Prevalence of Overweight and its Associated Factor among Primary School Students of Dukem Town, Central Ethiopia 2016

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Abstract

Overweight impose unacceptably high health problem and economic and social costs on countries at all income levels. it predispose for newly emerging disease such as diabetes mellitus, hypertension, cardiovascular disease, certain forms cancer and stroke. The objective of this study is to assess the level of overweight and its associated factors in primary school students in Dukem Town, Oromia region, Ethiopia, from January 23 - February 24 2016. Cross-sectional quantitative study was conducted on 470 primary schools students from two public and four private schools were selected randomly using lottery method and sample size was calculated using the formula of sample size determination for single population proportion taking the prevalence of overweight 9.9% and also study was used multi-stage sampling technique. Most of the Questionnaire were adopted and modified from previous study. Data were entered and cleaned using EPI info version 7.3 and analyzed using SPSS version 19. WHO 2007 growth reference was used as a standard reference for clarifying nutritional status of adolescent. Body mass index (BMI) was computed using weight/height (wt./(ht^2). Odd ratio with 95% confidence interval was used to assess presence and degree of association between variables. Bivariate and multivariate logistic regression analysis with 95% confidence interval was used to assess association among variables. The overall prevalence of overweight was 36 (9.2%). Attending in a private school more likelihood of overweight by more than three folds with COR of 3.74 (95% C.I. = 1.81, 7.74) and after controlling for selected variables, this significance was maintained with AOR of 3.15 (95%CI = 1.35 - 7.36).

Keywords: *Prevalence; Overweight; Associated Factor; Primary School; Ethiopia*

Introduction

According to the World Health Organization (WHO) adolescence is defined as 10 - 19 years of age [1]. Adolescents represent approximately 20% of the world's population and most (~ 84%) are living in developing country [2]. In Ethiopia, 20 - 26% of the population was represented by adolescents [3]. Adolescence is a period characterized by important biological, physical, psychological and social changes [4] and an active growth phase [5].

Overweight is defined as abnormal or excessive accumulation of fat in the body that may affect [6]. Overweight are the fifth leading risk for global death. In addition 44% of diabetic burden, 23% of ischemic heart diseases burden and between 7% and 41% of certain cancer burden are attributed to overweight and obesity [7,8].

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Africa is experiencing a shift from underweight to overweight along with rapid socioeconomic and nutritional transition particularly in their urban population. This transformation comes with increased access to energy-dense foods and less strenuous jobs resulting into many people having a positive energy balance and hence becoming overweight or obese [9].

Modern dietary patterns and physical activity patterns are risk behaviours that travel across countries and are transferable from one population to another like an infectious disease, affecting disease patterns globally [10]. As who estimated in 2008 in Ethiopia death due to overweight is 7.4%.

Overweight are rarely caused by hormonal and genetic defect, but the reason for dramatic worldwide increase in overweight in children and adolescent are unclear. Available evidences show that one of the effective ways to prevent obesity in the adult life is prevention and management of children's and adolescent overweight and obesity [11,12].

The main nutritional problem affecting school children's [10] worldwide includes under nutrition (in terms of stunting and wasting), overweight and obesity which are emerging public health problems during this time [13-15].

In recent year, overweight among child and adolescent have emerged as a global epidemic [16]. Adolescence is a vulnerable group for the development of overweight track to adulthood [17]. The fundamental cause of overweight is an energy imbalance between calories consumed and calorie expended. Globally there has been an increased intake of energy dense foods that are high in fat, salt and sugar 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 [18].

Studies have indicated that prevalence of overweight is increasing in both developing and developed countries. Ethiopia is experiencing changing in dietary pattern of its people, as a result of prevailing nutritional transition, especially in urban area. This transition often comes with changes in habit that predispose to overweight, which tend to persist into adulthood with its sequel. In view of this problem assessing prevalence of overweight and its associated factor is important as it will provide data that may help in prevention, intervention and rehabilitation program.

Statement of the problem

The nutrition and epidemiologic transition has its own impact on changes in diet and activity patterns, leading to the development of a double burden of malnutrition. The changes in the nutritional intake combined with increasingly sedentary life styles resulting from food market, globalization and increasing urbanization has led to the emergence of chronic disease as a major new health threat [19].

Adolescent overweight associated with serious medical problem including high blood pressure, adverse lipoprotein profile, diabetic's mellitus, atherosclerotic cardiovascular disease, coronary heart disease colorectal cancer, and death from all causes, as well as lower educational attainment and higher rates of poverty. Adolescent obesity also dramatically increases the risk of adult obesity [20].

A study conducted in Addis Ababa (the capital town of Ethiopia) elementary school showed that, the overall prevalence of overweight were 7.6%. The prevalence of overweight among girls were: 9.4%, while that prevalence among boys were: 5.4%.

The overall prevalence of overweight is 46 (9.9%). From a total of 221 male study participants 17 (7.7%) were overweight. 29 (12%) and 6 (2.5%) out of 242 female participants were overweight [22].

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The overall Prevalence rate of overweight among children in primary schools of Bole sub city was 9.8% using BMI for age and sex classification among which over weight accounted 8%. It was higher in females 5.2% overweight than male's 2.8% overweight students. The overall prevalence rate of overweight was also higher among private school children 6.4% overweight than government school children 1.6% overweight. This Prevalence rate among private school children alone when calculated separately was 16% and among government school children alone was 3.4% [23].

Justifications

But studies conducted in the country in general and in Dukem town in particular are limited in this age group (primary school children). One of the factors that influence overweight is high intake of calorie dense foods which is usually related with high socio economic status family. Children from such families particularly at school age are prone to access and consumption of calorie dense food as they want which lead to overweight and the extent of the problem on such social group should be known to take appropriate measure. Primary preventive measure for children overweight should start early in children and address factors for overweight. A fundamental step in the prevention and control of overweight is identification of risk factors contributing to the rapid increase of the problem. Therefore, this study enables to see the prevalence rate and factors associated to the problem among primary schools in Dukem town.

Significance

Up to recently little was known about nutrition of adolescent, particularly in low and middle income countries. The government is working to invest in adolescent with a view to attaining to a healthier and more productive adult population in the future. Combating such kinds of nutritional problems may help to cut intergenerational effect, especially under nutrition. This study will expect to give highlight and help as a baseline study in the area as well as in the country.

Objective

General objectives

To assess prevalence of overweight and its associated factors among primary school students in Dukem town from January 24 - February 23, 2016.

Specific objectives

- To determine magnitude of adolescent overweight
- To identify factors associated with adolescent overweight.

Methodology

Study area and period

The study will conducted in Dukem town, South Shewa Zone of Oromia regional state from Jan 24- Feb 23, 2016. Dukem town founds from Finfine at 37 km, and established in 1907, when the train started from Djibuti-Finfine and also the cause for settlement around the these town in year 1997 E.C. The location of Dukem town astronomically latitude 8o45'25" N-8o50'30"N and longitudinally 38o51'55"E-38o56'5"E. Dukem town founds from north West Galan town administration, in south west Bishoftu town, in north east Ada'aworeda, in west Akaki Woreda. The greatest mountain altitude of 2,100 m and 1,800 m above sea level.

The number family in one home in average 4.6, and totally 7,560' husbands expected. The people living in the town are the follower of Christianity (orthodox, protestant), Muslim, waqefena, and others sequentially the followers of these. In our town different nation and nationality like Oromo, Amharic, Tigre, south nation and nationality peoples.

Study design

Cross-sectional study was conducted among primary school adolescent students.

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Population

Source population: All adolescent students in primary schools in Dukem town.

Study population: All adolescent students from grade 5-8 in primary schools of Dukem town.

Sample size determination

The sample size was calculated using the formula of sample size determination for single population proportion taking the prevalence of overweight 9.9% [28].

n= $\frac{(Z\acute{a}/2)^2\ P\ (1-P)}{(d)^2}$

Where p= prevalence of overweight

Za/2 = 1.96 at 95% level of confidence

d: margin of error = 0.04 (reduced in order to increase the sample size)

n = $(1.96)^2$ (0.129) $(0.871)/(0.04)^2$

= 214

So 214 with 10% non-response rate, the sample size will be 235.

Because the study was used multi- stage sampling technique, by considering the design effect of 2 the number will multiply by 2 and the total number of the student will be 470.

Sampling procedure

First Stage: As shown in figure 2, schools that fulfil the inclusion criteria were taken as a primary sampling unit (PSU). These made a total of 9 schools which constitutes 2 governmental and 7 private. A total of 6 schools were included in the study by considering the available resource. Two governmental and four private schools were randomly selected using lottery method.

Second Stage: From each of the 6 schools all sections of grade 5, 6, 7 and 8 were separately enlisted and one section from each grade was randomly selected by applying a lottery method. Out of each selected section, based on proportional allocation method subjects were randomly selected by calling random numbers from the class roster making the total number of students from all school 470.

Inclusion and exclusion criteria

Exclusion criteria: Obvious physical deformity like deafness, deformity on hand and leg Extension program student

Variable
Dependent variable

- Overweight

Independent variable
- Socio demographic: Age, sex, marital status, educational status of the family and economic status
- Physical activity
- Nutritional factor-source of food, shortage of food and meal frequency
- Adolescent behavior-sedentary life

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Operational definitions

- **Overweight:** BMI for age Z – score, BAZ (+1SD < 2 < +2SD)

- **Physical activity:** Any activity that increase your heart rate and make you gate out of breathe some of the time

- **Common physical activity:** The subjects was asked how many days in the past week and in a typical week they would physically active (cumulative activity including sport, school activity, playing with friends and walking to school) for 60 minute or more.

- **Sedentary behaviors:** The subjects was asked how many hours they watched television (including videos) and used a computer (for playing games/video console games, emailing, chatting, or school/ non-school -related Internet use) in their free time in a typical weekday and weekend and studying or homework (not including classroom time).

- **Low Physical Activity:** Is the lowest level of physical activity. Those individuals who do not meet the criteria for moderate and high are consider as low.

- **Moderate Physical Activity:** The pattern of activity is classified as moderate is either Of the following criteria:

  o 3 or more days of vigorous-intensity activity of at least 20 minutes per day OR

  o 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day OR

  o 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum total physical activity of at least 600 minutes/week.

- **High Physical Activity:** The two criteria classification as high are

  o Vigorous-intensity activity on at least 3 days achieving a minimum total physical activity of at least 1500 minutes/ week OR

  o 7 or more days of any combination of walking, moderate intensity or Vigorous-intensity activities achieving a minimum Total physical activity of at least 3000 minutes/week [25].

Data collection tool, procedure and quality assurance

Most of the Questionnaire were adopted and modified from previous study [9,26]. Concerning the variable on: gender, age, family size, parent educational level, eating habit (number of meal, frequency of consumption of different type's food, frequency of breakfasting). Physical activity performed by adolescent was assessed using standard questionnaire on international physical activity questionnaire (IPAQ). A height measuring board with high precision of 0.1 cm used for measuring height and a digital balance a precision of 0.1 kg was used to measuring weight. The English version of questionnaire was translated in Oromifa and Amharic for better understanding both data collectors and respondents. Consistence was checked by translating Oromia and Amharic version back to English by another person fluent in both languages.

Data collectors were recruited from health institution based on relevant previous experience in anthropometric measurement. The training was given by principal investigator (PI) prior to data collection. The session of the training include purpose and objective of the study, meaning of each question and technique of interview. Four nurses from health institution recruited as data collector. From selected school one supervisor was recruited as coordinator after explaining to him/her to organize and avail the study subjects when needed for interview and examination.

Letter of support written by Debre Markos University and Gamby Medical College was given for each school principal and permission was requested. In those schools in which get permission, one nurse per school was trained to collect data from all eligible subjects using a pre-test structured questionnaire under close supervision of principal investigator.

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Anthropometric measurement partically weight and height was take from all eligible subjects by the nurse, under close supervision of principal investigator. Weight was measured to the nearest 0.1 kg using calibrated digital balance in standing position and height was be measured to the nearest 0.1 cm using height measuring board in standing position. Finally 470 was selected and requested to consent. Student who assented to participate in the study was interview. In case the selected student absent repeat visit was arranged in the following day.

The data collectors was trained for two days and standardized particularly in proper filling of questioner, and the use of weight and height scale in order to minimize intra and inter error. Throughout the course of data collection, interviewers was supervised at each site, regular meeting was be held between data collectors and principal investigator together in which problematic issues arising from interviews which was conducted and mistaken found was discussed and decision was reached.

Before the actually study begin the questioner was tested in similar school, but not in proposed study school and some modification was made on response category. The collected data was reviewed and cheeked for completeness before data entry; the incomplete data was discarded. Data entry format template was prepared

Data management and analysis

Data was checked manually for completeness and then coded and entered to computer using Epi-info version 3.7 and Statistical analysis was made to SPPSS version 19 by PI. WHO 2007 growth reference was used as a standard reference for clarifying nutritional status of adolescent. Body mass index (BMI) was computed using weight/height $(wt./(ht^2)$. Descriptive statistics was used to show prevalence of overweight and other socio demographic characteristics. Odd ratio with 95% confidence interval was used to assess presence and degree of association between variables. Bivariate and Multivariate Logistics regression analysis was used to identify important association with the dependent one by controlling the effect of possible confounder.

Ethical clearance

Ethical clearance was obtained from Debre Markos University and Gamby College of medical science. Formal written letter of support to the educational department of region and then to town where the school are situated and consent was primarily obtained from the education department of the town and head master of the school was studied. Data was collected with the consent of the student after they become informed about the objective of the study, on how long it take to fill the questioner and the fact that they had the right to decide not to participate or discontinue.

Results

Socio-demographic characteristics

Majority of the participants were governmental school 308 (65.5%), female 242 (51.5%), orthodox 384 (81.7%), grade six students 127 (27.2%), whose father education from 5 - 8 grade 207 (44.0%), whose mother education from 1 - 4 grade 122 (26.0%), father occupation farmer 136 (28.9%), mother occupation private employee 94 (20.0%) (Table 1).

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| Variable		Frequency	Percentage (%)
Sex	Male	228	48.5
	Female	242	51.5
Age	10 - 14	286	60.4
	15 - 19	184	39.6
School type	Governments	308	65.5
	Private	162	34.5
Marital status	Single	470	100
Grade	Five	124	26.4
	Six	128	27.2
	Seven	114	24.3
	Eight	104	22.1
Religion	Orthodox	384	81.7
	Catholic	10	2.1
	Protestant	48	10.2
	Muslim	14	3.0
	Waqefena	14	3.0
Father education	Illiterate	44	9.4
	Read and write	68	14.5
	1 - 4 grade	102	21.7
	5 - 8 grade	207	44.0
	9 - 12 grade	43	9.1
	Above grade 12	6	1.3
Mother education	Illiterate	73	15.5
	Read and write	61	13.0
	1 - 4 grade	122	26.0
	5 - 8 grade	112	23.8
	9 - 12 grade	96	20.4
	Above grade 12	6	1.3
Father occupation	Farmer	136	28.9
	Daily labor	37	7.9
	Private employee	127	27.0
	civil servant	62	13.2
	Trade	40	8.5
	I don't know	68	14.5
Mother occupation	Daily labor	27	5.7
	Private employee	94	20
	civil servant	92	19.6
	trade	88	18.7
	I don't know	69	14.7
	House wife	46	9.8

Table 1: *Socio-demographic characteristics of participant among primary school of Dukem, January 2016 (n = 470).*

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Prevalence of overweight

The overall Prevalence of overweight among respondents was 36 (9.2%) and 10 (0.6%) of respondents was obeys.

Adolescent meal patterns

112 (23.8%) of respondents ate milk and milk product once per week followed by 104 (22.1%) two to four times per week, 86 (18.3%) never, 75 (16%), 59 (12.6%) less than once per month and 34 (7.3%) once per day.
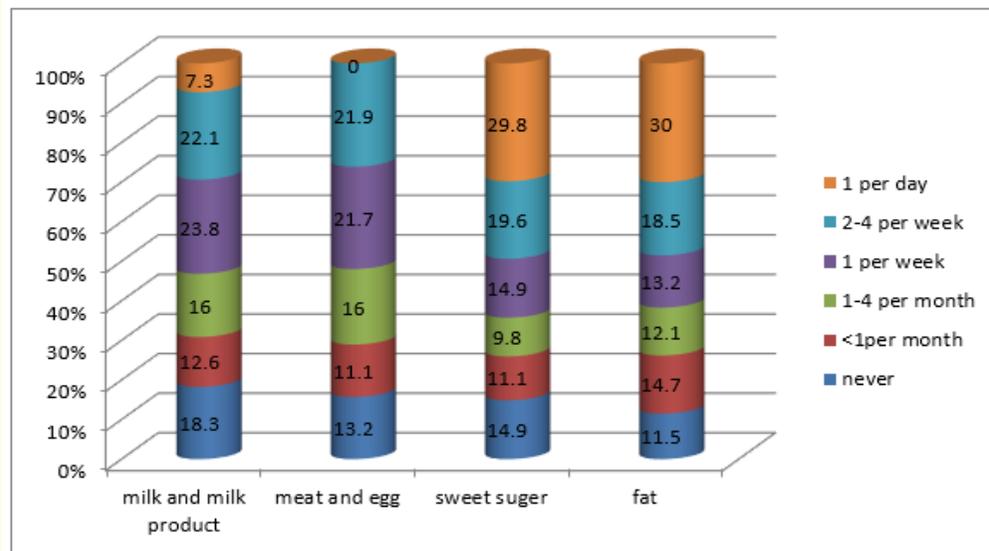
Figure 1: Consumption milk and milk product, meat and egg, sweet sugar and fat among respondents.

102 (21.7%) respondents ate cereals two to four times per week followed by, 95 (20.2%) per day week, 77 (16.4%), never, 69 (14.7%) once per day, 65 (13.8%) one to four times per month and 62 (13.2%).

	Variable	Frequency	Percentage
Cereals	Never	77	16.4
	Less than once per month	62	13.2
	One to four times per month	65	13.8
	Once per week	95	20.2
	Two to four times per week	102	21.7
	Once per day	69	14.7
Vegetable	Never	32	6.8
	Less than once per month	26	5.5
	One to four times per month	29	6.2
	Once per week	98	20.9
	Two to four times per week	166	35.3
	Once per day	119	25.3
Fruit	Never	37	7.9
	Less than once per month	65	13.8
	One to four times per month	46	9.8
	Once per week	111	23.6
	Two to four times per week	169	36.0
	Once per day	42	8.9

Table 2: Adolescents meal pattern according to food frequency questionnaire (FFQ) among primary schools of Dukem town, January 2016 (n = 470).

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Dietary habit

Out of the subjects 109 (23.2%) ate more than three meals per day, 279 (59.4%) ate three meals per day, 61 (13.0%) ate two meal per day, 13 (2.8%) ate one meals per day and 8 (1.7%) ate less than one meals. Three meals were taken a day i.e. snack and school recess was taken daily by 305 (64.9%) and 299 (63.6%) of the respondents, respectively.
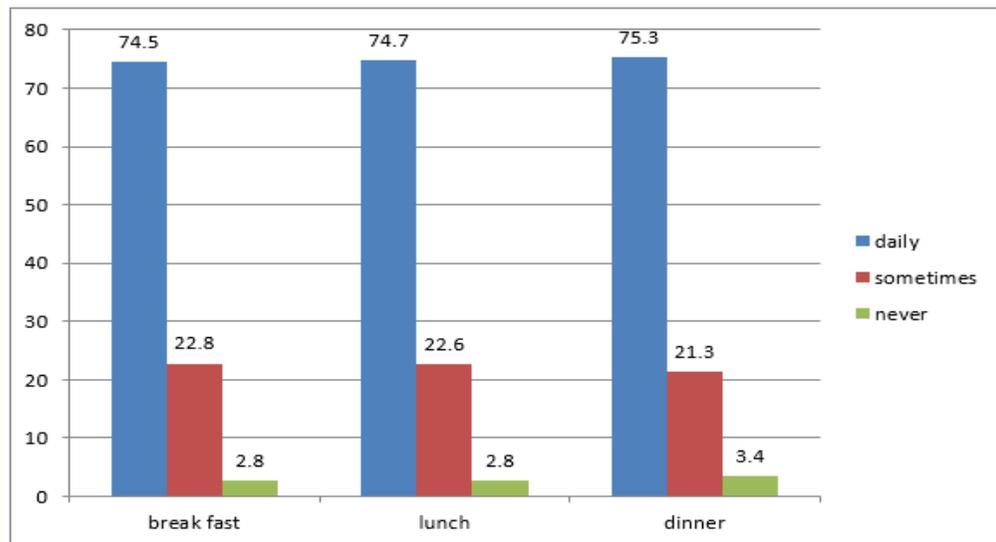
Figure 2: Dietary habit of Dukem primary school students, January, 2016.

Sedentary life and physical exercise

Physical activity pattern of participant was assessed using the IPAQ were evaluated according to the standard WHO total physical activity calculation guide. 267 (56.8%) of the participant were low activity, 187 (39.8%) were engaged in moderate physical activity for at least 10 minute per day and 16 (3.4%) participate vigorous activity for at least 10 minute. Out of 470 participants students 22 (4.7%) spent more than two or more hour, 56 (11.9%) spent one and half up to two hour, 103 (21.9%) spent one up to one and half hour, 143(30.4%) spent half up to one hour and 146 (31.1%) spent less than half hour on watching TV, playing video game and computer.
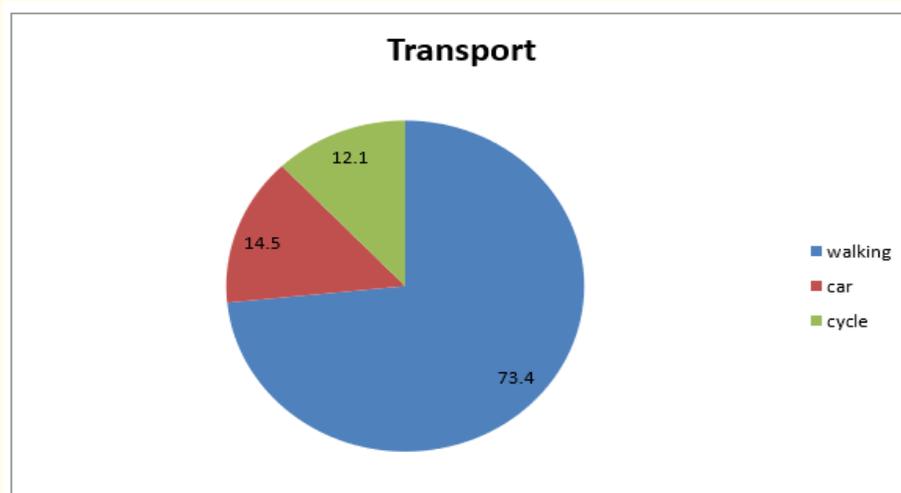
Figure 3: Sedentary life of the participant among Dukem primary school, January, 2016

Factor associated with overweight

As depicted in table 3, bivariate logistic regression was done to assess factors related to overweight. Attending in a private school more likelihood of overweight by more than three folds with COR of 3.74 (95% C.I. = 1.81, 7.74) and after controlling for selected variables, this significance was maintained with AOR of 3.15 (95%CI = 1.35 - 7.36).

Variables	Overweight		COR (95%Cl)	AOR (95%Cl)
Socio - demographic variable	Yes (n%)	No (n%)		
School type				
Private	24 (6.1)	124 (31.6)	3.74 (1.81 - 7.74)	3.15 (1.35 - 7.36)*
Government	12 (3.1)	232 (59.2)	1.00	1.00
Age				
10 - 14	33 (8.4)	243 (62.0)	5.11 (1.54 - 17.03)	0.36 (0.97 - 1.30)
15 - 19	3 (0.8)	113 (28.8)	1.00	1.00
Sex				
Male	11 (2.8)	166 (42.3)	1.00	1.00
Female	25 (6.4)	190 (48.5)	0.50 (0.24 - 1.05)	2.14 (0.94 - 4.94)
Father educational status				
> 8	7 (1.8)	31 (7.9)	2.53 (1.02 - 6.25)	1.88 (0.53 - 6.67)
≤ 8	29 (7.4)	325 (82.9)	1.00	1.00
Mother educational status				
> 8	11 (2.8)	78 (19.9)	1.57 (0.74 - 3.33)	0.71 (0.25 - 2.03)
≤ 8	25 (6.4)	278 (70.9)	1.00	1.00
Eating habit				
Number of meals				
≤ 3meal per day	31 (7.9)	275 (70.2)	1.83 (0.69 - 4.85)	0.29 (0.93 - 0.88)
> 3 meal per day	5 (1.3)	81 (20.7)	1.00	1.00
Frequency of break fast				
Not daily	13 (3.3)	88 (23.0)	1.67 (0.81 - 2.44)	2.06 (0.80 - 5.32)
Daily	23 (5.9)	266 (67.9)	1.00	1.00
Frequency of school recess				
Daily	21 (5.4)	225 (57.4)	0.82 (0.41 - 1.64)	1.36 (0.48 - 3.90)
Not daily	15 (3.8)	131 (33.4)	1.00	1.00
Frequency of lunch				
Daily	27 (6.9)	266 (67.9)	1.01 (0.46 - 2.24)	0.53 (0.18 - 1.61)
Not daily	9 (2.3)	90 (23.0)	1.00	1.00
Frequency of snack				
Daily	21 (5.4)	236 (60.2)	0.71 (0.35 - 1.43)	1.22 (0.45 - 3.34)
Not daily	15 (3.8)	120 (30.6)	1.00	1.00
Frequency of dinner				
Not daily	12 (3.1)	83 (21.2)	1.64 (0.79 - 3.43)	1.61 (0.59 - 4.39)
Daily	24 (6.1)	273 (69.6)	1.00	1.00
Consumption of cereal				
> Once a day	12 (3.1)	132 (33.7)	0.85 (0.41 - 1.75)	0.72 (0.32 - 1.64)
≤ once a day	24 (6.1)	224 (57.1)	1.00	1.00
Consumption of vegetable				
≥ Once a day	26 (6.6)	212 (54.1)	1.77 (0.83 - 3.77)	1.38 (0.51 - 3.70)
< once a day	10 (2.6)	144 (36.7)	1.00	1.00
Consumption of fruit				
≥ Once a day	19 (4.8)	161 (41.1)	1.35 (0.68 - 2.69)	1.18 (0.48 - 2.88)
< once a day	17 (4.3)	195 (49.7)	1.00	1.00
Consumption of milk& its product				
> Once a day	15 (3.8)	97 (24.7)	1.91 (0.95 - 3.85)*	1.92 (0.83 - 4.45)
≤ Once a day	21 (5.4)	259 (66.1)	1.00	1.00
Consumption of meat &egg			5632 2160	
> Once a day	18 (4.6)	135 (34.4)	1.64 (0.82 - 3.26)	1.28 (0.54 - 3.04)
≤ Once a day	18 (4.6)	221 (56.4)	1.00	1.00
Consumption of sweet and sugar				
> Once a day	16 (4.1)	173 (44.1)	0.85 (0.43 - 1.69)	0.66 (0.29 - 1.48)
≤ Once a day	20 (5.1)	183 (46.7)	1.00	1.00
Consumption of fat				
> Once a week	13 (3.3)	175 (44.6)	0.58 (0.29 - 1.19)	1.88 (0.53 - 6.67)
≤ Once a week	23 (5.9)	181 (46.2)	1.00	1.00
Physical activity pattern				
Time spent on watching TV, video game and computer				
> 120 minute per day	6 (1.5)	25 (6.4)	2.65 (1.01 - 6.96)	2.65 (0.82 - 8.55)
≤ 120 minute per day	30 (7.7)	331 (84.4)	1.00	1.00
Transport				
Car	9 (2.3)	51 (13.0)	1.99 (0.87 - 4.48)	0.79 (0.29 - 2.14)*
Foot/bicycle	27 (6.9)	305 (77.8)	1.00	1.00

***Table 3:** Factors associated with overweight among primary schools students of dukem town, January 2016.*

Meal pattern was positively associated with overweight having COR 1.83 (0.69, 4.85). This significant association was maintained with AOR = 0.29, 95%C.I. = 0.93, 0.88).

Discussion

This study disclosed the prevalence of overweight and associated factor among primary school in Dukem town. In this study, the prevalence of overweight was found to be 9.2%. It was consistent with study done in Addis Ababa [22,23], while lower than a study conducted on India [24], Jordan [25], Nepal [27], Ghana and Uganda [28]and Hawassa [29]. One of possible reasons for the difference in overweight could be due to cultural difference in dietary intake.

School type prevalence overweight shows 24 (6.1%) and 12 (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 3.2 times at higher risk than government school students. This study is consistent with study conducted in Addis Ababa (6.4%) [23].

This finding is lower than study conducted in Lebanese private school: a cross-sectional study of adolescents in private Lebanese schools, aged 10 - 18 years indicates that overweight prevalence was 24.4% [36]. 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.

The eating pattern of our respondent shows, eating meals less than or equal to three times has less likely association with overweight. This result is lower than study conducted in Addis Ababa1.9 times than more than three times meal per day [19]. WHO reported that there is insufficient evidence that increased eating frequency leads to increased or decreased obesity [10].

Conclusion

In conclusion, the findings of this study have shed light on the prevalence and determinants of overweight among primary school children in Dukem town. The finding reveals that the level of overweight consistent with study done in Addis Ababa while Addis Ababa had more populated town than Dukem.

Among the factors identified are being in private school and lack of regular consumption of meals were associated overweight in adolescents.

Recommendation

Based on the findings of the study we recommended the following:

- The Regional and Zone health bureaus should design intervention like health diet which targets overweight adolescents.
- Health institutions should provide Skill based Nutrition education for adolescents about regular consumption of meal.
- There must be collaboration among health sectors and education sectors of the city to address adolescent overweight problems of the City. The intervention could be school based nutrition education.

Bibliography

1. UNDO/UNFPA/WHO/World Bank, special program of research, development and research training in human reproductive health (HRH), progress in reproductive health research. Who productive service, Geneva, Switzerland.

2. Gahi O., *et al*. "Child adolescent health and development" 6 (2006): 66.

3. UNICEF progress for children: report card with adolescent: UNICEF publication, New Work, USA: Number 10 (2012).

4. Campagna V. "Souza Acorpoeimagim corporal no inclio da adolecentia faminnea". *Boletim de Psicologia* 56.124 (2006): 9-35.

5. Nutrition for school age - child. "UNL/cooperative extension service". *Nebraska Extension Publications* No G 92-1086A, (2002): 1.

6. Global strategy in diet, physical activity and health, world health organization.

7. Overweight and obesity fact sheet, world health organization (2011).

8. Global health observatory (GHO), world health organization.

9. Gebregergs GB., *et al*. "Overweight and Obesity, and Associated Factors among High School Students in Gondar Town, North West Ethiopia". *Journal of Obesity and Weight Loss Therapy* (2013).

10. World Health Organization. "Nutrition in adolescence -Issues and Challenges for the Health Sector (2005).

11. International Scholarly and Scientific Research and Innovation 10.4 (2016).

12. Afework M., *et al*. "Nutrition status of adolescent girls from rural communities of Tigray, northern Ethiopia". *Ethiopian Journal of Health Development* 23.1 (2009): 5-11.

13. Anyika J., *et al*. "Nutrient intake of adolescent girl in secondary schools and university in abia state of Nigeria". *Pakistan Journal of Nutrition* 2009: 8(10) :1596-602.

14. Kalhan M., *et al*. "Nutritional status of adolescent girls of rural Haryana". *The Internet Journal of Epidemiology* 8.1 (2010): 67-75.

15. Carvalho IH., *et al*. "Risk factors foroverweight and obesity in adolescents of a Brazilian university: a case-controlstudy". *Nutricion Hospitalaria* 24.1 (2009): 17-24.

16. WHO Media Center fact sheet Obesity and overweight (2013).

17. Tsiros M., *et al*. "Obesity: the new childhood disability?" *Obesity Review* 12.1 (2011): 26-36.

18. WHO. "Infobase data on overweight and obesity, mean BMI, healthy diets and physical inactivity, Geneva" (2012).

19. Yoseph G/Y, determinants of overweight and obesity (2011).

20. Hadush G., *et al*. "Assessment of Nutritional Status and Associated Factors among School Going Adolescents of Mekelle City, Northern Ethiopia". *International Journal of Nutrition and Food Sciences* 4.1 (2015): 118-124.

21. Alemu E., *et al*. "Prevalence of Overweightand/or Obesity and Associated Factors among High School Adolescents in AradaSub city, Addis Ababa, Ethiopia" (2014).

22. Deshmukh P., *et al*. "Nutritional Status of Adolescents in Rural Wardha Indian". *Journal of Pediatrics* 73.2 (2006):139-141.

23. WHO anthroplus manual. "Department of Nutrition for Health and Development". Geneva, Switzerland, (2009).

24. Bhatia R. "Overweight among adolescent in primary school of Jordsh India" (1999).

25. Ahmad H., *et al*. "Assessment of Nutritional Status of Adolescents versus Eating Practices in Islamabad City". *Pakistan Journal of Nutrition* 8.8 (2009): 1304-1308.

26. Mehta M., *et al*. "Obesity amongst affluent adolescent girls". *Indian Journal of Pediatrics* 74.7 (2007): 619-622.

27. Vander Kloet M. "Dual Burden of Malnutrition in Andhra Pradesh, India: Identification of Independent Predictors for Underweight and Overweight in Adolescents with Overweight Mothers" (2008).

28. Zeleke A. "Prevalence of childhood and adolescent overweight and obesity among elementary school students in Addis Ababa" (2007).

29. Stice E., *et al*. "Psychological and Behavioral Risk Factors for Obesity Onset in Adolescent Girls". 73.2 (2005): 195-202.

30. Reilly J. "Childhood obesity in United Kingdom". *British Medical Journal* (2003).

31. Christine Jildeh., *et al*. "Assessing the Nutritional Status of Palestinian Adolescents from East Jerusalem: School-based Study 2002-2003". *Journal of Tropical Pediatrics* 57.1 (2011): 51-58.

32. Carvalho IH., *et al*. "Risk factors forever weight and obesity in adolescents of a Brazilian university: a case-controlstudy". *Nutricion Hospitalaria* 24.1 (2009): 17-24.

33. Weight control Information Network WIN. "Statistics related to overweight andobesity". *NIDDK* (2010).

34. Ketsela D. "Precursors of atherosclerotic and hypertensive diseases amongadolescents in Addis Ababa, Ethiopia". *Bulletin of the World Health Organization* 71.6 (1993): 787-794.

35. Olumakaiye M. "Prevalence of Underweight: A Matter of Concern among Adolescents in Osun State, Nigeria". *Pakistan Journal of Nutrition* 7.3 (2008): 503-508.

36. Gebremichael B and Chere A. "Prevalence of Childhood Overweightand Obesity and its Determinant Factors among Elementary School Children inAddis Ababa, Ethiopia: A Cross Sectional Study". *Journal of Nutritional Disorders and Therapy* 5 (2015) 168.