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Prevalence of Overweight and/or Obesity and Associated Factors among High School Adolescents in Arada Sub city, Addis Ababa, Ethiopia

Emana Alemu[1], Azeb Atnafu[2], Mezgebu Yitayal[3] and Kedir Yimam[4]*

[1]Ethiopian Health and Nutrition Research Institute, Addis Ababa, Ethiopia
[2]Department of Applied Human Nutrition, Institute of Public Health, College of Medicine and Health Science, University of Gondar, Gondar, Ethiopia
[3]Department of Health Service Management and Health Economics, Institute of Public Health, College of Medicine and Health Science, University of Gondar, Gondar, Ethiopia
[4]Department of Public Health, Medicine and Health Science College, Debre Markos University, Debre Markos, Ethiopia

Abstract

Introduction: In recent years, overweight and/or obesity among children and adolescents have emerged as a global epidemic. Overweight and/or obesity during adolescence predispose them to the development of cardiovascular and metabolic disorders in adulthood. However, information regarding overweight and/or obesity is still scarce for primary prevention. Thus, this study aimed at assessing prevalence of overweight and/or obesity and factors associated with them.

Methods: Institution based cross-sectional study was employed. The participants were 800 high school adolescents aged 15–19 years selected using multistage sampling technique. Body mass index (BMI) was used to determine the nutritional status. Univariate, bivariate and multivariate analyses were considered.

Results: The overall prevalence of overweight and/or obesity was found to be 75 (9.4%). Having small family size (AOR=3.10 95% CI: 1.69-5.53), learning in private school (AOR=2.73 95% CI: 1.36-5.49), being with lower middle income family (AOR=2.40 95% CI: 1.07-5.37) and living in male headed household (AOR=2.56 95% CI: 1.25-5.24) were significantly and positively associated with overweight and/or obesity. Adolescents in 15-17 years of age (AOR=0.44 95% CI: 0.25-0.75) and those who were walking at least 30 minutes in a day (AOR= 0.40 95% CI: 0.19-0.65) were negatively associated with overweight and/or obesity.

Conclusion: This study revealed that overweight and/or obesity are becoming major public health problem. Learning in private school, having small family size, being in male headed household and living in lower middle income household were positively associated with overweight and/or obesity. Early adolescents and those who walk at least 30 minutes per day have inverse relationships. This study showed that promoting active lifestyles and healthy diets should be national public health priority.

Keywords: Overweight; Obesity; Adolescents; High school; Addis ababa

Introduction

In recent years, overweight and/or obesity among children and adolescents have emerged as a global epidemic [1]. Adolescence is a vulnerable period for the development of obesity and weight of adolescent tracks strongly into adulthood [2]. The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Globally there has been: an increased intake of energy-dense foods that are high in fat, salt and sugars but low in vitamins, minerals and other micronutrients and decrease in physical activity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization [3].

The 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 [4]. The fastest overweight and obesity growth rates are found in Africa – the number of overweight or obese children in 2010 was more than double that in 1990 [5].

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 [6]. In Ethiopia, one study conducted in Addis Ababa in 2007 reported that the prevalence of overweight and obesity on elementary school students were 7.6%and 0.9% respectively [7].

Overweight and/or obesity during adolescence increases the risk for the development of non-communicable diseases and predisposes the individual to the development of overweight, obesity, cardiovascular disease, and metabolic and other disorders in adulthood. Therefore data on prevalence and determinants of obesity in developing countries are needed for primary prevention. Thus, the aim of this study was to assess the prevalence of overweight and/or obesity and associated factors among high school adolescents in Arada sub-city in Addis Ababa, Ethiopia.

Methods

Study design and study setting

Institution based cross sectional study was conducted in Arada sub-city of Addis Ababa from March 20 to April 28, 2013. Arada sub city is

***Corresponding author:** Kedir Yimam, Department of Public Health, Medicine and Health Science College, Debre Markos University, PO Box: 269, Debre Markos, Ethiopia, Tel: +251-910-889265; E-mail: kedirymam331@gmail.com

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found in the Northeast part of Addis Ababa Ethiopia. The Arada sub city has a total of 23 high schools of which 11 were governmental and 12 were private schools.

Source and study population

The source populations were all high school students attending in Arada Sub-city administration. All regular students of grade 9 -12 in the academic year 2012/2013 and in the age range of 15-19 years old were included.

Sample size and sampling procedure

The sample size was determined using single population proportion formula assuming prevalence of overweight and obesity (p=23%) among children and adolescents of private schools in Addis Ababa [7]. The sample was multiplied by a design effect of two and 10% non-response was added which give the final sample size of 800. Multistage sampling technique was used to select the study subjects. At stage one, lottery method was used to select four high schools (two government and two private) from the total of 23 (12 government and 11 private) high schools. Finally computer generated simple random sampling method was used to select study participants.

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.

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.

Data collection

Self-administered questionnaire was used to collect the data. Questions used to assess socio demographic data and other relevant information were from the global physical activity questioner (GPAQ) analysis guide [8] and WHO steps instruments for chronic disease risk surveillance [9]. Six diploma nurses as a data collector and one health officer as a supervisor participated in the data collection process. Measurement of weight was recorded to the nearest 0.1 kg and the height was recorded to the nearest 0.5 cm. Measurements of weight and height were made using calibrated digital bath balance and height measuring board in standing position respectively. The weight was measured with minimum clothing.

Data quality control

The questionnaire was prepared in English and translated to Amharic and back to English to keep the consistency of the questions. Training of data collectors and supervisors and pre testing of questionnaire were made to ensure the quality of data. Principal investigator and supervisors made on the spot checking and reviewed all the completed questionnaires to ensure completeness and consistency of the information collected and immediate action was made. Double data entry was done by the principal investigator to keep accuracy of the data.

Data processing and analysis

The data were coded, cleaned and entered to EPI- INFO version 3.5.1 and were exported to SPSS version 20 for analysis. Body mass index (BMI) was computed using weight and height (Kg/m^2). Individual BMI was compared with age and sex specific BMI for age percentile cut off points of CDC growth chart. Univariate, bivariate and multivariate analyses were considered.

Ethical consideration

Ethical clearance was obtained from Institutional Review Board of University of Gondar. Permission was obtained from Arada sub city Education Office and respective School Directors. Informed verbal consent was obtained from each study subjects after the data collectors clearly explained the aims of the study. Respondents were also informed that they could refuse or discontinue participation at any time. Information was recorded anonymously to maintain confidentiality and privacy of respondent.

Results

Socio demographic characteristics

A total of 800 students were interviewed with 100% response rate. Among these, 439 (54.9%) of them were female. The mean (± SD) age of respondents was 16.89 (± 1.67) years. Nearly one third (63.4%) of them were 17 and above age groups. Majority, 640 (80%) of the respondents were Orthodox Christian in religion. About 421(52.6%) of respondents were from government school (Table 1).

Variables	Frequency	Percent (%)
Sex		
Male	439	54.9
Female	361	45.1
Age		
15-17 years	289	36.1
17-19 years	511	63.9
School type		
Government school	413	51.6
Private school	387	48.4
Family size		
Less than 4	186	23.3
4 and above	604	76.8
School grade level		
High school (9-10th)	322	40.3
Preparatory (11-12th)	478	59.7
Religion		
Orthodox	640	80
Muslim	85	10.6
Protestant	57	7.1
Others	18	2.3
Sex of house hold head		
Male	589	73.6
Female	211	26.4
Occupation of house hold head		
Merchant	352	41.5
Government	327	40.9
Farmer	69	8.6
Dailey laborer	49	6.1
NGO employer	23	2.9
Educational status of head of house hold		
No formal education	38	4.8

Primary school (1-8th)	81	10.1
Secondary school (9-12th)	194	24.3
College and above	487	60.9
Average monthly income		
Lower income	216	27
Lower middle income	335	41.9
Middle upper income	202	25.3
Higher income	47	5.9
Family vehicle		
Yes	269	33.6
No	530	66.3

Table 1: Socio demographic characteristics of Arada Sub- city high school students, Addis Ababa Ethiopia, 2013 (n=800).

Variables	Frequency	Percentage
Fruits intake		
None	100	12.5
One day/week	277	34.6
Two or more days/week	421	52.6
Vegetable intake		
None	78	9.8
One day/week	191	23.9
Two day/week	255	31.9
Three or more day/week	275	34.4
Using snack		
Yes	721	90.1
No	79	9.9
Number of snack in a day		
One times	672	93.2
Two times	29	4.0
Three times	20	2.8
Number of meals other than snack		
One times	33	4.1
Two times	72	9.0
Three times	591	73.9
Four and above	104	13.0
Food bought other than regular meal		
Cake	234	29.3
Biscuit	366	45.8
Ice-cream	26	3.3
Chocolate	97	12.1
Others	77	9.6
Eat when watching TV or film		
Yes	447	55.9
No	338	42.3
Eat when studying		
Yes	186	29.3
No	614	76.8
Soft drink intake per week		
No intake	191	23.9
One times	219	27.4
Two times	179	22.4
Three times	116	14.5
Four and above	91	11.4

Table 2: Dietary habits among Arada sub-city adolescent high school students in Addis Ababa Ethiopia, 2013 (n=800).

More than three fourth 614 (76.8%) of them were living with greater or equal to four family members. Using World Bank economic classification about 335 (41.9%) of respondents parents have average monthly income of 1539-6053 Eth birr (Table 1).

Dietary habits

Above half of adolescents 421 (52.6%) consumed fruit two days and above in a weak. Nearly one third 275 (34.4%) of adolescents were consuming vegetables three or more times per week. Majority, 721 (90.1) of respondents were using snack currently. More than half 447 (55.9%) of participants were reported that they ate while watching TV (Table 2).

Physical activity

Two hundred thirty two (29%) of adolescents were engaged in works that involve moderate to vigorous intensity activity beside education. Majority 561 (70.1%) of adolescents were walking at least 30 minutes in a day. Among adolescents, 361 (45.1%) and 316 (39.5%) of them were engaged in moderate and vigorous intensity sports respectively (Table 3).

Prevalence of overweight and/or obesity

The prevalence of overweight among high school students in Arada Sub-city was found to be 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%) (Figure 1).

Factors associated with overweight and/or obesity

In multivariate analysis; 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 (Table 4).

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. The likelihood of overweight and/or obesity among adolescents who were in 15-17 age groups was lower (AOR=0.44 95% CI: 0.25-0.75) as compared to 17-19 age groups. The odds of being overweight and/

Variables	Frequency	Percent
Work in moderate to vigorous intensity activity		
Yes	232	29.0
No	568	71.0
Walk at least 30 minutes in a day		
Yes	561	70.1
No	239	29.9
Vigorous intensity sports		
Yes	316	39.5
No	484	60.5
Moderate intensity sports		
Yes	361	45.1
No	439	54.9
Get to and from school		
On foot	352	44.0
By taxi(service)	448	56.0

Note: *= for educational, fitness and/or recreational purpose

Table 3: Physical activity among Arada sub-city adolescent high school students in Addis Ababa, Ethiopia, 2013 (n=800).

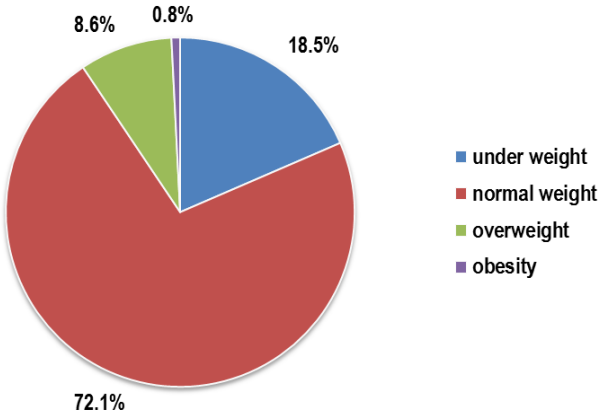

Figure 1: Nutritional status of Arada sub-city high school adolescents in Addis Ababa Ethiopia, 2013.

Variables	Overweight&/or obesity		COR with 95% CI	AOR with 95% CI
	Yes	No		
Age				
15-17	42	500	0.57(0.35-0.93)	**0.44(0.25-0.75)***
17-19	33	225	1.00	1.00
School type				
Government	27	386	1.00	1.00
Private	48	339	2.02(1.42-5.26)	**2.73(1.36-5.48)***
Family size				
Less than 4	26	160	1.87(1.13-3.11)	**3.06(1.69-5.53)****
Four &above	49	565	1.00	1.00
Sex of head of house hold				
Male	63	526	1.99(1.05-3.76)	**2.56(1.25-5.24)***
Female	12	199	1.00	1.00
Monthly income				
Lower	10	206	1.00	1.00
Lower middle	45	290	3,20(0.19-2.68)	**2.40(1.07-5.37)***
Middle upper	17	185	1.89(0.68-7.64)	1.88(0.32-2.48)
Higher	3	44	1.40(0.38-4.80)	1.69(0.15-3.18)
Walking 30 minutes in a day				
Yes	41	520	0.48 (0.29-0.77)	**0.40 (0.19-0.65)***
No	34	205	1.00	1.00

Note: 1.00=Reference *=P ≤ 0.05 **=P ≤ 0.001

Table 4: Factors associated with overweight and/or obesity among Arada sub-city high school students in Addis Ababa Ethiopia, 2013.

or obesity among adolescents who were from lower middle income families was higher (AOR=2.40 95% CI: 1.07-5.37) compared to those from lower income families. Walking at least 30 minutes in a day was negatively associated with overweight and/or obesity (AOR= 0.40 95% CI: 0.19-0.65) (Table 3).

Discussion

In this study, the prevalence of overweight and/or obesity was found to be 9.4%. This finding was found to be consistent with prevalence study done using the same cutoff point in Uganda and South Africa which was 10% [10,11]. However, this finding was slightly higher than study conducted six years back in Addis Ababa which was 8.5% [12]. This could be explained by the change in the life style factors of the society. Moreover, the finding was lower than study conducted in Sudan which was 14% [13]. This might be due to the food eaten in Sudan were highly energy dense foods and there is also frequent eating habits while in Ethiopia mostly eaten foods are fibers and cereals, three times a day.

Overweight and/or obesity were significantly associated with age; it showed that early adolescents had less likelihood to be overweight and/or obesity. This finding was consistent with study done in Turkey, Iran and china [14-16]. It might be do you to as age increase there will be decrease in physical activity and exposed for high energy dense foods.

The findings of this study showed that adolescents who were learning in private schools had higher odds of being overweight and/or obese. This finding was consistent with other studies conducted globally [17,18]. One study in Burkina Faso demonstrated that students from private school were in 2.7 folds more likely to become overweight as compared to students from government school [17]. This could be explained by adolescents in private schools usually come from families with higher socioeconomic groups which exposed them to highly energy dense foods and allow them to use vehicles to transport from and to school. Moreover, adolescents in private school may also have less restriction on food and snack choices compared with those in public schools [17,19].

A small family size was significantly associated with overweight and/or obesity. A similar finding was reported in Iran study [15]. It could be explained by individuals who were within small family might live in good economic conditions, that create better opportunity to secure the household food security as they needed. Male headed families were positively associated with overweight and/or obesity. It might be due to the income and food security of the house hold in female headed family can decrease the risk of overweight.

In this study, adolescents came from lower middle income family had higher prevalence of overweight and/or obesity as compared to those who came from lower income family. Study done in Saudi Arabia showed that adolescents who came from families with good manner (higher income) were highly exposed to overweight and/or obesity [19], this might be due to adolescents comes from high income family were exposed for fat dense foods and for sedentary way of life style. In Ethiopia, weight gain was considered as a sign of healthiness and others considered overweight as a disease of high economic class. However, studies conducted in Germany children and Korean boys reported that lower household income significantly increased the risk for overweight and/or obesity [4,17]. This might be due to those families in low socioeconomic status are accessible for fat dense foods.

This study demonstrated that walking at least 30 minutes in a day was inversely related with the prevalence of overweight and/or obesity. This finding was consistent with global studies [4,16,20], showing that physical inactivity is a leading factor in obesity during childhood and adolescence.

The study has the following limitation. First, due to nature of cross-sectional study we cannot infer causality from the findings. Second, there is a potential for recall and social desirability bias in the frequency of dietary habits, physical activity and sedentary behaviors. Also the food frequency questionnaire did not account for portion size.

Conclusion

This finding revealed that overweight and/or obesity was major public health problem among high school adolescents. The prevalence of overweight and/or obesity was higher among late adolescents, those learning in private school, those from small family size, those from male headed families, those from lower middle income families and vegetable consumers. Walking at least 30 minutes in a day was inversely related with overweight and/or obesity. This finding suggests that promoting active lifestyles and healthy diets should be a national public health priority and there is a need of longitudinal study to investigate the relationship between vegetable intake and overweight and/or obesity.

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