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DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG ADOLESCENT GIRLS IN YEKA SUB CITY, ADDIS ABABA, ETHIOPIA, 2020

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A RESEARCH THESIS TO BE SUBMITTED TO JIMMA UNIVERSITY, INSTITUTE OF PUBLIC HEALTH, DEPARTMENT OF NUTRITION AND DIETETICS; IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR MASTERS OF SCIENCE IN HUMAN NUTRITION

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JIMMA UNIVERSITY

INSTITUTE OF HEALTH, FACULTY OF PUBLIC HEALTH

DEPARTMENT OF NUTRITION AND DIETETICS

DIETARY DIVERSITY AND ASSOCIATED FACTORS AMONG ADOLESCENT GIRLS IN YEKA SUB CITY, ADDIS ABEBA, ETHIOPIA, 2020.

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Addis Ababa, Ethiopia

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ABSTRACT

Background: Adolescence girls are very importance section of our society as they are the potential mothers and homemakers in future. Malnourished adolescent girls are at risk of being stunted mothers who are likely to suffer obstetric complications and to deliver low birth weight babies that could lead to intergenerational cycle of malnutrition. Addressing the nutritional problems of adolescent girl is important as their nutritional status has a negative effect on the future generation. However, adolescents receive very little attention; as a result, there is limited understanding of the problem and how best to manage it.

Objective: To assess the dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia

Methods: A community based cross sectional study was conducted by among 464 adolescent girls at Yeka sub city, Addis Ababa Ethiopia from September 1 to 30, 2020. Data was collected using trained data collectors. The data was collected by semi structured questionnaire by systematic random sampling technique and checked for completeness and entered by Epidata version 3.1 and cleaned and analyzed by SPSS version 21.Multivariable logistic regression model was fitted to identify factors associated with dietary diversity practice. The degrees of association between dependent and independent variables was assessed using OR at 95% CI. Multicolliniearity and model God fitness test was also done.

Result: The mean and SD of dietary diversity score was 3.75±1.16 respectively. More than two-third (77.6%) adolescent girls had sub-optimal dietary diversity score. Type of school: government school attendant (AOR [95% CI] = 2.14 [1.37, 4.07]), grade of adolescent girls: elementary school AOR [95% CI] = 2.98 [1.27, 7.01]), high school AOR [95% CI] = 2.87 [1.21, 6.77]), maternal educational status: elementary level AOR [95% CI] = 3.00 [1.07, 8.28]), secondary level AOR [95% CI] = 2.45 [1.32, 4.57], family size: 5 and above AOR [95% CI] = 0.41 [0.23, 0.73] and dependency ratio 50% and above AOR [95% CI] = 3.75 [2.01,6.33]) were significantly associated with sub-optimal dietary diversity score.

Conclusion and Recommendation: The prevalence of sub-optimal dietary diversity score was high in the study area. Adolescent girls attending school type, grade level, maternal education, family size and dependency ratio were significantly associated with sub-optimal

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dietary diversity score. School-based nutrition education and counseling and community based programs to reach both the students and their families.

Keywords: Dietary diversity practice, Adolescent girl, Addis Ababa

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TABLE OF CONTENTS

Content page

Abstract ..... **iii**

ACKNOWLEDGEMENTS ..... **iv**

Table of Contents ..... **v**

LIST OF Tables ..... **vii**

LIST OF FIGURES ..... **viii**

Acronym and abbrevations ..... **viii**

CHAPTER 1: INTRODUCTION **1**

Background **1**

Statement of the Problem **1**

Significance of the study **4**

CHAPTER 2: literature review **5**

2.1 Adolescent Girl Nutrition **5**

2.2Dietary Practice of Adolescent girl **5**

2.2.1Meal consumption and skipping behaviors **5**

2.2.2Snaking habit and food consumption practice **6**

2.3Dietary diversity practice and associated factors in adolescent girl **7**

2.5Conceptual Framework **8**

CHAPTER 3: OBJECTIVES **9**

3.1 General Objective **9**

3.2 Specific Objectives: **9**

CHAPTER 4: METHODS AND MATERIALS **9**

4.1 Study Area and period **9**

4.2 Study Design **9**

4.3 Population..... 9

4.3.1 Source Population 9

4.3.2 Study Population 10

4.3.3 Inclusion and Exclusion Criteria 10

4.4 Sample size determination 10

4.5 Sampling procedure 11

4.6 STUDY Variables 12

4.6.1 Dependent Variable..... 12

4.6.2 Independent Variables..... 12

4.7 Operational Definitions..... 13

4.8 Data collection tools and processes 14

4.8.1 Data collection instruments..... 14

4.8.2 Data collection procedures 14

4.9 Data Quality Assurance 15

4.10 Data processing and analysis..... 15

4.11 Ethical clearance..... 16

4.12Plan for dissemination of finding 16

CHAPTER-5: Result 16

5.2 Socio-demographic characteristics of adolescent girls..... 16

5.2 household related among adolescent girls..... 17

5.3 ENVIRONMENTAL characteristics of adolescent girl..... 19

5.4 meal consumption and skipping habit of Adolescent girls 20

5.5 Snacking habits and Food Consumption Practices of Adolescent girl 22

5.6 Nutritional Related knowledge of Adolescent girls 23

5.7 Dietary diversity Score..... 24

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5.8 Factors associated with Dietary diversity Score among adolescent girls 25

CHAPTER-6: discussion 28

Strength and limitation of the study 31

7 CONCLUSIONS AND RECOMMENDATION 31

7.1 Conclusion 31

7.2 Recommendations 31

References 32

ANNEX-I Informed and written concent 35

ANNEX-II Questionnaire 37

ANNEX-III Questionnaire (Amharic version)□□□□ 43

ANNEX-IV ASSURANCE OF PRINCIPAL INVESTIGATOR 49

LIST OF TABLES

Table 1: sample size calculation 10

Table 2: Socio demographic characteristic of adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020. 17

Table 3: Family related information among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020 17

Table 4: Environmental characteristics of adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020 19

Table 5: Meal consumption and skipping habit in Yeka Sub city, Addis Ababa Ethiopia, 2020. 20

Table 6: Snacking habits and Food Consumption Practices in Yeka Sub city, Addis Ababa Ethiopia, 2020 22

Table 7: Nutritional Related knowledge among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020 23

Table 8: Bivariate and multivariable Logistic Analysis of factors associated with Dietary diversity Score among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020 26

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LIST OF FIGURES

Figure 1: conceptual framework: the dietary practice and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia 2020. 8
Figure 2: schematic representation of sampling procedure. 12
Figure 3: Dietary diversity Score among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020. 24
Figure1: Types of food groups among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020.
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ACRONYM AND ABBREVATIONS

AOR Adjusted Odd Ratio

CDC-Centers for Disease Control and Prevention

CI-Confidence Interval

DDS- Dietary Diversity Score

DGLV- Dark Green Leafy Vegetables

FAO- Food and Agriculture Organization

IDA-Iron Deficiency Anemia

LIC-Low-Income Country

NGOs-Non-Governmental Organizations

PCA- Principal Component Analysis

SD-Standard Deviation

SPSS- Statistical Package for Social Sciences

WHO- World Health Organization

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CHAPTER 1: INTRODUCTION

Background

Adolescence is the age between 10-19 years old(1), and it is the transition from dependent childhood to independent adulthood, that comprises 20% of the global population, and with approximately 80% of them live in developing countries (2, 3). A quarter of Ethiopians are adolescents between the ages of 10 and 19 and more than 53% are under the age of 20 (4).

Adolescence girls are very importance section of our society as they are the potential mothers and homemakers in future. Moreover, they perform various other roles in the family and the community.(5)

It is a transitional period marked by rapid and sequential physical and mental changes that transform a small child into a young adult girl. This age is a stage of growth and development in the lifespan that needs adequate and proper quality food to meet the nutrient requirement for their physical, mental growth and development in addition to reproductive maturity (6).

Dietary diversity is the consumption of an adequate variety of food groups (7). A monotonous diet lacks essential micronutrients and contributes to the burden of malnutrition and micronutrient deficiencies (8). The problem is particularly critical in adolescents because they need energy and nutrient-dense foods to grow and develop both physically, mentally and to live a healthy life(9) .

Nutritional needs during adolescence are influenced mainly by the onset of puberty with its associated increased growth rate and changes in body composition and organ systems (10). In this period adolescents gain 15% of their final adult height, 45% of increments in bone mass and 50% of adult weight is attained together with changes in body shape and composition (11-13).

Adolescents in all income and ethnic groups can be at risk for dietary excesses and deficiencies(14).Therefore, malnourished adolescent girls are at risk of being stunted mothers who are likely to suffer obstetric complications and to deliver low birth weight babies that could lead to intergenerational cycle of malnutrition. Thus, adequate nutrition and healthy eating habits at this age are foundations for good health in adulthood.

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Statement of the Problem

The adolescent today (1.2 billion) represents the largest generation in history (15), and 90% of these adolescents reside in a low- or middle-income country (LMIC) (16). While some populations have stabilized, projections estimate a 42% growth of youth (15–24 years) in Africa alone from 2015 to 2030 (17), underpinning the importance of this group, and especially girls and young women, in driving global health and development. Undoubtedly, reaching adolescents will be critical to achieve each of the Sustainable Development Goal targets, but particularly those relating to health, poverty, education, and the reduction of inequalities (18).

Globally regarding to the DDS, Only 17% of adolescents had diversified diet(19). Similarly, in developing countries 23.5–50% (20, 21) of the Iranian, 11.2% of Zimbabwe (22) and 26.8% Ethiopian Gurage zone adolescents was reported as having adequate dietary diversity(23). Studies done in Jimma ,south west of Ethiopia majority (61.3%) of students had dietary diversity score less than five(24).

Researches documented that maternal education (23), school type ,occupation, nutritional knowledge (25), residence (23, 25) and wealth status(23, 25) were associated with dietary diversity of adolescents. Another study also showed that integration of school based health and nutrition education had significant contribution to adolescent nutrition (26). Improving adolescent girls' nutrition has benefits other than reproduction; the well-being and long-term nutritional health of women are legitimate goals in themselves(27). In many low- and middle-income countries (LMICs) the double burden of malnutrition is high among adolescent girls, leading to poor health outcomes for the adolescent herself and sustained intergenerational effects. This underpins the importance of adequate dietary intake during this period of rapid biological development(28).

Adolescent girl malnutrition is a common nutritional problem due to poor diet and lack of health care service in the developing world. Mostly, household diets are predominantly starchy staples with few animal products and seasonal fruits and vegetables(29). Addressing the nutritional problems of adolescent girl is important as their nutritional status has a negative effect on the future generation (30). Being in transition, adolescents may no longer benefit from the attention and care that usually go to children, but they may not get the protections associated with adulthood either.

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Adolescent has typically being considered as low risk of poor health and often receive few health care resource and less attention. However, this approach ignores the fact that many health problems later in life can be improved by adapting healthier life style habit during adolescence (31).

Studies from different developing countries also showed that under nutrition among school girls has a strong linkage with poor household socioeconomic condition, burden of disease and unequal intra-familial distribution of food like specific food taboos and dietary restrictions during menstruation. Eating behaviors of adolescents are influenced by many factors, including peer influences, parental modeling, food preferences, cost, personal and cultural beliefs, mass media, and body image perception(32, 33)

Studies have also shown that adolescents who have healthy eating habits are more likely to have the ability to learn normally in school and perform better academically than adolescents who have unhealthy eating habits(34, 35).

Past studies have further revealed that adolescents frequently consume energy-dense diets which are of poor quality in terms of essential micronutrients (36, 37). The poor nutritional status of adolescents has been attributed to many factors, including low meal frequency, high consumption of sweetened beverages, increased consumption of energy-dense foods, increased consumption of foods away from home (with peers), skipping meals, particularly breakfast (36-40). Other unhealthy practices include the consumption of high-dense fatty and sugary fast foods as the main meals of the day, eating meals characterized by a low content of fruits and vegetables, adopting unconventional dietary practices such as cutting down portion sizes of meals in an attempt to lose weight and attain a slim body figure, particularly among females (41).

In Ethiopia twenty seven percent of women had chronic energy deficiency (Body mass index <18.5), 17 % of women were anemic, and 6 % of rural women are experiencing night-blindness in their most recent pregnancy(42)

Most of the women in parts of sub-Saharan Africa, including Ethiopia, enter pregnancy with a poor nutritional status. It has been found that most of the time, the women may enter pregnancy with iron deficiency anemia and may have other micronutrient deficiencies which adversely affect her health and that of the fetus like low birth weight, neural tube defect and others(27, 43, 44).

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The dietary practices of adolescents have been described as not the best, mainly as a result of their busy schedules, peer pressure and the independent nature of their behavior. It is important that adolescents have reliable nutrition information that will guide them to make informed decisions regarding their dietary patterns and practices at community setting.

Adolescent nutrition promotion is also lagging and should connect with health services on one side, and food security programs on the other. Nonetheless, schools provide a wealth of opportunities to improve nutrition: formal learning, and in particular, gardening, cooking and feeding. Despite the above mentioned facts, in developing countries like Ethiopia there is limited community based studies, assessment and interventions depending on dietary diversity of adolescent girls. In addition, recently the government has planned to initiate the school nutrition program. And also their limited study did in meal consumption, skipping behavior and snaking habit in Ethiopia. Therefore this study was conducted to assess the dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia.

Significance of the study

In developing countries like Ethiopia there is limited community based studies, assessment and interventions depending on dietary diversity and nutritional status of school adolescent girls. In addition, recently the government has initiated the school nutrition program in elementary schools in Addis Ababa. So this community based study will be used as a base line for the initiation of this program and further continuity to high schools and act as guidance for further studies.

The study will expected to provide valuable information for stakeholders working in youth and adolescent health. It will also add an input for our communities, policy maker and Researcher.

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CHAPTER 2: LITERATURE REVIEW

2.1 Adolescent Girl Nutrition

Adolescence is a unique period that represents immense biological and socio-emotional development, typically alongside increased autonomy. The benefits of encouraging healthy practices in adolescence are likely to extend into adulthood and throughout the life course, though, until recently, the health and wellbeing of adolescents have been largely overlooked in policy and programming (18).Nutritional deficiencies have far reaching consequences, especially in adolescent girls. If their nutritional needs are not met, they are likely to give birth to undernourished children, thus transmitting under nutrition to future generations.

Adolescence represents a window of opportunity to prepare nutritionally for a healthy adult life. Some nutritional problems originating earlier in life can potentially be corrected, in addition to addressing current ones. It may also be a timely period to shape and consolidate healthy eating and lifestyle behaviors, thereby preventing or postponing the onset of nutrition-related chronic diseases in adulthood (27, 43).

The study done in Chakwal (Punjab) revealed that boys eat relatively better than the girls of same age and boys were taking more regular meals (78%) as compared to girls (62%). Dietary practices of the boys were better as compared to girls at P. Value < 0.002. Regularity in having breakfast was better in boys as compared to girls i.e. 87% boys and 64% girls. Almost similar pattern was observed in lunch consumption, where 80% boys and 70% girls were taking lunch regularly. Most of the male adolescents (89%) were taking their dinner regularly while only 65% female adolescents were regular in taking dinner(45). This implies that there need to have an attention on girls

2.2Dietary Practice of Adolescent girl

2.2.1Meal consumption and skipping behaviors

Breakfast skipping is defined as anything other than daily consumption of breakfast(28). A Systematic Review study done on the Dietary Intake and Practices of Adolescent Girls in Low-

and Middle-Income Countries: 42 studies (n = 44,990) had data on the prevalence of breakfast skipping among adolescent girls. For all adolescents (10–19 years), 40.3% reported skipping breakfast. It was slightly more common among adolescents aged 15–19 years (49%) compared to those aged 10–14 years (40%). They also noted with almost half of girls sampled in Africa and less than 20% of girls residing in Latin America and the Caribbean reporting that they skipped breakfast frequently(28)

In Africa study done in Ghanaian Junior High School Adolescents Dietary Practices and Food Preferences: Implications for Public Health Concern 62.8% of the respondents indicated that they usually skipped breakfast before going to school. The common reason given by many 34.6% of the breakfast skippers was that parents gave them money to buy food on their way to school, but they used the money to browse at the internet café after school. Nearly half (44.8%) of the respondents reported that they usually consumed an average of two cooked meals per day at home(46).

In Ethiopia there is lack of study on meal consumption and skipping habit especially on the adolescent girl

2.2.2Snaking habit and food consumption practice

Snacking is defined as eating between meals, regardless of the time of day when the food was consumed(28). Systematic review on snacking (N = 24; n = 12,647), it was found that 48.5% of adolescents (n = 6134) regularly consumed snacks throughout the day, with 55% of older adolescents snacking compared to 33% of younger adolescents. they also found that snacking was more common in the morning, between breakfast and lunch, and in the afternoon, between lunch and dinner, as compared to the evening(28).

Study done in Ghana When students were asked whether they usually brought food to school from their homes, 66.3% of them responded negatively. Of these (33.7%) students who usually brought food from home, 93(33.7%) brought cooked food such as boiled rice and stew/sauce. Another 76(27.5%) brought pastries (cookies, meat pie or cakes); and another 62(22.5%) brought Canned/packaged fruit juice to school, 86.1% of the students indicated that they usually bought a snack during break. Of the students who usually bought a snack or food at school, 41.7% indicated that they bought cooked food such as waakye (a combination of boiled rice and beans), kenkey (boiled corn dough) and fried fish, fried rice and fried chicken. Others 16.5% bought

pastries; (13.7%), ice cream; 13.0%, soft drinks; and 11.7%, canned/packaged fruit juice. A majority (54.6%) of the respondents reported that they took their own decisions regarding what to buy in school. However, with some 26.3%of them, parents gave instructions as to what their children should buy. Other respondents 10.0% were influenced by friends or classmates or elder siblings as to the food that they bought during break. About one-third (33.8%) of the respondents preferred a soft drink for snack during the day(46)

In Ethiopia there is no study done in the snaking habit.

2.3Dietary diversity practice and associated factors in adolescent girl

Dietary diversity score (DDS) is defined as a number of individual food groups consumed over a given period of time(47). It reflects quality diet at the household or individual level. In addition, DDS is measure of food security, nutrition information, early warning system and target of intervention at Global or national level (48, 49). Mostly, monotonous staple diets lack essential micronutrients which lead to macro and micronutrient deficiencies, particularly in the most vulnerable group(23)

Globally, Only 17% of adolescents had diversified diet(19). Similarly, 23.5–50% (20, 21) of the Iranian, 11.2% of Zimbabwe (22) and 26.8% Ethiopian Gurage zone adolescents was reported as having adequate dietary diversity(23). Number of the researches documented that maternal education (23), school type ,occupation, nutritional knowledge (25), residence (23, 25) and wealth status(23, 25)were associated with dietary diversity of adolescents

Study done in Jimma Town, South West Ethiopia in majority (61.3%) of students had dietary diversity score less than five and their mean (±SD) dietary diversity score was 4.34 ± 1.41. Low dietary diversity of school adolescent girls was positively associated with attending government schools, lack of maternal education and low-economic status(24).

Another study done in Gonder adolescent girls who met minimum dietary diversity with were 75.4%. School type and residence were significantly associated with adequate dietary diversity.(50)

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2.5Conceptual Framework

This conceptual framework was developed from different literatures on Dietary Diversity and its associated Factors among adolescent girl.(23-25, 28, 46, 48, 50-52)

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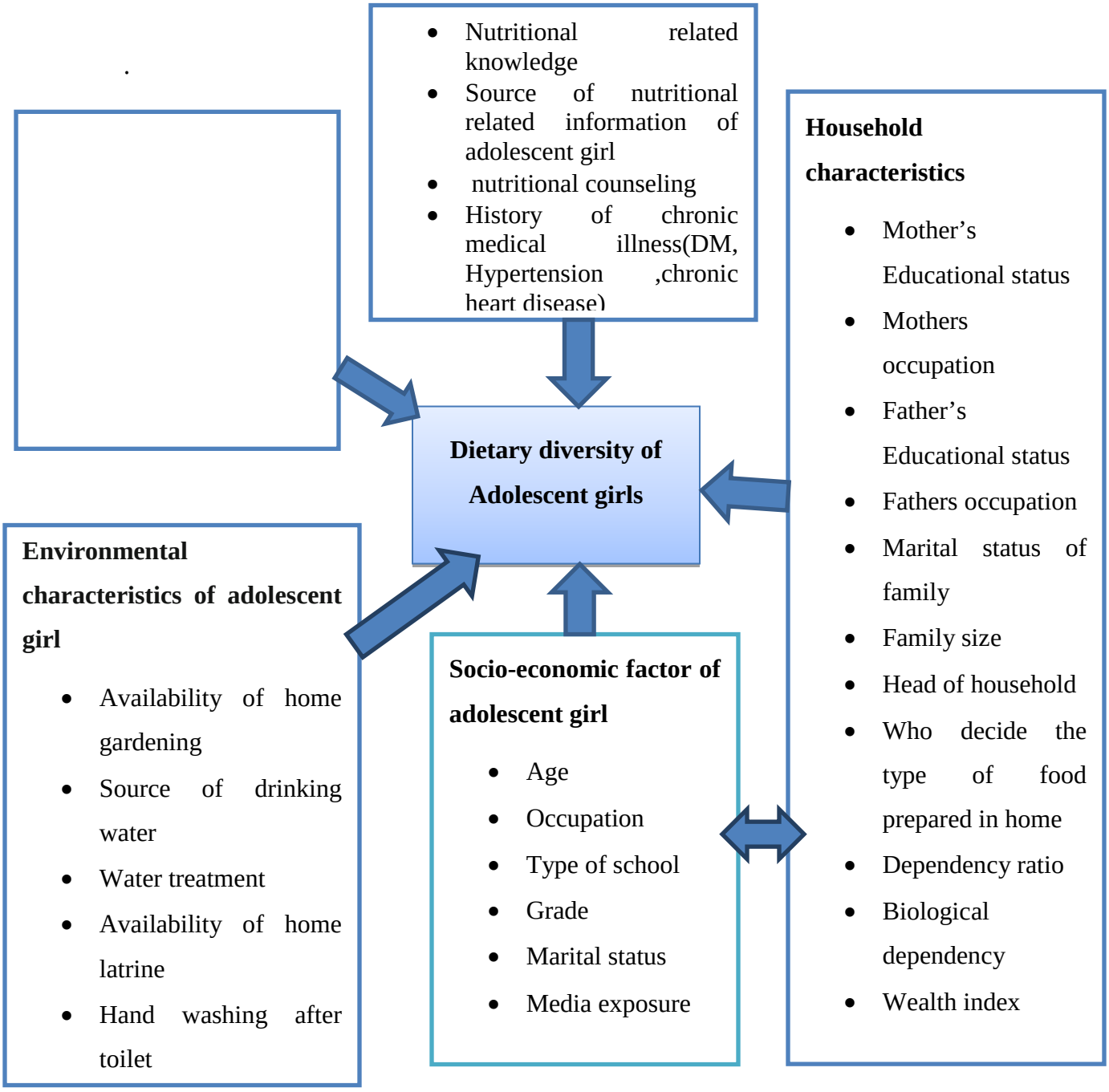

Figure 1: conceptual framework: the dietary practice and associated factors among adolescent girls in Yeka Sub city, Addis Abeba Ethiopia 2020.

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CHAPTER 3: OBJECTIVES

3.1 General Objective

- To assess dietary diversity and associated factors among adolescents girls in Yeka Sub city, Addis Ababa Ethiopia, 2020.

3.2 Specific Objectives:

- To determine dietary diversity among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020
- To identify factor associated with dietary diversity among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020

CHAPTER 4: METHODS AND MATERIALS

4.1 Study Area and period

The study was conducted in Yeka sub city, Addis Ababa, Ethiopia. Addis Ababa is the capital city of Ethiopia. Yeka sub-city is located in the North east Part of Addis Ababa city. The total area of the sub-city is 85.98 km square and 4,284.9 people live in one kilometer square. Moreover, its entire population of the area is 368,418 people and 47,921 estimated house hold. There are 13 woredas and 9 average Ketenas in each woredas based on the Yeka sub city administrative office 2019 data.

According to Yeka sub city 2019 data, the sub city had 11,593 estimated adolescent girls. On average there are 892 and 99 adolescent girls in single woreda and Ketena respectively.

The study was conducted from September 1 to 30, 2020.

4.2 Study Design

Community based cross sectional study was employed

4.3 Population

4.3.1 Source Population

All adolescent girls living in Yeka sub city Addis Ababa Ethiopia

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4.3.2 Study Population

All adolescent girls aged 10-19 in randomly selected Ketenas at Yeka sub city Addis Ababa Ethiopia

Sample unit

Individual adolescent girls.

4.3.3 Inclusion and Exclusion Criteria

Inclusion criteria

All adolescent girls living at least six month in randomly selected Ketenas at Yeka sub city Addis Ababa Ethiopia

Exclusion criteria

1 An adolescent girl who was critically ill during the study

4.4 Sample size determination

The sample size for first objective calculated using single population proportion formula:

$$n = \frac{\left(Z\frac{\alpha}{2}\right)^2 P(1-P)}{d^2}$$

By considering the following assumptions, the proportion of low dietary diversity score (<5) 0.754 among adolescent girl students a study done in the context of urban Northwest Ethiopia: 2017(50),a confidence level of 95% : 1.96, 1.5 design effect and a 0.05 margin of error become 428. By adding 10% non-response rate, finally become 471.

The sample size for second objective also calculated by using Epi info version 7.083 in the following table

Table 2: sample size calculation

Major variables	Assumptions	

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		Proportion of control exposed	Proportion of case exposed	Odd ratio	Case to control ratio	Confidence level	Power	Design effect	Total sample size with 10 % non-response rate	reference
School	Government	68.5	36.9	5.20	1:1	95%	80%	1.5	173	(24)
	Private									
Residence	Urban	24.8	57.2	0.80	1:1	95%	80%	1.5	60	(23)
	Rural									
School	Government	54.2	23.7	3.17	1:1	95%	80%	1.5	200	(50)
	Private									

From the calculated alternatives sample size 471 was the largest. Therefore 471 adolescent girls was included on the study

4.5 Sampling procedure

Multi-stage sampling technique was used to select the study participant. There were13 woredas and on average 9 Ketenas in each woreda at Yeka sub city. Of these, 4 woredas were randomly selected for the study. And then 3 Ketenas also selected for the study in each woreda. In order to obtain the sample size from each 3 Ketenas proportional allocation to sample size were done. Participating adolescent girls aged 10-19 during home to home visit households from the selected Ketenas were identified using systematic sampling technique from the woredas youth center frame. Finally every Kth adolescent girl from each house hold of selected Ketenas were identified until the required sample size fulfilled and the starting household was selected using a lottery method. If the eligible adolescent girls was absent during the first home visit, a second home visit was done, and if the adolescent girls was also absent at the second visit, she was considered as non-respondent. If there were more than one adolescent per household by lottery method the study was conducted only from one of

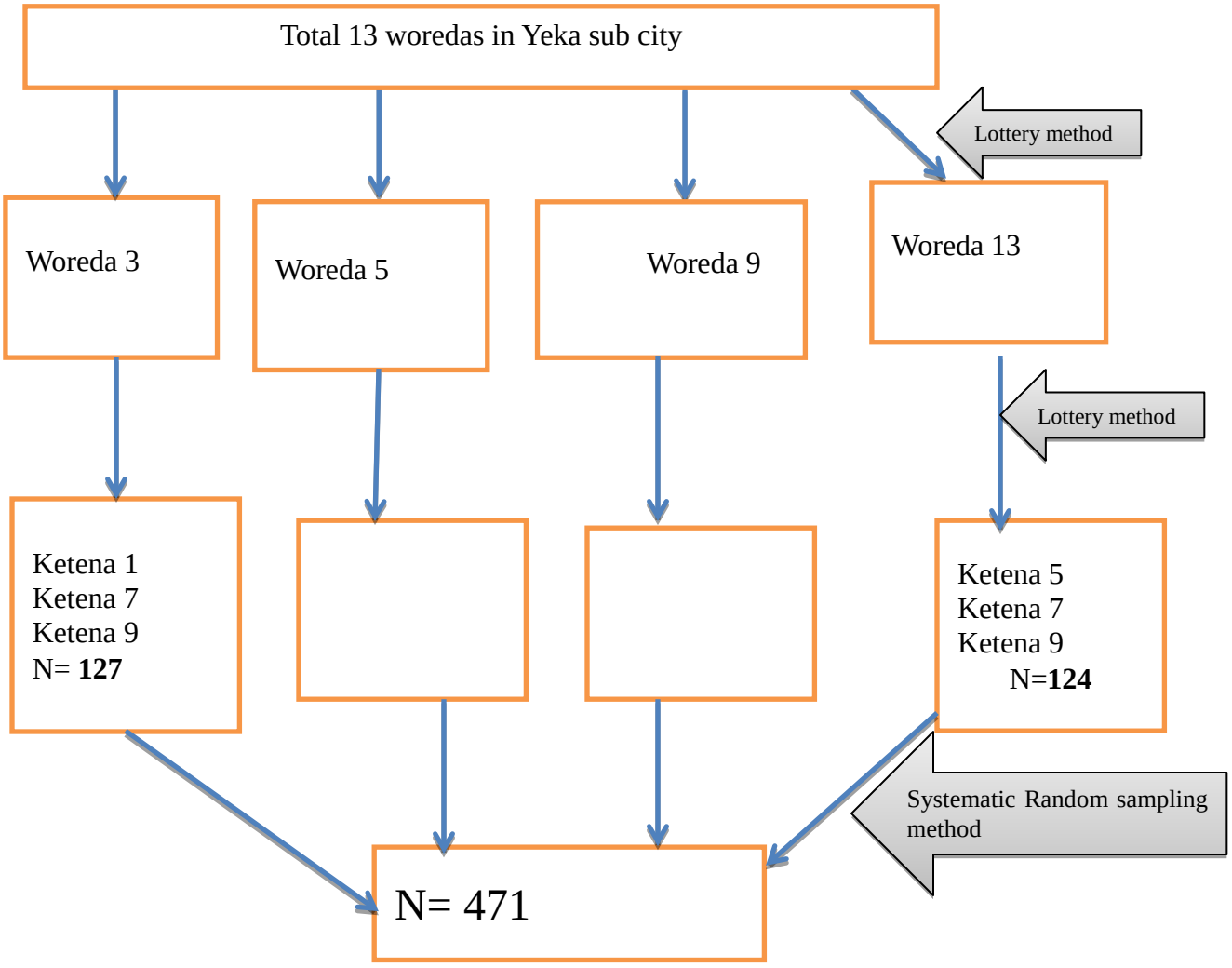

Figure 2: schematic representation of sampling procedure dietary diversity and associated factors among adolescent's girls in Yeka Sub city, Addis Ababa Ethiopia, 2020

4.6 STUDY Variables

4.6.1 Dependent Variable

- **Dietary diversity**

4.6.2 Independent Variables

- **Socio economic variables of adolescent girl**
  - ✓ Age
  - ✓ Type of school

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- ✓ Grade
- ✓ Marital status
- ✓ Media exposure

- **Family related information**
  - ✓ Mother's Educational status
  - ✓ Mothers occupation
  - ✓ Father's Educational status
  - ✓ Fathers occupation
  - ✓ Marital status of family
  - ✓ Wealth index
  - ✓ Family size
  - ✓ Head of household
  - ✓ Who decide the type of food prepared in home
  - ✓ Dependency ratio
  - ✓ Biological dependency
- **Culture related variables**
  - ✓ Eating time respective to family
  - ✓ Eating companions
- **Environmental characteristics**
  - ✓ Source of drinking water
  - ✓ Do you use water treatment
  - ✓ Availability of home latrine
  - ✓ Hand washing after toilet
  - ✓ Availability of home gardening
- **Nutritional related knowledge and source of information**
- **Nutritional counseling**
- **History of chronic medical illness (DM, Hypertension, chronic heart disease etc.)**

4.7 Operational Definitions

Adolescent ; is an individual with 10-19 years age group (1)

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Nutritional knowledge about twelve food items were assessed. This was aimed to assess whether adolescent girls had enough knowledge about the nutrients, advantage of diversified food and cause of malnutrition. A total nutrition knowledge score was obtained by adding the responses, scoring. A correct response was given a score of one, and an incorrect one had given a score of zero.(24)The knowledge score was classified as good and poor by data driven classification after having done PCA.

Dietary diversity is assessed using dietary diversity score, optimal dietary diversity score: adolescent girls who received goods greater than or equal to five food groups out of 9 food groups, which was created by summing up the number of food groups consumed over a 24 hour period by an individual. Otherwise it was sub optimal dietary diversity score (24, 50,53)

Wealth index was classified into tertile using PCA as poor, medium and rich based of EDHS 2016 list of household items

Improved drinking water sources' includes sources that, by nature of their construction or through active intervention, are protected from outside contamination, particularly fecal matter. These include piped water in a dwelling, plot or yard, and other improved sources.(54)

4.8 Data collection tools and processes

4.8.1 Data collection instruments

Data collection was accomplished by a semi structured questionnaire prepared in Amharic for socio-demographic characteristics of adolescent girls, dietary practices like meal pattern and frequency, type of food group, snaking habit and food consumption practice and skipping behaviors developed from similar literatures(23-25, 28, 46, 48, 50-52). The dietary diversity questionnaire developed from FAO 2011 Guidelines for measuring household and individual dietary diversity food groups were used to obtain information on subject’s food intake(48). Subjects were asked to recall all foods eaten and beverages taken in the previous 24 hr inside and outside the home. And also participants were asked to remember any snacks eaten between main meals.

4.8.2 Data collection procedures

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The data were collected by interviewer administered questionnaire. Data collectors were three nurse and two midwives. Training was given for data collectors regarding the purpose of the study and the procedures to be followed for data collection.

4.9 Data Quality Assurance

A questionnaire was first prepared in English and then translated to the local language Amharic. The training was given for data collectors and supervisors on methods of obtaining consent, study objectives, contents of the questionnaire, interviewing technique. Overall data collection was monitored daily and the questionnaire was checked for completeness and consistency at the end of the data collection date.

Pre-test

Before the actual data collection, the questionnaire was tested on 5% (23) adolescent girls in woreda 8 ketena 2 and 6 at Yeka sub city, Addis Ababa. Important amendments like word errors, unclear questions were checked and reedited for main data collection and also average number of adolescent girls in the ketena was estimated to be used as a sampling frame for final data collection

4.10 Data processing and analysis

The collected data were edited and entered by using Epidata software version 3.1 and cleaned and analysed using SPSS version 21.0. Normality of the data was checked using Kolmogorov-Smirnov Goodness of Fit Test and presented as mean and SD. Socio-demographic and other variables of students were presented by frequency tables, graphs and other summary statistic. Bivariate analysis was used to check association between dependent and independent variables and crude odds ratio (COR) with 95% CI was obtained.All variables that were have significant association with p-value <0.25 in the bivariate analysis were the candidate for multivariable logistic regression. Multivariable logistic regression model was fitted to identify factors affecting the dietary diversity score. P-value less than 0.05 were considered as statistically significant. The degrees of association between dependent and independent variables was assessed using OR at 95% CI.

The results of multivariable logistic regression with backward method after checking of model fitness test by Hosmer and Lemeshow test which had non-significant (with p value of 0.865)

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result were tested. And also multicollinearity was checked by using variance inflation factor of less than five (maximum VIF 1.595) indicating that there was no multicollinearity.

Principal component Analyses (PCA) was conducted to identify variables that explained high variability among household wealth response and nutrition knowledge responses ranked in to tertile and dichotomy respectively.

4.11 Ethical clearance

The ethical clearance was obtained from Jimma University institute of health ethical review committee and Addis Ababa health research and emergency management directorate with reference number of IRB 000345/2012 and A/A/H/1686/227 respectively. Support letter was obtained from department of nutrition and dietetics and official permission letter to undertake the study obtained from the Addis Ababa education office and Yeka Sub city administrative and health office. The supportive staffs (i.e. sub city and woreda administrates) was informed about the purpose of the study and written and verbal consent from their parents were obtained. Confidentiality of patient's information was assured and information recorded anonymously.

4.12Plan for dissemination of finding

The result of the study was submitted to Jimma University, department of Nutrition and dietetics, It will also submit to Addis Ababa health beauro and to the targeted health facility and to NGOs working on child and youth health. Further attempt will be made to publish it on national and international scientific journals

CHAPTER-5: RESULT

5.2 Socio-demographic characteristics of adolescent girls

A total of 464(98.5% response rate) adolescent girls from Yeka sub city Addis Ababa Ethiopia were interviewed in the study period.

The mean (± SD) age of the respondents was 14.98(±2.72) years and165 (35.6%) of the Adolescent girls were in the age range of 17-19 years. Among the total respondents 452(97.4%) were single and 262(56.5%) attended at private school. About their grade 253(54.3%) were primary school students and 463(99.8%) had media exposure like TV, radio, and other social medias.

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Table 3: Socio demographic characteristic of adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020.

Variables	Category	Frequency	Percent
Age	Early	149	32.1
	Middle	150	32.3
	Late	165	35.6
Marital status	Single	452	97.4
	Married	12	2.6
Type of school attend	Government	202	43.5
	Private	262	56.5
Educational status	Primary school	253	54.5
	Secondary school	120	25.9
	Preparatory school and Above	91	19.6
Media exposure like TV, radio, and other social medias.	Yes	463	99.8
	No	1	0.2

5.2 household related among adolescent girls

With respect to family related informations majority of their parents 403(86.9%) were married. Among the total respondents 172(37.1%) maternal educational status were college and above and 135 maternal occupation were private work. About 166(35.6%) father educational status were college and above and 166(35.6%) were government employ. And also 354(76.3%) household head were father and 362(78.0%) of prepared food in the household were decided by father. Among the total Household 243 (52.4%) had family size five and above. The dependent ratio 230(49.6%) were 50% and above and 424(91.4%) biological dependency of Adolescent girl were from their biological parents. Regarding to the wealth status based on wealth index 148(40.5%) were medium.

Table 4: Family related information among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020

Variables	Category	Frequency	Percent
Marital status of parent	Married	403	86.9
	Single	36	7.6
	Divorced	19	4.1
	Widowed	6	1.3
Educational status mother	Unable to read and write	69	14.9
	Able to read and write	55	11.9
	Primary school(grade 1-8)	41	8.8
	Secondary school(grade 9-12)	127	27.4
	College and Above	172	37.4
Occupation of mother	Housewife	124	26.7
	Government employee	114	24.6
	Private organization	135	29.1
	Merchant	76	14.4
	Daily laborer	15	3.2
Educational status of father	Unable to read and write	15	3.2
	Read and write only	73	15.7
	Primary school (Grade 1–8	79	17.0
	Secondary school(Grade 9-12)	131	28.2
	College and above	166	35.8
Occupation of father	Farmer	9	1.9
	Government employee	166	35.8
	Private organization	165	35.6
	Merchant	100	21.6
	Daily laborer	24	5.2
Head of household	Father	354	76.3

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	Mother	98	21.1
	Others	12	2.6
	Father	362	78.0
Who decide the type of food prepared in home	Mother	98	21.1
	Children	62	13.4
	Other	7	1.5
Family size	5 and above	243	52.4
	Less than 5	221	47.6
Dependency ratio	50% and above	230	49.6
	Less than 50%	211	45.5
Biological dependency of adolescent girl	with biological parents	424	91.4
	with grand parents	17	3.7
	other relatives	13	2.8
	non-biological relatives	10	2.2
Wealth index	Poor	154	33.2
	Medium	188	40.5
	High	122	26.3

5.3 ENVIRONMENTAL characteristics of adolescent girl

The Environmental characteristics of adolescent girls only 19(4.1%) have home gardening, 453(97.65) had improved water source and 66(14.2%) have no latrine.

Table 5: Environmental characteristics of adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020

Variables	Category	Frequency	Percent
Availability of home gardening	Yes	19	4.1
	No	445	95.9
Source of drinking water	Improved	453	97.6
	Unimproved	11	2.4
Do you use water treatment	Yes	312	67.2
	No	152	32.8

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Availability of home latrine	Yes	398	85.8
	No	66	14.2
Hand washing after toilet	Yes	436	94.0
	No	28	6.0

5.4 meal consumption and skipping habit of Adolescent girls

Majority of adolescent girls 316(68.1%) of had an eating champion with their family members and 355(72.2) were eat after other family eaten. Regarding to Satisfaction with body weight/Size and Shape 114(24.4%) were want bigger.

About skipping habit 127 (27.4%), 67(17.4%) and 84(18.1%) were skip their breakfast, lunch and dinner 1-2 times per week.

The number of cooked meals usually consumed per day 280(60.3%) were 3-4 times and the average meal per day was 3.16.

Table 6: Meal consumption and skipping habit in Yeka Sub city, Addis Ababa Ethiopia, 2020.

Variables	Category	Frequency	Percent
Eating companions	With family members	316	68.1
	With peers or friends	17	3.7
	Eats alone often	131	28.2
Eating time from other family member	Before other family member	92	19.8
	After other family member	335	72.2
	The same time as family member	37	8.0

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Satisfied with body weight/Size and Shape	No, wants to be bigger	114	24.6
	Yes, satisfied	269	58.0
	No, wants to be smaller	81	17.4
Always eat breakfast before going to school	Yes	388	83.6
	No	76	16.4
Reasons attributed to missing breakfast before school	Breakfast not prepared at home	35	43.8
	Parents give money to be used for buying food on way to school	2	2.5
	Fear of being late to school	37	46.3
	I prefer to buy food out from home as my breakfast	6	7.5
Number of times skipped breakfast in past week	Not skipped	309	66.6
	1-2 times/week	127	27.4
	3-4 times/week	28	6.0
Number of times skipped lunch in past week	Not skipped	380	81.9
	1-2 times/week	67	14.4
	3-4 times/week	17	3.7
Number of times skipped supper in past week	Not skipped	333	71.8
	1-2 times/week	84	18.1
	3-4 times/week	36	7.8
	5-6 times/week	6	1.3
	7 times/week	5	1.1
Average number of cooked meals usually consumed per day	one meal	18	3.9
	two meals	99	21.3
	Three to four meals	280	60.3
	More than four meals	67	14.4

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Meal frequency per day(average)	Mean= 3.16 (SD=0.99)

5.5 Snacking habits and Food Consumption Practices of Adolescent girl

More than two third of respondents were usually brought food from home to school and also 244(52.6%) were usually buy snacks/food at school during break time. Among them the majority food preference about were by their parents.

Table 7: Snacking habits and Food Consumption Practices in Yeka Sub city, Addis Ababa Ethiopia, 2020

Variables	Category	Frequency	Percent
Food is usually brought from home to school	Yes	367	79.1
	No	97	20.9
Type of food usually brought from the house to school	Cooked food (like injera with stew, pasta, macaroni)	304	65.5
	Packaged or canned Fruit juice (eg. Mango	102	22.0
	Pastries (eg. cookies, biscuits, cakes and other fast foods)	47	10.1
	Candies (toffee), chocolate	6	1.3
	Cocoa/Milo drink	5	1.1
Do you usually buy snacks/food at school during break time	Yes	244	51.6
	No	220	48.4
Type of snack/food usually bought in school	Yogurt/fan ice, fan chocolate	249	53.7
	Soft drink (coke, fanta, sprite etc)	30	6.5
	Canned/packaged fruit juice (eg.	42	9.1

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	Mango)		
	Fruit(eg. orange, banana, pineapple)	18	3.9
	Pastries (eg. cake, meat pie, sausage roll, doughnut and other fast food)	117	25.2
	Cooked food (eg. Injera with stew,past, mekoreni)	8	1.7
Who influences your decision on what you buy in School	Parents	223	48.1
	Elder sibling	66	14.2
	Friends/class mate	86	16.5
	No one (I decide on my own)	89	19.2

5.6 Nutritional Related knowledge of Adolescent girls

About half of the adolescent girls had poor knowledge and almost all the respondents had not got any nutritional counseling health and nutrition professionals. Majority of respondents got nutritional information from schools and also 20(4.35) had history of chronic disease like DM, hypertension, kidney, heart disease etc.

Table 8: Nutritional Related knowledge among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020

Variables	Category	Frequency	Percent
Nutritional related knowledge	Good	228	49.1
	Poor	236	50.1
Source of nutritional related information	Mass media	92	19.8
	Friends	29	6.3
	Family	51	11.0
	School	292	62.9
Nutritional counseling from health and nutrition	Yes	3	0.6
	No	461	99.4

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professionals			
History of chronic disease like DM, hypertension, kidney, heart disease	Yes	20	4.3
	No	444	95.7

5.7 Dietary diversity Score

The mean and the standard deviation of Dietary diversity score was 3.75 and 1.16 respectively. Among them also 77.6% (360) adolescent girls had low dietary diversity score.

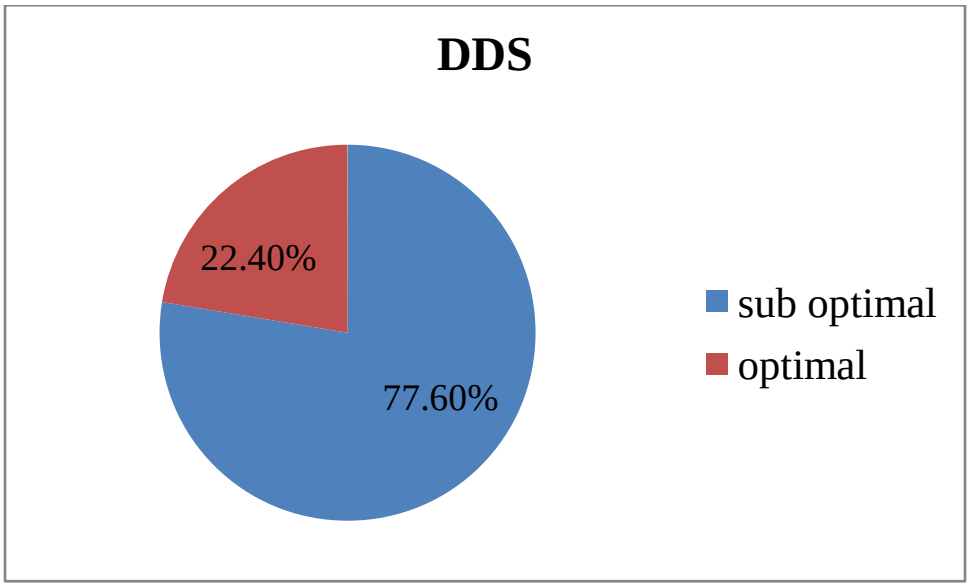

Figure 3: Dietary diversity Score among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020.

The majority 83% and 73.9% of adolescent girls consumed cereal based foods and Legumes/ Nuts respectively. Greater than half (59.3%) of the study participants consumed other fruits. Nearly a half (44.0%) and 39.2% of study participants consumed Vit A Rich Fruits/Vegetables and DGLV respectively. A small number of adolescent girls reported that they consumed organ meat (8.2%) and milks (11.4%).

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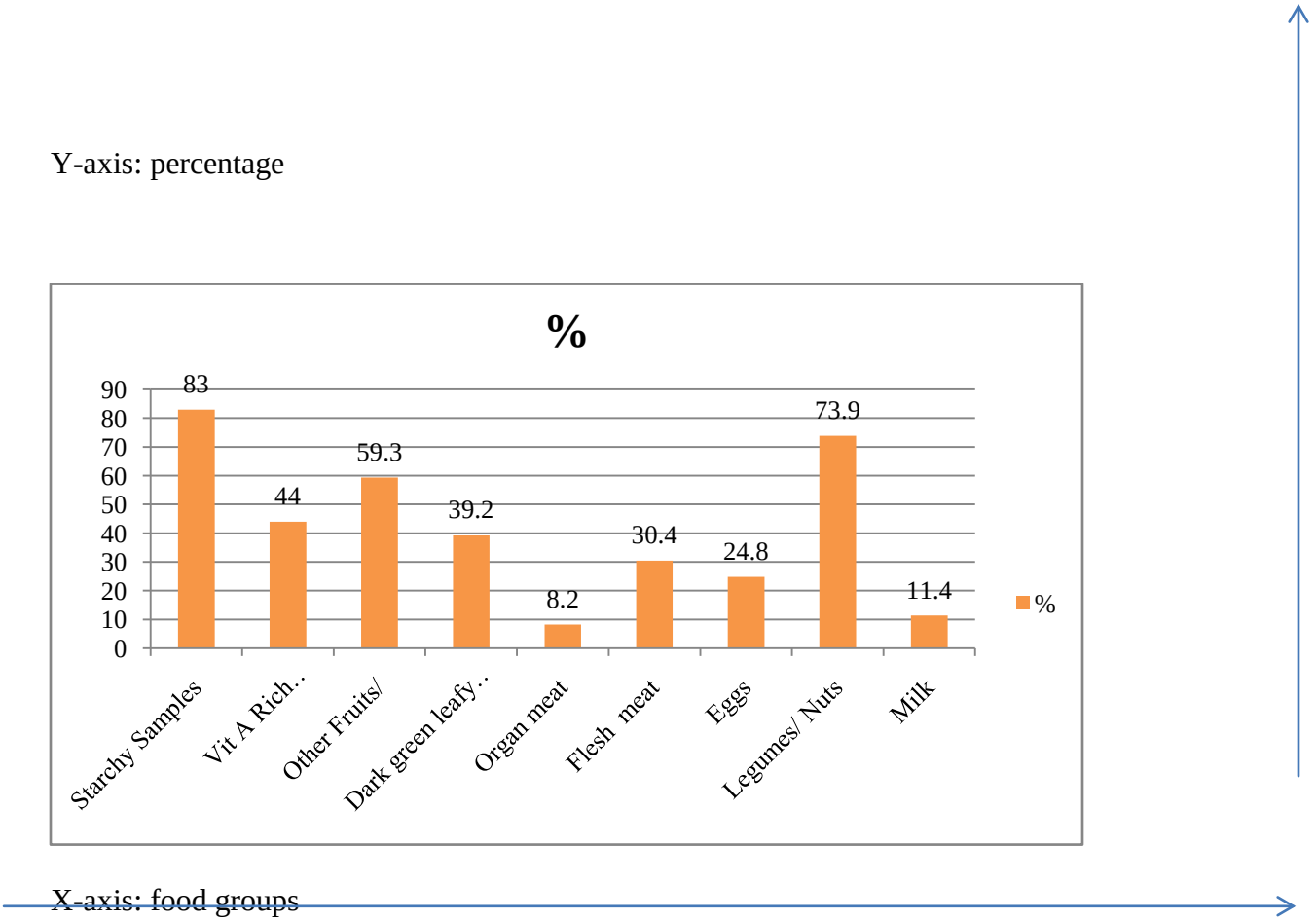

Figure 9: Types of food groups among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020.

5.8 Factors associated with Dietary diversity Score among adolescent girls

Chi square test and bivariate analysis was done to assess any association between individual independent variables and DDS. Age of adolescent girls, type of school attended, grade of adolescent girls, marital status of adolescent girls, maternal educational status, family size, dependency ratio and wealth index were significantly associated with (P-values<0.25) and entered in logistic regression.

Finally, the odds of sub optimal dietary diversity score were 2.14 times higher in among government school attendant compare to private [AOR, 2.14 (95% CI: 1.37, 4.07)], the odds of low DDS were 2.98 times higher in elementary grade students [AOR, 2.98 (95% CI: 1.27, 7.01)], and 2.87 times higher in high school students[AOR, 2.87 (95% CI: 1.21, 6.77)],as compare to preparatory students. The odds of low DDS were 3 times higher in elementary level maternal

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educational status [AOR, 3.00 (95% CI: 1.07, 8.28)], and 2.45 times higher in Secondary school level [AOR, 2.45 (95% CI: 1.32, 4.59)], as compared to maternal education with college and above level. The finding also showed that the odds of low DDS were 59.0% less likely among family size 5 and above as compared to family size below 5 [AOR, 0.41 (95% CI: 0.23, 0.73)].The odds of low DDS were 3.75 times higher among dependency ratio 50% and above compared to less than 50% [AOR, 3.75 (95% CI: 2.01, 6.33)].

Table 10: Results of Bivariate and multivariable Logistic Analysis of factors associated with Dietary diversity Score among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia. 2020

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Variables		DDS		COR	P-value	AOR	P-value
		Sub optimal No (%)	optimal No (%)	(95% CI)		(95% CI)	
Age	Early	101(28.1%)	48(39.4%)	0.57(0.34-0.94)	0.028	0.44(0.20-1.00)	0.051
	Middle	129(35.8%)	21(20.2%)	1.61(0.91-2.99)	0.097	1.63(0.73-3.65)	0.232
	Late	130(31.6%)	35(33.7%)	1		1	
Type of school	Government	181(50.3%)	21(20.2%)	4.0(2.37-6.73)	0.001	2.14(1.37-4.07)	0.020*
	Private	179(49.7%)	83(79.8%)	1		1	
Grade	Primary school	196(54.5%)	57(54.8%)	1.69(0.99-2.87)	0.051	2.98(1.27-7.01)	0.012*
	Secondary school	103(28.6%)	17(16.3%)	3.00(1.52-5.85)	0.001	2.87(1.21-6.77)	0.016*
	Preparatory school and Above	61(16.9%)	30(28.9%)	1		1	
Marital status of adolescent	single	354(98.3%)	98(94.2%)	3.61(1.14-11.45)	0.029	----------	
	Married	6(1.7%)	6(5.8%)	1		1	
Maternal educational status	Unable to read and write	69(19.2%)	0(0%)	---------		----------	
	Read and write only	55(15.3%)	0(0%)	---------		----------	
	Primary school (Grade 1–8)	35(9.7%)	6(5.8%)	3.91(1.56-9.79)	0.004	3.00(1.09-8.28)	0.034*
	Secondary school(Grade 9-12)	98(27.2%)	29(27.9%)	2.26(1.37-3.79)	0.002	2.45(1.32-4.57)	0.005*

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	College and above	103(26.6%)	69(66.3%)	1		1	
Family size	5 and above	179(49.7%)	64(61.5%)	0.62(0.40-0.97)	0.034	0.41(0.23-0.73)	0.003*
	Less than 5	181(50.3%)	40(38.5%)	1		1	
Dependency ratio	50% and above	190(56.4%)	40(38.5%)	2.07(1.32-3.24)	0.002	3.75(2.01-6.33)	0.001**
	Less than 50%	147(43.6%)	64(61.5%)	1		1	
Wealth index	Poor	132(36.7%)	22(21.2%)	2.22(1.22-4.07)	0.009	1.30(0.62-2.72)	0.485
	Middle	139(38.6%)	49(47.1%)	1.07(0.63-1.76)	0.848	0.96(0.49-1.86)	0.898
	Rich	89(24.7%)	33(31.7%)	1		1	

***Significant at P value <0.05, ** significant at p value <0.001, AOR= adjusted odds ratio, COR: Crude Odds Ratio, P: P value**

CHAPTER-6: DISCUSSION

This study demonstrated that average dietary diversity score was 3.75(±1.16) and the prevalence of low dietary diversity among adolescent girls was 77.6%, which was slightly higher when compared to Gurage zone 73.2% (23), Jimma Town, South West Ethiopia61.3% (24) and Gonder adolescent75.4% (50).However, this finding is relatively low when compared to another study done in Jimma town where 12% of school adolescents had low DDS (55). And also at country level this study still higher in 50–76.5% (20, 21) of the Iranian, lower than 88.8% of Zimbabwe (22)and lower at Global level which was only 17% of adolescents got diversified diet (19). The mean DDS was lower when compared to a study in Jimma Town, South West Ethiopia which was 4.34(±1.415)(24) and 4.69±1.46 in Ethiopian Gurage zone adolescents (23), This might be due to lack of accessibility of diversified diet in the city.

The majority 83% and 73.9% of adolescent girls consumed starch staples (cereal based foods) and Legumes/ Nuts respectively. Greater than half (59.3%) of the study participants consumed other fruits. Nearly a half (44.0%) and 39.2% of study participants consumed Vit A Rich Fruits/Vegetables and DGLV respectively. A small number of adolescent girls reported that they consumed organ meat (8.2%) and milks (11.4%). This finding was consistent with a study done in Gondar City Administration, Northwest Ethiopia: Majority (97.7%) of adolescent girls

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consumed starchy staples (grains, roots and tuber) and only 32.4% ate fruits(50). Another study in Jimma town also supports the current study (24) .This is Obviously that, dietary habit of developing nations is entirely depends on starchy staples(56)

Breakfast skipping is anything other than daily consumption of breakfast(28) and breakfast is very important especially among adolescents who are still in school. This study showed that 16.4 % of the respondents no always eat breakfast before go to school which is lower when compared to a Systematic Review study done on Adolescent Girls in Low- and Middle-Income Countries: 42 studies (n = 44,990) had data on the prevalence of breakfast skipping among adolescent girls. For all adolescents (10–19 years), 40.3% reported skipping breakfast. It was slightly more common among adolescents aged 15–19 years (49%) compared to those aged 10–14 years (40%) and almost half of girls sampled in Africa and less than 20% of girls residing in Latin America and the Caribbean reporting that they skipped breakfast frequently(28). It is also lower when compared to Africa study done in Ghanaian Junior High School Adolescents which was 62.8% of the respondents indicated that they usually skipped breakfast before going to school(46).In Ethiopia there is lack of study on skipping habit especially on the adolescent girls.

Snacking is eating between meals, regardless of the time of day when the food was consumed(28). This study showed that 79.1% of the respondents had usually brought food from home to school and which is higher than Systematic review on snacking (N = 24; n = 12,647), it was found that 48.5% of adolescents (n = 6134) regularly consumed snacks throughout the day, with 55% of older adolescents snacking compared to 33% of younger (28).The finding also higher when compared to study done in Ghana When students were asked whether they usually brought food to school from their homes, 66.3% of them responded negatively 33.7% students who usually brought food from home. In the current finding 52.6% of adolescent girls usually buy snacks/food at school during break time which is lower when compared with this Ghana students study since 86.1% of the students indicated that they usually bought a snack during break(46) . In Ethiopia there is lack study done in the snaking habit.

The results of this study indicated that 46.1% of adolescent girls had good knowledge about the deficiency and source of different kinds of micronutrients like iron, iodine and vitamin A and their consequences. Dietary knowledge of adolescent girls was lower when compared to the findings from Jimma Town, South West Ethiopia (24). Similarly, interventional study done in

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Jimma zone showed that school based health and nutrition education had significant contribution in the improvement of dietary practices(26). This might be due to nutrition education is not being given by government and non-governmental organizations.

The result of multivariate logistic regression analysis showed that adolescent girls attending in governmental schools had two times more likely to have sub optimal dietary diversity score compared to those who attended private schools. The finding is consistent with other studies in Ethiopia adolescent girls attending school had significantly associated with DDS(24, 50). This may be due to the fact that the children of families with better socio-economic status can afford to study at private schools hence; as demonstrated in the current study, the attendants of private schools are more likely to get access to diversified foods(24).High household socioeconomic status is key to enhance household and individual dietary diversity(50). This may be related to poor affordability of variety of food ingredients among families with low socio-economic status(26, 55)

The finding also revealed that elementary students and high school students were 3 times and 2.87 times more likely to had sub optimal DDS compared to preparatory school adolescents respectively. This might be due to the fact that as the grade level is increase the knowledge of diversified diet will be rise. This difference also might be due to an exposure to different nutrition related health education in the current study area(55).

In addition maternal educational status primary level and secondary school level were 3.0 and 2.45 times more likely to have suboptimal DDS compared to college and above levels. This finding is consistent with the study done in Jimma town and Gurage (23, 24). The reason could be in most areas the role of food preparation and serving is given for females. So this gives them a power to decide the quantity and quality of food that will be prepared in the household. Awareness about diversification of food could be related with their educational level. So that low grade maternal education level had low knowledge on the diversified diet and interventional study done in Jimma zone showed that school based health and nutrition education had significant contribution in the improvement of dietary practices(26).

Family size 5 and above had 59.5 % less likely to had sub-optimal DDS compared to family size less than 5. This might be due to the different social structure in different areas.

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Lastly dependency ratio of 50% and above had 3.6 times more likely to have sub-optimal DDS than compared to less than 50%. This might be as the number of dependent age group less than 15 and greater than 65 years old increases, the economic status may not be comparable at household level. Adolescents from families with lower socioeconomic status were more likely to have a lower dietary diversity scores among school compared to their counterparts.(55)

The result of this study implied that three from four adolescent girls got sub-optimal dietary diversity .As a result, there is a need to strengthening of dietary diversity practice and focusing the identified factors for the sub-optimal dietary practice in the study area.

Strength and limitation of the study

The results of this study have a significant contribution to address the nutritional problems of adolescent girls. The major strength was being community based study

The limitation of the study were cross-sectional nature of the study limits the strength of determining associated factors. The study assessed individual dietary diversity only for the last 24 h; hence, there might be lack of a correct reflection of the usual dietary habits of adolescents and also leads to social disability bias.

7 CONCLUSIONS AND RECOMMENDATION

7.1 conclusion

The mean dietary diversity of adolescent girls in Yeka sub city Addis Ababa Ethiopia was low. The prevalence of sub optimal DDS (food group less than 5) was also high. Adolescent girls attending School type, Grade level, maternal education, family size and dependency ratio were significantly associated with low dietary diversity Score.

7.2 recommendations

- **For Sub city health office**: Strengthening nutritional education at all health care level and community based awareness with the Health extension workers both mothers and their children

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- **For Sub city Education office**: starting Nutritional education and counseling at lower grade level and continue also to the higher levels.
- **For Researcher:** It is to be noted that there is limited studies at community level have been in the country and as such these findings will save as a baseline for future related studies.

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ANNEX-I INFORMED AND WRITTEN CONCENT

Title of the Research Proposal: Dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia 2020 cross sectional study

Name of Principal Investigator: Getachew Sale , ID A20015/10

Name of the Organization: Jimma University

Introduction

We are planning to conduct study on Dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia 2020. We wish to find out ways by which we can identify the determinants and develop strategic interventions so as to address the problem. We value your input to make this study a successful one.

Purpose of the Research Project

The aim of this study is to assess the Dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia from, 2020

Procedure

You are randomly selected to be one of the study participants. If you are willing to participate in this study, you will be requested to sign the consent form after you clearly understand the aim of

this study. Finally you are kindly requested to give your genuine response in the interview questionnaire.

Risk and /or Discomfort

By participating in this research project, you may have some discomfort. There are no or minimal anticipated risk but you will take time about 25 minutes for interview.

Benefits of being in the study

There may not be direct benefits to you for giving us information for the study but your participation is likely to help us in Dietary diversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020, ultimately this will help us to provide information for planners to implement interventions.

Confidentiality and Privacy Protections:

You do not need to tell your name to the data collector. All your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your responses.

Incentives/Payments for Participating

You will not be provided any incentives or payment to take part in this project.

Right to Refusal or Withdraw

You have the full right to refuse from participating in this research. You have also the full right to withdraw from this study at any time you wish.

Contacts and Questions:

If you have any questions about the study please ask now. If you have questions later, want additional information, or wish to withdraw call the researcher conducting the study.

1. ——————

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ANNEX-IIQUESTIONNAIRE

Jimma University

Department Human Nutrition and dietetics

Dietarydiversity and associated factors among adolescent girls in Yeka Sub city, Addis Ababa Ethiopia, 2020 cross sectional study

Q.No	Question	Choices	Skip	Remark
Part One: Socio demographic and economic characteristics of the respondent.				
101	age in years	……..		
102	Type of school attend	1. Government 2. Private		
103	Grade level	……..		
104	Income per month in Ethiopian birr	……		
105	Marital status	1. Married 2. Single 3. Divorced		
105	Media exposure	1. Yes 2. No		
Part 2 Family Related Information				
201	Marital status of parent?	1. Married 2. Single 3. Divorced 4. widowed		
202	Educational status mother	1.Unable to read and write 2.Read and write only 3.Primary school (Grade 1–8) 4.Secondary school(Grade 9-12) 5.College and above		
203	Occupation of mother	1. House wife 2. Government employee 3. Private organization 4. Merchant 5. Daily laborer 90 other specify		
204	Educational status of father	1.Unable to read and write 2.Read and write only 3.Primary school (Grade 1–8)		

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		4.Secondary school(Grade 9-12) 5.College and above		
205	Fathers occupation	1. Farmer 2. Government employee 3. Private organization 4. Merchant 5. Daily laborer 90 other specify		
206	Head of household	1. Father 2. Mother 3. Others		
207	Who decide the type of food prepared in home	1. Mother 2. father 3. children 4. other		
208	Family Size	----------		
209	No of people age < 15 and>64 years old	……..		
210	Biological dependency of adolescent girl	1. with biological parents 2. with grand parents 3. other relatives 4. non-biological relatives 5. other 6. independent		
211	Does your household have: 1. Own house 2. Sofa 3. Mattress 4. Car 5. Bicycle 6. Motor cycle 7. Television 8. Refrigerator 9. Electric stove 10. Mitad electric 11. Gas stove 12. Table and chair 13. DVD player/CD/VCD 14. Video camera 15. Digital camera 16. Washing machine	1. Yes 2. No 1. Yes 2. No		

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	17. Mobile phone 18. Telephone wire less 19. Fixed line telephone 20. Computer 21. Shelf 22. Domestic animals 23. Radio/tape 24. Bajaj	1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No 1. Yes 2. No		
Part 3 Environmental characteristics of adolescent girl				
301	Availability of home gardening	1. Yes 2. No		
302	Source of drinking water	1. Improved 2. Unimproved		
303	Do you use water treatment	1. Yes 2. No		
304	Availability of home latrine	1. Yes 2. No		
305	Hand washing after toilet	1. Yes 2. No		
Part 4 meal consumption and skipping habit of Adolescent girls				
401	Eating companions	1. With family members 2. With peers or friends 3. Eats alone often		
402	Eating time from other family member	1. Before other family member 2. The same time as family member 3. After other family member		
402	Satisfied with body weight/Size and Shape	1. No, wants to be bigger 2. Yes, satisfied 3. No, wants to be smaller		
403	Always eat breakfast before going to school	1.Yes 2.No		
404	If no to Q203, Reasons attributed to missing breakfast before school	1. Breakfast not prepared at home 2. Parents give money to be used for buying food on way to school 3. Fear of being late to school 4. I prefer to buy food out from home as my breakfast		
405	Number of times skipped breakfast	1. Not skipped 2. 1-2 times/week		

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	in past week	3. 3-4 times/week 4. 5-6 times/week 5. 7 times/week		
406	Number of times skipped lunch in past week	1. Not skipped 2. 1-2 times/week 3. 3-4 times/week 4. 5-6 times/week 5. 7 times/week		
407	Number of times skipped supper in past week	1. Not skipped 2. 1-2 times/week 3. 3-4 times/week 4. 5-6 times/week 5. 7 times/week		
408	Average number of cooked meals usually consumed per day	1 one meal 2 two meals 3 three meals four meals 4 More than four meals		
410	Meal frequency per day(average)	……		
Part 5 Snacking habits and Food Consumption Practices				
501	Food is usually brought from home to school	1. Yes 2. No		
502	Type of food usually brought from the house to school	1. Packaged or canned Fruit juice (eg. Mango) 2. Cocoa/Milo drink 3. Pastries (eg. cookies, biscuits, cakes and other fast foods) 4. Candies (toffee), chocolate 5. Cooked food (like injera with stew		
503	Do you usually buy snacks/food at school during break time	1. Yes 2. No		
504	Type of snack/food usually bought in school	1. Yogurt/fan ice, fan chocolate 2. Soft drink (coke, fanta, sprite etc) 3. Canned/packaged fruit juice (eg. Mango) 4. Fruit(eg. orange, banana, pineapple) 5. Pastries (eg. cake, meat pie, sausage roll, doughnut and other fast food) 6. Cooked food (eg. Injera		

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		with stew)		
505	Who influences your decision on what you buy in School	1. Parents 2. Elder sibling 3. Friends/class mate 4. No one (I decide on my own)		
Part 6 Nutritional Related knowledge				
	Nutrition knowledge item			
601	Knows the dietary sources carbohydrate	1. Yes 2. No		
602	Knows the dietary sources of fat	1. Yes 2. No		
603	Knows the dietary sources of fiber	1. Yes 2. No		
604	Knows the dietary sources of Vitamins	1. Yes 2. No		
605	Knows the dietary sources of minerals	1. Yes 2. No		
606	Knows the benefits of diversified diet	1. Yes 2. No		
	Causes of malnutrition			
607	Knows iron deficiency	1. Yes 2. No		
608	Knows about marasmus and kwashiorkor	1. Yes 2. No		
609	Knows the three cause of malnutrition	1. Yes 2. No		
610	Knows the causes of anemia	1. Yes 2. No		
611	Knows the causes of goiter	1. Yes 2. No		
612	Knows the causes of vitamin A deficiency	1. Yes 2. No		
	Source of information about nutrition related information			
613	Source of information	1. Mass media 2. Friends 3. Family 4. School		
614	Nutritional counseling	1. Yes 2. No		
615	History of chronic disease	1. Yes 2. No		
Part 7Dietary diversity Questionnaire / By 24 hours' dietary recall				
701 Please describe the foods (meals and snacks) 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 and snacks not mentioned. **Format for conducting dietary intake using 24-hour recall**				

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Breakfast	Snack	Lunch	Snack	Dinner	Snack	

Did you eat anything (a meal or snack) OUTSIDE the home yesterday? When the respondents recall is complete, fill in the food groups based on the information recorded above. For any food groups not mentioned, ask the respondent if a food item from this group was consumed.

702 DDS
Format for summarized women's dietary diversity score/WDDS/

Starchy Samples	Vit A Rich Fruits/Vegetables	Other Fruits/ Vegetables	Dark green leafy vegetables	Organm eat	Fleshm eat	Eggs	Legumes/ Nuts	Milk	WDDS Score
Corn,rice, barely,wheat,pasta, sgarcane,sugarbeet,potato,cornflake	Mango,carrot,papaya,pumpkin,spinach, watermelon,fresh , sweet potato,	Banana, orange, grapefruit,lemon,tomato,strawberry	spinach, ;lettuce, green beans,cabbage,greenpepper,mustardgreens,zucchini,	Kideny meat,livermeat, heart meat	Sheep, cow,ox meat	eggs	Peas.beans,lentils,soyabeans,chickpeas,	Milk,yoghurt,cheese	

43 | Page

ANNEX-III QUESTIONNAIRE (AMHARIC VERSION)መጠይቅ

ጅማ ዩኒቨርስቲ

የሰው ምግብ እና የማዕድ ጥናት ክፍል

በኢትዮጵያአዲስአበባ ከተማ የካ ክፍለ ከተማ ዕድሜያቸው ከ10-19 ያሉ ሴት ተማሪዎች (ኮረዳ)

የምግብ አመጋገብ እና ከሱ ጋር ተያያጂ ምክኒያቶች ጥናት ፡፡

ክፍል አንድ፡- ሥነ- ህዝብ፤ ማህበራዊ እና ኢኮኖሚያዊ ጉዳዮችንበ ተመለከተ የተዘጋጁ

ጥያቄዎች

ተ.ቁ ጥያቄዎች አማራጭመልሶች ይለፉ ምርመራ
101 ዕድሜሽስንትነዉ? ------------ ዓመት
102 የትነውየሚማሩት? 1. የመንግስትት/ቤት
2. የግልት/ቤት
103 የክፍልደረጃ? ....
104 የቤታችሁአማካይየወርገቢስንትነዉ? -----------------ብር
105 የጋብቻሁኔታዎ? 1. ያላገባች
2. ያገባች
3. የፈታች
106 ሬዲዮወይምቴሌቪዥንአላችሁ? 1. አዎ
2. የለም

ክፍል 2፡- ስለቤተሰብ የተያያዘ ጥያቄዎች

ተ.
ቁ

ጥያቄዎች አማራጭመልሶች ይለ
ፉ
201 የቤተሰብየጋብቻሁኔታዎ? 1. ያገባች
2. ያላገባች
3. የፈታች
4. ባሏየሞተባት
202 የእናትየትምህርትደረጃ? 1.ማንበብናመፃፍየማትችል
2. ማንበብናመፃፍየምትችል

3. አንደኛደረጃ (1 – 8ኛክፍል)
4.
ከዘጠነኛእስከአስራሁለተኛክ
ፍል
5. ዲግሪናከዚያበላይ
203 የእናትሥራዎምንድንነዉ 1. የቤትእመቤት
2. የመንግስትሰራተኛ
3. የግልድርጅትሠራተኛ
4. ነጋዴ

GSJ: Volume 9, Issue 7, July 2021
ISSN 2320-9186

888 GSJ© 2021

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44 | Page

5. የቀንሰራተኛ
6.

ሌላ(ይጠቀስ)………………….
.

204 የአባትየትምህርትደረጃ? 1.ማንበብናመፃፍየማይችል
2. ማንበብናመፃፍየሚችል

3. አንደኛደረጃ (1 – 8ኛክፍል)
4.
ከዘጠነኛእስከአስራሁለተኛክ
ፍል
5. ዲግሪናከዚያበላይ
205 የአባትሥራምንድንነዉ? 1. ገበሬ
2. የመንግስትሰራተኛ
3. የግልድርጅትሠራተኛ
4. ነጋዴ
5. የቀንሰራተኛ
6. ሌላ

(ይጠቀስ)…………………..
206 ማነውየቤቱአስታዳዳሪ? 1. አባት
2. እናት
3. ሌላ

(ይጠቀስ)……………
… …..

207 ማነውቤትምንአይነትምግብመሰራትያለበትየሚወስ
ነው?

1. እናት
2. አባት
3. ልጃች

4. ሌላ (ይጠቀስ)……….
208 የቤተሰብብዛት? -----------------
209 ከ 15 አመት በታች እና ከ64 አመት በላይ ያሉ
የቤተሰብ ብዛት

----

210 የምትኖሪዉ ከማን ጋር ነው 1. ከእናት እና አባቴ ጋር
2. ከአያት ጋር
3. ከሌሎች ዘመዶች ጋር
4. የስጋ ዝምድና
ከሌላቸዉ ሰዎች ጋር
5. ለብቻሽ
211 የሚከተሉት አሉ?
1. የራስቤት
2. ሶፋ
3. ፍራሽ
4. መኪና
5. ብስክሌት
6. የሞተርሳይክል
7. ቴሌቪዥን
8. ማቀዝቀዣ
9. የኤሌክትሪክምድጃ
10. የኤሌክትሪክምጣድ
11. የጋዝምድጃ

1 አለ 2 የለም
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GSJ: Volume 9, Issue 7, July 2021
ISSN 2320-9186

889 GSJ© 2021

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45 | Page

12. ጠረጴዛእናወንበር
13. ዲቪዲማጫወቻ / ሲዲ / VCD
14. ቪዲዮካሜራ
15. ዲጂታልካሜራ
16. ማጠቢያማሽን
17. ሞባይል
18. የስልክሽቦያነሰ
19. የቋሚ መስመርስልክ
20. ኮምፒተር
21. መደርደሪያ
22. የቤትእንስሳት
23. ሬዲዮ / ቴፕ
24. ባጃጅ

1 አለ 2 የለም
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1 አለ 2 የለም
ክፍል 3 ፡- የኮረዳ የአከባቢ ተግባራት ጥያቄዎች

ተ.ቁ ጥያቄዎች አማራጭ መልሶች ይለፉ
301 ቤታችውየአትክልትቦታአለ? 1. አዎ
2. የለም
302 የመጠጥውሃምንጭ? 1. የተሻሻለ
2. ያለተሸሻለ
303 ውሃማከሚያትጠቀማላችው? 1. አዎ
2. የለም
304 ቤታችውሽንትቤትአለ? 1. አዎ
2. የለም
305 ሽንትቤትበኃላእጆችሁንይጣጠባሉ? 1. አዎ
2. የለም
ክፍል 4 ፡- የኮረዳአመጋገብእናምግብንየመዝለልሌምድጥያቄዎች

ተ.
ቁ

ጥያቄዎች አማራጭ መልሶች ይለ
ፉ
40
1

በአብዛኛውጊዜከማንጋርነውምግብየምትበይው? 1.ከቤተሰቦቼጋርየምበላው
2.ከጋደኞቼጋርየምበላው
3.ብቻዬንየምበላው
40
2

ከሌላዉ በተሰብ አንጻር መችነው የምትመገቢ 1. ቀደም ብየ
2. እነሱ በሚበሉበት
ተመሳሳይጊዜ
3. እነሱ ከበሉ ነኋላ
40
3

በሰውነትቅርጽሽእናበክበደትሽደስተኛነሽ? 1.የለምመወፈርእፈለጋለው
2.አዋደስተኛነኝ
3. የለምመቀነስእፈለጋለው
40
4

ት/ቤትከመሄድሽበፊትሁሌቁርስትበያለሽ? 1. አዎ
2. የለም

40 ጥያቄተ.ቁ(403) የለምከሆነለምንነወየማትበይው? 1.ቁርስቤትስለማይዘጋጅልኝ

GSJ: Volume 9, Issue 7, July 2021
ISSN 2320-9186

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5		2. □□□□

47 | Page

እንጀራበወጥ)
505 ማነውእድገዥተጽኖያደረገብሽ? 1. ወላጆቼ
2. ታላቅወድሜ /እህቴ

3. ጋደኞቼ (የክላሴልጆች)
4. ማንም (
በራሴነዉየወሰንኩት)
ክፍል 6 ፡- የስነ_ምግብእውቀትጥያቄዎች

ተ.
ቁ

ጥያቄዎች አማራጭመልሶች ይለ ፉ
ስለሰውምግብየሚጠናእውቀትግብሀት
601 ካርቦአድሬትየሚገኘበትየምግብአይነትታውቃለሽ? 1. አዎ
2. አላዉቅም
602 ቅባትየሚገኘበትየምግብአይነትታውቃለሽ? 1. አዎ
2. አላዉቅም
603 ፋይበርየሚገኘበትየምግብአይነትታውቃለሽ? 1. አዎ
2. አላዉቅም
604 ቫይታሚንየሚገኘበትየምግብአይነትታውቃለሽ? 1. አዎ
2. አላዉቅም
605 ሚንራልየሚገኘበትየምግብአይነትታውቃለሽ? 1. አዎ
2. አላዉቅም
606 የተለያየአይነትምግብመመገብጥቅምታውቃለሽ? 1. አዎ
2. አላዉቅም
የተመጣጠነምግብእጥረትመንሰሄ

607 ብረት(አይረን) እጥረትታውቃለሽ? 1. አዎ
2. አላዉቅም
608 በየተመጣጠነምግብእጥረትየሚመጣየልጆችበሽታታውቃ
ለሽ?

1. አዎ
2. አላዉቅም
609 የተመጣጠነምግብእጥረትየሚያመጡሦስትመንሴዮችታው
ቃለሽ?

1. አዎ
2. አላዉቅም
610 የደምማነስየሚያመጡመንሴዮችታውቃለሽ? 1. አዎ
2. አላዉቅም
611 እንቅርትየሚያመጡመንሴዮችታውቃለሽ? 1. አዎ
2. አላዉቅም
612 ቫይታሚንኤእጥረትየሚያመጡመንሴዮችታውቃለሽ? 1. አዎ
2. አላዉቅም
ስለሰውምግብየተያየዘመረጃ

613 ይሄንመረጃከየትነውየሰማሽው? 1. ከመገናኛብዙኃን
2. ከጋደኞቼ
3. ከቤተሰቦቼ
4. ከት/ቤት
614 የስነ ምግብ የምክር አገልግሎት አግኝተሽ ታዉቂለሽ? 1. አዎ
2. አላዉቅም
615 የደም ግፊት፣ስኳር፣ልብ እና ሌሎች ህመሞችአሉብሽ? 3. አወ
4. የሉብኝም
ክፍል7፡ የማዕድ ጥናትተግባር
701የሴቶች የአመጋገብልዩነት/በ 24 ሰዓታትውስጥየሚመገቡትንያስታውሱ እባክዎትንትናንትበቀንወይምበማታበቤትወይምከቤትውጭየተመገቡትንምግቦች (ምግቦች እና መቆያዎች)

GSJ: Volume 9, Issue 7, July 2021
ISSN 2320-9186

892 GSJ© 2021

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48 | Page

የተመገቡትወይምየጠጡትንይግለፁ፡፡ በጠዋትከበሉትወይምከጠጡትምግብይጀምሩ፡፡
የተጠቀሱትንሁሉንምምግብ እና መጠጦችይጥቀሱ፡፡ የሚመገቧቸውንምግቦችሲጠቅሱምግቦቹያካተቱትንነገርዝርዝርይጥቀሱ፡
፡ መላሹሲጨርስያልጠቀሳቸውንምግቦች እና መቆያዎችይጠይቁ፡፡
በ 24 ሰዓታትውስጥያስታወሷቸውንምግቦችአመጋገብለማስቀመጥየሚያስፈልግቅፅ
ቁርስ መቆያ ምሳ መቆያ እራት መ

ትናንትከቤትውጭየበሉትነበርአለ (ምግብወይምመቆያ?) መላሹአስታውሶሲጨርስከላይበተመዘገበውመረጃመሠረትበምግብምድቦችላይይሙሏቸው፡፡ ለተጠቀሱትለማናቸውምየምግብምድቦችበዚህምድብላይያለውየምግብዝርዝርአልቆከሆነማለቁንመላሹንይጠይቁ፡፡

ደብልዩዲዲኤስ(WDDS)
የሴቶችየአመጋገብልዩነትየተጠቃለለነጥብአሰጣጥቅፅ/ደብልዩዲዲኤስ/

ስኳርነት/ስ
ታችነትያላቸ
ውናሙናዎች

በቫይታሚን
ኤ
የበለፀጉፍ
ራፍሬዎች/
አትክልቶች

ሌሎችምግቦ
ች/አትክል
ቶች

ጠቆርያለአረንጓ
ዴያማቅጠልያላቸ
ውአትክልቶች

ኦርጋንሚ
ት/ስጋ

ፍሌሽሚ
ት/ስጋ

እንቁ
ላሎች

ሊጉመስ/ኦቸ
ለኒዎች

ወተት

በቆሎ፣
ሩ ፣ገብስ
፣ ስንዴ፣
ፓስታ፣
የሸንኮራአገ
ዳ ፣
ስኳርድንች
፣ ድንች ፣
ኮርንፍሌክስ
፣

ማንጎ ፣
ካሮት፣
ፓፓያ ፣
ዱባ፣
ስፒናች፣
ሐብሐብ፣
ትኩስስኳር
ድንች

ሙዝ ፣
ብርቱካን፣
ወይንፍሬ፣
ሎሚ፣
እንጆሪ

ስፒናች፣
አረንጓዴባቄላ
፣ ጎመን፣
ቃሪያ፣
ኡስታርድግሪንስ
፣ ዝኩኒ

የኩላሊት
ስጋ ፣
የጉበትስ
ጋ ፣
የልብስጋ

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የ ሬ
ስጋ

እንቁ
ላል

አተር፣
ባቄ ፣
ምስር ፣
የአኩሪአተር
፣ ሽንብራ

ወተት
፣
እርጎ
እና
አይብ

GSJ: Volume 9, Issue 7, July 2021
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ANNEX-IVASSURANCE OF PRINCIPAL INVESTIGATOR

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DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

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Signature: _____

Name of the institution: _____

Date of submission: 03-11-2020

This thesis has been submitted for examination with my approval as University advisor

Name and Signature of the first advisor

Dr. Kalkidan Hassan (PhD, Associate Professor)

_____

Name and Signature of the second advisor

Mr. Getu Gizaw (MSc)

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