

Determinants of overweight and obesity among Adolescent Students in
Butajira Town Schools, Gurage zone, Southern Ethiopia.



Investigator: Shemsu Kedir Mohammed (BSc.)

A research thesis submitted to Jimma University, Institute of Health, Department of Nutrition and Dietetics in partial fulfillment for the requirement of Master of Science, in Human Nutrition.

June, 2019

Jimma, Ethiopia

Determinants of overweight and obesity among Adolescent Students in Butajira Town Schools, Gurage zone, Southern Ethiopia.

Investigator: Shemsu Kedir Mohammed (BSc.)

Advisors:

1. Dr. Kalkidan Hassen (PhD in Human Nutrition, Associate professor)
2. Mrs. Yabsra Melaku (BSc, MSc in Human Nutrition)

June, 2019

Jimma, Ethiopia

Abstract

Background: The global rise of adolescent overweight and obesity is bringing a new challenge to the public health sector by shaping the upcoming generation for the worst. It is also known to cause disruptive quality of social life by inducing teasing, bullying, social isolation and stigmatization among children which contribute to the mental wellbeing of growing adolescent. Identifying context specific determinants of overweight and obesity is critical undertaking to formulate preventive programs.

Objectives: To identify determinants of over-weight and obesity among school adolescent.

Methods: School based un-matched case control study design was employed from March 1-30, 2019, in Butajira town, Gurage zone, South Ethiopia. A total of 297 (ratio of 2 controls:1 case) adolescent students were selected from Butajira town schools using simple random sampling technique after cases and controls identified by survey. Through sociodemographic, dietary practice, physical activity and nutritional knowledge related factors data were collected. Bivariable logistic regression analyses were employed to identify associated variables and multi-variable logistic regression analysis was employed to identify independent predictors of overweight/obesity. All statistical tests were considered significant at p-value<0.05.

Results: A total of 297 adolescents were involved in this study with a response rate of 100%. The odds adolescents from high wealth quantile were 5.8 times more for overweight and obesity as compared to adolescents from low wealth quantile [AOR = 5.8 (95% CI: 2.66,12.5)]. Likewise, the likelihood of adolescents being physically inactive were 4.4 times more for overweight and obesity as compared to adolescents from physically active AOR=4.4(95% CI: 1.68,11.6). Regarding to sedentary behavior, the likelihood of adolescents who spent free time by watching television/movies for 3 and above hours per day were 8.6 times more for overweight and obesity as compared to adolescents from their counterparts [AOR=8.6(4.3,17)]. Moreover, the odds of adolescents who had poor knowledge in nutrition were 3.4 times more for overweight and obesity as compared to adolescents who had good knowledge in nutrition [AOR=3.4(1.7,6.9)].

Conclusion: High socioeconomic status, consumption of soft drink, physical inactivity and sedentary behavior were significantly associated with overweight/obesity. Parents and adolescents need to set aside time for healthy meals, physical activity and limit television viewing for their children's and also Reduce consumption of high energy dense foods and Increase consumption fruit and vegetable.

Key Words: Overweight; Obesity; adolescents; determinants; Butajira town

ACKNOWLEDGMENT

First of all, I would like to thank Jimma University Institute of Health, Department of Nutrition and Dietetics for providing me this golden opportunity to develop this research thesis.

Secondly, I would like to present my heartfelt thanks to my Advisors Dr. Kalkidan Hassen (PhD in Human Nutrition, Associate professor) and Mrs. Yabsra Melaku (BSc, MSc in Human Nutrition) for their intensive guidance, being available and sparing their valuable time to help me in all possible ways for this research thesis development.

Thirdly, I express special thanks to my entire friends who supported me in my work.

Fourthly, I would like to appreciate the study participants for their willingness and participation in the study and also the data collectors, school directors and teachers for their valuable support during the survey and fully study.

Finally, gratitude is owed to my beloved wife's for her intensive support, silti woreda and kibet town administration for their financial supports.

TABLE CONTENTS

Abstract.....	I
ACKNOWLEDGMENT.....	II
TABLE CONTENTS.....	III
LIST OF TABLES.....	V
LIST OF FIGURES.....	V
List of Acronyms and Abbreviations	VI
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background.....	1
1.2 Statement of the problem	2
1.3 Significance of the study.....	4
CHAPTRE TWO: LITERATURE REVIEW	5
2.1 Sociodemographic characteristics.....	6
2.2 Adolescents Food Consumption Patterns (Dietary habit).....	7
2.3 Physical activity and sedentary lifestyle	8
2.4 Nutritional knowledge.....	10
CHAPTER THREE: OBJECTIVES.....	12
3.1 Objectives.....	12
3.2 Alternative Hypothesis.....	12
CHAPTER FOUR: METHODS and MATERIALS	13
4.1 Study area and period.....	13
4.2 Study design.....	13
4.3 Population	13
4.4 Eligibility criteria	13
4.5 Sample size determination	14
4.6 Sampling procedure	15
4.8 Measurements	17
4.9 Study variables.....	19
4.10 Operational and Term definition.....	19

4.11 Data processing and Statistical Analysis.....	21
4.12 Data quality control.....	21
4.13 Ethical clearance	22
4.14 Dissemination of findings	22
CHAPTER FIVE: RESULTS.....	24
5.1. Characteristics of study participants.....	24
5.2 Characteristics dietary practice and related factors	26
5.3 characteristics of physical, sedentary behaviors and recreational activities	27
5.4 Nutritional knowledge related factors.....	28
5.5 Bivariable logistic regression for candidate variables for overweight and obesity	28
5.6 Determinants of over-weight and/or obesity in multi-variable logistic regression.....	30
CHAPTER SIX: DISCUSSION.....	32
Strength and limitation of this study	34
CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION	36
7.1 Conclusion.....	36
7.2 Recommendation.....	36
8. REFERENCE	38
9. ANNEXES	44

LIST OF TABLES

Table 1:Associated Variables for sample size determination determinants of overweight and obesity among adolescent in Butajira town schools, Gurage zone, Southern Ethiopia, 2019.....	14
Table 2: overweight and obesity screening format to identify cases and controls among Butajira Town Adolescent, 2019.....	15
Table 3: Distribution of demographic characteristics among primary and secondary school adolescent of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019	25
Table 4:Distribution of socioeconomic characteristics among primary and secondary school, 2019.....	26
Table 5:Distribution of dietary related factors among primary and secondary school adolescents of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019	26
Table 6: Distribution of physical, and sedentary behaviors and recreational activities related factors among primary and secondary school students of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019	27
Table 7: Distribution of nutritional knowledge factors among primary and secondary school adolescents of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019.....	28
Table 8:Bivariable logistic regression of independent variable and overweight and obesity among adolescents in Butajira Town, 2019	29
Table 9: Multivariable logistic regression analysis of factors associated with overweight/obesity among Butajira town adolescent students in 2019.....	31

LIST OF FIGURES

Figure 1: conceptual frame work for overweight and obesity among adolescent in 2019.	11
Figure 2:The schematic presentation of the sampling procedure Butajira Town adolescent to identify overweight and obesity in 2019.....	16

List of Acronyms and Abbreviations

AOR	Adjusted Odds ratio
BAZ	BMI-for –age Z scores
BMI	Body mass index
BCC	Behavioral change communication
CDC	Communicable disease control and prevention
CI	Confidence interval
COR	crude odd ratio
CVD	Cardiovascular disease
DALYs	Disability Adjusted Life Years
DDS	Dietary diversity score
EDHS	Ethiopian Demographic and Health Survey
FAO	Food and agriculture organization
FMOH	Federal ministry of Health
GPAQ	Global physical activity questionnaire
HH	House hold
IDDS	Individual dietary diversity score
ID	Identification
JU	Jimma University
kg	Kilogram
M ²	Meter square
MET	Metabolic equivalent time
NGO	Non-Governmental Organization
PA	Physical activity
SD	Standard Deviation
SES	Socioeconomic Status
SNNPR	Southern Nation Nationality Peoples of Representatives
SPSS	Statically package of social science
TV	Television
USA	United States of America
WHO	World health organization

CHAPTER ONE: INTRODUCTION

1.1 Background

Overweight and Obesity is defined by the World Health Organization (WHO) as an excess of body fat that may impair or hinder health (1). Overweight and obesity are both chronic conditions that are the result of an energy imbalance over a period of time. An energy imbalance arises when the number of calories consumed is not equal to the number of calories used by the body. The cause of this energy imbalance can be due to combination of several different factors and varies from one person to another (2).

WHO defines adolescence as the period of life from 10 to 19 years. Adolescents constitute 20% of the world population and about 25% of the populations of Ethiopia are adolescent. This period is very crucial since it is the formative years in the life of an individual when major physical, psychological and behavioral changes take place (3).

In children and adolescents, assessment of overweight and obesity is problematic which means there is no clear delineation between how much fat is normal and how much fat is abnormal. Furthermore, body fat is difficult and expensive to measure directly in large samples. Unlike the situation in adults where a universally applicable system of classifying obesity and overweight is available, there has been little agreement on either the method or the cut-offs to be used in defining overweight and obesity in children and adolescents. This is largely due to the physiological changes associated with growth and maturation, which complicate assessment of body composition at this age.

The WHO Expert Committee has recommended the use of Body Mass Index (BMI) for children appropriate for aged between 5-19 years and sex to diagnose overweight and obesity. Based on this, Overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median; and obesity is greater than 2 standard deviations above the WHO Growth Reference median (4,5).

1.2 Statement of the problem

Worldwide, overweight and obesity is becoming one of the most challenging current health concerns with the worrisome rise in children and adolescents. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016. The prevalence of overweight and obesity among children and adolescents aged 5-19 has risen dramatically from just 4% in 1975 to just over 18% in 2016. The rise has occurred similarly among both boys and girls: in 2016 18% of girls and 19% of boys were overweight (1).

Around 55% of obese children go on to be obese in adolescence, around 80% of obese adolescents will still be obese in adulthood and around 70% will be obese over age 30(6).

Overweight and obesity are the fifth leading risk for global deaths. WHO estimates that at least 2.8 million adults die each year as a result of being overweight / obese. In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity (2).

According to world health statistics (WHO) 2018 implied that in 2016, an estimated 41 million deaths occurred due to non-communicable diseases (NCDs), accounting for 71% of the overall total of 57 million deaths. The majority of such deaths were caused by the four main NCDs, namely: cardiovascular disease (17.9 million deaths; accounting for 44% of all NCD deaths); cancer (9.0 million deaths; 22%); chronic respiratory disease (3.8 million deaths; 9%); and diabetes (1.6 million deaths; 4%) (7).

In Africa, under-nutrition is the major nutritional problem affecting both children and adolescents. However, overweight and obesity is noticeably high with a prevalence of 8.5% in 2010 and predicted to be 12.7% by 2020. This situation pinpoints a double burden of malnutrition, and epidemiological as well as nutrition transition by virtue of several socioeconomic and demographic changes (8). Currently, about 20-50% of the urban population in Africa is classified as either overweight or obese, and by 2025, 3/4th of the obese population worldwide will be in non-industrialized countries(9).

In 2012, the prevalence of overweight and obesity in Addis Ababa adolescent was 6.2% and 8.5% respectively (10) and also study conducted 2015 on Jimma town school adolescent The prevalence of overweight and/or obesity was 13.3%(11). According to the study conducted in Hawassa 2012 in high school adolescents showed that combined prevalence of overweight and /or obesity was

15.6% (12). These findings showed that overweight and obesity are becoming health problem of developing country (Ethiopia).

Forces of globalization have led to a creeping homogenization in diets. Diets are changing wherever incomes are rising in the developing world, with a marked shift from fruit and vegetable to meat, fats and sugar (8). Moreover, it must be noted that adulthood overweight and obesity related disease are usually traced back to obesity in childhood and adolescents. Once adults are obese; it is often difficult for them to lose weight through physical activity and healthy diet (13).

School based health education and promotion tactics such as enhancing physical activity among the children and adolescents, vegetables and fruits intake have been helpful to minimize overweight and obesity(14). To solve this emerging health problem, Ethiopia incorporated the concern of overweight/obesity into the national nutrition program and launched an initiative to promote physical activity in the population(15). Nevertheless, the efforts do not target children and adolescents in particular.

Ethiopian House of Peoples of Representatives endorsed a law restricting the smoking in public areas and prohibiting alcohol commercials on public media outlets 2019. National nutrition program from 2016-2020 suggested timely interventions will help prevent NCDs or reduce their severity and consequences. The health sector, the Ministry of Youth and Sport, and other concerned governmental bodies are responsible for implementing nutrition-sensitive interventions (16).

Even though recently adolescent nutrition problem in Ethiopia is considered, but still there is no strong action was taken. The national prevalence of overweight and/or obesity among adolescents is not established so far (17). Given the tracking of overweight and/or obesity among adolescents, adolescence is a key developmental period for early identification and prevention of excessive adiposity in adults (18). Although there are cross-sectional studies that have been conducted in different parts of Ethiopia on prevalence of overweight and obesity among adolescents, few studies have been conducted with regard to its determinants using case-control study design(19). This study also did not consider the most important variables like house hold assets, nutritional knowledge and methodologically conducted only private schools. Hereafter, the aim of this study is going to address aforementioned gaps.

1.3 Significance of the study

The health and well-being of adolescents have a major impact on the overall social and economic health of nation as today's adolescents are tomorrow's workforce, parents and leaders. But for many years, their health has been neglected because they were considered to be the less vulnerable group. However, Adolescent obesity has a strong tendency to track in to adult hood and become a foundation for substantial increase in the risk of premature development of chronic disease and certain cancers which will have far reaching impact on the overall welfare and disease burden of a nation. Currently, adolescence Overweight and obesity are the fifth leading risk for global deaths.

Given the tracking of obesity and associated risk factors, adolescent is a key developmental period for early identification and prevention of excessive adiposity in adults. Therefore, a fundamental step in the prevention and control of obesity is the identification of factors contributing to the rapid increase of overweigh and obesity.

So, this study is designed to identify predictors of overweight and obesity among adolescent to stimulate planners and researchers on double burden of disease in Ethiopia which is less recognized problem.

This study may help to design effective and appropriate intervention program to enhance the linkage among Health and educational office along Overweight and Obesity in Ethiopia particularly in the study area by offering evidence based support to people who have overweight and obesity within study population.

In addition, it will help educational planners, health policy makers, parents or guardians and all other stakeholders to have a clear understanding associated factors of adolescent overweight and obesity.

Moreover, this study also important for study participants as well. Because they got advice the risk of overweight and obesity.

Finally, this study is also used as a base line for researchers to conduct further researches on related issue.

CHAPTRE TWO: LITERATURE REVIEW

Many low- and middle-income countries are now facing a "double burden" of disease. While they continue to deal with the problems of infectious disease and under-nutrition, they are experiencing a rapid upsurge in non-communicable disease risk factors such as obesity and overweight, particularly in urban settings. It is not uncommon to find under-nutrition and obesity existing side-by-side within the same country, the same community and the same household (2).

Children in low- and middle-income countries are more vulnerable to inadequate pre-natal, infant and young child nutrition. At the same time, they are exposed to high-fat, high-sugar, high-salt, energy-dense, micronutrient-poor foods, which tend to be lower in cost but also lower in nutrient quality. These dietary patterns in conjunction with lower levels of physical activity, result in sharp increases in childhood and adolescent obesity while under nutrition issues remain unsolved (2).

Therefore, Obesity is a multi-factorial disorder. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and expended. The epidemic of obesity and overweight has been fueled by an increase intake of energy dense food that are high in fats, coupled with an increase in physical inactivity due to the increasing sedentary work, changing modes of transportation and decrease in outdoor recreational activities (20). Knowledge is an important but not a sufficient factor for dietary behavior change. Nutrition knowledge was consistently high across overweight individuals who are concerned about their weight sought out information and advice and therefore become more educated in terms of nutrition knowledge (21).

2.1 Sociodemographic characteristics

Many studies in developed countries have shown that low socioeconomic status (SES) is associated with obesity among children and adolescents (22–25). Among SES indicators, such as income, occupational class, and educational attainment, low maternal education has been most consistently associated with childhood and adolescent obesity.(23)

The study conducted in Saudi-Arabia showed that Children were more to be obese if they had families with low income, compared to families with high income. Obesity rates decrease when the family consists of four or less members. In contrast, the BMI increases when the family members are more than four. Also, we found that BMI increases with low parent's educational level for father's educational level and mother's educational level (26).

Also a case control study done in Brazil showed that excess of weight was positively associated to males and cross-sectional study carried out in Brazil showed greater frequency of overweight among male students in the age range of 15 to 17 years. Boys presented greater prevalence of obesity evaluated by triceps and sub scapular skin folds (27).

According to the study was conducted in India showed that obesity statistically significant association to age of adolescents, female gender in private school students, employment status of mother, and monthly family income (28). Whereas study conducted in Bangladesh showed that gender was not significant association with overweight and obesity (29).

African countries in the last few decades have experienced rapid growth and development in both social and economic sectors that resulted in improved lifestyle of the populace. This rapid economic development manifested in the accumulation of different assets which further widen the socioeconomic strata among the people and had equally changed the cause of death from infectious to chronic non communicable disease (NCDs)(30).

The study carried out in Botswana indicated that the odd of overweight were 2.0 times greater for private school students and 1.7 times greater for students from families with high assets compared with the odds of overweight for students from public schools and low assets, respectively. The odds of obesity was 3.0 times greater for private school students and 2.6 times greater for students with high assets compared with the odds of obesity for students from public schools and with low assets respectively (30).

Study conducted in Hawassa showed that being female, increased monthly income, and higher level of maternal education were found to be risk factors for overweight and obesity among study participated adolescents(19). Adolescents in private schools were 3 times more likely to be overweight and obesity, being above grade eight of fathers or mother's education was also risk factors of overweight and obesity in Addis Ababa selected government and private secondary schools (10).

2.2 Adolescents Food Consumption Patterns (Dietary habit)

The WHO and FAO (Food and Agriculture Organization) expert group found convincing evidence that high intake of energy dense foods is a risk factor for obesity. It also found that heavy marketing of fast foods and high intakes of sugar sweetened drinks were probable risk factors and that large portion sizes was a possible risk factor for obesity (31).

According to American Dietetic Association, fruits and vegetables have been promoted for the prevention of childhood and adolescent obesity because of their low energy density, high fiber content, and satiety value(32). High intake of vegetables and fruit were protective factors for overweight and obesity(33), but some study revealed consumption of fruit and vegetables were not protective factors(34).

A case-control study conducted in adolescents of a Brazilian university noticed that less than three meals per day, skipping breakfast and no regular consumption of fruits were statistically associated to obesity and overweight. Also, as observed in other field studies, controls reported a higher consumption of sugar, sweets, oils and fat. Moreover, overweight and obesity revealed to be related to weight loss dieting in the month preceding the interview (27).

A case control study conducted in Sri-Lanka shown that High family income, first born in family, skipping breakfast, consumption of fruits < 4 days per week, screen viewing > 2 hours/ day, energy intake, significantly increased the risk of obesity(35).

Children and adolescents in developing countries are prone to sugar, high fat salts, energy rich foods and micronutrient-poor foods that are less costly and lower in nutrient quality. These dietary habits in combination with other factors result in substantial upsurge of overweight/obesity (36). Whereas study conducted in seven African countries showed that

Vegetable consumption significantly increases the odds of being obese in Mauritania and Malawi but no effect for the other countries (37) .

Adolescent students who eat fruit twice per month or less are 4.67 times more likely to be overweight than adolescents who eat fruit for more than two times per day. The odds of being overweight were 91% lower in adolescents who eat meat twice per month or less compared with adolescents who eat meat once or more than once per day which was conducted in urban communities of Hawassa (12).

2.3 Physical activity and sedentary lifestyle

Physical activity (PA) has been defined as any bodily movement produced by skeletal muscles that requires energy expenditure (38). Physical inactivity is the 4th leading factor of global mortality and increasing physical inactivity has been seen worldwide with 1 in 3 adults not being so active which prompted to agree to reduce physical inactivity by 10% by 2025 (39).

Changes in patterns of physical activity and the adoption of more sedentary lifestyles are likely to be important factors behind obesity. A study showed that only 31 % of US adults report that they engage in regular leisure-time physical activity (defined as either three sessions per week of vigorous physical activity lasting 20 minutes or more or five sessions per week of light-to-moderate physical activity lasting 30 minutes or more). About 35 % of high school students report that they participate in at least 60 minutes of physical activity on 5 or more days of the week, and only 30% of students report that they attend physical education class daily. As children get older, participation in regular physical activity decreases dramatically (40).

The worldwide association between television viewing and obesity in Children and Adolescents study conducted in USA identified that 207,672 adolescents from 37 countries and 77,003 children from 18 countries provided data. Daily television viewing in excess of one hour was reported in 89% of adolescents and 79% of children. Compared with adolescents in the short viewing group, those in the moderate, long and prolonged groups had BMIs that were 0.14 kg/m², 0.21 kg/m², 0.30 kg/m² and 0.08 kg/m², 0.16 kg/m² and 0.17 kg/m² larger for females and males respectively. Compared with children in the short viewing group, those in the moderate, long and prolonged

groups had BMIs that were 0.24 kg/m², 0.34 kg/m², 0.36 kg/m² and 0.19 kg/m², 0.32 kg/m² and 0.36 kg/m² larger for females and males respectively (38).

A case control study conducted in adolescents of Bangladesh shown that children who had at least one overweight parent were nearly three times more likely to be overweight or obese compared to children whose parents were not overweight, and children who spent >4 hours on sedentary activities each day were two times more likely to be overweight or obese than children who spent less time on sedentary activities. Children who spent ≥ 30 minutes each day with outdoor games at home that involved physical exercise had decreased odds of being overweight or obese compared to children who did not exercise at home (29).

Study conducted in a semi-rural district of Babati in Tanzania shown that being categorized as participating in vigorous physical activity was associated with a two-fold increase in the likelihood of being overweight or obese. Adolescents who were sedentary had a 70% increased odds of being overweight or obese than their non-sedentary counterparts (41).

According to study done in Gondar Ethiopia, revealed that 43% were engaged in moderate or vigorous intensity work beside learning, 33% did not walk or ride bicycle at least 30 minutes per week, 25.9% walk or ride bicycle at least 30 minutes for 5 or more days per week, 48% do moderate to vigorous intensity sport for at least 10 minutes continuously, however, 15.8% of participants responded that they spent 3 or more hours sitting and watching Television. Most students 80% got to and from school on foot and 20% traveled by car(42).

Study conducted in Addis Ababa Ethiopia, identified that determinants related to Physical Activity: Sedentary activity (watching TV, using the computer and playing videogames) for over 120 minutes increased odds of being overweight/obese almost by two fold. Using car as a means of transport from home to school and from school to home also increased the odds of being overweight/obese by two fold. Physical activity pattern (low, moderate and high physical activity) did not show statistically significant association with overweight/obesity (10).

According to the study conducted in Hawassa private school Adolescents in low (sedentary) activity category were 5.46 times more likely to be obese than that of active adolescents. There was statistically significant association between times spent watching TV or using computer and overweight. Those adolescents who used to watched TV or used computer three or more hours per

day were 3.04 times more likely to be overweight than those who watched TV or used computer for less than three hours per day (12).

2.4 Nutritional knowledge

Study conducted in Cincinnati found increased knowledge of dietary guidelines to be positively related to healthier eating practices among college students. The author concluded that healthy eaters have a higher nutritional knowledge leading to good food choices which can promote reduction and maintenance of weight (43). Knowledge is an important but not a sufficient factor for dietary behavior change. Nutrition knowledge was consistently high across overweight individuals who are concerned about their weight sought out information and advice and therefore become more educated in terms of nutrition knowledge (21). Knowledge is a predisposing factor for eating behavior (44). Study suggests that increase prevalence of overweight among adolescent may be deficit in overweight and obesity knowledge in the adolescents (45). Study conducted England showed that nutritionally less knowledgeable adolescents were 5.3 times more likely to be obese than knowledgeable adolescents.

Study done USA revealed that nutritional awareness had no relationship to overweight and obesity. Nutrition and certain health conditions are more likely to follow a balanced diet and avoid excessive weight gain. This means that nutritional knowledge can be a good strategy to employ in the reduction and control of the high prevalence of obesity.

2.3. Conceptual frame work

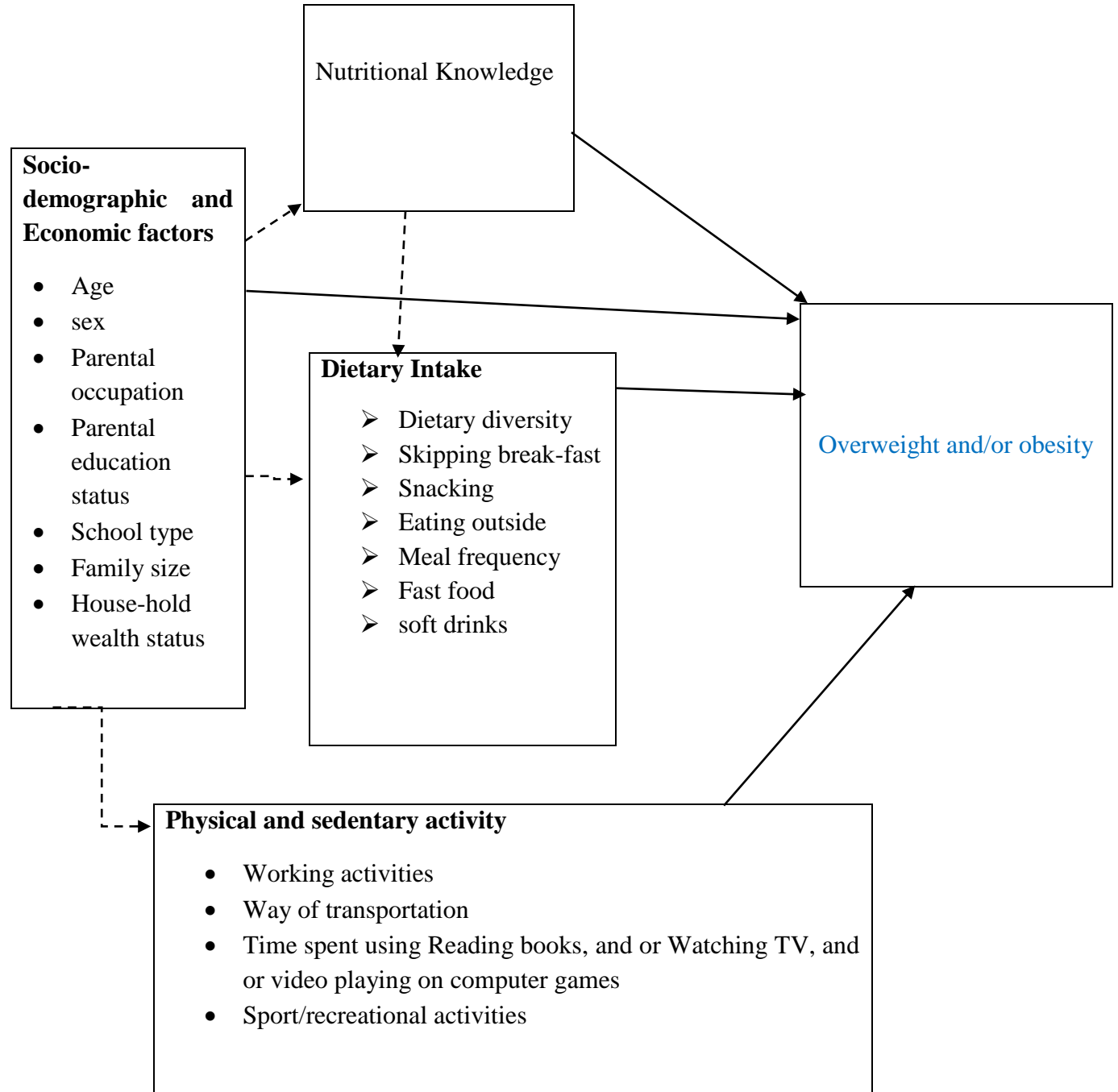


Figure 1: conceptual frame work for overweight and obesity among adolescent in 2019.

Source: Adapted from different literature review

CHAPTER THREE: OBJECTIVES

3.1 Objectives

- ✚ To identify determinants of overweight and obesity among school adolescents in Butajira town, Gurage zone, South Ethiopia, 2019.

3.2 Alternative Hypothesis: -

- The odds of being overweight and obesity are more likely to be among adolescents from physically inactive as compared to adolescents from physically active.
- The odds of being overweight and obesity are more likely to be among adolescents from high socioeconomic status as compared to adolescents from low socioeconomic status.
- The odds of being overweight and obesity are more likely to be among adolescents who had poor knowledge in nutrition as compared to adolescents who had good knowledge in nutrition.

CHAPTER FOUR: METHODS and MATERIALS

4.1 Study area and period

The study was conducted in Butajira Town, Gurage zone, and Southern Nation Nationalities of Peoples of Representatives. Butajira town is located at 132 km to the south of Addis Ababa. The town has an area of 32. 43 square kilo meter with an altitude of 2131 meters above sea level. Butajira Town is the growing city in Ethiopia with an estimated population of about 52,228. According to the 2018/2019 the town's education office statistics, six (06) governmental (6646 students) and 05 (945 students) private schools there. There are 7591 adolescents (3928 males and 3663 female) in both category of schools. Study area also easy to accessibility in travel within 30 minutes and the study populations are well cooperating and stables. The study was conducted from March 1 to 30 March /2019.

4.2 Study design

School based un-matched case control study design was employed.

4.3 Population

4.3.1. Source population

All adolescents in private and governmental primary and secondary schools in Butajira town.

4.3.2. Study Population

Adolescents in private and governmental primary and secondary in the randomly selected school who fulfil the inclusion criteria.

Case: BMI-for-age Z scores above $>1SD$ (4,5).and

Control: BMI-for –age Z scores between $-2SD < BAZ \leq +1SD$ (4,5).

4.4 Eligibility criteria

4.4.1. Inclusion criteria

- Being inhabitants of Butajira town for at least six months.

4.4.2. Exclusion criteria

- Adolescents with body deformity like kyphosis and scoliosis
- Thinness (BMI-for –age Z scores $\leq -2SD$)
- Individuals who are unable to communicate and hear.

4.5 Sample size determination

Sample size was determined using Epi Info7 preview version 3.5.3 using Stat- Calc by taking main determinants of overweight and obesity from a previous study(19,28). Considering, the proportion of always meals while watching television was 25.7% among control exposed and AOR 2.1. Control to case ratio =2:1 by using Kelsey. By considering 5% non-response rate, the sample size increases to 298. Therefore, the sample size was 297 (99 cases and 198 controls)

Table 1:Associated Variables for sample size determination determinants of overweight and obesity among adolescent in Butajira town schools, Gurage zone, Southern Ethiopia, 2019.

Associated variables	% of non-exposed	Confidence level	Power	Adjusted Odd ratio	Sample size						Reference
					Case	Control	Ratio of control to case	5 % non-rr	total	Maximum	
Meals while watching Tv	25.7	95%	80%	2.1	95	189	2:1	14	297	1st	(28)
Drinking sweetened beverages	44.7	95%	80%	2:1	21	41	2:1	3	65	4th	
Education of mother	36.7	95%	80%	3.36	38	76	2:1	6	120	3 rd	(19)
Consuming vegetable	4.74	95%	80%	6	46	92	2:1	7	145	2 nd	

4.6 Sampling procedure

Butajira Town school was stratified into governmental and private. There are 5 private and 6 governmental schools. From both governmental and private schools 2 schools from each were selected randomly by Microsoft office excel. To identify adolescents that have been eligible, survey was conducted from selected schools.

The survey was conducted on 2691 adolescent students from selected schools two weeks prior to data collection and among this, 179 cases and 1826 controls were identified.

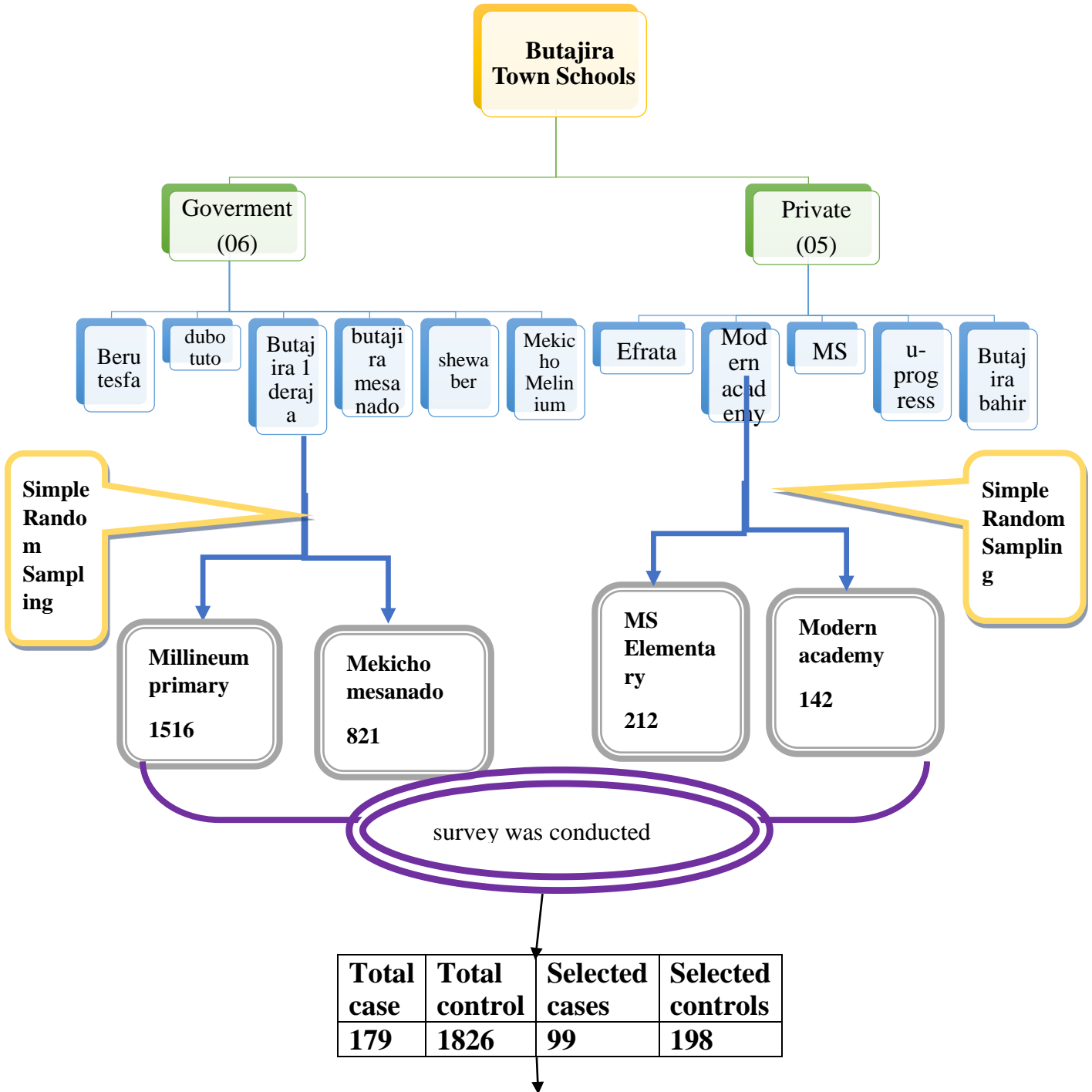
Table 2: overweight and obesity screening format to identify cases and controls among Butajira Town Adolescent, 2019

Overweight and obesity screening format

s/n	Class no	sex	age	grade	Section (A,B,C,.....)	School type(p/G)	weight	height	Baz
1									
2									
3									

To select individuals with case, one sampling frame was developed for cases including both private and governmental school adolescents coded by grade level and ID, then the list of cases in the sampling frame were entered into Microsoft office excel and generate the number of cases. The same procedures done for controls as well.

Schematic presentation of sampling procedures



Among 297 students, 99 as case and 198 as control were selected by SRS using computer generate

Figure 2: The schematic presentation of the sampling procedure Butajira Town adolescent to identify overweight and obesity in 2019.

4.7 Data Collection tools and procedures

First of all, Questionnaire was translated into Amharic language and then back translated to English by language experts for their consistency. A total of two supervisors and four data collectors were recruited for data collection and survey was performed to identify cases and controls prior to two weeks. The participants were classified as case and control depend on their BAZ status. Data were collected among selected cases and controls randomly based on sampling frame. Data were collected by face to face interview method using semi-structured questionnaire which is adopted from WHO step-wise chronic disease, Food Agriculture Organization and other literatures (46,47) and taking anthropometric measurement to identify determinants of over-nutrition among adolescent students.

4.8 Measurements

4.8.1 Anthropometric Measurements

Height and weight were measured using Stadiometer and Seca digital scale (Seca Germany).

Weight was measured using portable standing scale. It has ability to measure weight from 0 to 150 Kg. The weight was recorded to the nearest 0.1 kg. It was calibrated against known weight regularly. Before the real anthropometric data collection, (we took four (4) adolescent weight and height and then calculated **coefficient variation** of weight and height were 2.7% and 1% respectively) a standardization exercise was performed during the training to capture technical error of measurement (TEM). During the procedure the subjects wore light clothes and took off their shoes. Height was measured in cm using portable Stadiometer. All adolescents were measured against the wall without foot wear and with heels together, shoulder blades, buttocks and calf's touching measurement board and their heads positioned and eyes looking straight ahead (Frankfurt plane) so that the line of sight was perpendicular to the body. The height was recorded to the nearest 0.1cm. The same measurer was employed for a given anthropometric measurement to avoid variability.

Two reading of height and weight was taken and their mean were considered as final. BMI is the ratio of weight in kilogram to height in meter square were used to assess overweight and obesity in the study subjects. The new WHO reference data using WHO Anthro-Plus computer program

was utilized for the estimation of overweight and obesity in the study subjects. The values between 1SD to 2SD for specific age and sex will be considered overweight and values above 2SD for age and sex was considered as obesity (48).

4.8.2 Dietary Assessment

Dietary diversity [DD] was assessed **using a food frequency questionnaire containing 28 food items** that are commonly consumed in the study area. The list of food items was developed based on an **extensive interview of the data collectors** who are from the study area and who knew the culture and language and key informants in the study area on the types of foods commonly consumed. The food frequency questionnaire was pre-tested on 14 adolescents and the food items commonly consumed in the area and the patterns over the week days observed during the pretest were used to refine the food frequency questionnaire. Adolescents were coded as a **“consumer”** of a food item if they had consumed the food item at least once per week. As there is no Ethiopian classification of food groups, the 28 food items of the food frequency questionnaire were grouped into nine (9) groups according to WDDS (49). For example, an adolescent who consumed one item from each of the food groups at least once during the week would have the maximum DDS 9 and those who did not consumed per week score 0 for all food group (50).

4.8.3 Physical Activity and Sedentary Behaviors

The Global Physical Activity Questionnaire (GPAQ) developed by WHO for physical activity surveillance was used to collect information on physical activity participation in three settings (or domains) including activity at work, travel to and from places and recreational activities and sedentary behavior. Data collectors were asked participants about physical activity level daily in minute and then changed to weekly and determine whether active or not. Data collectors were asked about sedentary activities and sleeping pattern hours per day. The activity level of the study participants were evaluated according to the standard WHO total physical activity calculation guide line(46).

4.8.4 Nutritional knowledge

Thirteen validated and reliable Questionnaires from food and agriculture organization of united nations 2014 for school children were developed. Based on this question, nutritional knowledge index variable was created using principal component analysis and categorized in to two

components. So, the first component students who scored “**poor knowledge**” and the second component students who scored “**good knowledge**” (47).

4.9 Study variables

4.9.1 Dependent variables

- overweight and/ or obesity

4.9.2 Independent variables

•Socio demographic and economic status

- Age, Sex, School grade level, Parental educational status, Parental occupation, school type and Household wealth status

•Dietary habits

- Individual dietary diversity score (fruit, cereals, vegetable, milk and milk product, meat), skipping breakfast, fast food, Snacking, Eating outside, meal frequency and soft drinks

•Physical and recreational activities

- Working activities, Mode of transportation, Sport/recreational activities

• Sedentary behaviors

Time spent using Reading books, and or Watching TV, and or video playing on computer games and hours of sleep

• Nutritional knowledge

4.10 Operational and Term definition

Thinness: BMI-for –age Z scores $\leq -2SD$

Normal weight: BMI-for –age Z scores between $-2SD < BAZ \leq +1SD$

Overweight: BMI-for-age Z scores between $+1SD < BAZ \leq +2SD$.

Obese: BMI-for-age Z scores above $> +2SD$ (4,5).

Overweight and/or obesity: BMI-for-age Z scores above $>1SD$

High DDS- is dietary diversity score of Consuming 5 & more food groups (51).

Low DDS- is dietary diversity score of Consuming 4 and less food groups (51).

Snacking: foods that are eaten between regular meals

Skipping breakfast: individual will be considered as skipping breakfast if she/he skips 3 or more breakfast per week

Fast food: consumption of food made fast like burger, pizza, bombolino, sanbusa per week (28)

Physical activity: the total time spent in physical activity during a typical week (total physical activity level); **Inactive:** inactive at work, transport and leisure time or less than 600 Metabolic Equivalent Task (MET) - minutes/week; **Moderate:** having a moderate activity or at least 600 MET-minutes per week and **Vigorous:** vigorous activity at work, transport or leisure time or at least 1,500 MET-minutes/weeks (52).

Sedentary behaviors: Time spent using Reading books, and or Watching TV, and or video playing on computer games more than 2hrs/day or less than 8 hours sleeps (19,28).

Meal frequency: number of regular meal intake 3 times per day

Soft drinks: Frequency of drinking sweetened beverages like mirinda, Coca-Cola, Fanta and others more than once per day (28).

Eating outside: eating the purchase and consumption of meals and snacks prepared outside the home.

Wealth index: Socioeconomic index was developed as follows: first all study participants were asked about the ownership of fixed assets by their household with a score 1 given to those who own the asset and score of “0” given to those who did not own. Then principal component analysis was used to develop the wealth index and categorize in to 3 tertiles (17).

Nutritional knowledge index Thirteen validated and reliable Questions from FAO 2014 for school children were developed. Based on this question, nutritional knowledge index variables were created using principal component analysis and categorized in to two components. So, the first component students who scored “**poor knowledge**” and the second component students who scored “**good knowledge**” (47).

4.11 Data processing and Statistical Analysis

Data were checked for completeness and consistencies, and then edited, coded and entered using Epi-data version 3.1, and then exported to SPSS version 21 for further analysis. Variables were checked for missing values before analysis. Descriptive statistics were computed for all variables according to their type. Means, medians and standard deviations were computed for continuous variables. The categorical variables were described by their frequencies. The multivariable binary logistic regression had good model fitness by using Hosmer-Lemshow model test with P-value=0.69 and $\chi^2=7$. Multicollinearity of the independent variables was checked by variance inflation factor which was (VIF) <5 for all candidate variables. Principal Component Analysis was employed for wealth index and nutritional knowledge and all assumptions like sample size, ratio of variables to cases, the variables included were dichotomous, measure of sampling adequacy (KMO and Anti-Image ≥ 0.5), Bartlett test of sphericity is statistically significant ($P < 0.05$), and no complex structure were seen and explained variation also satisfied. Bivariate analyses were done to identify the candidate variables for multivariable logistic regression model to determine risk factors of overweight and/or obesity. Accordingly, any variable having $p \leq 0.25$ was considered as a candidate variable for multivariable analysis and entered into multivariable logistic regression model using backward elimination stepwise likelihood ratio method. All tests were two-sided and $p < 0.05$ was considered statistically significant. The results were reported as Odds Ratio (OR) and 95% Confidence Interval (CI).

4.12 Data quality control

Training: One-day training was given for all data collectors, two of Health Officer as a supervisor and four Diploma Nurses as a data collector, about the objectives, process of the data collection and demonstration of interview through and taking measurement was given for each trainee to reduce inter observer error.

Pretest: The instrument was pretested by 5% (14) out of selected school's participants for clarity, understandability, flow and construction, and those questions found to be unclear or confusing will be modified based on the result of pretest. And also response rate (availability and willingness) showed 100%, excluding foods that had a low frequency of consumption and Cronbach's-alpha of nutritional knowledge was 0.73.

Calibrations: Weight scale was calibrated at 0 with no object on it and placed in level surface before measurement carry out. Every morning and when the instruments move apart, calibration and validation were checked the scales by 2kg metal iron sheet to keep their reliability.

Blinding: Cases and controls were classified by investigator and supervisor but Data collectors were blinded to case and control for minimizing information bias during data collection

Supervision: The supervisors were supervised and reviewed every questionnaire for completeness and logical consistency and correction are made. Data collectors were submitted the collected data on daily basis to supervisors and the principal investigator. Each questionnaire was checked on daily basis before data entry for completeness and consistency. Data coding, entry and cleaning were performed by the principal investigator. The principal investigator was collected the completed questionnaires every day and is responsible for the coordination and on spot supervision of overall data collection process.

4.13 Ethical clearance

Research ethical review committee of Jimma University Institute of Health was approved this research project. There are no potential risks that may cause any harm on study participants in any form. Then support letter was obtained from Butajira Education office and sent support letter for each sub-city. Finally, each sub-city sent support letter for each selected high schools in that sub-city. Then nature of the study was fully explained to each school administration. After getting permission from school to participate in the study, written consent was taken from students' family by sending consent letter by students and verbal assent was taken from each participant student. Coding and aggregate reporting were used to eliminate names and other personal identification of respondents throughout the study process to ensure anonymity, private and confidentiality. For those obese adolescents had given mass advices about promoting healthy diets and physically active by investigator to reduce overweight and obesity in 4 selected schools.

4.14 Dissemination of findings

The finding of the study may be present in Jimma university institute of health, department of population and family health, for final thesis defense. Furthermore, the finding of the study may be delivered for the Butajira Education and Health office and selected Schools. The findings may be also disseminated to different stakeholders that have a contribution to improve adolescents'

health. Finally, it may be present in different symposium & publish in reputable journals. Hard and soft copies of the thesis may be made available in the library of Jimma University for readers.

CHAPTER FIVE: RESULTS

5.1. Characteristics of study participants

A total of 297 adolescents from both government [209(70.4%)] and private [88(29.6%)] were involved in this study with a response rate of 100%. Of these, 62.6% of cases and 55.6% controls were females. The mean age of adolescents was 14.13 ± 2.33 . 49.5% of cases and 47% of controls were early adolescence between the age of 10-13 years old. 56.6% of cases and 20.7% of controls were in higher wealth index category. Whereas, 17.2% of cases and 44.4% of controls were in low wealth index category. Regarding father occupation, 57.6% of cases and 47% of controls were merchant. With regard to maternal education, 19.2% of cases and 26.8% of controls were no formal education. The mean family size of adolescents was 3.9 ± 1 (table 3 and 4).

Table 3: Distribution of demographic characteristics among primary and secondary school adolescent of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019

Variables	Category	Cases N(%)	Controls N(%)
Sex	Male	37(37.4%)	88(44.4%)
	Female	62(62.6%)	110(55.6%)
Religion	Muslim	36(36.4%)	81(40.9%)
	Orthodox	33(33.3%)	64(32.3%)
	Protestant	9(9.1%)	16(18.7%)
	Catholic	21(21.2%)	37(18.7%)
Ethnicity	Gurage	41(41.4%)	111(56.1%)
	Oromo	11(11.1%)	17(8.6%)
	Amhara	21(21.2%)	32(16.2%)
	Silte	9(9.1%)	14(7.1%)
	Others*	17(17.2%)	27(12.1%)
Maternal education	Not read and write	19(19.2%)	53(26.8%)
	Formal education	80(80.8%)	145(73.2%)
Paternal education	Not read and write	19(19.2%)	42(21.2%)
	Formal education	80(80.8%)	156(78.8%)
Family size	<4 family	49(49.5%)	83(41.9%)
	≥4 family	50(50.5%)	115(58.1%)
School type	Governmental	71(71.7%)	138(69.7%)
	Private	28(28.3%)	60(30.3%)
Age category	Early adolescence	49(49.5%)	93(47%)
	Middle adolescence	34(34.3%)	72(36.4%)
	Late adolescence	16(16.2%)	33(16.7%)

*In category of Ethnicity others include Hadiya, Kambata, Tigre, Afar and Wolayta

Table 4: Distribution of socioeconomic characteristics among primary and secondary school overweight and obesity adolescent, 2019

Variable	Category	Cases N(%)	Controls N(%)
Maternal occupation	Home wife	29(29.3%)	70(35.4%)
	Gov't&NGO	31(31.3%)	61(30.8%)
	Merchant	39(39.4%)	67(33.8)
Father occupation	Gov't&NGO	31(31.3%)	85(42.9%)
	Merchant	57(57.6%)	93(47%)
	Other*	11(11.1%)	20(10.1%)
Wealth index	High	56(56.6%)	41(20.7%)
	Medium	26(26.3%)	69(34.8%)
	Low	17(17.2%)	88(44.4%)

* In category of father occupation others include daily labor, farmer, and workless

5.2 Characteristics dietary practice and related factors

The mean of individual dietary diversity of adolescents were 3.66 ± 1.89 . 42(42.4%) of cases and 102(51.5%) of controls had history of taking fast foods. 67.7% of cases and 45.5% of controls were consuming snacks. Low dietary diversity scores were reported from 67.7% of cases and 45.5% of controls. Moreover, 77.8% of cases and 51% of controls were habit of consuming soft drinks habit ≥ 3 times per week (Table 5).

Table 5: Distribution of dietary related factors among primary and secondary school adolescents of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019

Variables	Category	Cases	Control
		N(%)	N(%)
fast food	Yes	42(42.4%)	102(51.5%)
	No	57(57.6%)	96(48.5%)
Snack	Yes	67(67.7%)	90(45.5%)
	No	32(32.3%)	108(54.5)
Regular meals	1-2 times/day	30(30.3%)	72(36.4%)
	3-4 times/day	69(69.7%)	126(63.6%)
Eating out side	no	71(71.7%)	137(69.2%)
	Yes	28(28.3%)	61(30.8%)
Skip meals	No	36(36.4%)	74(37.4%)
	Yes	63(63.6%)	124(62.6%)
Soft drinks per week	≥3x/week	77(77.8%)	101(51%)
	<3x/week	22(22.2%)	97(49%)
Category of IDDS	Low	67(67.7%)	89(44.9%)
	High	32(32.3%)	109(55.1%)

5.3 characteristics of physical, sedentary behaviors and recreational activities

Regarding to physical activity, 71.7% of cases and 44.9% of controls did not have any physical activity. Whereas, 8.1% of cases and 22.7% of controls were in vigorous physical activity. 48.5% of cases and 57.1% of controls were used vehicles for transportation. Moreover, 52.5% of cases and 12.6% of controls were sedentary behaviors ≥ 3 hours per day (Table 6).

Table 6: Distribution of physical, and sedentary behaviors and recreational activities related factors among primary and secondary school students of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019

Variables	Category	Cases N(%)	Controls N(%)
Physical activity	Low	71(71.7%)	89(44.9%)
	Moderate	20(20.2%)	64(36.3%)
	Vigorous	8(8.1%)	45(22.7%)
Transportation in vehicles	Yes	48(48.5%)	113(57.1%)
	No	51(51.5%)	85(42.9%)
Sedentary behavior	≥3 hours/day	52(52.5%)	25(12.6%)
	<3 hours/day	47(47.5%)	173(87.4%)

5.4 Nutritional knowledge related factors

Regarding to nutritional knowledge, 77.8% of cases and 60.6% of controls had poor knowledge (Table 7).

Table 7: Distribution of nutritional knowledge factors among primary and secondary school adolescents of cases and controls in public and private schools of Butajira Town, south, Ethiopia, 2019

<i>Variables</i>	<i>Category</i>	<i>Cases N(%)</i>	<i>Controls N(%)</i>
<i>Nutritional knowledge</i>	<i>Good</i>	<i>22(22.2%)</i>	<i>78(39.4%)</i>
	<i>Poor</i>	<i>77(77.8%)</i>	<i>120(60.6%)</i>

5.5 Bivariable logistic regression for candidate variables for overweight and obesity

Twelve Candidate variables that were draw from Bivariable logistic regression analyzed each predictor with dependent variable from socio-demographic, dietary practice, physical activity and nutritional knowledge (table 8).

Table 8: Bivariable logistic regression of independent variable and overweight and obesity among adolescents in Butajira Town, 2019

Candidate variable	Category	Overweight and obesity		COR with 95% CI	P- value
		Yes N(%)	No N(%)		
Sex	Female	62(62.6%)	110(55.6%)	1.34(0.82,2.2)	0.245
	Male	37(37.4%)	88(44.4%)	1	
Maternal education	No formal education	19(19.2%)	53(26.8%)	0.65(0.36,1.17)	0.153
	Formal education	80(80.8%)	145(73.2%)	1	
Family size	<4 family	49(49.5%)	83(41.9%)	1.36(0.8,2.2)	0.216
	≥4 family	50(50.5%)	115(58.1%)	1	
Wealth index	High	56(56.6%)	41(20.7%)	7(3.6,13.6)	0.001
	Medium	26(26.3%)	69(34.8%)	1.95(0.98,3.8)	
	Low	17(17.2%)	88(44.4%)	1	
Fast food	Yes	42(42.4%)	102(51.5%)	0.69(0.4,1.12)	0.14
	No	57(57.6%)	96(48.5%)	1	
Snack	Yes	67(67.7%)	90(45.5%)	2.5(1.5,4.1)	0.001
	No	32(32.3%)	108(54.5)	1	
Soft drink	≥3x/week	77(77.8%)	101(51%)	3.36(1.9,5.8)	0.001
	<3x/week	22(22.2%)	97(49%)	1	
IDDS	Low	67(67.7%)	89(44.9%)	2.56(1.5,4.2)	0.001
	High	32(32.3%)	109(55.1%)	1	
Physical activity	Low	71(71.7%)	89(44.9%)	4.5(1.9,10)	0.001
	Moderate	20(20.2%)	64(36.3%)	1.75(0.7,4.3)	
	Vigorous	8(8.1%)	45(22.7%)	1	
Transport in vehicles	Yes	48(48.5%)	113(57.1%)	0.7(0.4,1.15)	0.162
	No	51(51.5%)	85(42.9%)	1	
Sedentary behaviors	≥3 hours/day	52(52.5%)	25(12.6%)	7.6(4.3,13.6)	0.001
	<3 hours/day	47(47.5%)	173(87.4%)	1	
Nutritional knowledge	Good	22(22.2%)	78(39.4%)	2.2(1.3,3.9)	0.004
	Poor	77(77.8%)	120(60.6%)	1	

5.6 Determinants of over-weight and/or obesity in multi-variable logistic regression

Multivariable logistic regression analysis indicated high wealth index, soft drink consumes more than or equal 3 times per week, physical inactivity, spent free time by watching movies (sedentary behaviors) ≥ 3 hours per day and poor nutritional knowledge were significant predictors of over-weight and/or obesity.

The odds adolescents from high wealth quantile were 5.8 times more for overweight and obesity as compared to adolescents from low wealth quantile [AOR = 5.8 (95% CI: 2.66,12.5)]. Likewise, the likelihood of adolescents being physically inactive were 4.4 times more for overweight and obesity as compared to adolescents from physically active [AOR=4.4(95% CI: 1.68,11.6)]. Regarding to sedentary behavior, the likelihood of adolescents who spent free time by watching television/movies for 3 and above hours per day were 8.6 times more for overweight and obesity as compared to adolescents from their counterparts [AOR=8.6(4.3,17)]. The likelihood of adolescents who were consumed soft drinks 3 and above times per week were 3.7 times more for overweight and obesity as compared to adolescents who were consumed soft drink less than 3 times per week with AOR=3.7 (95% CI:1.8,7.3). Moreover, the odds of adolescents who had poor knowledge in nutrition were 3.4 times more for overweight and obesity as compared to adolescents who had good knowledge in nutrition [AOR=3.4(1.7,6.9)]. (table 9).

Table 9: Multivariable logistic regression analysis of factors associated with overweight/obesity among Butajira town adolescent students in 2019

Variable	category	Overweight and obesity		COR with 95% CI	AOR with 95% CI
		Yes, N (%)	No N(%)		
Wealth index	High	56(56.6%)	41(20.7%)	7(3.6,13.6)	5.8(2.66,12.5)**
	Medium	26(26.3%)	69(34.8%)	1.95(0.98,3.8)	1.79(0.87,4.47)
	Low	17(17.2%)	88(44.4%)	1	1
Physical activity	No	71(71.7%)	89(44.9%)	4.5(1.9,10)	4.4(1.68,11.6)*
	Moderate	20(20.2%)	64(36.3%)	1.75(0.7,4.3)	2.2(0.75,6.3)
	vigorous	8(8.1%)	45(22.7%)		1
Soft drink	≥3x/week	77(77.8%)	101(51%)	3.36(1.9,5.8)	3.7(1.8,7.3)**
	<3x/week	22(22.2%)	97(49%)		1
Sedentary behavior	≥3 hours	52(52.5%)	25(12.6%)	7.6(4.3,13.6)	8.6(4.3,17)**
	<3 hours	47(47.5%)	173(87.4%)		1
Nutritional knowledge	Good	22(22.2%)	78(39.4%)	1	1
	Poor	77(77.8%)	120(60.6%)	2.2(1.3,3.9)	3.4(1.7,6.9)*

**it Suggests the significant variables p-value < 0.001 and * indicates P-value<0.05

NB. Hosmer and Lemeshow's goodness-of-fit test was chi-square of 7 with p-value of 0.69.

CHAPTER SIX: DISCUSSION

The finding of this study showed that high wealth index, soft drink consumes more than or equal 3 times per week, physical inactivity, spent free time by watching movies (sedentary behaviors) ≥ 3 hours per day and poor nutritional knowledge were independent significant predictors of overweight and/or obesity.

In this study adolescents from high socio-economic family were more likely to be overweight than adolescents from low socioeconomic family. This finding was consistent with study findings from different developed countries including Russia and Italy (53,54) and developing countries including South Africa and Ethiopia (Gondar and Hawassa) (9,12,42). Similar finding from Pakistan showed where increased risk of being overweight and obesity was found in the adolescents from wealthier family (55). Diets are changing wherever incomes are rising in the developing world, with a marked shift from fruit and vegetable to meat, fats and sugar (8). This finding might be related to the diets, adolescents from higher socio-economic group were well known to adopt western life leading to greater consumption energy-dense foods which may substitute the healthier local available diet like fruits, vegetables, cereals etc. and more sedentary life style because they are transported to and from school by car and bus (55). Possible reason might be adolescents from high socioeconomic family had high access to diet than low socioeconomic family.

Some studies from developed countries were not in line with present finding. In Island levels of overweight and obesity was higher in the lower socioeconomic groups (55). In addition, study finding from America was inconsistent with this finding (54). The possible reason for this discrepancy might be related to in developed countries adolescents in higher socioeconomic groups tend to have a healthier diet (54), while in developing countries adolescents from high socio-economic are prone to energy dense food consumption (42,55). This implies that high socioeconomic status may be attributable to the change in life style, and dietary pattern that leads to obesity.

This study documented significant association between physical inactivity and overweight/obesity which is similar to the result of study conducted in Gondar (42) and Hawassa (12). This finding was consistent with finding from Pakistan indicated that lack of physical activity was found to be significantly associated with overweight and obesity in children and adolescents (55). Another

result from USA revealed that regular physical activity was an important factor in reducing the prevalence of overweight and obesity (54). Additionally, WHO report Switzerland (39,46) showed lack of physical activity had positive association with overweight and obesity. This finding might be related to lack of energy expenditure because of lack of physical activity (46). But in contrast to the study in Iran and UAE (56,57), this difference may be attributed to methodological difference like Iran study just quantify PAL whereas in UAE sample size and technique were different in measurement of physical activity.

According to WHO (2014), In 2013, WHO Member States agreed to a target of reducing insufficient physical activity by 10% by 2025 and included strategies to achieve their target in "Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013-2020". The strategies to be adopted to achieve this lofty goal include the provision of safe spaces and facilities for students to spend their free time actively; quality physical education supports, inculcating in children attitude of developing behavior patterns that will keep them physically active throughout their lives and making sports and recreation facilities available for everyone to do sports. Other strategies include making walking, cycling and other forms of active transportation accessible and safe for all and establishing labor and workplace policies to encourage physical activity (58). This implies physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and weight control.

This study also found a significant positive association between sedentary behavior of ≥ 3 hr/day and overweight/obesity which are in agreement with the study conducted in Addis Ababa (10) and Jimma (11). This study is consistent with studies done in Brazil (59), Munich Germany (60), Tamale metropolis of Ghana (61), and Ghana and Uganda (62) that revealed children who spent their free time in viewing television, play computer game for 3 and more hours were more likely to be overweight and obese. This might be explained by advancement in technology change the life style of children. Watching Television and playing computer game may have decreased the amount of time spent on Playing Outdoor games which might result in gaining extra Weight. That sedentary behaviors were one of the risk factors for childhood overweight and obesity. This implied that Watching Television and playing computer game may have decreased the amount of time spent on Playing Outdoor games which might result in gaining extra Weight.

Evidence shows that high intake of soft drinks positively correlates with obesity (63,64). It is believed that intake of soft drinks contribute greatly to weight gain by virtue of high added sugar content, low satiety, and incomplete compensation for total energy (65). This study revealed that soft drink intake 3x/week and above was significantly associated with overweight and/or obesity compared to less than 3x/week. This finding was in line with findings from Ethiopia and Bangladesh and Brazil (27,29,42). This could be explained as sweet food items are calorie dense food which result in positive energy balance to their consumers. This implies that soft drinks not taken every day, maximum once or twice a week only. Because they are not needed for health and may promote overweight and obesity.

In the present study, adolescents with poor knowledge in nutrition were more prone to overweight and obesity than adolescents who had more knowledge in nutrition. This study supported by a study conducted in six Latin America and Israel, suggests that increase prevalence of overweight among adolescents is due to deficit in nutritional knowledge in the adolescents compared to those who had good knowledge in nutrition (45,66). In contrast a study from northern Ireland showed that a knowledge deficit may not be the most significant factor preventing overweight individuals from adopting a healthier diet and questions the utility of purely educational approaches to dietary behavior change (21) and a study from Isfahan province in Iran revealed that nutritional awareness had no relationship to overweight and obesity. Furthermore, nutritional knowledge was not different between obese and non-obese adolescents (67). The difference might be related to overweight individuals, who are concerned about their weight sought out information and advice and therefore become more educated in terms of nutrition knowledge (42). This implies that adolescents who had good knowledge in nutrition is important to decide preference in healthy diets and also guide to do physical activity to reduce overweight and obesity.

Strength and limitation of this study

This case control study design was the first in Ethiopia by identifying determinants (especially wealth index and nutritional knowledge) of overweight and obesity among adolescents incorporating both governmental and private schools.

Even though this study addressed very important issues it should be highlighted with the following limitations. Other factors like genetic factors and health condition of participants were not addressed. Even though there might be recall bias and social desirability but different efforts were

used to minimize such problems. since the dietary intake and physical activity were self-reported there might be over or under reporting such type of problems might affect the estimation of odd ratio (OR). BMI for age was also wrongly misclassify individual as obese while their body is built with muscle.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

Even though factors of overweight and obesity are complex and are not limited these, present study isolated certain socioeconomic, dietary, and lifestyle factors that are linked with greater risk of overweight and obesity among this population. Accordingly, high house hold wealth status, soft drink intake, being physically inactive, sedentary behavior and poor knowledge in nutrition were significantly associated with overweight and obesity.

7.2 Recommendation

Adolescence provides a window of opportunity for long term positive impact that nutrition should be a programmatic priority in adolescents. So promotion of healthy nutrition behaviors is the core element. Based on the findings of study the following recommendations were forwarded:

For federal ministry of health and education.

- Ministry of education need to give attention for physical education class has to be strengthen for instance, frequency of physical education and their time.
- Before giving license to open private schools need to verify the environment to enhance physical activities in the school by Ministry of Education.
- Ministry of health need to promote public awareness on healthy life styles such as increased physical activities, lesser sedentary behavior, lesser frequent consumption of soft drinks, should be given for the adolescents, family and community through media.
- Also ministry of health need to develop nutrition guide line, nutrition labels and health claims are one possible avenue to reduce such problems.

Butajira town health, education office

- Need to promote public awareness on healthy life styles such as increased physical activities, lesser sedentary behavior, lesser frequent consumption of soft drinks, should be given for the adolescents, family and community **through** health extension program, different public forum and media.

Schools

- Needs to establish standards for school physical education should be enjoyable, meet the needs of all students and keep the students' activity to meet WHO recommendation for adolescents.
- Need to develop school nutrition club to promote the knowledge of adolescents concur with physical activity and healthy diets.

Parents and adolescents

- Need to set aside time for healthy meals, physical activity and limit television viewing for their adolescent's
- Need to reduce consumption of high energy dense foods and Increase consumption fruit and vegetable.
- Need to increase active transport to schools.

Researchers

- More extensive research need to be done with large sample size using the most precise technologies such as Air displacement plethysmography/DXRA/MRI including factors that were not addressed such as genetic factor, nutritional attitude and practice and overall health condition of participants.

8. REFERENCE

1. WHO FS. Obesity and overweight. 2018;
2. WHO. Media centre Obesity and overweight. 2016;1–5.
3. Mak K, Tan SH. Underweight problems in Asian children and adolescents. 2012;779–85.
4. WHO. BMI-for-age GIRLS Thinness Severe thinness. 2007;2007.
5. WHO. BMI-for-age BOYS Thinness Severe thinness. 2007;2007.
6. G C, Simmonds M, Llewellyn A, Owen CG, Woolacott N. Article : Predicting adult obesity from childhood obesity : a systematic review and meta-analysis. 2016;
7. WHO. WHO Health Statistics Monitoring Health For SDGs. 2018.
8. Keats S, Wiggins S. Future diets Future diets. 2014;(January).
9. Kamadjeu RM, Edwards R, Atanga JS, Kiawi EC, Unwin N, Mbanya J. Anthropometry measures and prevalence of obesity in the urban adult population of Cameroon : an update from the Cameroon Burden of Diabetes Baseline Survey. 2006;8:1–8.
10. Gebreyohannes Y, Shiferaw S, Demtsu B, Bugssa G. Nutritional status of adolescents in selected government and private secondary schools of Addis Ababa , Ethiopia. 2014;3(6):504–14.
11. Gali N, Tamiru D, Tamrat M. Journal of Pediatric Nursing The Emerging Nutritional Problems of School Adolescents : Overweight / Obesity and Associated Factors in Jimma Town , Ethiopia. J Pediatr Nurs. 2017;35:98–104.
12. Teshome T, Singh P, Moges D. Prevalence and Associated Factors of Overweight and Obesity Among High School Adolescents in Urban Communities of Hawassa , Southern Ethiopia. 2013;1(1):23–36.
13. CDC. DEPARTMENT of HEALTH and HUMAN SERVICES. 2006;
14. Langford R, Bonell C, Jones H, Campbell R. Obesity prevention and the Health promoting Schools framework : essential components and barriers to success. 2015;1–17.
15. Demissie T, Ali A, Mekonen Y, Haider J, Umata M. Magnitude and distribution of

- vitamin A deficiency in Ethiopia. 2010;31(2):234–41.
16. FMOH. FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA NATIONAL NUTRITION PROGRAM 2016-2020. (July 2016).
 17. FMOH. Ethiopian Demographic Health Survey. 2016.
 18. Kleiser C, Rosario AS, Mensink GBM, Prinz-langenohl R, Kurth B. Potential determinants of obesity among children and adolescents in Germany : results from the cross-sectional KiGGS study. 2009;14:1–14.
 19. Bereket AH, Beyero M, Fikadu AR, Boshu T. Risk Factors for Overweight and Obesity in Private High School Adolescents in Hawassa City , Southern Ethiopia : A Case-control Study. 2017;7(2):29–34.
 20. Mokdad AH, Bowman BA, Ford ES, Vinicor F, Marks JS, Koplan JP. The Continuing Epidemics of Obesity and Diabetes in the United States. 2001;286(10).
 21. G. O’Brien and M. Davies M. Nutrition knowledge and body mass index. 2007;22(4):571–5.
 22. Sobal J, Stunkard AJ. Socioeconomic Status and Obesity : A Review of the Literature. 1989;105(2):260–75.
 23. Shrewsbury V, Wardle J. Socioeconomic Status and Adiposity in Childhood : A Systematic Review of Cross-sectional Studies 1990 – 2005. 2008;16(2).
 24. El-sayed AM, Scarborough P, Galea S. Socioeconomic Inequalities in Childhood Obesity in the United Kingdom : A Systematic Review of the Literature. 2012;10032:671–92.
 25. McLaren L. Socioeconomic Status and Obesity. 2007;29:29–48.
 26. Med F, Sci M, Al-gha AE, Tatwany BO, Aiash DA, Mandourah LA, et al. Family Medicine & Medical Science Research The Effect of Socioeconomic Status , Number of Siblings and Parental of Education on Children ’ Body Mass Index at Jeddah , Saudi Arabia : Cross Sectional Study. 2015;4(5):4–7.
 27. I. H. Carvalho Franciscantonio Menezes¹ MBN and JA de ACT. Risk factors for overweight and obesity in adolescents of a Brazilian university : a case-control study.

2009;

28. Nirmala A, Kanniammal C, Venkataraman P, Arulappan J. Predisposing factors associated with obesity among adolescents-A case control study . 2018;29(18):3497–501.
29. Bhuiyan MU, Zaman S, Ahmed T. Risk factors associated with overweight and obesity among urban school children and adolescents in Bangladesh : a case – control study. 2013;
30. Wrotniak, B. H., Maleté, L., Maruapula, S. D., Jackson, J., Shaibu, S., Ratcliffe, S. et al. (2012). Association between Socio - economic Status Indicators and Obesity in Adolescent Students in Botswana an African Country in rapid Nutrition Transition. 2012;9–13.
31. Stice E, Presnell K, Shaw H, Rohde P. Psychological and Behavioral Risk Factors for Obesity Onset in Adolescent Girls : A Prospective Study Psychological and Behavioral Risk Factors for Obesity Onset in Adolescent Girls : A Prospective Study. 2014;(August).
32. Al-hazzaa HM, Abahussain NA, Al-sobayel HI, Qahwaji DM, Musaiger AO. Lifestyle factors associated with overweight and obesity among Saudi adolescents. ??? 2012;12(1):1.
33. Teferi DY, Atomssa GE, Mekonnen TC. Overweight and Undernutrition in the Cases of School-Going Adolescents in Wolaita Sodo Town , Southern Ethiopia : Cross-Sectional Study. 2018;2018.
34. Intan S, Sharif Z, Shohaimi S. Assessing the children ' s views on foods and consumption of selected food groups : outcome from focus group approach. 2013;7(2):132–8.
35. Rathnayake KM, Roopasingam T, Wickramasighe VP. Nutritional and behavioral determinants of adolescent obesity : a case – control study in Sri Lanka. 2014;1–6.
36. Ther JND, Gebremichael B, Chere A. Nutritional Disorders & Therapy Prevalence of Childhood Overweight and Obesity and its Determinant Factors Among Elementary School Children in Addis Ababa , Ethiopia : A Cross Sectional Study. 2015;1–9.
37. Manyanga T, El-sayed H, Doku DT, Randall JR. The prevalence of underweight , overweight , obesity and associated risk factors among school-going adolescents in seven

- African countries. 2014;1–11.
38. Braithwaite I, Stewart AW, Hancox RJ, Beasley R, Murphy R, Mitchell EA, et al. The Worldwide Association between Television Viewing and Obesity in Children and Adolescents : Cross Sectional Study. 2013;8(9).
 39. WHO. global recommendation on physical activity for health. 2010;
 40. Brownson RC, Chiqui JF, Burgeson CR, Fisher MC. The Case for Promoting Physical Activity in School Settings. 2013;20(6):436–44.
 41. Tluway FD, Leyna GH, Mmbaga EJ. Magnitude and factors associated with overweight and obesity among adolescents in semi-rural area of Babati District , Tanzania. 2018;20(2):1–9.
 42. Gebregorgis. Obesity & Weight Loss Therapy Overweight and Obesity , and Associated Factors among High School. 2015;(January 2013).
 43. Keith A. King, Krista Mohl, Amy L. Bernard RAVU. Does Involvement in Healthy Eating Among University Students Differ Based on Exercise Status and Reasons for Exercise? Keith. NIDA Res Monogr Ser. 2007;5(3):106–19.
 44. Gracey D, Stanley N, Burke V, Corti B, Beilin LJ. Nutritional knowledge , beliefs and behaviours in teenage school students. 1996;(June).
 45. Pena M, Holbert D. Effects of socioeconomic status on the obesity knowledge of adolescents from six Latin American cities. 2017;(September 2001).
 46. WHO. Global Physical Activity Questionnaire (GPAQ) WHO STEPwise approach to NCD risk factor surveillance. 2007;1–3.
 47. FAO. Guidelines for assessing nutrition-related Knowledge , Attitudes and Practices manual. 2014.
 48. Onis M De, Onyango AW, Borghi E, Siyam A, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. 2007;043497(July):660–7.
 49. Kennedy G, Ballard T, Dop, MarieClaude (FAO). Guidelines for measuring household and individual dietary diversity. Fao. 2011. 1-60 p.

50. 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. 2013;8(3):1–9.
51. Micklesfield LK, Lambert E V, Hume DJ, Chantler S, Paula R, Dickie K, et al. Review Articles Socio-cultural , environmental and behavioural determinants of obesity in black South African women. 2013;24(9):369–75.
52. WHO. Global Physical Activity Questionnaire. 2011;
53. Adesina AF, Peterside O, Anochie I, Akani NA. OF PEDIATRICS Weight status of adolescents in secondary schools in port Harcourt using Body Mass Index (BMI). ??? [Internet]. 2012;38(1):1. Available from: ???
54. Popkin BM, Distinguished WRKJ. Obesity dynamics and their environmental causes; Dietary and physical activity patterns, trends and determinants. 2019;
55. Mushtaq MU, Gull S, Mushtaq K, Shahid U, Shad MA. Dietary behaviors , physical activity and sedentary lifestyle associated with overweight and obesity , and their socio-demographic correlates , among Pakistani primary school children. 2011;1–13.
56. Jalali-farahani S, Amiri P, Chin YS. Are physical activity , sedentary behaviors and sleep duration associated with body mass index-for-age and health-related quality of life among high school boys and girls ? Health Qual Life Outcomes [Internet]. 2016;1–9. Available from: <http://dx.doi.org/10.1186/s12955-016-0434-6>
57. Reem A-S. The Prevalence and Selected Determinants of Overweight and Obesity Among Children and Adolescent in the City of Al-Ain, UAE. 2008;(Cdc).
58. WHO. Physical Inactivity : A Global Public Health Problem. 2019;
59. Neto FA, Eto FN, Sabrina T, Pereira S, Carletti L, Bisi C. Active and sedentary behaviours in children aged 7 to 10 years old : the urban and rural contexts , Brazil. 2014;1–10.
60. Toschke M, Rosario AS, Beyerlein A. Risk Factors for Obesity : Further Evidence for Stronger Effects on Overweight Children and Adolescents Compared to Normal-Weight

- Subjects. 2011;6(1).
61. Zingina FM, Mogre V. aged 6 – 12 years in Tamale Metropolis. 2013;2:26–34.
 62. Peltzer K, Pengpid S. Overweight and Obesity and Associated Factors among School-Aged Adolescents in Ghana and Uganda. 2011;3859–70.
 63. Basu S, Stuckler D, Mckee M, Galea G. Nutritional determinants of worldwide diabetes : an econometric study of food markets and diabetes prevalence in 173 countries. 2012;16(1):179–86.
 64. Frank B. Hu, MD, PhD^{1 2} and Vasanti S. Malik. Sugar-sweetened beverages and risk of obesity and type 2 diabetes: Epidemiologic evidence. 2011;100(1):47–54.
 65. Malik VS. intake of sugar sweetend beverages and weight gain. 2011;84(2):274–88.
 66. Brooka U. High school students ’ attitudes and knowledge of food consumption and body image : implications for school based education. 1997;30:283–8.
 67. Farajzadegan Z. Assessment of the Relationship between Nutritional Knowledge and Anthropometric Indices in Isfahan Children and Adolescent. 2018;

9. ANNEXES

Annex I: Consent form

Written consent form for child parents Participant Information Sheet

Good morning/ afternoon?

My name is _____. Currently I am a graduate student at Jimma University Institute of Health, Department of Population and Family Health. And now I am conducting a research on determining the predictors of overweight and obesity among school adolescent chi in Butajira town.

Objective: To determine the predictors of overweight and obesity among school adolescent in Butajira town, Gurage zone, SNNPR, Ethiopia 2018

You are selected randomly as a possible participant in this study as a subject.

Potential risks: There is no potential risk that may cause any harm on study participants.

Benefits: No financial benefits are related with this study. But by participating in this study, you contribute to improve the prevention and control method of adolescent overweight and obesity.

Confidentiality: You and your child name will not be written in this form and will never be used in connection with any information you tell us. All information given by you and your child will be kept strictly confidential. Your participation is voluntary and you are not obligate to answer any question which you do not wish to answer. If you fill discomfort to respond to the questioner, please fill free to drop it. This questionnaire will take about 10 minutes.

Written consent form for child parents

Jimma University institute of Health, department of Population and Family Health.

I have read and understand all about the objective and the process of the study. My participation is voluntary and not obligate to answer any question which I do not know or do not wish to answer. I also understood that all information given by me and my child will be kept strictly confidential. Therefore, I am willing to participate in this study.

Study participant sign _____ date _____

Data collector sign _____ date _____

Annex II: Questionnaires English Version

Jimma University institute of Health, department of Population and Family Health. This questionnaire is designed to collect information from respondents in respect to determine the predictors of the overweight and obesity among school adolescent in Butajira town.

Part I: Questionnaire for sociodemographic surveillance to be filled by student Participant about their parent's code_____

S , no	Demographic information	Response	skip
101.	Religion	1. Muslim 2. Orthodox 3. catholic 4. protestant 5. other_____	
102.	What is the occupation of the Mothers?	1. House wife 2. Government Employee 3. Private Business 4. others	
103.	What is the occupation of the Mothers?	1. Government employee 2. Daily laborer 3. Private business 4. others	
104.	Ethnicity	1. Gurage 2. Amhara 3. Silte 4. Oromo 5. Tigre 6. other_____	
105.	What is the highest level of maternal education you have completed?	1. No formal education 2. 1-8 grade 3. 9-12 grade 4. College/ university	

106.	What is the highest level of paternal education you have completed?	1. No formal education 2. 1-8 grade 3. 9-12 grade 4. college/university	
107.	How many people live in your household?	_____	

Household Wealth			
<i>Now I will ask you about some fixed assets that your household have.</i>			
Does the household have any of the following properties? (Circle)		Yes	No
108.	Functioning radio/Tape recorder/CD player	1	0
109.	Functioning Television	1	0
110.	Gas Stove	1	0
111.	Electric stove	1	0
112.	Bicycle	1	0
113.	Motor Cycle	1	0
114.	Cart/Gari	1	0
115.	Bajaj	1	0
116.	Mobile phone	1	0
117.	Plough	1	0
118.	Sofa	1	0
119.	Spring mattress	1	0
120.	Sponge/Foam mattress	1	0
121.	Cotton mattress	1	0
122.	Car	1	0
123.	Generator	1	0
124.	Milling	1	0
125.	Water pump	1	0

Verbal assent form for students

Good morning/ afternoon?

My name is _____. Currently I am a graduate student at Jimma University Institute of Health, Department of Population and Family Health. And now I am conducting a research on determining the predictors of overweight and obesity among school adolescent in Butajira town.

Objective: To determine the predictors of overweight and obesity among school adolescent in Butajira town, Gurage zone, SNNPR, Ethiopia 2019.

You are selected randomly as a possible participant in this study as a subject.

Potential risks: There is no potential risk that may cause any harm on study participants.

Benefits: No financial benefits are related with this study. But by participating in this study, you contribute to improve the prevention and control method of adolescent overweight and obesity.

Confidentiality: You and your child name will not be written in this form and will never be used in connection with any information you tell us. All information given by you and your child will be kept strictly confidential. Your participation is voluntary and you are not obligate to answer any question which you do not wish to answer. If you fill discomfort to respond to the questioner, please fill free to drop it. This questionnaire will take about 10 minutes.

Interviewer sign _____ date _____ code _____

Part II; Questionnaire for Overweight and obesity and associated Factor Surveillance for students

Participant code _____ Kebele----- Name of the school -----

1:Sociodemographic of the children, Location and type of school		
Question	Response	Skip rule

126.	Sex	1. Male 2. Female	
127.	Age	_____	
128.	Type of school	1. Government 2. Private	
129.	Grade	_____	

Dieting question

For the following questions, please tell me how often in a week did you consume the following food items?						
s/no	Food item		Frequency per week			
			Never	1-2 times	3-4 times	>4times
130.	Bread (“Furno”)					
131.	Teff (Injera)					
132.	Porridge (genfo)	F/m teff				
		F/m wheat				
133.	food made f/m maize					
134.	food made f/m barely					
135.	food made f/m sorghum					
136.	Wheat (Pasta, macaroni, Rice)					
137.	Bean, pea and lentils					
138.	Nuts					
139.	Banana, Mango, Avocado,					

140.	Papaya, Orange, Gishta					
141.	Butter					
142.	Oil					
143.	Milk, Cheese and yogurt					
144.	Meat	Beef, Goat, Sheep/lamb				
		Chicken				
		Fish				
145.	chips, biscuit/sambusa, cookies					
146.	Egg					
147.	Sandwich made from vegetables					
148.	Sweet potato					
149.	Potato (White)					
150.	Carrot					
151.	Tomato					
152.	Keysir					
153.	Vege table	“Salata”				
		“Habesha gomen”				
		Cabbage (teqel gomen				

154.	Do you ever have a snack?	1. Yes 2. No	if no go to Q 156
155.	How many times a day do you have snack?	_____	
156.	How many meal do you have a day other than snacks?	_____	
157.	Do you eat out-side the home?	0. no 1. yes	
158.	Do you have habit of missing any of your breakfast schedules?	1. Yes 2. No	
159.	Do you consume sweet food and soft drink	1.yes 2. no	
160.	How many servings of soft drink do you drink per weekper week	
161.	How many servings of soft drink do you drink per dayper day	

3: Physical Activity

Questions about time you spend doing different physical activities in usual week in the past one months

	Question	Response	Skip rule
162.	Do you engage in Work besides your education?	1. Yes 2. No	If no go to Q 169
163.	If your answer in Q 162 is yes does your work involve vigorous intensity activity that for at least 10 minutes continuously?	1. Yes 2. No	If no go to Q 166

164.	In a typical week on how many days do you do vigorous –intensity activities as part of your work?	Number of days _____	
165.	How much time do you spend doing vigorous – intensity activities at work on a typical day?	Hours: minutes _____	
166.	Does your work involve moderate intensity activity that for at least 10 minutes continuously?	1. yes 2. No	If no go to Q 169
167.	In a typical week on how many days do you do moderate –intensity activities as part of your work?	-----	
168.	How much time do you spend doing Moderate – intensity activities at work on a typical day?	Hours: minutes -----	
Travel to and from places, sports/recreation activities			
The next questions exclude the physical activities at work beside of your education that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example work, school, place of worship			
169.	Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	1. Yes 2. No	If no go to Q 172
170.	In a typical week on how many days do you walk or use a bicycle for at least 10 minutes continuously	_____	
171.	How much time do you spend walking or bicycling for travel in a typical day?	Hours: minutes _____	
172.	Mode of transportation	1. foot 2 .vehicle	
173.	Do you do any vigorous-intensity sports for at least 10 minutes continuously?	1. Yes 2. No	If no go to Q 176

174.	If yes Q172, In a typical week on how many days do you do vigorous –intensity sports, fitness activities?	_____	
175.	How much time do you spend doing vigorous – intensity sports, fitness or recreational activities in a typical days?	Hours: minutes _____	
176.	Do you do any moderate-intensity sports for at least 10 minutes continuously?		
176.	In a typical week on how many days do you do moderate –intensity sports, fitness activities?	_____	
177.	How much time do you spend doing moderate – intensity sports, fitness or recreational activities in a typical days?	Hours: minutes _____	
4: Sedentary behavior			
178.	How much time do you spent your free time by reading books, watching TV and video Playing on computer games per day	Hours..... Minute.....	
179.	Do you have sleeping habit in afternoon	1. Yes 2. No	
180.	Average Sleep duration in particular day	Hours _____	

6: Nutritional knowledge		
I am going to ask you some questions about your nutrition and nutrition in general. Please let me know if you need me to clarify any of my questions. Feel free to ask any question you may have.		
181.	Do you know eating fruit and vegetables are prevents heart disease, diabetes, hypertension and cancer?	1. Yes 2. No

182.	Do you think people who are overweight are more likely to have health problems than people who are not overweight?	1. Yes 2. No
183.	Do you think people who are physically active are more likely to have health problems than people who are physically in-active?	1. Yes 2. No
184.	Do you think eating fruits and vegetables protects you from diseases?	1. Yes 2. No
185.	Do you know eating salty, sugar and fatty snacks every day leads to overweight and obesity?	1. Yes 2. No
186.	Do you know sticky and sugar-rich foods, such as sweets and candies causes interfere with appetite, can cause tooth decay and overweight and/or obesity	1. Yes 2. No
187.	Do you aware the bread, cereal, rice and pasta group is a good source of fat?	1. Yes 2. No
188.	Do you think Vitamin K is most important for healthy vision?	1. Yes 2. No
189.	Do you think iodine is most important for prevention of goiter?	1. Yes 2. No
190.	Do you think iron is most important for prevention of anemia?	1. Yes 2. No
191.	Do you think balanced diet is most preventive way of overweight and obesity?	1. Yes 2. No
192.	Do you know drinking alcohol causes interfere with appetite, can cause overweight and obesity?	1. Yes 2. No
193.	Do you aware eating fish meat is better than beef meat ?	1. Yes 2. No

Part III: Questionnaire for Overweight and obesity and associated Factor Surveillance for Physical Measurements to be filled by data collectors

measurements	Response	Results
194.	Height	In centimeters _____
195.	Weight	In kilograms (Kg) _____

Thank You for your cooperation!!

Annex III. Amharic version of the questioner

ጅማ ዩኒቨርሲቲ ጤና ኢንስቲትዩት የስነ-ህዝብ እና ጤና ትምህርት ክፍል ከጤና ጋር የተያያዘ ጥናታዊ ፅሁፍ የተሳታፊዎች መረጃ መስጫ ቅጽ

እንደምንደረሁ/ዋሉ?

-----እባላለሁ። በጅማ ዩኒቨርሲቲ ጤና ሳይንስ ኢንስቲትዩት ጤና ትምህርት ክፍል በስርዓተ-ምግብ የ2ኛ ዓመት የማስትሬት ድግሪ ተመራቂ ተማሪነኝ። በአሁኑ ሰዓት በቡታጅራ ከተማ እድሜያቸው ከአስር ዓመት እስከ አስራ-ዘጠኝ ዓመት ዕድሜ ለሚማሩ ተማሪዎች እና ወላጆችቻቸው ስለ ክብደት መጨመር እና ለክብደት መጨመር ተያያዥነት ያላቸውን ነገሮች ለመለየት በማጥናት ላይ እገኛለሁ።

የጥናቱ አላማ: የልጆች የክብደት መጨመር እና ለክብደት መጨመር ተያያዥነት ያላቸውን ነገሮች ለመለየት ነው።

የጎንዮሽ ጉዳት: በዚህ ጥናት መሳተፍ በርሶዎም ሆነ በልጅዎ ላይ ምንም አይነት ጉዳት አያመጣም።

ጥቅማጥቅም: በዚህ ጥናት መሳተፍ ምንም አይነት ገንዘብ አያስገኝም። ከአንተ/ች የምናገኘው መረጃ ከልጆች ክብደት መጨመር ጋር ተያይዞ የሚመጡ የልጆችን የጤና ችግሮች ለመከላከል፣ እቅድ ለማውጣት ይረዳል። ስለዚህ ይህንን አስመልክቶ የተወሰኑ ጥያቄዎችን ልጣይቅዎት እወዳለሁ። የእርስዎ በእውነት ላይ የተመሰረተ መልስ ለዚህ ጥናት መሳካት አስተዋፅኦ ያደርጋል። እርስዎም የሚሰጡት መረጃ ከአጥኚውና ቃለመጠይቅ አድራጊው በስተቀር በማንኛውም መልኩ ለሌላ 3ኛ ወገን ተላልፎ አይሰጥም። በሙሉ ፈቃደኝነት እንዲሳተፉ እየጠየቅሁ ያለመሳተፍ ወይም በማንኛውም ጊዜ ራስዎን ከጥናቱ የማግለል ሙሉ መብት አለዎት። በማንኛውም ጊዜ ጥያቄ ካለዎት በሚከተለው አድራሻዬ ማግኘት ይችላሉ። ጥያቄዎችን ለመመለስ አስር ደቂቃ ያህል ጊዜ ያስፈልጋል።

የስምምነት መግለጫ ፎርም

ጅማ ዩኒቨርሲቲ ጤና ኢንስቲትዩት የስነ-ህዝብ እና ጤና ትምህርት ክፍል በድህረ ምረቃ ፕሮግራም እኔ ስሜ ከዚህ በታች የተገለፀው፤ የዚህ ጥናት ዓላማ በደንብ የተብራራልኝ ሲሆን የጥናቱንም ዓላማ ተረድቻለሁ። በዚህ ጥናት ላይ መሳተፍ በሙሉ ፈቃደኝነት ላይ የተመሰረተ መሆኔን በሚገባ የተረዳሁ ሲሆን በማንኛውም ጊዜ ከጥናቱ ራሴን የማግለል መብት እንዳለኝ አውቄአለሁ። ስለሆነም የምሰጠው መረጃ እስከ ተጠበቀ ድረስ በዚህ ጥናት ለመሳተፍ ተስማምቻለሁ። በዚህ ጥናት ለመሳተፍ ስምምነቴን ስገልፅ ለምጠየቀው ጥያቄ በእውነት ላይ የተመሰረተ መልስ ለመስጠት የተስማማሁ መሆኔን አረጋግጣለሁ።

የመረጃ ሰጪው ፊርማ _____ ቀን _____
የአጥኚው ፊርማ _____ ቀን _____

ለአሳዳጊ ቤተሰብ የስምምነት መግለጫ ፎርም

ጅማ ዩኒቨርሲቲ ጤና ኢኒስቲዩት የስነ-ህዝብ እና ጤና ትምህርት ክፍል በድህረ ምረቃ ፕሮግራም እኔ ስሜ ከዚህ በታች የተገለጸው፤ የዚህ ጥናት ዓላማ በደንብ የተብራራልኝ ሲሆን የጥናቴንም ዓላማ ተረድቻለሁ። በዚህ ጥናት ላይ ልጄ/ተማሪዬ እንዲሳተፍ በሙሉ ፍቃደኝነት ላይ የተመሰረትኩ መሆኑን በሚገባ ተረድቻለሁ። ስለሆነም ልጄ/ተማሪዬ የምሰጠው መረጃ እስከ ተጠበቀ ድረስ በዚህ ጥናት እንዲሳተፍ የተስማማሁ መሆኔን አረጋግጣለሁ።

የመረጃ ሰጪው ፊርማ _____ ቀን _____
 የአጥኝው ፊርማ _____ ቀን _____

ለልጆች ክብደት መጨመር ተያያዥነት ያላቸውን ነገሮች ለመለየት በተማሪ ሚሞላ ቅጽ የሚከተሉትን ጥያቄዎች በጥንቃቄ ከነበቡ በኋላ ለእንዳንዱ በተሰጠው መልስ መስጫ ቦታ መልሱን ይሙሉ።

**የተሳታፊ መለያ ቁጥር-----ክፍል -----የክፍል አይነት-----
 የመንግስት/የግል... የት/ት ቤቱ ስም.....**

ተ.ቁ.	ጥያቄ	መልስ	ዝላል
101.	ሀይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ሌላካለይጠቀስ.....	
102.	የእናት ስራ ድርሻ	1. የቤት እመቤት 2. የመንግስት ሰራተኛ 3. የግል ንግድ(ስራ)	
103	የአባት ስራ ድርሻ	1. የመንግስት ሰራተኛ 2. የግል ንግድ(ስራ) 3. የቀን ውሎ ስራ	
104.	ብሔረሰብ	1. ሶማሌ 2. ኦሮሞ 3. አማራ 4. ጉራጌ 5. ትግሬ 6. ሌላካለይጠቀስ.....	
105.	የልጁ እናት የትምህርት ደረጃ	1. መደበኛ ትምህርት አልተከታተሉም 2. ከ1 እስከ 8ኛ ክፍል 3. ከ9 እስከ 12ኛ ክፍል 4. ከሌጅ ወይም ዩኒቨርሲቲ ትምህርት አተናቅቄያለሁ	
106.	የልጁ አባት የትምህርት ደረጃ	1. መደበኛ ትምህርት አልተከታተሉም 2. ከ1 እስከ 8ኛ ክፍል	

		3. ከ9 እስከ 12ኛክፍል 4. ከሌጅወይምዩኒቨርሲቲ ትምህርትአተናቅጭያለሁ	
107.	እርሶዎን ጨምሮ የቤተሰብ ብዛት ስንት ነዉ	-----	

የቤት ንብረት ሁኔታ			
አሁን ስለ ቤተቼህ የንብረት እና እሴት ሁኔታ እጠይቃቸዋለሁኝ			
ንብረት ካለ አለን ክበብ ከሌለ ደግሞ ይለምን ክበብ		አለ	ይለም
108.	የሚሰራ ሬዲዮ/ቴፕ/ሲዲ አለ	1	0
109.	የሚሰራ ቲቪ አለ	1	0
110.	የጋዝ እስቶቭ አለ	1	0
111.	የኤሌክትሪክ እስቶቭ አለ	1	0
112.	በይስክል አለ	1	0
113.	ሞተር ሰይክል አለ	1	0
114.	ጋሪ አለ	1	0
115.	ባጃጅ	1	0
116.	የእጅ ስልክ አለ	1	0
117.	መረሻ	1	0
118.	ሶፋ አለ	1	0
119.	ሚለጠጥ ፍራሽ አለ	1	0
120.	የስፖርት ፍራሽ አለ	1	0
121.	የጥጥ ፍራሽ አለ	1	0
122.	መኪና	1	0
123.	ጀነሬተር አለ	1	0
124.	ወፍጮ አለ	1	0
125.	የውሃ ምንጭ አለ	1	0

የተማሪዎች መግለጫ፣ የትምህርት ቤቱ አይነት			
ጥያቄ		መልስ	ዝላል
126.	ጾታ	1. ወንድ 2. ሴት	
127.	እድሜ	-----	
128.	የትምህርት ደረጃ	-----	
129.	የትምህርት ቤቱ አይነት	1. የመንግስት 2. የግል 3. መንግስታዊ ያልሆነ ድርጅት 4. የመስጊድ/የቤተክርስቲያን/ካቶሊክ ትምህርት	

2: የአመጋገብ ልምድ ጋር የተያያዙ ጥያቄዎች

ከዚህ ቀጥሎ ባለፈው አንድ ሳምንት አዘውትረው ስለተመገቡ አቸው የምግብ አይነቶች በተመለከተ እጠይቅዎታለሁ።

	የምግብ አይነት		በሳምንት ስንት ጊዜ ይመገባሉ			
			አልተመገቡም	1-2 ጊዜ	3-4 ጊዜ	ከ4 ጊዜ በላይ
130.	የስንዴ ዳቦ (“ፉርኖ”)					
131.	የጤፍ እንጀራ					
132.	ገንፎ	ከገብስ				
		ከስንዴ				
133.	ከበቆሎ የተሰራ ምግብ					
134.	ከገብስ የተሰራ ምግብ					
135.	ከማሽለ የተሰራ ምግብ					
136.	ፍዝ፣ መኮሮ፣ ፓስታ					
137.	ባጭላ፣ አተር፣ ሽምብራ					

138.	ለውዝ				
139.	ሙዝ፣ አሸካይ፣ መንጎ				
140.	ፓፓያ፣ ቡርትካን፣ ጊሽጣ				
141.	ቂቤ				
142.	ዘይት				
143.	ወተት፣ አይቤ፣ ኡርጎ				
144.	ስጋ	የክብት/ፊያል/በግ			
		ዶሮ			
		ዓሳ			
145.	ቺፕስ፣ኩኪስ፣ብስኩት				
146.	እንቁላል				
147.	ሰንዲዊች	የአትክልት			
		የእንቁላል			
148.	ስኳር ድንች				
149.	ድንች				
150.	ካሮት				
151.	ቲጣቲም				
152.	ቀይስር				
153.	አትክልት	ሰላጣ/ቆስጣ/ፎሶሊያ			

		ሀበሻ ጎማን				
		ጥቅልል ጎማን				

154.	በቁርስና በምሳ መካከል ወይም በምሳና በእራት መካከል ወይም ከመደበኛው አመጋገብ በተጨማሪ ምግብ ይመገባሉ?	1. አዎ 2. አልመገብም:	መልሱ አልመገብም ከሆነ ወደ ጥያቄ 138 ይህዱ
------	---	---------------------	--

155.	በቀን ስንት ጊዜ መክሰስ ይመገባሉ?	_____	
156.	ከላይ የጠቀሱትን ምግብ ሳይጨምር በቀን ስንት ጊዜ ይመገባሉ?	_____	
157.	ከቤት ውጭ ይመገባሉን	1 አዎ 2 አልመገብም	
158.	አንድ አንድ ቀን ቁርስ፤ ሳይበሉ የሚቀሩበት ቀን አለ?	1. አዎ 2. የለም	
159.	ለስላሳ የመጠጣት ልምድ አሎት	1. አዎ 2. የለም	
160.	አብዛኛውን ጊዜ በአንድ ሳምንት ውስጥ ስንት ቀን ለስላሳ መጠጦች ይጠጣሉ? ለምሳሌ ከካ፣ ፕፕሲ እናም ሌሎችም?	ቀን.....	
161.	ለስላሳ መጠጦች ከሚመገቡባችዎ ቀናት ውስጥ በአንዱ ቀን ስንት ጊዜ ይጠጣሉ?	ብዛት.....	

አካላዊ እንቅስቃሴ እና ስራ ጋር የተያያዘ እንቅስቃሴ

ክዚህ ቀጥሎ የተለያዩ የአካል እንቅስቃሴ በማካሄድ የሚያሳልፉአቸውን ጊዜ በተመለከተ እጠይቅዎታለሁ።

ጥያቄ	መልስ	ዝላል
162. ከትምህርት ውጭ ተጨማሪ የሚሰፍኑ ስራ አለ?	1. አዎ 2. የለም	መልሱ የለም ከሆነ ወደ ጥያቄ 164 ይህዱ
163. ከዚህ በላይ ለተጠቀሰው ጥያቄ መልሰዎ አዎ ከሆነ ስራዎ ብርቱ ጉልበት የሚጠይቅ ተግባር ወይም ቶሎቶሎ መተንፈስን ወይም ፈጣን የልብ ምት ሊያስከትል የሚችል ተግባር ያለማቋረጥ ቢያንስ ለ10 ደቂቃ ይሰራሉ?	1. አዎ 2. የለም	መልሱ የለም ከሆነ ወደ ጥያቄ 169 ይህዱ
164. አብዛኛውን ጊዜ በሰዎች ስንት ቀን ብርቱ ጉልበት የሚጠይቅ ተግባር ያከናወናሉ?	የቀን ብዛት _____	

165. ብርቱ ጉልበት የሚጠይቁትን ተግባራት ከሚያከናውኑባቸው ቀናት በቀን ለምን ያህል ጊዜ ይሰራሉ?	ስዓት _____ ደቂቃ _____	
166. ስራዎ መጠነኛ ጉልበት የሚጠይቅ ተግባር ወይም መጠነኛ የመተንፈስ ወይም የልብ ምት ፍጥነት ጨማሪ ሊያስከትል የሚችል ተግባር ያለቋረጥ ቢያንስ ለ10 ደቂቃ ይሰራሉ?	1. አዎ 2. የለም	መልሱ የለም ከሆነ ወደ ጥያቄ 169 ይህዱ
167. አብዛኛውን ጊዜ መጠነኛ ጉልበት የሚጠይቁ ስራዎችን በሰዎች ስንት ቀን ይሰራሉ?	የቀን ብዛት _____	
168. መጠነኛ ጉልበት የሚጠይቁ ተግባራት ከሚያከናውኑባቸው ቀናት በአንዱ ቀን ለምን ያህል ጊዜ ይሰራሉ?	ስዓት _____ ደቂቃ _____	

ከዚህ ቀጥሎ ከቦታ ቦታ ሲንቀሳቀሱ በብዛት የሚጠቀሙባቸውን መንገዶች እጠይቅዎታለሁ።

169. ከቦታ ቦታ በሚንቀሳቀሱበት ጊዜ ለ 10 ደቂቃ ያለማቋረጥ በእግረዎ ወይም በብስክሌት ይሄዳሉ።	1. አዎ 2. አልሄድም	መልሱ አልሄድም ከሆነ ወደ ጥያቄ 172 ይህዱ
170. በሰዎች ውስጥ ስንት ቀን ከ 10 ደቂቃ ያላነሰ ያለማቋረጥ በእግረዎ ወይም በብስክሌት ይሄዳሉ።	የቀን ብዛት _____	
171. በነዚህ ቀናት ውስጥ በቀን ምን ያህል ሰዓት ሳይቋረጡ በእግር ወይም የብስክሌት ጉዞ ያደርጋሉ?	ሰዓት----- ደቂቃ-----	

ከስፖርትና ከመዝናናት ጋር የተያያዙ እንቅስቃሴዎች

172.	ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት ቢያንስ ለ10 ደቂቃ ያክል ሳያቋርጡ ይሰራሉ?	1. አዎ 2. የለም	መልሱ የለም ከሆነ ወደ ጥያቄ 175 ይህዱ
173.	አበዛኛውን ጊዜ በሳምንት ስንት ቀን ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት በያንስ ለ10 ደቂቃ ያክል ያለማቀዋረጥ ይሰራሉ?	የቀንብዛት__ _____	
174.	ስፖርት ከሚሰሩባቸው ቀናት ውስጥ በአንዱ ቀን ሳያቋርጡ ለምን ያክል ጊዜ ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት ይሰራሉ?	ስዓት_____ _ደቂቃ_____ — —	
175.	መጠነኛ የሆነ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት በያንስ ለ10 ደቂቃ ያክል ሳያቋርጡ ይሰራሉ?	1. አዎ 2. የለም	መልሱ የለም ከሆነ ወደ ጥያቄ 172 ይህዱ

176.	አበዛኛውን ጊዜ በሳምንት ስንት ቀን መጠነኛ የሆነ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት በያንስ ለ10 ደቂቃ ያክል ሳያቋርጡ ይሰራሉ?	የቀን ብዛት_____	
177.	የእረፍት ስዓት ስዓት ፎሎቭዮን፣ ቫዲዮ በማየት እና ኮምፕተር ጌም በመጫወት በቀን ለምን ያህል ሰዓት ያሳልፋሉ?	1. ሰዓት..... 2. ደቂቃ.....	
178.	ስፖርት ከሚሰሩባቸው ቀናት ውስጥ በአንዱ ቀን ሳያቋርጡ ለምን ያህል ጊዜ መጠነኛ የሆነ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያሰከትል የሚችል ስፖርት ሳያቋርጡ ይሰራሉ?	ስዓት_____ደቂቃ_____ —	
179.	በአብዛሃኛው ጊዜ ከሰዓት በኋላ የመተኛት ልምድ አለህ/ሽ?	1. አዎ 2. የለኝም	
180.	በአብዛሃኛው በአንድ ቀን ለስንት ሰዓት በእንቅልፍ ተኝተው ያሳልፋሉ?	ስዓት_____	

ከዚህ ቀጥሎ ስለ ምግብ አጠቃቀም እና ጥቅሞች ላይ ጠቅላላ ዕውቀት እጠይቅዎታለሁ።

181.	አትክልትና ፍራፍሬ መመገብ ደምግፊት፣ የስኳር እና የልብ ህመምን እንደሚከላከል ያውቃሉ	1. አውቀለሁ 2. አላቅም
182.	ከሚገቡው በላይ የወፈረ ሰው ትክክለኛ ክብደት ከለው ሰው ይልቅ ለተለያዩ በሽታዎች እንደሚጋለጡ ያውቃሉ	1. አውቀለሁ 2. አላቅም

183.	የአካል እንቅስቃሴ ማያደርጉ ሰዎች ለበሽታ የበለጠ ተጠቂ መሆናቸውን ያውቃሉ	1. አውቀለሁ 2. አላቅም
184.	አትክልትና ፍራፍሬ መመገብ በሽታን እንደሚከላከል ያውቃሉ	1. አውቀለሁ 2. አላቅም
185.	ጨው፣ ሱኪር እና ስብ የበዛባቸው ምግቦች አዘውትሮ መመገብ ላልተገባ ክብደት መጨመር ምክኒያት መሆኑን ያውቃሉ	1. አውቀለሁ 2. አላቅም
186.	ከረጫላ እና ስኪር ነክ ያላቸው ምግቦችን ስንመገብ የምግብ ፍላጎታችን እንደሚዘባ ያውቃሉ	1. አውቀለሁ 2. አላቅም
187.	ዳቦ፣ ፓስታ እና ሩዝ ስብን እንደሚይዝ ያውቃሉ	1. አውቀለሁ 2. አላቅም
188.	ቫይታሚን ኤ የያዙ ምግቦች ለአይን እይታ ትልቅ ፋይዳ እንዳላቸው ያውቃሉ	1. አውቀለሁ 2. አላቅም
189.	አዮዲን የእንቅርት በሽታ ወይም ጎይተርን እንደሚከላከል ያውቃሉ	1. አውቀለሁ 2. አላቅም
190.	አይረን የደም ማነስን እንደሚከላከል ያውቃሉ	1. አውቀለሁ 2. አላቅም
191.	ጤናማ/የተመጣጠነ ምግብ የልተፈለገ ክብደት መጨመርን እንደሚቀንስ ያውቃሉን	1. አውቀለሁ 2. አላቅም
192.	አልክሆል መጠጣት የምግብ ፍላጎትን እንዲሁም የልተፈለገ ክብደትን ለመጨመር ምክኒያት መሆኑን ያውቃሉ	1. አውቀለሁ 2. አላቅም
193.	የዓሳ ስጋ ከከብት ስጋ ያልተፈለገ ክብደትን ለመቀነስ የተሸለ መሆኑን ያውቃሉ	1. አውቀለሁ 2. አላቅም

በመረጃ ሰብሳቢዉ የሚሞላ አካላዊ ልኬት

ልኬት	መልስ	ዝላል
194.	ቁመት	በሴንቲ ሜትር _____
195.	ክብደት	በኪሎግራም _____

ለተደረገልኝ ትብብር በጣም አድርጌ አመሰግናለሁኝ!!