ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF ALLIED HEALTH SCIENCES

DEPARTMENT OF NURSING AND MIDWIFERY

PREVALENCE OF CHILDHOOD OVERWEIGHT AND OBESITY AND ITS DETERMINANT FACTORS AMONG ELEMENTARY SCHOOL CHILDREN IN ADDIS ABABA, ETHIOPIA

BY BERKET G/ MICHAEL

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JUNE, 2014

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BY BERKET G/ MICHAEL (BSC)

ADVISOR: AMSALE CHERIE (PhD)

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ABSTRACT

Background: Obesity and overweight pose major risk for serious diet-related chronic diseases, including type2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. Even though there is no well-documented information recently, chronic diseases that are directly or indirectly related to overweight and obesity become increasing in Ethiopia especially in urban areas.

Objective: the main aim of this study is to determine the prevalence of childhood overweight and obesity and its determinant factors.

Methods: A cross-sectional survey was conducted among 463 elementary school children in Addis Ababa. Study participants were selected using multi stage sampling from 10 public and 10 private elementary Schools. Overweight and obesity was determined using CDC 2000, BMI percentile chart. Socio-demographic and other determinants of childhood overweight were assessed. Data were collected using combination of interview of children and self-administered questionnaire to their parents. Finally data were processed and analyzed using Epi info version 3.5.4and SPSS version 21.

Result: A total 463 children and 463 parents participated in the study. The overall prevalence of underweight, normal, overweight and obesity is 44(9.5%), 360(77.8%), 46(9.9%) and 13(2.8%) respectively. Sex specific prevalence of overweight and obesity shows 7.7% and 3.2% for male and 12%and 2.5% for female respectively. Significant association with overweight was observed among car ownership of the family (p<0.001), number of snacks per day (p=0.03), sweet food preference (p<0.001), buying ice cream (p=0.014), eating breakfast regularly (p=0.034), walking or riding bicycle for at least 10 minutes per day (p=0.009) and family participation in regular physical activity (p=0.023).

Conclusion and Recommendations: The prevalence of overweight was found to be high even computable with the global prevalence. Among the factors identified are unhealthy dietary pattern like preferring sweet foods, eating breakfast irregularly, buying ice cream and frequent snacking are strongly associated with overweight. In addition physical inactivity are also important factors impacting on the risk of obesity in children. If Primary preventive measures is not taken immediately, prevalence of overweight and obesity among children in Addis Ababa might increase rapidly in the coming few years. Early interventions on modifiable risk factors by promoting active lifestyles and healthy diets are likely to decrease the rate of childhood obesity.

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Abbreviations

AAU: Addis Ababa University

AOR: Adjusted Odds Ratio

BMI: Body Mass Index

CDC: Center for Disease Control

CI: Confidence Interval

EMR: Eastern Mediterranean Region

IOTF: International Obesity Task Force

OR: Odds Ratio

SPSS: Statistical Package for the Social Sciences

WHO: World Health Organization

1. BACKGROUND

1.1 INTRODUCTION

Obesity has become a global health problem. Obesity and overweight pose a major risk for serious diet-related chronic diseases, including type2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. (1)

The World Health Organization(WHO) estimated that by 2005, at least 1.6 billion and 400 million people aged above 15 years were overweight and obese respectively .It further projected that by 2015,these statistics will increase to 2.3 billion for overweight and 700 million for obesity unless drastic measures are taken to mitigate this burgeoning problem(2)

In Africa, despite a high prevalence of under nutrition, the prevalence of overweight is increasing at an alarming rate. It is estimated that 25% to 60% of urban women are overweight (3)

The prevalence of overweight and obesity is also rapidly increasing among children. The International Obesity Task Force(IOTF)estimates that about 155 million school-going children globally are either overweight or obese(4) WHO defines children as those age group less than 18 adolescents as those in the age group of 10-19.

Childhood obesity is considered to be a precursor of adverse health effects in adulthood, as overweight children are more likely to become overweight adolescents and adults; 2.8 times more likely in one study in Chinese children (5)

Furthermore, rapid changes in diets and lifestyles that have occurred with industrialization, urbanization, economic development and market globalization have accelerated over the past decade. This is having a significant impact on the health and nutritional status of populations, particularly in developing countries and in countries in transition. (6) In 2005 WHO launched a campaign calling for increased global investment to prevent the growth of chronic disease in developing countries (7).

Despite the fact poverty, nutrition deficiency and unhygienic living condition are major problems in the developing countries, chronic disease that are directly related to overweight and obesity are emerging in an alarming rate. In spite of this scenario People are not using preventive measures against obesity, but they only depend on their daily routine work.

1.2 STATEMENT OF THE PROBLEM

Different studies have indicated that the prevalence of overweight and obesity is increasing in both developed and developing countries. Due to economic growth, modernization, urbanization and globalization of food markets many developing countries are experiencing a shift from underweight to overweight along with rapid socioeconomic and nutritional transition particularly in their urban population. It is difficult to conduct an assessment of trends in several countries like Ethiopia, due to non-availability of even base line data. (8)

The 2006 report of WHO states, at least 1.6 billion and 400 million people aged above 15 years were overweight and obese respectively .It will further increase by 2015 to 2.3 billion for overweight and 700 million for obesity. (2, 17)

According to the study conducted in Tanzania in 2012, the overall prevalence of child obesity was 5.2% and was higher among girls (6.3%) compared to boys (3.8%). Obese children had significantly higher mean values for age (p=0.042), systolic and diastolic blood pressures (all p<0.001) (19).

Study conducted in Addis Ababa in 2007 Prevalence of overweight and obesity among primary school children in Addis Ababa were 7.6 %(95%CI =5.85, 9.37%) and 0.9% (95%CI=0.027%, 1.53%) respectively. The sex specific prevalence of overweight and obesity were 9.4 and 0.8 for females, 5.4% and 1.1 for boys respectively. The prevalence of overweight in private school was 23.2 %(95%CI= 14.71%, 31.69%). Whereas the overall prevalence of underweight was13 %(18.1% in boys and 9% in girls). (9)

Even though there is no well-documented information recently, chronic diseases become Increasing in Ethiopia especially in urban areas. In Addis Ababa it becomes common to
See overweight people in all age group including school children. In my experience I see a lot of obese people in Addis Ababa and some urban part of Ethiopia like Nazheret and Hawassa. As far as our knowledge is concerned there is only two documented study done to assess prevalence and determinants of childhood and adolescent overweight and obesity in Addis Ababa. Limited number of research in this area motivates me to select this topic. Even though, there is a lack of data concerning overweight and obesity assessment in childhood and adolescence in Ethiopia,

clearly the risk of childhood obesity leading to adult morbidity is of great public health significance.

Due to the above circumstances this study is designed to measure the prevalence of childhood overweight and effect of socio-demographic and life style factors on childhood overweight to stimulate planners and researchers on double burden of disease in Ethiopia which is less recognized problem. As a result this study will have great contribution on designing preventive action of early age overweight and obesity.

2: LITRATURE REVIEW

Obesity among children and adolescents; the prevalence of excess weight among children is increasing in both developed and developing countries, but at very different speeds and in different patterns (10). Worldwide, over 22million children under the age of 5 years are severely overweight, as are 155 million children of school age. This implies that one in 10 children worldwide is overweight. This global average reflects a wide range of prevalence level (11)

At any age an excessive rate of weight gain relative to linear growth should be recognized and underlying predisposing factors should be addressed with parents and other caregivers (12)

The definition of both overweight and obesity in children and adolescents is still a matter of debate (1, 3, 4, 10). Obesity is often defined simply as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired [10]. To date, body mass index (BMI), calculated as weight (kg) per height (m2), can be easily assessed at low cost and is strongly associated with body fat and health risks in adults (4). In children and adolescents, BMI has increasingly been accepted as a valid indirect measure of fat mass with age and gender specific cutoffs proposed in various studies; but there remains a wide array of references used, based on different populations, including weight-for-height (ideal weight for height or *z*-score), BMI percentile, skin fold thickness, and waist circumference. BMI for age and sex specific is recommended to screen children 2 to 20 years for at risk of overweight or overweight to identify child who may need further assessment and possible treatment (14)

The study done in Douala, Cameron in 2010 showed that the prevalence of overweight ranges from 6.4% to 8.2% in boys and from 10.7% to 17.2% in girls, whereas prevalence of obesity ranges from 1.4% to 5.5% in boys and from 2.4 to 8.6% in girls. Prevalence of underweight and stunting according to WHO 2007 reference was higher in boys as compared to girls, 5.5% versus 4.8% and 9.2% versus 2.4%, respectively; while wasting was about 1.5 times higher in girls as compared to boys at 2.9% versus 1.6%. (20)

Study conducted in Uganda showed that the overall prevalence of obesity and overweight was 2.3% and 10.4%, respectively. The prevalence of obesity was 4.4% in Kampala and 0% in Kamuli while the prevalence of overweight was 10.2% and 10.6% in Kampala and Kamuli, respectively. Compared to males, females were more likely to be obese (2.9% vs. 1.8%) or overweight (17.4% vs. 3.3%). Residing in the city, alcohol consumption, smoking, non-engagement in sports activities, commuting to school by taxi or private vehicle and being from a

rich family were the main factors significantly associated (P<0.05) with obesity. Being female (p = 0.0001) and not engaging in any sports activities (P = 0.002) were two factors significantly associated with being overweight. (21)

A study done in Addis Ababa in Arada Sub-city on the prevalence of overweight among high school students were 69 (8.6%) with 95%CI (4.0, 12.0%) whereas the prevalence of obesity was 6 (0.8%) with 95% CI (0.4, 2.0%). Therefore, the overall prevalence of overweight and/or obesity was found to be 75 (9.4%). Among the factors associated with overweight and/or obesity age, school type, family size, monthly income, sex of head of the household and walking at least 30 minutes in a day were significantly associated with overweight and/or obesity. Having small family size (AOR=3.1095% CI: 1.69-5.53), learning in private school (AOR=2.73 95% CI: 1.36-5.49) and living in male headed household (AOR=2.56 95% CI: 1.25-5.24) were positively and significantly associated with overweight and/or obesity (38).

Another study done in Missipi among elementary and middle school students (grade 1-8) in 2003 showed that there was 24.0% over all prevalence of overweight and others 14.7% were at risk of becoming overweigh (13). With exception of grade six, there was a trend of increasing prevalence of overweight to grade (17.5% in grade 1 compared with 31.3% in grade 8. (22)

As far as our knowledge is concerned there is only two documented study done in 2007 and 2013 to assess prevalence and determinants of childhood and adolescent overweight and obesity in Addis Ababa. As a result this study will be the third in its kind in the country. The result of the study showed that prevalence of overweight and obesity among primary school children in Addis Ababa were 7.6 %(95%CI =5.85, 9.37%) and 0.9% (95%CI=0.027%, 1.53%) respectively. Whereas: Sex specific prevalence of overweight and obesity were 9.4 and 0.8 for females, 5.4% and 1.1 for boys respectively. The prevalence of overweight in private school was 23.2 %(95%CI= 14.71%, 31.69%). Whereas the overall prevalence of underweight was13 %(18.1% in boys and 9% in girls).(9)

Determinant of overweight and obesity

Genetic, environmental and behavioral factors have been documented as potential causes of obesity (23, 24, 27). The rising prevalence of childhood obesity in developing countries is attributed to have occurred with industrialization, urbanization, economic development and

market globalization that have accelerated over the past decade, which leads towards high caloric western diet of refined and fast foods and sedentary lifestyle. (7, 26, 27)

Physical activity versus sedentary activity: Walking to and from school and morning joggings provided a potentially important opportunity for establishing daily physical activity among primary school children. In the contrary Entertainments such as television, video and computer games require less physical activity results in less energy expenditure (1, 19, 28, 29, 30)

Food choices: Diets higher in calories (including fat and simple sugars) and leaser in fruits and vegetables are linked with overweight. Over the last several decades, an increase in variety, availability, price and aggressive marketing have encouraged a shift in children's food choices from healthy foods such as fruit and vegetables to energy-dense, refined foods including fast-foods and sugar-laden beverages. The energy balance equation holds that obesity is the consequence of chronic positive energy imbalance (16, 28, 29, 30).

Eating patterns:-Skipping meals or failure to maintain a regular eating schedule can result in increased intakes (28). Skipping meals or intake of a poor nutritional value is common among both children and adults. Recent systematic review of 16 studies from Europe has showed that eating based on schedule is associated with a reduced risk of becoming overweight or obese and a reduction in the BMI in children and adolescents. Studies in the relationship between skipping meals intake and obesity in EMR are few and all of them are cross-sectional. In UAE, Kerkrade found that 72.2% of non-obese female university students eat their breakfast regularly, and the rest (25.8%) were either overweight or obese. (13)

The 'built environment'; has come to refer to the many forms of surroundings that influence human activity. Physical activity levels of youth may depend on environmental features that encourage or discourage physical activity, such as access to recreational facilities, walkability of the environment and low neighborhood crime rates. (16)

Parental factors; There is an inherited component to childhood over weight that makes it easier for some children to become overweight than others. Children of obese parents are more likely to be overweight themselves. Even children with genetic risk for overweight will still only become overweight if they consume more calories than they use. Beyond genetics and heritability, the family also has profound influences on obesity-related behaviors. A recent review of 58 papers

found fairly consistent associations between parental dietary intake and children's fat, fruit and vegetable consumption as well as physical activity since children might role model those behaviors of their parents (16, 28).

Diabetes during Pregnancy: - overweight and type 2 diabetes occur with greater frequency in the offspring of diabetic mothers (who are also more likely to be obese) (28).

Formula feeding: - Breast feeding is generally recommended over formula feeding (28, 29, 31)

Potential health consequence: literature from both, developed and developing countries have documented association between childhood obesity with many adverse health effects, ranging from hyperlipidemia, gall bladder disease, osteoarthritis, gout, early puberty, hypertension, respiratory disorders, glucose intolerance, type 2 diabetes mellitus and some forms of cancer (colon, breast, prostate cancer). (1, 16, 28, 32, 33)

Potential psychosocial correlates and consequences: it has been known for several decades that overweight and obese youth are subject to stigmatization, particularly in Western cultures. A longitudinal study in a nationally representative sample showed that women who were obese as adolescents consequently grew up to have lower education, income, and likelihood of marriage compared with their thinner counterparts. Obese youths experience discrimination throughout their lives, including experiencing lower admission rates into college. Overweight has been associated with increased experiences of anxiety, depression, suicidal thoughts, poor body image, low self-esteem and hopelessness specially in Western youth. (16, 28, 34)

Health consequence related to overweight can begin in childhood or adolescence. Overweight children and adolescents are at increased risk for various chronic diseases in later life (12, 14).

Nearly 60% of overweight children had at least one cardiovascular risk factor compared to 10% of those with a BMI-age < 85th percentiles and 25% overweight children had two or more risk factors (15). Seventy percent of overweight adolescents have a chance of becoming overweight or obese adults (31).

As one study indicated overweight children had significantly CVD risk factors like higher mean systolic pressure measurement, higher mean concentrations of total cholesterol, higher LDL cholesterol, higher triglycerides and lower mean concentration of HDL cholesterol than did their

normal-weight counterpart (in all p<0.0001) (35). In western countries around 90% type 2 diabetic cases are attributable to weight gain (36).

Dietary and activity change to produce a 5-7% weight loss can successfully reduce the incidence type 2 diabetes (36). Over Wight in children increases the risk for cardio vascular disease and premature death in adult hood (14). A study done in 1999 showed that 90 percent of children with high levels of triglycerides were also over weight (15). Considerable evidence associates childhood obesity with childhood hypertension, diabetes, respiratory disease, orthopedic conditions and psychosocial disorders (37).

CONCEPTUAL FREAM WORK

DISTANT FACTOR   PROXY FACTOR   OUTCOME

MONTHLY INCOME OF PARENTS

EDUCATIONAL STATUS

SCHOOL TYPE

ETHNICITY

RELIGION

EATING HABIT AND FOOD CHOICE

PHYSICAL ACTIVITY

SEDENTARY LIFE STYLE

OTHER FACTOR

AGE

SEX

OVERWEIGHT AND OBESITY
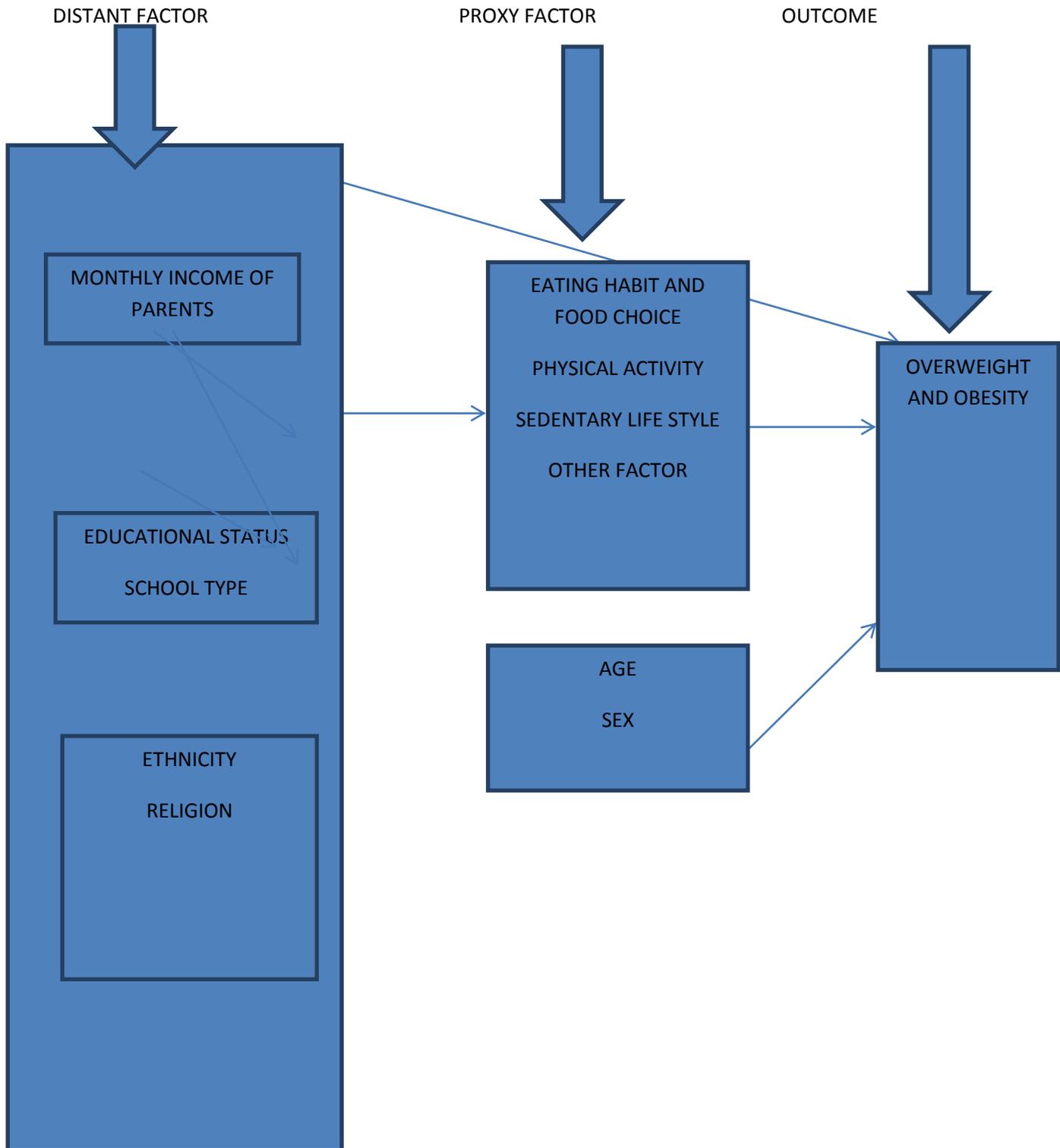
3. Objectives

3.1 General objective

The main objective of this study is to determine the prevalence of childhood overweight and obesity and its determinant factor among elementary school children in Addis Ababa.

3.2 Specific objectives:

1. To identify the prevalence of childhood overweight and obesity among elementary school children.
2. To asses risk factors for childhood overweight and obesity among elementary school children.
3. To give baseline data for researcher and planner in order to take evidence based intervention to prevent overweight.

4. Materials and methods

4.1. Study design:

Cross-sectional survey of childhood overweight and obesity and its determinant factor was conducted.

4.2. Study area and period

The study was conducted in Addis Ababa from April 20 to May 7, 2014. Addis Ababa is the capital city of Ethiopia with a great diversity of ethnicity almost home of all ethnicity found in the country. The city is divided in to 10 administrative sub cities namely: Arada, Yeka, Gulele, Addis Ketema, Akaki-kality, Nefassilk-Lafto, Lideta, Bole, Kolfe-keranio , and Kirkos. The study included all sub cities. According to 2011/12 report of Addis Ababa Educational Bureau of City Government, there are 765 primary schools. In all this school there are a total of 487,344 students. From the total number of school 15.03% are owned by government sector and 84.97% are owned by private sector. The study was conducted in 20 selected schools from all sub cities of which 11 were government school and 9 were private.

4.3. Source population, study population and sample size

4.3.1. Source population

The source populations were elementary school students living in Addis Ababa.

4.3.2. Study population

Elementary school students from grade 5-8 in 2013/14 academic year were the study population.

4.3.3. Sample Size calculation

Sample size was determined using the formula given below:

$$n = \frac{z^2 p\,(1-p)}{d2}$$

Where: n- is the minimum sample size required

p- Is an estimate of the proportion of the overweight in the population.

d- Margin of error for sampling

Z- The standard normal value at (100%−α) confidence level.

In this study we consider P= 10% (global prevalence of child hood overweight)

D= 0.04

$$n= \frac{(1.96)^2 0.1(1-0.1)}{0.04^2}$$

n= 217+22(10% of non-respondent) =239

Since we used multistage sampling technique, we try to draw our study population using three consecutive stages. To reduce the sampling error we multiplied the whole sample size by two design effect. So the total sample size was 478.

4.3.3 Sampling procedure

In Addis Ababa there are 10 sub cities, from each sub city one private and one government school were selected randomly based on lottery method. Only one school administration refused to participate in the study due to this reason another school were selected in the same method from the same sub city. A total of 20 schools from all sub cities were selected. From each school an average of 24 students were selected which in some cases were modified based on their population proportion until it meets meet the sample size. Since the study group range from 10-18 years of age the study participant were selected from grade 5-8. From each grade level one section was selected by lottery method. And from each selected class an average of 6 students were selected by lottery method by making male to female ratio proportional. When any of the selected participant or their family were not willing to participate on the study another student from the same section with the same sex were selected by lottery method.

4.4. Inclusion and exclusion criteria

Inclusion criteria: Students from grade 5-8 and who give consent (were willing to participate in the study).

Exclusion criteria: students from grade 1-4 were excluded in the sample, because students at this level may not respond correctly to the prepared questionnaire. Student with age greater than or equal to 19 were excluded since they don't belong to child age group. Children is usually

refs to age group less than or equal to 18 years old. Any refusal either from parent or student made participant to be excluded from the study.

4.5. Data collection

4.5.1. Data collection tools:

Semi structured questioners were used to collect the data. Most of the questions were adapted and modified from previous study (9, 26). The questionnaires were first developed in English and were translated in to local language (Amharic) and review was made by different expertise for consistency of translation of the language. Training was given to data collector and supervisor by principal investigator for Two days. Pretest and demonstration of instrument was performed at each school for each data collector. Socio-demographic variables: family size, family monthly income, sex of participant child, education level of head of the house hold, ethnicity and possession of car was collected from student family using self-administered questionnaire(annex3). Physical activity and eating habit was assessed by interview using questionnaire (Annex4). Weight was measured by *water bath* scale. Height measurement was conducted using height measuring board.

Before application the instrument was checked by external tap meter for its accuracy.

4.5.2. Data collection procedure

Support letter written by Addis Ababa University (AAU) was given for each school principal and permission was requested. In those schools in which we got permission, selections of classes were made. Data collectors and supervisors were recruited with minimum qualification of diploma in any health related fields. Training was given on how to feel questioners and how to take measurement.

After class selection performed in each school, each respective class room teachers in selected class and PI gave orientation to the study participant. The selected students were given parental self-administered questionnaire with consent form to their parent to give their consent to participate in the study. Those students whose parents consented and returned the questionnaire were further interviewed and their height and weight measurements were taken.

4.5.3 Variables of the study

Independent variable

Demographic variables (age, sex, family occupation, family educational status, school type)

Eating habit

Physical activity

Sedentary activity

Parental factor

 Dependent variables

Height and Weight

BMI percentile

4.5.4. Data quality control

Training of data collectors were carried out. Demonstrations of interview through and taking measurement was done for each data collectors on one participant to reduce enter observer error. Weight scale was calibrated at 0 with no object on it and placed in level surface before measurement is carried out. Continuous checkup of scales were performed for their reliability. Data collection was supervised for correct implementation of procedures by the principal investigator. The principal investigator supervised and reviewed every questionnaire for completeness and logical consistency and correction was made in the field. Data coding, entry and cleaning was performed by the principal investigator.

4.5.5. Data processing and analysi*s*

Data was entered and analyzed by EPI Info version 3.5.4 and SPSS version 21. Body mass index (BMI) was calculated by; BMI = weight (kg)/height square (M^2) using Excel 2010 program. BMI percentiles for age were determined separately for male and female using CDC growth charts developed in 2000 (30). Weight classification was performed as follows:

Underweight -BM I for Age less than 5thpercentile

Normal weight - BMI for age 5th percentile to less than 85thpercentile

Overweight- BMI for age 85thpercentile and 95th

Obesity - BMI for age 95thpercentile and above. (27, 17, 28, 29, 30)

We select BMI from other methods because of its simplicity and popularity and ability to measure all ranges of nutritional status from underweight to obesity. Variation of overweight with socio-demographic variables, dieting habit, and physical activity was analyzed using descriptive statistics to see percentage distribution of overweight over those determinants. To evaluate significance of difference, 95% confidence interval for odds ratio was used. To control effect of confounding and predict the effect of some variables, binary logistic regression was performed.

4.6. Ethical clearance/consent/ confidentiality

Ethical clearance was obtained from Addis Ababa University, department Nursing and midwifery. Support letter, written by the department was given to Addis Ababa education bureau and each selected school. After getting permission from school to participate in the study, each subject in selected classes was given a written consent form to take home to their parents or guardians. If the parents of the selected students were willing to participate in the study, the child was included in the study. If they were not willing the child was replaced by another willing participant.

(Annex V.1) verbal consent for the child

(Annex V.2) verbal consent for the family

4.7. Dissemination of results

Final result of this paper will be given to Addis Ababa University, Addis Ababa Administration Education Bureau and federal Ministry of Health. The paper will be presented at different conference. Attempt will be made for publication of the research on reputable Journal.

4.8. Operational definition

Overweight: BMI for age greater than or equal to 85th percentile but less than 95th percentile according the CDC 2000 growth chart.

Obesity: BMI for age greater than or equal to 95th percentile according the CDC 2000 growth chart.

Other determinant factor: factors that is not considered as a major factor. Like use of medication, Diabetes Mellitus during pregnancy, formula feeding.

'Built environment'; has come to refer to the many forms of surroundings that influence human activity.

Moderate exercise: Low-impact aerobic exercise classes, brisk walking or hiking, recreational team sports (volleyball, soccer, etc.).

Vigorous exercise: Running or jogging, high-intensity aerobic classes, competitive full-field sports (soccer) or basketball.

Children; population that exist in the age group between 10 to 18

5. RESULT

5.1 SOCIO DEMOGRAPHIC CARACTERSTICSE

A total of 478 children from 20 schools (10 private and 10 government schools) were selected to participate in the study of which 463 participated in the study which gives 96.9% response rate.

The socio demographic characteristics of children participated in the study is shown in Table 1. Of the 463 children participants 221 (47.7%) were Male and 242 (52.3%) were Female and 306 (66.1%) were between the age of 10-14 and 157 (33.9%) in the age group 15-18 years. Composition of study participant by school type shows 209 (45.1%) were from private school and 254 (54.9%) were from government school.

Over all 293 (63.3%) of the respondents were Orthodox Christians, 117 (25.3%) Muslim, 23(5%) protestants and 30 (6.5%) Catholic. Regarding the ethnic background of parents 208(44.9%) were Amhara, 118(25.5%) Gurage, 85(18.4%) Oromo, 31(6.7%)Tigre and 21 (4.5%) others which includes Hadiya, Wolaita, and Somallie. The educational status of the head of the households showed that 14(3.0%) of them can only read and write but don't have any formal education, 77(16.6%) attended primary education, 180(38.9%) attended secondary education and 192(41.5%) attend higher education. Regarding to car ownership of the family 99(21.4%) have car while the rest 364(78.6%) do not. Of all 8(1.7%) of the respondents family earn 150 ETB or less, 94(20.3%) earn 3551-5000 ETB and 88(19.0%) earn more than 5000 birr per month.

Table1: Socio demographic characteristics of participants among Elementary school children in Addis Ababa, in 2014

Variables	level	Number of student n=463	Percent (%)
Sex	Male	221	47.7
	Female	242	52.3
Age	10-14	306	66.1
	15-18	157	33.9
School type	Private	209	45.1
	Government	254	54.9
Sub city of living	Addis ketema	47	10.2
	Akaki kality	45	9.7
	Arada	49	10.6
	Bole	47	10.2
	Gulelie	43	9.3
	Kirkos	46	9.9
	Kolfe keranio	46	9.9
	Lideta	47	10.2
	Nefas silk-Lafto	49	10.6
	Yeka	44	9.4
Religion	Orthodox	293	63.3
	Muslim	117	25.3
	Protestant	23	5.0
	Catholic	30	6.5
Ethnicity	Amara	208	44.9
	Oromo	85	18.4
	Gurage	118	25.5
	Tigre	31	6.7
	Others	21	4.5
Educational status	Read and write	14	3.0
	Primary education	77	16.6
	Secondary education	180	38.9
	Higher education	192	41.5
Income of the house hold(In ETB)	≤150	8	1.7
	151-650	58	12.5
	651-1400	55	11.9
	1401-2350	81	17.5
	2351-3550	79	17.1
	3551-5000	94	20.3
	>5000	88	19.0
Car ownership	Yes	99	21.4
	No	364	78.6

5.2. PREVALENCE OF OTHER DETERMINANT FACTOR

Feeding practice and presence of pregnancy related diabetes mellitus of the respondent's parent is described in Table3. Of all the study subjects, 318 (68.7%) of the participant's parent use formula feeding in the first 2 years of their child's life while the rest 145 (31.3%) do not. The presence of pregnancy related diabetes mellitus of the participant's parent reviled that 24 (5.2%) had diabetes mellitus in any of their pregnancy and 439 (94.8%) did not have the disease.

Table 2: Feeding practice and presence of pregnancy related diabetes mellitus of the respondent's parent, 2014

Variable	Level	Number of parents	Percent (%)
Diabetes mellitus in any pregnancy.	Yes	24	5.2
	No	439	94.8
Formula feeding practice in the first 2 years of child life.	Yes	318	68.7
	No	145	31.3

5.3 PREVALENCE OF OVERWEIGHT AND OBESITY

The overall prevalence of underweight, normal, overweight and obesity is 44(9.5%), 360(77.8%), 46(9.9%) and 13(2.8%) respectively. The distribution of underweight, overweight and obesity by age, sex and school type is depicted in Table4. From a total of 221 male study participants 22(9.9%) were under weight, 17(7.7%) were overweight and 7(3.2%) were obese. 22(9.1%), 29(12%) and 6(2.5%) out of 242 female participants were underweight, overweight and obese respectively. According to the distribution shown above girls are more over weight than boys whereas boys are slightly obese. Younger children at age 10-14 are more underweight 36(11.8%) than 8(5.1%) older children 15-18 years age classification. They also have lower Proportion of overweight 29(9.5%) but higher proportion of obese 13(4.5%).

Private school children have less underweight proportion 18(8.6%) than 26(10.2%) government school children. Overweight and obesity have remarkably high prevalence in private school than government which is 38(18.2%) overweight and 10(4.8%) obese for private school whereas 8(3.1%) overweight and 3(1.2%) obese in government school.

Distribution of underweight, overweight and obesity by car ownership, feeding pattern practice during childhood and DM during pregnancy is illustrated in Table5. The proportion of underweight is less for child from car owner family than those who don't own. Which is 6(6.1%) for car owner and 38(10.4%) for those who don't. 7(1.9%) of children whose family do not own car are overweight which is remarkably lower than those who own car 39(39.4%). The same is true for obesity 12(12.1%) and 1(0.2%) for those who have car and for those who don't respectively. From 24 children whose parents reported to have DM during pregnancy 1(4.1%) was underweight 5(20.9%) were overweight and 5(20.9%) were obese. Compared to those who did not have DM history there is lower proportion of underweight, overweight and obese. Highest proportion of overweight 33(10.4%) and obesity 11(3.5%) were recorded in children from family who have habit to feed formula feeding to their children in the first years of their life. Underweight was also higher in this population.

Table3. Distribution of underweight, overweight, and obesity by socio demographic and other determinant factors among primary school children in Addis Ababa, 2014

Variable	Level	Under weight (%)	Normal weight (%)	Overweight (%)	Obesity (%)
Sex	Male	22(9.9%)	175(79.2%)	17(7.7%)	7(3.2%)
	Female	22(9.1%)	185(76.4%)	29(12%)	6(2.5%)
Age	10-14	36(11.8%)	228(74.5%)	29(9.5%)	13(4.2%)
	15-18	8(5.1%)	132(84.1%)	17(10.8%)	0(0%)
School type	Private	18(8.6%)	143(68.4%)	38(18.2%)	10(4.8%)
	Government	26(10.2%)	217(85.5%)	8(3.1%)	3(1.2%)
Car ownership of the family	Yes	6(6.1%)	42(42.4%)	39(39.4%)	12(12.1%)
	No	38(10.4%)	318(87.4%)	7(1.9%)	1(0.2%)
DM during pregnancy	Yes	1(4.1%)	13(54.1%)	5(20.9%)	5(20.9%)
	No	43(9.8%)	347(79.1%)	41(9.3%)	8(1.8%)
Formula feeding during first 2 years of child life	Yes	38(11.9%)	236(74.2%)	33(10.4%)	11(3.5%)
	No	6(4.1%)	124(85.5%)	13(9.0%)	2(1.4%)

SOCIO DEMOGRAHPIC AND OTHER DETERMINANTS RELATED TO OVERWEIGHT

Socio demographic related factors of the child and their parents in association with overweight are described in Table4. According to the result females were slightly to be overweight than male which is 1.6 times higher than male at (95%CI 0.87, 3.06). Private school children were at higher risk to overweight than government school. They are 6.8 times at higher risk than government school students (95%CI 3.15, 15.01). older children aged 15-18 were also found to have slightly more risk to be overweight than younger aged 10-15, which is 1.6 times higher in older children (95%CI 0.6,2.2)

Ethnicity of the parents was found to have no association with overweight. Only being Oromo was found to be protective by 25% when compared to being others (Hadiya, Wollita and Somali). Children from families who own car was found to be significantly overweight than children from family who do not own car. Children from car owner family were 33 times more likely to be overweight than those who do not (95%CI 14.2, 77.5). The formula feeding practice of the parents in the first 2 years of life and DM during pregnancy was found to have no strong association with overweight.

Table4. Socio demographic related factor of the children and their parents in association with overweight among elementary school children in Addis Ababa, 2014

Variables	Level	Proportion		COR(95% CI)	P-value
		Overweight (%)	Not overweight (%)		
Sex	Male	204(92%)	12(7%)	1	
	Female	213(88%)	29(12%)	1.634(0.871-3.064)	0.126
School Type	Gov't	246(97%)	8(3%)	1	
	Private	171(82%)	38(18%)	6.833(3.111-15.011)	<0.001
Age	10-14	277(90%)	29(10%)	1	
	15-18	140(90%)	17(10%)	1.16(0.616-2.183	0.646
Ethnicity	Amhara	186(90%)	22(10%)	0.503(0.155-1.628)	0.251
	Oromo	81(95%)	4(5%)	0.210(0.048-0.923)	0.039
	Gurage	106(90%)	12(10%)	0.481(0.139-1.666)	0.248
	Tigre	27(88%)	4(12%)	0.630(0.139-2.859)	0.549
	Others	17(80%)	4(20%)	1	
Car ownership	Yes	60(61%)	39(39%)	33.1(14.2-77.5)	<0.001
	No	357(99%)	7(1%)	1	
DM during pregnancy	Yes	19(80%)	5(20%)	2.55(0.91, 7.2)	0.076
	No	398(91%)	41(9%)	1	
Any formula feeding practice	Yes	285(90%)	33(10%)	1.176(0.599-2.307)	0.638
	No	132(91%)	13(9%)	1	

5.4 EATING HABIT AND FOOD CHOICE

Dieting habit of the respondents is depicted in Table6. As the result of the study shows 5(1.1%) of the respondent did not consume vegetable while 285(61.6%) eat vegetable 1-2 times per week, 135(29.2%) eats 3-4 times per week, and 38(8.2%) eats 5-7 times per day. The frequency for the consumption of fruit shows 8(1.7%) did not consume fruit, 285(61.6%) consume 1-2 times per week, 130(28.1%) consume 3-4 times per week, 40(8.5%) consume 5-7 times per week. From the respondents who report to eat fruit and vegetable they eat 1-3 times per day In their typical day they eat fruit or vegetable.

As it is indicated in the table, the food preference of the participant as they are requested to list five food they prefer to eat most was asked and classified. The result revealed that 421(90.0%) mention that is classified as animal product as their preferred food, 410(88.6%) reported food that are rich in carbohydrate in their preference list, 82(17.7%) listed sweet foods in their preference list, 359(77.5%) and 419(90.5%) of the respondent did not mention at least one vegetable or fruit in their preference list.

Out of all the study participant 62(13.4%) did not use snack, 325(70.2%) use snack once in a day, 67(14.5%) and 9(1.9%) use snack twice and three times a day respectively. The frequency of meal attended by the participants without considering snack shows 1(0.2%) attends meal once per day, 16(3.5%), 443(95.7%) and 4(0.6%) attend meal two, three and four times in a day respectively. The result described in the table also shows 442(95.5%) get their lunch by either going home or bringing from home, 6(1.3%) get their lunch from school cafeteria and 15(3.2%) from cafeteria around school.

The food buying habit of the study participant in addition to the regular diet type and schedule depicted 332(71.7%) of the total respondent bought cake, 374(80.8%) biscuit, 197(42.5%) ice cream and 176(38.0%) chocolate.

Table5. Dieting habits among primary school children in Addis Ababa, 2014

Variable	Level	Frequency	Percent (%)
Number of days per week vegetable consumed n=463	0	5	1.1
	1-2	285	61.6
	3-4	135	29.2
	5-7	38	8.2
Number of days per week fruit consumed=463	0	8	1.7
	1-2	285	61.6
	3-4	130	28.1
	5-7	40	8.6
Food preference of the participants they like most (up to five food choice) n=463			
Animal product	Yes	421	90.9
	No	42	9.1
Vegetable	Yes	104	22.5
	No	359	77.5
Fruit	Yes	44	9.5
	No	419	90.5
Sweet food	Yes	82	17.7
	No	381	82.3
High carbohydrate diet	Yes	410	88.6
	No	53	11.4
Number of serving snacks per day n=463	0 or no snack	62	13.4
	1times	325	70.2
	2times	67	14.5
	3times	9	1.9
Number of meals per day without snack n=463	1 times	1	0.2
	2 times	16	3.5
	3 times	443	95.7
	4 times	4	0.6
Ways of getting lunch n=463	Going home or bring from home	442	95.5
	Buy from school cafeteria	6	1.3
	Buy from cafeteria around school	15	3.2
Food bought by the participants n=463			
Cake	Yes	332	71.7
	No	131	28.3
Biscuit	Yes	374	80.8
	No	89	19.2
Ice cream	Yes	197	42.5
	No	266	57.5
Chocolate	Yes	176	38.0
	No	287	62.0
others	Yes	35	7.4
	No	428	92.6

The patterns of meal intake by study participant are described in Table6. The result shows 92(19%) use food when they go to cinema while 148(32%) do not go cinema at all. 161(34.8%), 171(36.9%) use food while they watch TV and study respectively. The result also shows 119(25.7%) of the respondent do not eat their breakfast regularly. Over all 463 children participated in the study 170(36.7%) eat their meal regularly while 293(63.3%) did not.

Table 6: Patterns of meal intake among primary school children in Addis Ababa, 2014

Variable	Level	Frequency	Percent (%)
Food use while going to cinema	Yes	92	19.9
	No	223	48.2
	I don't go	148	32.0
Food use while watching TV	Yes	161	34.8
	No	275	59.4
	I don't watch	27	5.8
Food use while studying	Yes	171	36.9
	No	292	61.3
Do you eat your breakfast regularly	Yes	344	74.3
	No	119	25.7
Do you eat your meal regularly	Yes	170	36.7
	No	293	63.3

Table7. Describe diet related factors associated with overweight among children in Addis Ababa. The result depicted eating snack has strong association with overweight. As the number of snack per day increase the risk to be overweight increases in significant manner. Children who eat snack are 1.7 times at high risk than those who do not (95% CI 0.6, 4.9). Children who eat snack 3 times per day and 2 times are 26 and 10 times at higher risk respectively than those who eat 1 times per day.

The food buying behavior of the study participant shows buying cake, chocolate, biscuit and ice cream have significantly strong association with overweight. Children who buy cake are 3.5 times more vulnerable to be overweight than those who do not (95% CI 1.4, 9.2). Children who buy biscuit are 5.8 times more risk than those who do not (95% CI 1.4, 24.4). Buying ice cream and chocolate is 11 and 6.2 times more risk than those who don't buy.

When compared to children who don't go to cinema, children who eat food while going to cinema is at higher risk for overweight with COR 8.1 (95%CI 3.7, 17.4). But going to cinema

without food was found to decrease the risk of overweight by 12.5% than those who don't go to cinema.

Children who eat when they watch TV has no association with overweight but children who do not eat while watching TV were 21.7% at lower risk of overweight than those who do not watch TV. Regarding eating breakfast regularly, children who don't eat breakfast regularly were at lower risk (32%) than those who do. Eating while studying was found to be strongly associated with overweight. Those who eat while studying were 3.3 times at higher risk than those do not (95%CI 1.75, 6.2).

Table7. Also describes the food preference of the study participants in association with overweight. Children who do not incorporate vegetable in their preference list were 14.7 times at higher risk than those who do. Sweet food preference is also strongly associated with overweight. These children were 29 times at higher risk than those who do not (95%CI 13.5, 62.7). There was no association between preferring carbohydrate and fruit diet.

Table7. Diet related factors associated with overweight among elementary school children in Addis Ababa, 2014

Variables	Level	Proportion		COR(95% CI)	P-value
		Overweight	**Not overweight**		
Do you eat snack	Yes	359(89.5%)	42(10.5%)	1.696(0.586-4.908)	0.330
	No	58(93%)	4(7%)	1	
How many times do you eat snack per day	1 times	310(95%)	15(5)%	1	
	2 times	45(67%)	22(33%)	10.104(4.884-20.902)	<0.001
	3 times	4(44%)	5(56%)	25.833(6.287-106.152)	<0.001
Food bought by the participants					
Cake	Yes	291(88%)	41(12%)	3.551(1.371-9.196)	0.009
	No	126(96%)	5(4%)	1	
biscuit	Yes	330(88%)	44(12%)	5.800(1.379-24.397)	0.016
	No	87(98%)	2(2%)	1	
chocolate	Yes	141(80%)	35(20%)	6.228(3.071-12.633)	<0.001
	No	276(96%)	11(4%)	1	
Ice cream	Yes	157(80%)	40(20%)	11.040(4.576-26.634)	<0.001
	No	260(98%)	6(2%)	1	
Eating while going to cinema	Yes	58(63%)	34(37%)	8.090(3.750-17.452)	<0.001
	No	221(99%)	2(1%)	0.125(0.027-0.578)	0.008
	I don't go	138(93%)	10(7%)	1	
Extra eating habits					
Eating while watching TV	Yes	129(80%)	32(20%)	1.426(0.461-4.416)	0.538
	No	265(96%)	10(4%)	0.217(0.063-0.746)	0.015
	I don't go	23(85%)	4(15%)	1	
Eating food while studying	Yes	142(83%)	29(17%)	3.304(1.756-6.216)	<0.001
	No	275(94%)	17(6%)	1	
Eating breakfast regularly	Yes	303(88%)	41(12%)	1	
	No	114(95%)	5(5%)	0.324(0.125-0.841)	0.021
Irregular eating habit	Yes	148(87%)	22(13%)	1.666(0.903-3.073)	0.102
	No	269(92%)	24(8%)	1	
Preferred food list					
Vegetable	Yes	103(99%)	1(1%)	1	
	No	314(87%)	43(13%)	14.761(2.016-108.428)	0.008
Fruit	Yes	41(93%)	3(7%)	1	
	No	376(90%)	43(10%)	1.563(0.464-5.262)	0.471
Sweet foods	Yes	46(56%)	36(44%)	29.035(13.515-62.735)	<0.001
	No	371(97%)	10(3%)	1	
Carbohydrate	Yes	373(91%)	37(9%)	0.485(0.220-1.071)	0.074

diet	No	44(93%)	9(7%)	1	

5.5 PHYSICAL ACTIVITY AND SEDENTARY LIFE STYLE

Activity related to job, and regular physical activity of the participants and the parent is described in the table 8. 245(52.9%) of the children do not participate in any work beside learning. 218(47.1%) participate in moderately intense work for at least 10 minute per day, only 12(2.6%) participate in vagarious activity for at least 10 minute per day. out of 463 participant children 240(51.8%) walk or ride bicycle,5-7/week,154(33.3%) for 3-4 days per week,40(8.6%) for 1-2 days/week while 29(6.3%) do not walk or ride bicycle at all. The participants physical activity status related sport and recreation revealed that 429(92.7%) participate in moderate physical exercise that cause minor increase heart rate and respiration. Activity performed in school during physical education period is incorporated moderate physical activity 29(6.3%) do vagarious /intense physical activity that cause major increase in HR and respiration for at least 10 minutes.

Out of all 463 study participant 216(46.7%) play in playing stations around their residence where as 247(53.3%) do not play. From that reasons why they are not playing was 79(17.1%) do not allowed and 168(36.2%) reported that there is no playing station around their residence place. The participants physical exercise habit is also described in the table according to the result the frequency of parents who participate in regular physical activity is 125(27.0%) whereas 338(73.0%) do not.

Sedentary behavior of the participants was assessed by different questions. 82(17.7%) spend less than 6 hours sitting, 260(56.2%) spend 7-8 hours and 125(26.1%) spend 9 hours and more.

Table 8: Physical activity among primary school children in Addis Ababa, 2014

Variable		Frequency	Percent (%)
Physical activity related to job	Level		
Work beside learning n=463	No work	245	52.9
	Moderate intense activity for at least 10 minute	218	47.1
	Vigorous intense activity for at least 10 minute	12	2.6
Physical activity related to moving from place to place			
No of Walking or bicycling days per week at least for 10 minutes continuously n=463	0	29	6.3
	1-2	40	8.6
	3-4	154	33.3
	5-7	240	51.8
Physical activity related to sport or recreation			
Playing in any playing station around residence n=463	Yes	216	46.7
	No	247	53.3
If no to the above question, why?	Not allowed	79	17.1
	Not available	168	36.2
Vigorous or moderate intensity activity sport at least for 10 minutes n=463	No	0	0
	Moderate	429	92.7
	Vigorous	29	6.3
Family member participate in regular exercise	Yes	125	27.0
	No	338	73.0
Sedentary behavior			
Time spend in sitting per day	Less than or equal to 6 hours	82	17.7
	7-8	260	56.2
	Greater or equal to 9 hour	125	26.1

Physical activity related to work, sport, recreation and sedentary behavior of the children is shown in table8. According to the study children who do not participate in any work after school were 4.8 (95%CI 2.2, 10.6) times at higher risk than those who do. Work that need medium energy were found to decrease the risk of overweight by 20.8%. Walking or riding bicycle was also found to be protective for overweight. It decreases the risk by 17.2%. There is also strong association between strong vigorous intense sporting activity and overweight. Children who do not do strong physical activity are 3.2 times at higher risk those who do (95%CI 0.43, 24.8). Moderately intense sporting activity was found to increase the risk of overweight by 20.8%.

Regarding recreation and playing, children who play in any playing station around their residence were found to be at lower risk of overweight. Those who do not paly were 5.6times at higher risk than those who do (95%CI2.4, 12.8). Sedentary behavior of the child was also strongly associated with overweight. Children who sit more than 9 hours per day are 40 times at higher risk (95% CI 6.4, 268) than those who sit 5-6 hours per day considering 4 and half hour school stay. Children from family where there is any member who perform regular physical activity are at lower risk of overweight. Those whose family members do not perform activity were 3.3 times at higher risk than those families do.

Table9. Sport and physical activity related factor in association with overweight among elementary school children in Addis Ababa, 2014

Variable	Level	Proportion		COR(95% CI)	P value
Participation in work after school	Yes	210(96%)	8(4%)	1	
	No	207(84%)	38(16%)	4.819(2.195-10.578)	<0.001
Medium energy work	Yes	207(84%)	38(16%)	1	
	No	210(96%)	8(4%)	0.208(0.095-0.456)	<0.001
Walk or ride bicycle for at least 10 minute	Yes	398(92%)	36(8%)	0.172(0.074-0.397)	<0.001
	No	19(65%)	10(35%)	1	
Vigorous extensive exercise	Yes	28(96%)	1(4%)	1	
	No	389(90%)	45(10%)	3.239(0.430-24.378)	0.254
Moderately extensive exercise	Yes	391(91%)	38(9%)	1	
	No	14(82%)	3(18%)	0.208(0.095-0.456)	<0.001
Playing and recreation around residence	Yes	209(97%)	7(3%)	1	
	No	208(84%)	39(16%)	5.598(2.448-12.802)	<0.001
Number of hours spend sitting per day	5-6	81(99%)	1(1%)	1	
	7-8	255(98%)	5(2%)	1.588(0.183-13.793)	0.675
	≥9	81(67%)	40(33%)	40.00(6.370-297.957)	<0.001
Family member who perform regular excersice	Yes	120(96%)	5(4%)	1	
	No	297(88%)	41(12%)	3.313(1.278-8.587)	0.014

Finally binary logistic regression was done to control the effect of confounders. As it is indicated in the table12 below, the following variable shows strong association; car ownership of the family (p<0.001), number of snacks per day (p=0.03), sweet food preference (p<0.001), buying ice cream (p=0.014), eating breakfast regularly (p=0.034), walking or riding bicycle for at least 10 minutes per day (p=0.009) and family participation in regular physical activity (p=0.023).

Children who use have family car to come from and go school were more likely to be overweight with AOR 28.2 (5.3, 148.5). When confounders were avoided children who prefer sweet food were found to be 25 times at higher risk than those who do not. High risk of overweight was also observed in children who buy ice cream whenever they got money. Walking or riding bicycle daily for at least 10 minute was found to protect overweight. Those children who don't walk or ride bicycle was 10.5 times at higher risk than those who do (AOR 10.5 95% CI (1.8, 61.1)). Family participation in regular physical activity was found to profoundly decrease the risk of overweight. In contrary to the fact and other study habit of buying cake was found to protect overweight p=0.04 (AOR=0.12, 95%CI (0.016, 0.92)).

When binary logistic regression was done to control confounders, different variables like participation after school, eating while studying, school type and vegetable food preference has shown no significant association.

Table10: Logistic regression analysis of independent predictors of overweight among elementary school children in Addis Ababa, 2014

Variable	Level (Reference)	AOR(95%CI	P value
School type	Government private	1 2.3(0.5,10.9)	0.294
Car ownership of the family	Yes No	28.2(5.3,148.5) 1	<0.001
Number of snacks per day	1 times 2 times 3 times	1 4.9(1.2,20.7) 9.6(0.5,168.7)	0.029 0.123
Eating while studying	Yes No	2.16(0.6,7.8) 1	0.242
Eating breakfast regularly	Yes No	0.12(0.01,0.85) 1	0.034
Sweet food preference	Yes No	25.4(6.6,96.9) 1	<0.001
Vegetable preference	Yes No	1 2.29(0.2,23.6)	0.486
Food bought *cake (reference No) *Chocolate(reference No) *Ice cream(reference No)		0.12(0.016,0.92) 0.33(0.06,1.73) 12.4(1.7,92.1)	0.041 0.189 0.014
Participation in work after school	Yes No	0.5(0.08,3.05) 1	0.454
Walking or riding bicycle for at least 10 minute per day.	Yes No	1 10.5(1.8,61.1)	0.009
Any family participates in regular physical activity.	Yes No	0.2(0.05,0.8) 1	0.023

* refers that no is the reference.

6: DISCUSSION

The study was conducted to assess the prevalence of childhood overweight and obesity and its determinants among elementary school children.

Prevalence of overweight and/or obesity

Our study revealed the overall prevalence of underweight, normal, overweight and obesity is 44(9.5%), 360(77.8%), 46(9.9%) and 13(2.8%) respectively. The prevalence of overweight in our study was found to be consistent with the study conducted in Addis Ababa, Arada sub city which was 9.4% (38). But it was higher than the study done 7 years back in the same city which was 7.6% (9). This could be explained by the change in the life style factors of the society. The prevalence of obesity in our study was 2.8%. This is high proportion compared to the study conducted in Arada sub city, Addis Ababa which was (0.8%) (38). The reason for this may be due to our study tries to incorporate all sub cities of the town in which people with high economic status may reside. Our study shows males are slightly obese than female but study done in Uganda shows females were more likely to be obese than male (2.9% vs. 1.8%) (21)

Sex specific prevalence of overweight and obesity shows 17(7.7%) and 7(3.2%) of male participants were obese. Female participants were 29(12%) and 6(2.5%)overweight and obese respectively. High prevalence of overweight is recorded in female. This may be explained by our society culture in which females spent most of their time at home. The finding of this study is also consistent with some of the study done in African country. Study done in Douala, Cameron in 2010, the prevalence of overweight ranges from 6.4% to 8.2% in boys and from 10.7% to 17.2% in girls, whereas prevalence of obesity ranges from 1.4% to 5.5% in boys and from 2.4 to 8.6% in girls. Prevalence of underweight according to WHO 2007 reference was higher in boys as compared to girls, 5.5% and 9.2% respectively (20). The sex specific prevalence of underweight was almost equal in our study 22(9.9%) male and 22(9.1%) female. This proximate finding between our and Douala study may be due to the same socio economic and life style status of the population.

School type prevalence overweight shows 38(18.2%) and 8(3.1%) are overweight for private and government school respectively. The regression of this variable with overweight shows private school children were at higher risk to overweight than government school. They are 6.8 times at

higher risk than government school students. This finding is comparable with that of Lebanese private school: a cross sectional study of adolescents in private Lebanese schools, aged 10–18 years indicates that overweight prevalence was 24.4%(40). This high prevalence of overweight in private school is assumed to be due to high economic status of people in private school than government. People in the higher socioeconomic strata in the population were the most affected when obesity emerged in developing countries [39].

Study conducted in Addis Ababa showed the likelihood of overweight and/or obesity among adolescents increase as the age increase (38) this is the same as our study. Our study revealed out of 306 participant aged 10-14 years 29(9.5%) were overweight and out of 157 participant aged 15-18, 17(10.8%) were overweight.

The result of this study shows there is no association between educational statuses, religion, and ethnic background of the parents and overweight. Our findings appear to differ from conclusions reached by other studies which reported increased risk of overweight among children of mothers with higher education (41).

Determinants of overweight

According to our study the prevalence of overweight has no strong association with the use of snack. But in the population who use snack: as the number of snack consumed per day increase the risk to be overweight increases significantly (Table7). Unlike the study conducted in Addis Ababa which shows positive association between overweight and fruit consumption (9), our study has shown no association between fruit and vegetable consumption with overweight.

Over the last several decades, an increase in variety, availability, price and aggressive marketing have encouraged a shift in children's food choices from healthy foods such as fruit and vegetables to energy-dense, refined foods including fast-foods and sugar-laden beverages. The energy balance equation holds that obesity is the consequence of chronic positive energy imbalance. (16, 28,29,30)

Our study revealed food bought by the participants like cake, biscuit, chocolate and ice cream has shown strong association with overweight (Table7) when confounders were avoided only ice cream showed association. The study conducted in Addis Ababa in primary school children showed the same result. From those food items ever bought by students, chocolate, ice cream and

cake showed significant association with overweight. But in logistic regression analysis only ice cream revealed significant association (9).

The eating pattern of our respondent shows, eating while studying has significant association with overweight. Eating breakfast regularly was found to have positive association with overweight. When binary logistic regression was done eating breakfast regularly was found to be significantly associated. According to our study children who mention sweet food in their preference list was 29 times at high risk than those who don't. Fruit and vegetable preference was found to have positive association with overweight. The finding of our study is consistent with some study done recently. Systematic review of 16 studies from Europe has showed that eating based on schedule is associated with a reduced risk of becoming overweight or obese and a reduction in the BMI in children and adolescents. In UAE, Kerkrade found that 72.2% of non-obese female university students eat their breakfast regularly, and the rest (25.8%) were either overweight or obese. (13). This association could be explained by the fact that skipping meals or failure to maintain a regular eating schedule can result in increased intakes and this problem is usually common in children and adolescents (28).

Physical activity related factors like work besides learning, doing extensively vigorous physical activity and playing in any recreation area around residence were found to have strong association with overweight. At the same time walking or riding bicycle for at least 10 minute per day and doing medium energy work was found to protect overweight by 17% and 21% respectively. When confounders were avoided only walking or riding bicycle has shown strong association. This result was consistent was the study conducted in Arada sub city in 2013 and in Addis Ababa in 2007 which found walking to school or riding bicycle for 30 minute per day decrease the risk of overweight significantly. Another study done in china also indicates the same finding that those who was walking to and from school, doing low intensity physical activity greater than 2 hours per day, doing moderate/vigorous activity greater than 45 minutes per day were found to reduce risk of overweight(42). This may be explained by walking to and from school and morning joggings provided a potentially important opportunity for establishing daily physical activity that have direct impact on decreasing overweight.

Physical activity levels of youth may depend on environmental features that encourage or discourage physical activity, such as access to recreational facilities, walkability of the environment and low neighborhood crime rates. (16) The results of our study shows 247(53.3%) of the participants do not play around their residence. The reason mentioned by the participants were in availability of the places 168(36.2%) and not allowed by their parents 79(17.1%). The regression for activity related to recreation and playing around residence shows strong association with overweight. This could be explained by the fact that whenever there is no space to play around residence or children are not allowed to play, there is an increased risk of spending much time sedentarily which is found to be a major risk factor for overweight and obesity.

Children from family in which any family member participate in any regular physical activity were found to decrease the risk of overweight. Those who have no family member who participate in physical activity were 3 times more likely to be overweight than those who don't. Other studies also show the same finding. A recent review of 58 papers found fairly consistent associations between parental dietary intake and children's fat, fruit and vegetable consumption as well as physical activity since children might role model those behaviors of their parents (16, 28).

Sedentary behavior of the children was one of the variables that show amazingly strong association. Children who spent sitting more than 9 hours per day were 40 times more likely to be overweight than those who spend 5-6 hours per day (including 4 and ½ hours sitting at school).This finding is almost similar with the study done in Addis Ababa which found significant association between sedentary behavior and overweight. Overweight increases together with sedentary behavior. Sedentary behavior greater than 9hours per day (including 5 and 1/4hour sitting at school), had the highest prevalence (17.1 %) (9). Another study done in china also showed the same finding. The prevalence of overweight among those whose physical inactivity less than or equal to 2 hours per day and greater than 2 hour per day was 4.9% and 7.3% respectively(42).

Different variables like maternal DM during pregnancy and formula feeding practice in the first 2 years of children life was assumed to be risk factor. But our study showed no association with formula feeding and DM during pregnancy (28, 29, 31).

Strength and limitation

Our study has several strengths. This study used BMI as a criterion for classification which is mostly accepted and recommended to screen overweight and obesity for children aged 2-20 years. It is also the third in its kind to the country due to this reason it can motivate different researcher to do more investigation on overweight and obesity (the double burden of malnutrition in Ethiopia) and can also serve as a reference for future investigators.

Our study has also limitations. The study did not assess many other factors that influence the risk of childhood obesity. Weight gain during pregnancy, maternal obesity and birth weight have been shown to be strongly associated with childhood obesity [8,22,29 T]. Since the study is cross sectional it may not be strong to demonstrate direct cause and effect relationship between risk factors and outcome. During interview there might be a potential for recall and social desirability bias in the frequency of dietary habits, physical activity and sedentary behaviors of the participants. Also the food frequency questionnaire did not account for portion size. It is also possible that other unidentified confounders such as genetic factors may have influenced the findings of our study.

Conclusions and recommendation

In conclusion, the findings of this study have shaded light on the prevalence and determinants of obesity among primary school children in Addis Ababa. The prevalence of childhood obesity in this population was found to be low. However, the prevalence of overweight was found to be high even computable with the global prevalence. Among the factors identified are unhealthy dietary pattern like preferring sweet foods, eating breakfast irregularly, buying ice cream and frequent snacking are strongly associated with overweight. In addition physical inactivity are also important factors impacting on the risk of obesity in children. If Primary preventive measures is not taken immediately, prevalence of overweight and obesity among children in Addis Ababa , might increase rapidly in the coming few years.

Based on the findings we suggest that promoting active lifestyles and healthy diets should be a national public health priority. There is a need of longitudinal study to investigate the relationship between vegetable intake and overweight and/or obesity. We also recommend further studies have to be done to increase our understanding of genetic factors in relation to overweight and of the prenatal, perinatal and postnatal predictors of childhood obesity. Because early interventions on modifiable risk factors are likely to decrease the rate of childhood obesity, educational programs about obesity and associated health consequences should start early in childhood so as prevent the increasing prevalence of childhood obesity in Ethiopia.

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Questionnaire

1. Verbal consent form before conducting interview for students.

Greeting

How are you, I am----------------------. I am working in the research team of Addis Ababa University Medical Faculty. Allied school of health science,

I would like to ask you a few questions about your personal characteristics, eating habit, physical exercise, your willingness for weight and height measurements. This will help us to improve the prevention and control activities of child hood overweight and obesity in Addis based on the information you provide us. Your 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 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 with the interview, please fill free to drop it any time you want. This interview will take about 30 minutes. Could I have your permission to continue?

1. If yes, continue the interview.

2. If no, skip to the next participant.

Informed consent Certified by

Interviewer: Code-----------------Name-------------------------------signature------------------

ANNEX 2

Consent form 2

Written consent form before filling self-administered questionnaire for child parent

How are you, I am----------------------. I am working in the research team of Addis Ababa University, Medical Faculty, Allied school of health science, school of nursing and midwifery, department of child health. I would like to ask you a few questions about your lifestyle, income, and education status and your willingness for your child participation in our study. We will take measurement of your child height and weight. We will also ask your child eating habit and physical activity.This will help us to improve the prevention and control method of childhood overweight and obesity in Addis Ababa based on you and your child information. 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. Ifyou fill discomfort to respond to the questioner, please fill free to drop it. This questionnaire will take about 20 minutes. Could I have your permission to continue?

1. If yes, continue to fill the question.

2. If no, stop filling the question by writing your reason for refusal.

Informed consent Certified by

Data collector: Code-----------------Name-------------------------------signature------------

ANNEX 3 Questionnaire for Overweight Risk Factor Surveillance to be filled by student family

Participant Identification Number_____

Location	Response	Code
1 Sub city	-----------------------	
2 kebele	_____	
3 Specific name of the village	----------------------------	

Demographic information		Response	Code
4	sex	1. Male 2. Female	
5	Religion	1. Orthodox 2. Muslim 3. catholic 4. protestant 5. other_____	
6	Ethnicity	1. Amhara 2. Oromo 3.Gurage 4. Tigre 5. other_____	
7	What is the highest level of education you have completed?	1. No formal education 2. 1-4 grade 3. 5-8 grade 4. 9-10 grade 5. 11-12 grade 6. College/ university completed	
8	How many people including yourself, live in your household?	----------------------------	
9	What is the average estimated monthly earning of the family in birr?		
10	Is there vehicle to transport family from place to place?	1. Yes 2. No	
11	Have you ever been diagnosed pregnancy related DiabetesMellitus in any of your	1. Yes 2. No	

	pregnancy?		
12.	Do you have any habit of using formula food for any of your child when they were less than 2 years of age?	1. Yes 2. No	

ANNEX 4 Questionnaire for Overweight Risk Factor Surveillance for students

Participant Identification Number _____

Sex----------------- Age------------Grade----------------

Location and type of school		
Question	Response	Code
1 Name of the school	------------------------------	
2 Sub city	--------------------------------------	
4 Kebele	--	
3 Specific name of the location		
5 Type of school	1. Government 2. public 3. private 4. mission 5. NGO 6. mosque 7. church 8. catholic	

Behavioral question

Dieting habit

The next questions ask about fruits and vegetables that you usually eat. As you answer these questions please think of a typical week in the last year

Question	Response	Code
6 In a typical week on how many days do you eat fruit?		
7 How many serving of fruit do you eat on one of those days?		
8 In a typical week on how many days do you eat vegetables?		
9 How many servings of vegetables do you eat on one of those days?		

Dieting habit

The next questions ask about your dieting habit for the last one year.

Question		Response	Code
10	List up to five foods you like most	1._____ 2._____ 3._____ 4._____ 5._____	
11	List up to five foods you dislike most	1._____ 2._____ 3._____ 4._____ 5._____	
12	Do you ever have a snack?	1. Yes 2. No if no go to D8	
13	If your answer is yes what do you have for snack?	_____	
14	How many times a day do you have snack?	_____	
15	How many meal do you have a day other than snacks?	_____	
16	How do you get your lunch?	1. Bring from home 2. Buy from school cafeteria 3. Buy from near by food service establishment. 4. I did not use lunch	
17	List foods that you ever bought in addition to the regular meal	1. Cake 2. Biscuit 3. Ice cream 4. Chocolate 5. Others specify-------------	
18	Do you buy foods when you go to movies?	1. Yes 2. No 3. I did not go movies	
19	When you Watch television do you eat?	1. Yes 2. No 3. I did not watch television	
20	When you study do you eat food?	1. yes 2. No	
21	Do you always eat your breakfast?	1. Yes 2. No	

22	Do you have habit of missing any of your meal schedules?	1. Yes 2. No	

Physical activity

Next I am going to ask you about time you spend doing different physical activities in a typical week.

Activity at work

Question		Response	Code
23	Do you engaged in Work besides your education?	1. Yes 2. No	
24	If your answer in Q 23 is yes does your work involve vigorous –intensity activity that cause large increases in breathing or heart rate for at least 10 minutes continuously?	1. Yes 2. No	
25	In a typical week on how many days do you do vigorous –intensity activities as part of your work?	Number of days ------------	
26	How much time do you spend doing vigorous –intensity activities at work on a typical day?	Hours: minutes ----------------	
27	Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate for at least 10 minutes continuously?	1. yes 2. No if no go to P8	
28	In a typical week on how many days do you do moderate –intensity activities as part of your work?	--------------------	
29	How much time do you spend doing moderate –intensity activities at work on a typical day?	Hours: minutes ------------------	

Travel to and from places
Now I am going to ask you about the usual way you travel to and from places.

30	Do you walk or use a bicycle for at least 10 minutes continuously to get to and from places?	1. Yes 2. No	
31	In a typical week on how many days do you walk or use a bicycle for at least 10 minutes continuously	-----------------------	
32	How much time do you spend walking or bicycling for travel in a typical day?	Hours: minutes-------------	

Recreational activities
Now I would like to ask you abut sports, fitness and recreational activities

33	Do you do any vigorous-intensity sports that cause large increases in breasting or heart rate for at least 10 minutes continuously?	1. Yes 2. No if no go to P14	

Recreational activity (Continued) and living environment

	Questions	Response	Code
34	In a typical week on how many days do you do vigorous –intensity sports, fitness or recreational activities?	-----------------	
35	How much time do you spend doing vigorous –intensity sports, fitness or recreational activities in a typical days?	Hours: minutes --------------------	
36	Do you do any moderate-intensity sports that cause small increases in breathing or heart rate for at least 10 minutes continuously?	1. Yes 2. No if no go to P 17	
37	In a typical week on how many days do you do moderate –intensity sports, fitness or recreational activities?	----------------	
38	How much time do you spend doing moderate –intensity sports, fitness or recreational activities in a typical days?	Hours: minutes ---------------------	
39	Do you play in your compound outside your home?	1. Yes 2. No	
40	If your answer to Q 39 is No, why?	----------------	

Sedentary behavior

The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent(sitting at a desk sitting with friends, traveling in a car, bus, reading, playing card or watching television), but not include time spent sleeping

41	How much movies do you watch in your typical day?	---------	
42	How much time do you usually spend sitting on a typical day?	Hours: minutes -----------	

PARENTAL FACTORAND MEDICATION

The following questions are related to family members habit regarding physical exercise

43	Does any of your family member participate in any form of regular physical activity?	1. Yes 2. No	
44.	If your answer to Q 43 is yes, have you ever tried to exercise with them?	1. Yes 2. No	
45	If No, do you think you might participate if any of them were involved?	1. Yes 2. No	

Physical Measurements

measurements		Response	Code
46	Height in centimeters	In centimeters _____	
47	Weight	In kilograms (Kg) _____	
48	Waist circumference	In centimeter--------------	

ANNEX 5 AMHARIC VERSION OF THE QUESTIONNAIRE

የተሳታፊ መለያ ቁጥር----------------

አዲስ አበባ ዩኒቨርስቲ የጤና ሳይንስፋካልቲ

ከጤና ጋር የተያያዘ የምርምር ወይም ጥናታዊ ጽሁፍ መረጃ መሰብሰቢያ የተዘጋጀ መጠይቅ

በዚህ መጠይቅ ስለቤተሰብ ወርሃዊ ገቢ የትምህርት ደረጃዎን ሀይማኖቶንና ሌሎች አብረው የሚሄዱ ጥያቄዎችን እንጠይቅዎታለን:: ከዚህ በተጨማሪ ይህንን መጠይቅ ያመጣውን ልጅዎን ክብደት ቁመት እና የወገብ ዙሪያ ምጠን እንለካለን:: ከእርስዎና ከልጅዎ የምናገኘው መረጃ ከክብደት መጨመር ጋር ተያይዘው የሚመጡ የልጆችን የጤና ችግሮች ለመከላከል እቅድ ለማውጣት ይረዳናል:: ከእርስዎ ወይም ከልጅዎ የምናገኘውን መረጃ በሚስጥር እንጠብቃለን:: የሚሰጡን መረጃ ከስምዎ ወይም ከልጅዎ ስም ጋር አይያያዝም:: ይህንን መጠይቅ ከመሙላትዎ በፊት የእርስዎን ፍቃደኝነት እንጠይቃለን:: በዚህ መሰረት ፍቃደኛ ከሆኑ ቀጥሎ የተጻፉትን ጥያቄዎች መልስ ሞልተው ይላኩልን:: ፍቃደኛ ካልሆኑ ፍቃደኛ ያልሆኑበትን ምክንያት ቀጥሎ ባለው ክፍት ቦታ ላይ ጽፈው ይላኩልን::

እናመሰግናለን

በተማሪ ወላጅ ወይም አሳዳጊ የሚሞላ መጠይቅ

የሚከተሉትን አስር ጥያቄዎች በጥንቃቄ ካነበቡ በኃላ ለእያንዳዱ በተሰጠው የመልስ መስጫ ቦታ መልሱን ይሙሉ::

የተሳታሬ መለያ ቁጥር------------------------

ተ.ቁ	ጥያቄ	መልስ	Code
1	የሚኖሩበት ክ/ከተማ ማን ይባላል	------------	
2	የሚኖሩበት ወረዳ	--------------	
3	የሚኖሩበት ሰፈር ልዩ መጠርያ	------------	
4	ጾታ	1. ወንድ 2. ሴት	
5	ሀይማኖት	1. ኦርቶዶክስ 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት	
6	ብሄር	1. አማራ 2. ኦሮሞ 3. ጉራጌ 4. ትግሬ 5. ሌላ ካለ ይጠቀስ	
7	ያጠናቀቁት የት/ት ደረጃ	-----------	
8	እርሶን ጨምሮ የቤተሰብ ብዛት ስንት ነው	-----------	
9	አማካኝ የቤተሰብ የወር ገቢ ስንት ነው	-----------	
10	ቤተሰብ የሚጠቀምበት የግል መኪና አለ	1. አዎ 2. የለም	
11	በእርግዝና ወቅት ከእርግዝና ጋር ተያይዞ የሚመጣ የስኳር በሽታ የሚያሳይ የህክምና ውጤት ነበርዎት	1. አዎ 2. የለም	
12	ልጆትን በህጻንነት ወቅት የዱቄት ወተት እና መሰል ነገሮችን የመመገብ ልምድ ነበርዎት	1. ነበረኝ 2. አልነበረኝም	

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አዲስ አበባ ዩኒቨርስቲ የጤና ሳይንስ ፋካልቲከጤና ጋር የተያያዘ የምርምር ወይም ጥናታዊ ጽሁፍ መረጃ መሰብሰቢያ የተዘጋጀ መጠይቅ

ሰላምታ: እንደምንነህ/ሽ

ስሜ -- ይባላል:: በአዲስ አበባ ዩኒቨርስቲ የጤና ሳይንስ ፋካልቲ የነርሶችና ሚድፈሪ ትምህርትክፍል ምርምር ጥናት ቡድን ውስጥ እሰራለው:: ለማጠናው ጥናት የተወሰኑ ጥያቄዎችን እጠይቅሃለሁ/ሻለሁ:: በዚህ መጠይቅ የአመጋገብ ልምድ ስለ አካላዊ እንቅስቃሴ በመቀመጥ የምታሳልፈውን/ፈዉን ጊዜ በተመለከተ እጠይቅሃለሁ/ሻለሁ:: ከዚህ በተጨማሪ የአንተን /ያንቺን ክብደት የወገብ ዙሪያ እና የላይኛውን የክንድ ዙሪያ መጠን እንለካለን:: ከአንተ/ቺ እና ከቤተሰብህ/ሽ የምናገኘውን መረጃ ከክብደት በጫመር ጋር ተያይዘው የሚመጣ የልጆችንን የጤና ችግሮች ለመከላከል እቅድ ለማውየጣት ይረዳናል:: ከአንተ/ ቺ ና ክወላጅህ/ሽ የምንሰበስበው መረጃ በሚስጥር እንጠብቃለን:: ከአንተ/ ቺ ና ክወላጅህ/ሽ የምንሰበሰበው መረጃ ከአንተ/ ቺ ና ክወላጅህ/ሽ ስም ጋር አይያያዝም :: በዚህ ጥናት ውስጥ ለመሳተፍ በቅድሚያ የተሳታፌውን ፍቃደኝነት እንጠይቃለን:: መልስ ለመስጠት በማትፈልግበት ወይም በማትፈልጊበት ጥያቄ ካለ አትገደድም/ጅም :: በዚህ መሰረት ጥናቱ ውስጥ ለመሳተፍ ፍቃደኛ ነህ/ሽ?---------------------------------------

መልሱ ፍቃደኛ ነኝ ከሆነ ወደቀጣዩ ጥያቄዎች ይሂዱ

ኮንስንቱን ያረጋገጠው ሰው

ስም------------------------

ፈርማ----------------------

ቀን------------------------

Questioner for overweight risk factor surveillance for student

የተሳታፊዉ መለያ ቁጥር-----------------------------

ጾታ----------------- እድሜ------------------- የትምህርት ደረጃ------------

የትምህርት ቤቱ አድራሻና ይዞታ			
ተ.ቁ	ጥያቄ	መልስ	ኮድ
1	የትምህርት ቤቱ ስም		
2	ክፍለ ከተማ		
3	ወረዳ		
4	የሰፈሩ መጠሪያ		
5	የትምህርት ቤቱ አይነት	1. የመንግስት 2. የሀዝብ 3. የግል 4. ሚሽን 5. መንግስታዊ ያልሆነ ድርጅት 6. የመስኪድ ት/ቤት 7. የቤ/ክርስቴያን 8. ካቶሊክ	

ከባህሪ ጋር የተያያዙ ጥያቄዎች

የአመጋገብ ልምድ			
ከዚህ ቀጥሎ ባለፈው አንድ አመት አዘውትረው ስለተመገቧቸው አትክልት ና ፍራፍሬዎችን በተመለከተ እጠይቅዎታለው			
ተ.ቁ	ጥያቄ	መልስ	ኮድ
6	አብዛኛውን ጊዜ በአንድ ሳምንት ስንት ቀን ፍራፍሬን ይመገባሉ?	በሳምንት---------- ቀን ምንም ከሌለ ይሞላ... ወደ ይሄዱ	
7	ፍራፍሬ ከሚመገቡባቸዉ ቀናት ዉስጥ በአንድ ቀን እነዚህን ፍራፍሬዎች በቀን ስንት ጊዜ ይጠቀማሉ?	በቀን ----ጊዜ	
8	አብዛኛዉን ጊዜ በአንድ ሳምንት ዉስጥ ስንት ቀን አትክልቶችን ይመገባሉ?	በሳምንት ---ቀን ምንም ከሌለ ይሞላ... ወደ ይሄዱ	
9	አትክልት ከሚመገቡባቸዉ ቀናት ዉስጥ በአንዱ ቀን እነዚህን አትክልቶች በቀን ስንት ጊዜ ይጠቀማሉ?	-------------------	
የአመጋገብ ልምድ			
ከዚህ ቀጥሎ በአለፈው አንድ አመት ስለነበሮት የአመጋገብ ሁኔታ እጠይቅዎታለሁ::			
ተ.ቁ	ጥያቄ	መልስ	ኮድ

10	በይበልጥ የሚዎዱአቸውን የምግብ አይነቶች ይጥቀሱ	1. -------- 2. ---------- 3. ----------- 4. ----------- 5. ------------	
11	በይበልጥ የሚጠሉዋቸውን የምግብ አይነቶች ይጥቀሱ	1. -------- 2. ---------- 3. ----------- 4. ----------- 5. ------------	
12	በቁርስና በምሳ መካከል ወይም በምሳ እና በእራት መካከል ወይም ከመደበኛ አመጋገብ በተጨማሪ ምግብ ይጠቀማሉ?	1. አዎ 2. አይደለም መልሱ አይደለም ከሆነ ወደ ይሂዱ	
13	ከላይ ለተጠቀሰው ጥታቄ መልሶ አዎ ከሆነ ምን ምግብ ነው የሚጠቀሙት?	--------------------	
14	በቀን ስንት ጊዜ ይጠቀማሉ?	-----------------	
15	ከላይ የተጠቀሱትን ምግብ ሳይጨምር በቀን ስንት ጊዜ ይመገባሉ?	---------------	
16	ምሳዎን እንዴት ያገኛሉ?	1. ከቤት በማምጣት ወይም ቤት በመሄድ 2. በትምህርት ቤት ካፍቴሪያ በመግዛት 3. በት/ቤቱ አቅራቢያ በሚገኝ ምግብ ቤት በመግዛት	
17.	ከመደበኛ ምግብ በተጨማሪ ገዝተው የሚጠቀሙዋቸውን የምግብ አይነቶች ይጥቀሱ?	1. ኬክ 2. ብስኩት 3. አይስክሬም 4. ቾኮሌት 5. ሌላ ካለ ይጥቀሱ	
18	ፊልም ቤት በሚሄዱበት ጊዜ ምግብ ገዝተው ይጠቀማሉ?	1. አዎ 2. የለም 3. ፊልም ቤት አልሄድም	
19	ቴሌቪዥሮን በሚያዩበት ጊዜ ምግብ ይጠቀማሉ?	1. አዎ 2. የለም 3. አላይም	
20	ጥናት በሚያጠኑበት ጊዜ ምግብ ይበላሉ?	1. አዎ 2. የለም	
21	ሁልጊዜ ቁርስህን/ሽን በአግባቡ /ያለመዝለል ትበላለህ/ያለሽ?	1. አዎ 2. የለም	

| 22 | የምግብ ስአትቸን /ህን በአግባቡ ያለመጠበቅ ልምድ አለህ/ሽ? | 1. አዎ
2. የለም | |

አካላዊ እንቅስቃሴ

ከዚህ ቀጥዬ በተለለያዬ አካል እንቅስቃሴ በማካሄድ የሚያሳልፋቸውን ጊዜያት በተመለከተ እጠይቅዎታለሁ

ከስራ ጋር የተያያዘ እንቅስቃሴ

ተ.ቁ	ጥያቄ	መልስ	
23	ከትምህርትዎ ውጪ ሌላ ስራ ይሰራሉ?	1. አዎ 2. የለም ወደ ይሃዱ	
24	ከዚህ በላይ ለተጠቀሰው ጥያቄ መልስዎ አዎ ከሆነ ብርቱ ጉልበት የሚጠይቅ ተግባር ወይም ቶሎ ቶሎ መተንፈስን ወይም ፈጣን የልብ ምት ሊያስከትል የሚችል ተግባር ያለማቋረጥ ቢያንስ ለአስር ደቂቃ ይጠይቃል?	1. አዎ 2. አይደለም መልሱ አይደለም ከሆነ ወደ	
25	አብዛኛውን ጊዜ በሳምንት ስንት ቀን ብርቱ ጉልበት የሚጠይቅ ተግባር ያከናውናሉ?	የቀን ብዛት----------	
26	ብርቱ ጉልበት የሚጠይቅ ተግባር ከሚያከናውኑባቸው ቀናት በቀን ለምን ያህል ጊዜ ይሰራሉ?	ስአት------------ ደቂቃ-----	
27	ስራው መጠነኛ ጉልበት የሚጠይቅ ተግባር ወይም መጠነኛ የልብ ምት ፍጥነት ጭማሪ ሊያስከትል የሚችል ተግባር ያለማቋረጥ ቢያንስ ለ10 ደቂቃ ይጠይቃል?	1. አዎ 2. አይደለም አይደለም ከሆነ ይሃዱ	
28	አብዛኛውን ጊዜ መጠነኛ ጉልበት የሚጠይቁ ስራዎችን በሳምንት ስንት ቀን ያከናውናሉ?	የቀን ብዛት ----------	
29	መጠነኛ ጉልበት የሚጠይቅ ተግባራት ከሚያከናውኑባቸው በአንዱ ቀን ለምን ያህል ጊዜ ይሰራሉ?	ስአት------- ደቂቃ	

ከቦታ ቦታ እንቅስቃሴ

ከዚህ ቀጥሎ ከቦታ ቦታ ሲንቀሳቀሱ በብዛት የሚጠቀሙባቸውን መንገዶች እጠይቅዎታለሁ

30	ከቦታ ቦታ በሚንቀሳቀሱበት ጊዜ ለ 10ደቂቃ ያለማቋረጥ በእግርዎ /በብስክሌት ይሄዳሉ?	1.አዎ 2.አይደለም አይደለም ከሆነ ይሂዱ	
31	በሳምንቱ ውስጥ ስንት ቀን ከ10 ደቂቃ ያላነስ በእግርዎ /በብስክሌት ይሄዳሉ?	የቀን ብዛት --------	
32	በነዚህ ቀናት ውስጥ በቀን ምን ያህል ሰአት ሳያቋርጡ በእግርዎ /በብስክሌት ይሄዳሉ?	ሰአት ---------- ደቂቃ	
	ከመዝናናት እና ከስፖርት ጋር እንቅስቃሴዎች		

33	ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል የስፖርት ቢያንስ ለ10 ደቂቃ ያህል ሳያቋርጡ ይሰራሉ?	1.አዎ 2.አይደለም አይደለም ከሆነ ይሂዱ	
34	አብዛኛውን ጊዜ በሳምንት ስንት ቀን ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል የስፖርት ቢያንስ ለ10 ደቂቃ ያህል ሳያቋርጡ ይሰራሉ?	የቀን ብዛት ----------	
35	ስፖርት ከሚሰሩባቸው ከሚሰሩበት ቀናት ውስጥ በአንዱ ቀን ሳያቋርጡ ለምን ያህል ቀን ቀን ከፍተኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል ስፖርት ሳያቋርጡ ይሰራሉ?	ሰአት -------- ደቂቃ	
36	መጠነኛ የሆነ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል የስፖርት ቢያንስ ለ10 ደቂቃ ያህል ሳያቋርጡ	1.አዎ 2.አይደለም አይደለም ከሆነ ይሂዱ	

		ይሰራሉ?		
37	አብዛኛውን ጊዜ በሳምንት ስንት ቀን መጠነኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል የስፖርት ቢያንስ ለ10 ደቂቃ ያህል ሳያቋርጡ ይሰራሉ?	የቀን ብዛት	
38	ስፖርት በሚሰሩአቸው ቀናት ውስጥ በአንዱ ቀን ሳያቋርጡ ለምን ያህል ጊዜ መጠነኛ የልብ ምት ወይም የአተነፋፈስ ፍጥነት መጨመር ሊያስከትል የሚችል የስፖርት ቢያንስ ለ10 ደቂቃ ያህል ሳያቋርጡ ይሰራሉ?	ስአት -------- ደቂቃ	
39	የመኖሪያ አካባቢ ህ/ሽ በሚገኙ ስፍራዎች ላይ የመጫወት ልምድ አለህ/ሽ?	1.አዎ 2.አይደለም አይደለም ከሆነ ይሂዱ	
40	አይደለም ከሆነ ምክንያቱ ምንድነው?	---------	
	SEDENTARY BEHAVIOUR		

41	አብዛኛውን ጊዜ በቀን ስንት ሰአት ፊልም ያያሉ?	----------	
42	አብዛኛውን ጊዜ በቀን ስምን ያህል ጊዜያት ተቀምጠው ያሳልፋሉ?	ስአት -------- ደቂቃ	
43	ከቤተሰቡ አባል ውስጥ የሰውነት እንቅስቃ የሚያዘወትር ሰው አለ?	1.አዎ 2.የለም	
44	መልሱ አዎ ከሆነ የኦካል ብቃት እንቅስቃሴ ላይ ለመሳተፍ ጥረት አድርገው	1.አዎ 2.አላውቅም	

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	ያውቃሉ?		
45	መልሱ አላውቅም ከሆነ እንቅስቃሴ የሚያደርግ ሰው ቢኖር አብረው የመስራት ሃሳብ ይኖሮት ነበር?	1.አዎ 2.የለኝም	
አካላዊ ልኬት			

	ልኬት	መልስ	ኮድ
46	ቁመት	በሴንቲ ሜትር ----------	
47	ክብደት	በኪሎ ግራም--------	
48	የወገብ ዙሪያ	በሴንቲ ሜትር ----------	