.

38. Isabirye N, Bukenya JN, Nakafeero M, Ssekamatte T, Guwatudde D. Dietary diversity and associated factors among adolescents in eastern Uganda : a cross-sectional study. 2020;4–11.

39. Lin W, Yang HC, Hang CM, Pan WH. Nutrition knowledge, attitude, and behavior of Taiwanese elementary school children. Asia Pac J Clin Nutr. 2007;16(SUPPL. 2):534–46.

40. Leech RM, Worsley A, Timperio A, McNaughton SA. Understanding meal patterns: Definitions, methodology and impact on nutrient intake and diet quality. Nutr Res Rev. 2015;28(1):1–21.

41. Ethioipian statistical agency. Ethioipian Demographic and Health Servey. 2016. 115–123 p.

42. FAO. Guidelines for assessing nutrition-related K nowledge , A ttitudes and P ractices manual Guidelines for assessing nutrition-related K nowledge , A ttitudes and P ractices manual [Internet]. Control. 2014. 1–188 p. Available from: www.fao.org/docrep/019/i3545e/i3545e00.htm

43. Kigaru DMD, Loechl C, Moleah T, Macharia-Mutie CW, Ndungu ZW. Nutrition knowledge, attitude and practices among urban primary school children in Nairobi City, Kenya: A KAP study. BMC Nutr [Internet]. 2015;1(1):1–8. Available from: http://dx.doi.org/10.1186/s40795-015-0040-8

44. FAO. Minimum Dietary [Internet]. 2021. 1–176 p. Available from: https://doi.org/10.4060/cb3434en

45. M1 NI, , Fatema Akther2 SSS and QN. Assessment of Micro Nutritional Malnutrition in an Urban Area of Bangladesh Journal of Nutrition & Food Sciences Assessment of Micro Nutritional Malnutrition in an Urban Area of Bangladesh among the Adult Population on the Basis of Individual Dietary Dive. 2021;(January 2014):3–8.

46. KT R, M A. Nutritional Status and Its Associated Factors among School Adolescent Girls in Adama City, Central Ethiopia. J Nutr Food Sci. 2016;06(03).

47. Islam MR, Rahman SM, Tarafder C, Rahman MM, Rahman A, Ekström EC. Exploring rural adolescents' dietary diversity and its socioeconomic correlates: A cross-sectional study from matlab, bangladesh. Nutrients. 2020;12(8):1–16.

48. Baxter JB, Soofi SB, Wasan Y, Islam M, Ahmed I, Sellen DW, et al. Dietary diversity and social determinants of nutrition among late adolescent girls in rural

Pakistan. 2022;(July 2021):1–11.

49. Workicho A, Belachew T, Feyissa GT, Wondafrash B, Lachat C, Verstraeten R, et al. Household dietary diversity and Animal Source Food consumption in Ethiopia: Evidence from the 2011 Welfare Monitoring Survey. BMC Public Health [Internet]. 2016;16(1):1–11. Available from: http://dx.doi.org/10.1186/s12889-016-3861-8

50. Alkerwi A, Sauvageot N, Malan L, Shivappa N, Hébert JR. Association between nutritional awareness and diet quality: Evidence from the observation of cardiovascular risk factors in Luxembourg (ORISCAV-LUX) study. Nutrients. 2015;7(4):2823–38.

51. Dopp RR, Lipson SK, Eisenberg D. Mental health among late adolescents and young adults from a population-level and clinical perspective. Adolesc Med State Art Rev. 2013;24(3):573–96.

Jimma University, Institute of Health, Faculty of Public Health, Department of Human Nutrition and Dietetics

Dietary diversity and associated factors among high schools adolescent girl in Kedida Gamela Woreda, southern Ethiopia, 2022

1. **Information and consent form sheet from parents or guardians for age< 18 years adolescent girls.**

This is study on magnitude of dietary diversity and associated factors among school adolescents in kedida gamela woreda conducted by Askale Lodamo for partial fulfillment of master's degree in Jimma University, institute of health science, faculty of public health, department of human nutrition and dietetics, faculty of public health. Your child has been selected simple randomly to participate in this study. Since your child is under age 18, as parents/guardians you need to know detail information concerning the study to declare your agreement regarding the participation of your child in the study.

The study will be undertaken by asking your child structured questions which will take about 30-40 minutes .some of the questions are personal and sensitive. However, while responding to question no name will be documented on the questionnaire, as a result your child will not be transferred to third party. Participation of your child on this will be total based on your agreement and the child right not to participate from the beginning or may stop participating at any time after beginning participation and will not force to give information that he/she does not know. Sharing experience and giving guanine information will provide majority input to bring change on dietary diversity among adolescents. Therefore, I sincerely request your agreement by responding any of your response agree or disagree. Finally, I would like to thank you for all your contribution.

Agree ……. Disagree……..

Whom to contact: If you will have any questions about the research proposal or need further information please contact Askale Lodamo (MPH in human nutrition candidates) Jimma University, Institute of health, Faculty of public health, Department of human nutrition and dietetics. Mobile: 0926081776 or E-mail; askalelodamo@gmail.com

2. Assent Format

Dear respondent, my name is _____I am working as a data collector for the study conducted by Jimma university post-graduate student, diet diversity and associated factors among adolescent girls in kedida gamela woreda high schools, Southern Ethiopia2022. This questionnaire will be filled out only if you agree to take part in the study. Your honest answer to this question is very important for the for success of the study and also will help for better understanding of the problem that would eventually help in designing appropriate intervention to solve the problems and I sincerely ask you to give your genuine and true responses to the questions provided.

The information in this questionnaire will be kept strictly confidential, will not be disclosed to any one and only the research team will have access to the information you gave but your name will not be recorded or identified even by the research team.

So, would you willing to participate? 1. Yes 2. No

1. Code of respondent_____ 2. Name of Data collector _____

3. Name of supervisor_____ Signature _____date……. /…….2022

Many thanks for your participation and cooperation!

Annexes

Annex-I: English version questionnaire

Part I: Socio-demographic and related factor			
S. N	**Variables**	**Response**	**Skip**
01	What is your age?	----- in year	
02	What is your grade level?	-----	
03	How many people including yourself live In your household (family size)?	1. <5members 2. < or equal to5 members	
04	What is your ethnicity?	1. Oromo 2. Kambata3. Hadiya 4. Amhara 5. Sidama 6. Others(specify---	
05	What is your residence?	1. Rural 2. Urban	
06	Educational status of Mather?	1. No formal education 2. Primary education 3. Secondary education 4 .College /University	
07	Occupation of a mother?	1. Housewife 2. Merchant 3. Government employee 4. Daily laborer 5. Other (specify---	
08	Educational status of the father?	1. No formal education 2. Primary education 3. Secondary education 4. College /University	

09	Occupation of your father?	1. Farmer 2. Merchant3. Government employee 4. Daily laborer 5. Other specify----	
010	What is your religion?	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. Others specify-------	
011	Who is the head household in your home?	1. Mather 2. Father 3. Brother 4. Other	

Part II: Household wealth index.

Does your family have any of the following properties?

012	Functioning Radio/Tape recorder	1. Yes 2. No	
013	Functioning Television	1. Yes 2. No	
014	Kerosene stove	1. Yes 2. No	
015	Electric stove	1. Yes 2. No	
016	Mobile phone	1. Yes 2. No	
017	Abed with cotton/sponge/spring mattress	1. Yes 2. No	
018	Table /Chair	1. Yes 2. No	
019	Sofa	1. Yes 2. No	
020	Generator	1. Yes 2. No	
021	Refrigerator	1. Yes 2. No	
022	Computer	1. Yes2. No	
023	Chest drawer/ bife/	1. Yes 2. No	

	comedienne		
024	Bicycle	1. Yes2. No	
025	Motor cycle	1. Yes2. No	
026	Cart/Gari	1. Yes2. No	
027	Bajaj	1. Yes2. No	
028	Car	1. Yes2. No	
029	Cow milk/ox	1. Yes2. No	
030	Sheep/Goat	1. Yes2. No	
031	Horse/mule/donkey	1. Yes2. No	
032	Chickens	1. Yes2. No	
033	Farm land	1. Yes2. No	

Part III: Nutrition knowledge questionnaires

034	What is your Source of information about diet diversity?	1. Mass media 2. Friends 3. Family 4. School	
035	You should eat more vegetables and fruits in your diet	1. Yes 2. No	
036	Do you know the dietary sources of carbohydrates? If you say yes, please list its dietary sources.....	1. Yes 2. No	

037	Do you know the dietary sources of fat? If you say yes, please list its dietary sources.....	1. Yes 2. No	
038	Do you know the dietary sources of fiber? If you say yes, please list its dietary sources.....	1. Yes 2. No	
039	Do you know the dietary sources of proteins? If you say yes, please list its dietary sources …	1. Yes 2. No	
040	Do you know eating fruit and vegetables every day is good for our bodies to prevent the occurrence of a certain disease	1. Yes 2. No	
041	Do you know the dietary sources of Vitamin? if you say yes, please list its dietary sources.....	1. Yes 2. No	
042	Do you know a low intake of fruit and vegetables will cause a health problem?	1. Yes 2. No	
043	Do you know the health consequence of much consumption of salt?	1. Yes 2. No	

Part V; **Meal pattern questioner**

044	Source of food	1. Own production 2. food aid 3.Purchase	

045	Have you ever missed your meal in the last 24 hours?	1. Yes 2. No	**If yes Q46**
046	Which one did not eat?	1. Breakfast 2. Lunch 3. Dinner	
047	Who decides the type of food prepared In your home?	1. Mather2. Father 3. Brother 4. Sister 5. Other specify----	
048	Meal frequency per day?	1. One time per day 2. Two times per day 3. Three times per day	
049	How Eat companion?	1. With family members 2. With peers 3. Eats alone 4. Others	
050	Are you always eating breakfast before going to school?	1. Yes 2. No	**If no Q51**
051	What are reasons attributed to missing breakfast before school	1. Breakfast not prepared at home 2. prefer eating out 3. Fear of being late	

Part IV: 24-hour dietary recall questioners

Dietary diversity questionnaire consisting of short open recall meal based questions, Foods and Agricultural Organization (FAO 2021) guidelines. Open recall method involved continuous probing to ensure complete recall of food consumed. However, in cases of forgetting, a number of common listed food items were read out to the participant. The participant would then respond “yes” or “no” for each food item she consumed or didn’t respectively during the past 24 h. The recall method was used to collect information from the adolescent girls at five different times

Please describe the foods that you ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink eaten in the morning. Write down all food and drinks mentioned. When composite dishes are mentioned, ask for the list of ingredients. When the respondent has finished, probe for meals not mentioned. Format for conducting dietary intake using 24-hour recall

Breakfast	**Snack**	**Lunch**	**Snack**	**Dinner**	**Snack**

Then the respondent recall is complete, fill in the groups listed below based on the information recorded above. For any food groups not mentioned ask the respondent if a food item from this group will be consumed

S. N	Food Group	**Example**	1.Yes 2, No
052	Cereals (Grain and White roots tubers and plantains)	Any food prepared from (Teff, wheat, corn/maize, barley, rice, sorghum, millet, oats, enjera, bread, porridge, kita, kolo, nifiro, noodles (pasta)	1. Yes 2. No
		Potatoes (all skin colours), enset (kocho, bulla or amicho), sweet potato (white/pale yellow-fleshed), taro (godere)	
053	Pulses (beans, peas and lentils)	Beans, peas, chickpea, soya been	1.Yes 2.No
054	Nuts and	Groundnut/peanut, seeds and seed “butters	1. Yes 2. No

	seeds		
055	Milk and milk products	Cheese, yogurt, milk, arera or other milk product	1. Yes 2. No
056	Meat, and fish	Lamb goat, beef, ox, Chicken, fish, Organ meat (liver, kidney),	1. Yes 2. No
057	Eggs	chicken egg, duck, guine hen	1. Yes 2. No
058	Dark green leafy vegetable	Kale, broccoli, lettuce, spinach, and Swiss chard	1. Yes 2. No
059	Other vitamin A-rich fruits and vegetable	-Pumpkin, carrots, squash, or orange flesh sweet potatoes -Ripe mangoes or ripe papaya, carrot,	1. Yes 2. No
060	Other vegetables	Tomato, eggplant, green pepper, cucumber, cabbage (common and red varieties), cauliflower, mushroom, and zucchini, beans, peas or lentils when the fresh/ green pod is consumed	1. Yes 2. No
061	Other fruits	Orange, banana, avocado, pineapple, guava, watermelon, apple, grapefruit, berries	1. Yes 2. No

በደቡብ ኢትዮጵያ በቀዲዳ ጋሜላ ወረዳ የሁለተኛ ደረጃ ትምህርት ቤት ታዳጊ ልጃገረድ የአመጋገብ ልዩነት እና ተያያዥ ምክንያቶች 2022

1. መረጃ እና የስምምነት ቅጽ ከወላጆች ወይም ከአሳዳጊዎች ዕድሜያቸው<< 18 ዓመት ለሆኑ ጎረምሶች ልጃገረዶች።

ይህ ጥናት በከዲዳ ጋሜላ ወረዳ በትምህርት ቤት ታዳጊ ወጣቶች መካከል ስላለው የአመጋገብ ብዝሃነት መጠን እና ተያያዥ ጉዳዮች ላይ በአስካለ ሎዳሞ በጅማ ዩኒቨርሲቲ፣ በጤና ሳይንስ ኢንስቲትዩት ፣ በህብረተሰብ ጤና ፋኩልቲ ፣ በሰው ምግብ እና አመጋገብ ትምህርት ክፍል ፣ ፋኩልቲ የማስተርስ ዲግሪያቸውን በከፊል ለመጨረስ የተደረገ ጥናት ነው። የህዝብ ጤና. በዚህ ጥናት ላይ ለመሳተፍ ልጅዎ ቀላል በዘፈቀደ ተመርጧል። ልጅዎ ከ18 ዓመት በታች ስለሆነ፣ እንደ ወላጆች/አሳዳጊዎች ልጅዎን በጥናቱ ውስጥ ተሳትፎን በሚመለከት ስምምነትዎን ለመግለጽ በጥናቱ ላይ ዝርዝር መረጃ ማወቅ አለቦት።

ጥናቱ የሚካሄደው ልጅዎን የተዋቀሩ ጥያቄዎችን በመጠየቅ ሲሆን ይህም ከ30-40 ደቂቃዎች ይወስዳል። አንዳንዶቹ ጥያቄዎች ግላዊ እና ስሜታዊ ናቸው። ነገር ግን፣ ለጥያቄው ምላሽ ሲሰጡ፣ በመጠይቁ ላይ ምንም አይነት ስም አይመዘገብም፣ በዚህ ምክንያት ልጅዎ ወደ ሶስተኛ ወገን አይተላለፍም። በዚህ ጉዳይ ላይ የልጅዎ ተሳትፎ በጠቅላላ በእርስዎ ስምምነት ላይ የተመሰረተ እና ልጁ ከመጀመሪያው ጀምሮ ያለመሳተፍ መብት ወይም ተሳትፎ ከጀመረ በኋላ በማንኛውም ጊዜ መሳተፍ ሊያቆም ይችላል እና እሱ/ሷ የማያውቀውን መረጃ እንዲሰጥ አያስገድድም። ልምድ ማካፈል እና የጉዋኒን መረጃ መስጠት በጉርምስና ዕድሜ ላይ ባሉ ወጣቶች መካከል ባለው የአመጋገብ ልዩነት ላይ ለውጥ ለማምጣት አብላጫውን ግብአት ይሰጣል። ስለዚህ፣ የትኛውም ምላሽዎ

እስማማለሁ ወይም አልስማማም በማለት ምላሽ በመስጠት ስምምነትዎን ከልብ እጠይቃለሁ። በመጨረሻም ላደረጋችሁት አስተዋፅኦ ላመሰግናችሁ እወዳለሁ።

እስማማለሁ ……. አልስማማም……

ማንን ማነጋገር እንዳለቦት፡ ስለ የምርምር ፕሮፖዛል ማንኛውም አይነት ጥያቄ ካሎት ወይም ተጨማሪ መረጃ ከፈለጉ እባክዎን አስካለ ሎዳሞ (MPH in human nutrition candidates) ጅማ ዩኒቨርሲቲ፣ ጤና ኢንስቲትዩት ፣ የህብረተሰብ ጤና ፋኩልቲ፣ የሰው አመጋገብ እና አመጋገብ ትምህርት ክፍልን ያነጋግሩ። ሞባይል፡ 0926081776 ወይም ኢሜል; askalelodamo@gmail.com

2. የድጋፍ ቅርጸት(**ስምምነት ቅጽ**)

ውድ ምላሽ ሰጪ፣ ስሜ _____በደቡብ ኢትዮጵያ 2022 በከዲዳ ጋሜላ ወረዳ 2ኛ ደረጃ ት/ቤት በጅማ ዩኒቨርሲቲ የድህረ ምረቃ ተማሪ፣ የአመጋገብ ብዝሃነት እና በጉርምስና ዕድሜ ላይ የሚገኙ ልጃገረዶች ባደረገው ጥናት መረጃ ሰብሳቢ ሆኜ እየሰራሁ ነው። ይህ መጠይቅ የሚሞላው በጥናቱ ለመሳተፍ ከተስማሙ ብቻ ነው። ለዚህ ጥያቄ ትክክለኛ መልስዎ ለጥናቱ ስኬት በጣም አስፈላጊ ነው እና ለችግሩ የተሻለ ግንዛቤን ይረዳል እና በመጨረሻም ችግሮቹን ለመፍታት ተገቢውን ጣልቃገብነት ለመንደፍ ይረዳል እና እውነተኛ እና እውነተኛ ምላሾችን እንዲሰጡ ከልብ እጠይቃለሁ ። ለቀረቡት ጥያቄዎች. በዚህ መጠይቅ ውስጥ ያለው መረጃ በጥብቅ ሚስጥራዊ ይጠበቃል ለማንም አይገለጽም እና እርስዎ የሰጡትን መረጃ የሚያገኘው የምርምር ቡድኑ ብቻ ነው ነገር ግን ስምዎ በምርምር ቡድኑ እንኳን አይመዘገብም ወይም አይታወቅም።ስለዚህ ለመሳተፍ ፈቃደኛ ነዎት? 1. አዎ 2. አይደለ

ጅማ ዩኒቨርሲቲ፣ ጤና ኢንስቲትዩት፣ የህብረተሰብ ጤና ፋኩልቲ፣ የሰው ምግብና አመጋገብ ትምህርት ክፍል

ለአመጋገብ ልዩነት የተሣታፊ መረጃ ወረቀት እና በመረጃ የተደገፈ የፈቃደኝነት ስምምነት ቅጽ

ተማሪ ኮድ----------

የቃለ መጠይቁ ቀን _____ቀን

የጠያቂው ስም _____ፊርማ _____ቀን

የተቆጣጣሪው ስም_____ፊርማ _____

ANNEX II: Amharic vertion questioner

የአማርኛ ስሪትት ጥያቄዎች

ክፍል አንድ ፡-ማህበረ-ሕዝብ እና ተዛማጅ ምክንያቶች			
ቁ.	**ጥያቀዎች**	**ምላሽዎች**	**ዚላል**
01	የእርስዎ ዕድሜ ስንት ነው?		
02	የክፍል ደረጃዎ ስንት ነው?	……	
03	አንችን ጨምሮ ስንት ሰዎች በቤትዎ ውስጥ ይኖራሉ (የቤተሰብ መጠን)	1. 5 አባላት 2. > = 5 አባላት	
04	ብሀርሽ ምንድ ነው?	1. ኦሮሞ 2. ካምባታ3. ሀዲያ 4. አማራ 5. ሲዳማ 6. ሌሎች	
05	መኖሪያሽ የት ነው?	1. ገጠር 2. ከተማ	

06	የእናትሽ የትምህርት ደረጃ ምን ያህል ነው?	1.መደበኛ ትምህርት የለም) 2. የመጀመሪያ ደረጃ ትምህርት 3.የሁለተኛ ደረጃ ትምህርት 4.ኮሌጅ / ዩኒቨርሲቲ	
07	የእናትሽ ስራዎ ምንድነው?	1.የቤት ሚስት 2. ነጋዴ 3. የመንግስት ሰራተኛ 4.ገበሬ 5. ሌላ (ይግለጹ)	
08	አባትሽ የትምህርት ደረጃ ስንት ነው?	1.መደበኛ ትምህርት የለም) 2. የመጀመሪያ ደረጃ ትምህርት 3.የሁለተኛ ደረጃ ትምህርት 4.ኮሌጅ / ዩኒቨርሲቲ	
09	የአባትሽ ሥራ ምንድነው?	1. ገበሬ 2. የመንግስት ሰራተኛ 4. የቀን ሰራተኛ 5. ሌላ (ይግለጹ----	
010	ሃይማኖትህሽ ምንድ ነው?	1. ኦርቶዶክስ 2. ሙስሊም 3.ካቶሊክ 4. ፕሮቴስታንት 5. ሌሎች (ይጥቀሱ-	
011	የቤትታችሁ ኃላፊ ማ ነው?	1. እናት 2. አባት 3. ወንድ ወንድም 4. ሌላ 4. ሌላ	

ክፍል II፡- የቤት ሀብት መረጃ ጠቋሚ ምክንያቶች በቤቶት ዉስጥ ከዚህ በታች የተጠቀሱት ቁሳቁስ/ንብረት አለ

012	የሚሰራ ሬዲዮ/ቴፕ	1. አዎ 2.አይደለም	
013	የሚሰራ ቴሌቪዥን	1.አዎ 2.አይደለም	
014	የኤሌክትሪክ ምድጃ	1. አዎ 2.አይደለም	
015	የኬሮሴን ምድጃ	1. አዎ 2.አይደለም	
016	ሞባይል	1. አዎ 2.አይደለም	
017	ከጥጥ/ስፖንጅ/ስፕሪንግ ፍራሽ	1. አዎ 2.አይደለም	
018	ጠረጴዛ / ወንበር	1. አዎ 2.አይደለም	
019	ሶፋ	1አዎ2አይደለም	
020	የደረት መሳቢያ/ bife/	1. አዎ 2.አይደለም	
021	ጀነሬተር	1. አዎ 2.አይደለም	
022	ቤተሰብሽ ብስክሌት አላቸው?	1. አዎ 2.አይደለም	
023	ቤተሰብሽ ሞተር ሳይክል አላቸው?	1. አዎ 2.አይደለም	
024	አዎ 2.አይደለም	1. አዎ 2.አይደለም	
025	አዎ 2.አይደለም	1. አዎ 2.አይደለም	
026	አዎ 2.አይደለም	1.አዎ 2.አይደለም	
027	ጋር	1. አዎ 2.አይደለም	
028	መኪና	1. አዎ 2.አይደለም	
029	የላም ወተት	1. አዎ 2.አይደለም	
030	በግ / ፍየል?	1. አዎ 2.አይደለም	
031	ፈረስ / በቅሎ / አህያ	1. አዎ 2.አይደለም	

032	ዶሮ	1. አዎ 2.አይደለም	
033	የእርሻ መሬት	1. አዎ 2.አይደለም	

የአመጋገብ እውቀት መጠይቆች

034	ስለ አመጋገብ ልዩነት የአንች የመረጃ ምንጭ ካምንድን ነው?	1. የመገናኛ ብዙሃን 2. ጓደኞች 3. ቤተሰብ 4. ትምህርት ቤት	
035	በአመጋገብዎ ውስጥ ብዙ አትክልቶችን እና ፍራፍሬዎችን መብላት አለብዎ?	1. አዎ 2.አይደለም	
036	የሰባ የአመጋገብ ምንጮችን ታውቃለህ? አዎ ካሉ፣ እባክዎን የአመጋገብ ምንጮቹን ይዘርዝሩ?	1. አዎ 2.አይደለም	
037	የካርቦሃይድሬትስ የአመጋገብ ምንጮችን ታውቃለህ? አዎ ካሉ፣ እባክዎን የአመጋገብ ምንጮቹን ይዘርዝሩ::	1. አዎ 2.አይደለም	
038	የፋይበርን የአመጋገብ ምንጮች ታውቃለህ? አዎ ካሉ፣ እባክዎን የአመጋገብ ምንጮቹን ይዘርዝሩ::	1. አዎ 2.አይደለም	
039	የፕሮቲን አመጋገብ ምንጮችን ያውቃሉ? አዎ ካሉ፣ እባክዎን የአመጋገብ ምንጮቹን ይዘርዝሩ	1. አዎ 2.አይደለም	
040	አትክልትና ፍራፍሬ ዝቅተኛ መሆን የጤና ችግር እንደሚያስከትል ያውቃሉ?	1. አዎ 2.አይደለም	

041	ፋይበር አለመውሰድ የሚያስከትለውን የጤና ችግር ታውቃለህ	1. አዎ 2.አይደለም	
042	የቫይታሚን አመጋገብ ምንጮች ያውቃሉ? አዎ ካሉ፣ እባክዎን የአመጋገብ ምንጮቹን ይዘርዝሩ።	1. አዎ 2.አይደለም	
043	ጨው በብዛት በመጠቀም የሚያስከትለውን መዘዝ ታውቃለ	1. አዎ 2.አይደለም	

የምግብ ንድፍ እና ከባህሪ ተዛማጅ ተለዋዋጮች(ከአመጋገብ ጋር የተያያዘ መጠይቆች)

044	በታችሁ የምግብ ምንጭ ከየት ነው?	1. የራስ ምርት 2. የምግብ 3.እርዳታ	
045	ባለፉት ሰዓታት ውስጥ ምግብሽ አምልጠውሽ ያውቃሉ?	1. አዎ 2.አይደለም	አዎ ካሆነ 54
046	የትኛው ነው ያመለጠሽ?	1. ቁርስ 2. ምሳ 3. እራት	
047	የምግብ ድግግሞሽ?	1. በቀን አንድ ጊዜ 2. በቀን ሁለት ጊዜ 3. በቀን ሦስት ጊዜ	
048	የሚዘጋጀውን የምግብ አይነት ማን ይወስና ልበቤትዎ ውስጥ?	1. እናት2. አባት 3. ወንድም 4. እህት 5. ሌላ ይግለጹ ----	
049	ከጓደኛ ጋር መብላት?	1. ከቤተሰብ አባላት ጋር 2. ከእኩዮች ጋር 3. ብቻውን ይበላል 4. ሌሎች	

050	ወደ ትምህርት ቤት ከመሄድሽ በፊት ሁል ጊዜ ቁርስ ትበያለሽ?	1. አዎ 2.አይደለም	አይ ካሆና Q51
051	ምክኒያቶችሽ ከትምህርት ቤት በፊት ቁርስን ማጣት	1. ቁርስ በቤት ውስጥ አልተዘጋጀም 2. ከቤት ውጭ መብላትን ይመርጣሉ 3. የመዘግየት ፍርሃት	

ክፍል IV፡ የ24 ሰአት አመጋገብ ጠያቂዎች

ተሳታፊዋ ላለፉት 24 ሰአታት ለበላችው ወይም ላልደረገችው ለእያንዳንዱ ምግብ "አዎ" ወይም "አይ" የሚል ምላሽ ትሰጣለች። የማስታወሻ ዘዴው በአሥራዎቹ ዕድሜ ውስጥ ከሚገኙ ልጃገረዶች በአምስት የተለያዩ ጊዜያት መረጃን ለመሰብሰብ ጥቅም ላይ ውሏል

እባኮትን ቤት ውስጥም ሆነ ከቤት ውጭ ትላንትና ቀንና ማታ የበሉትን ወይም የጠጡትን ምግቦች ይግለጹ። በጠዋት ከተበላው የመጀመሪያው ምግብ ወይም መጠጥ ይጀምሩ. የተጠቀሱትን ምግቦች እና መጠጦች በሙሉ ይፃፉ

የቁርስ	መክሰስ	ምሳ	መክሰስ	እራት	መክሰስ

ከዚያም ምላሽ ሰጪው የማስታወስ ችሎታ ይጠናቀቃል, ከላይ በተመዘገበው መረጃ መሰረት ከዚህ በታች የተዘረዘሩትን ቡድኖች ይሙሉ. ላልተጠቀሱ ማናቸውም የምግብ ቡድኖች ምላሽ ሰጪውን ከዚህ ቡድን ውስጥ ያለ ምግብ ይበላ እንደሆነ ይጠይቁ

የምግብ ቡድን ምሳሌ			
052	ጥራጥሬዎች (እህል) ማንኛውም የሚዘጋጅ ምግብ (ጤፍ፣ ባቄላ፣ አተር እና ምስር) ባቄላ, አተር, ሽምብራ, አኩሪ አተር ስንዴ፣ በቆሎ፣ ገብስ፣ ሩዝ፣ ማሽላ፣ ኤንጀራ፣ ዳቦ፣ ገንፎ፣ ኪታ፣ ቆሎ፣ ኒፊሮ፣ ኑድል (ፓስታ)ድንች (ሁሉም የቆዳ ቀለሞች) ፣ እንሰት (ኮቾ፣ ቡላ ወይም አሚቾ፣ ድንች ድንች	1. አዎ 2.አይደለም	
053	ለውዝ እና ዘሮች ለውዝ/ለውዝ፣ዘር እና ዘር “ቅቤዎች	1. አዎ 2.አይደለም	
054	ወተት እና የወተት ተዋጽኦዎች አይብ፣ እርጎ፣ ወተት፣ አረራ ወይም ሌላ የወተት ተዋጽኦዎች	1. አዎ 2.አይደለም	
055 .	ስጋ, የዶሮ እርባታ እና አሳ የበግ ፍየል፣ የበሬ ሥጋ፣ በሬ፣ ዶሮ፣ ዓሳ፣ የሰውነት አካል ሥጋ (ጉበት፣ ኩላሊት)፣	1. አዎ 2.አይደለም	
056	ስጋ, የዶሮ እርባታ እና አሳ የበግ ፍየል፣ የበሬ ሥጋ፣ በሬ፣ ዶሮ፣ ዓሳ፣ የሰውነት አካል ሥጋ (ጉበት፣ ኩላሊት)፣	1. አዎ 2.አይደለም	
057	እንቁላል የዶሮ እንቁላል, ዳክዬ, ጊኒ ዶሮ	1. አዎ 2.አይደለም	
058	ጥቁር አረንጓዴ ቅጠላማ ካሌይ፣ ብሮኮሊ፣ ሰላጣ፣	1. አዎ 2.አይደለም	
059	ሌሎች በቫይታሚን ኤ የበለጸጉ ፍራፍሬዎችና አትክልቶች -ዱባ፣ ካሮት፣ ዱባ ወይም ብርቱካን ሥጋ ስኳር ድንች -የበሰለ ማንጎ ወይም የበሰለ ፓፓያ፣ ካሮት፣	1. አዎ 2.አይደለም	
060	ሌሎች አትክልቶች ቲማቲም ፣ ኤግፕላንት ፣ አረንጓዴ በርበሬ ፣ ዱባ ፣ ጎመን	1. አዎ 2.አይደለም	

	(የተለመዱ እና ቀይ ዝርያዎች) ፣ ጎመን ፣ እንጉዳይ እና ዝኩኒ ፣ ባቄላ ፣ አተር ወይም ምስር ትኩስ/አረንጓዴው ፓድ ሲበላ		
061	ሌሎች ፍራፍሬዎች ብርቱካን, ሙዝ, አቮካዶ, አናናስ, ጉዋቫ, ሐብሐብ, ፖም, ወይን ፍሬ	1. አዎ 2.አይደለም	

Approval form of the thesis

The Master of Science in Human Nutrition student declares this thesis is original work in partial fulfillment of the requirement for the degree of Master of Science in Human Nutrition.

Name of student: Askale Lodamo

ID Number = 0345/13

Signature_____

Date Submission: Agust25/2022

Place of submission: Department of Nutrition and Dietetics Faculty of public Health Institute of Health, Jimma University.

This thesis was submitted for examination with our approval as university advisors.

ADVISORS NAME

1. **BEYENE WONDEFRASH (MD, PH.D, ASSOCIATE PROFESSOR)**

2. BEAKAL ZINAB (MSc, ASSISTANT PROFESSOR)

Signature of first advisor

1. _____

Signature of second advisor

2. _____

INTERNAL EXMINER NAME

1. GETU GIZAW (MSc, ASSISTANT PROFESSOR)

1. Signature of internal examiner----------