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The Emerging Nutritional Problems of School Adolescents: Overweight/Obesity and Associated Factors in Jimma Town, Ethiopia

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ABSTRACT

Background: Globally, overweight is rapidly becoming one of the most important medical and public health problems. Adolescent obesity is a multisystem disease with potentially devastating consequences that persist into adulthood. However, there is a paucity of available information regarding the adolescent overweight and obesity in Ethiopia, particularly in the study area.
Methods: A school-based cross-sectional study was conducted from March to April/2015 among 546 adolescents. Study participants were selected using a multi-stage, stratified random sampling method. An interviewer administered questionnaire was used to collect data. Multivariable logistic regression analysis was used to identify independent predictors of overweight and obesity at 95% confidence intervals.
Results: The mean dietary diversity score of school adolescents was 6.97 ± 1.15. Cereal based diets (99.6%) and vegetables (73.9%) are the two common foods of adolescents. The prevalence of overweight/obesity was 13.3%. Overweight/Obesity was significantly associated with being a female (AOR = 3.57 [95% CI:1.28–9.9]), attending private schools (AOR = 7.53 [2.51–22.3]), lack of paternal education (AOR = 5.57 [95% CI:1.53–20.26]), wealthy households (AOR = 3 [95% CI:1.09–8.26]) and not being a vegetarian (AOR = 9.23 [95% CI:1.68–50.8]). Adolescents who are physically inactive (AOR = 3.7 [95% CI:1.06–13.02]) and those with sedentary lifestyles (AOR = 3.64 [95% CI:1.39–9.5]) were more obese compared to their counter peers.
Conclusions: The proportion of overweight/obesity among school adolescent was considerably high. Being a female, learning in private school, high household economic status, not being a vegetarian and having a sedentary life were significantly associated with overweight/obesity.
Practice implications: Findings of this study can be used to guide the development of programs aimed at preventing overweight/obesity in Ethiopia by informing policymakers and other stakeholders about this emerging nutrition-related problem among school adolescents.

Background

United Nations Population Fund (UNFPA) reported that adolescents account about one fourth of the total world's population in which the majority of them live in developing countries (UNFPA, 2014). World Health Organizations (WHO) defined adolescence as a pivotal period of development which represents the age between 10 and 19 years (WHO, 2013). During this critical period, dietary patterns play an important role in the nutritional status of adolescents, as well as lifelong health. However, adolescents face serious nutritional challenges which could affect their rapid growth spurt as well as their health status. In developing countries like Ethiopia, the main nutritional problems affecting both young children and adolescents are under-nutrition. Under-nutrition and infections play major roles in determining morbidity and mortality in low-income countries and limit the wellness and productivity of young children and adolescents. However, the problem of over-nutrition is increasing significantly, becoming one of the emerging public health problems in developing countries like Ethiopia (FDRE, 2013; PRB, 2013; UNFPA, 2014; WHO, 2013).

Overweight and obesity are both chronic conditions that are the result of an energy imbalance over a period of time. An energy imbalance arises when the number of calories consumed is not equal to the number of calories used by the body. The cause of this energy imbalance can be due to a combination of several different factors and varies from one person to another (WHO, 2013). Globally, overweight is rapidly becoming one of the most important medical and public health problems of our times with the worrisome rise in the magnitude among the young population. According to recent statistics, the worldwide rates of overweight and obesity among children aged 5–17 years were 10% and 2–3.5% respectively (UNFPA, 2014; WHO, 2013, 2014). In Africa,

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despite deep-rooted under-nutrition, a study conducted in seven countries reported that 8.5% of children were overweight or obese, and this incidence is projected to reach 12.7% by 2020. In Ethiopia, there are no national level data, but a study conducted in Addis Ababa showed that 8.6% of adolescents were overweight (Alemu, Atnafu, Yitayal, & Yimam, 2014; Onis, Blossner, & Borghi, 2010).

Obesity is assigned as the fifth leading risk for deaths globally. It accounts for nearly three million deaths and 35.8 million of global disability adjusted life years (DALYs). Likewise, 44% of the diabetes, 23% of the ischemic heart disease and 7% to 41% of certain cancers worldwide were attributed to nutrition related non-communicable disease (EU, 2014; WHO, 2003, 2011).

Adolescent obesity is a multisystem disease with potentially devastating consequences that persist into adulthood. Additionally, the care of overweight is associated with increased health care costs to the society. The impact also extends to psychological well-being, and is associated with decreased self-esteem, lower educational attainment and higher rates of poverty (EU, 2014; Onis et al., 2010; WHO, 2003).

Adolescent health and nutrition are important in the overall social and economic development of a country, as adolescents are tomorrow's workforce and leaders. Studies evaluating under-nutrition have identified it as the most common public health problem. However, for some time the nutritional status of adolescents has been largely overlooked, as they were considered to be less vulnerable to malnutrition. Various studies in different countries showed that there is a high increment of overweight and obesity among young children and adolescents. Studies also showed that urban dwellers are more obese than those in rural areas due to relatively lower physical activity and more sedentary lifestyles in urban (Creber, Smeeth, Gilman, & Miranda, 2010; EU, 2014; Onis et al., 2010; WHO, 2003). Without early intervention, adolescent obesity can persist into adulthood and increase the risk of chronic disease. Findings from several studies also showed that the most effective ways to prevent the adverse consequences of obesity are the identification of predisposing factors and management of obesity, especially during the early life stages (FDRE, 2013; WHO, 2003, 2013). To address this evolving health concern, the problem of overweight/obesity was incorporated into the national nutrition program, and an initiative to encourage physical activity was launched in Ethiopia (EU, 2014; FDRE, 2013; WHO, 2011, 2013). However, these efforts are not specifically targeted to adolescents. Additionally, studies were conducted using growth reference that used formula fed children from a single ethnic group as a global standard. These references were inaccurate in estimating the magnitude of the problem and were of limited value in planning effective intervention strategies (FDRE, 2013). Therefore, this study was conducted to determine the magnitude and predictors of obesity and overweight among Jimma town school adolescents. It is envisioned that data from this study can be used to inform policy makers, educators and other stakeholders in designing early prevention of nutrition-related problems among school adolescents.

Methods

Study Area and Period

This study was conducted in Jimma town's schools from March 8 to April 1, 2015. Jimma town is located at 357 km to the south west of Addis Ababa. Jimma town is the fifth largest city in Ethiopia with an estimated population of about 195,228. According to the 2014 Jimma town education bureau report, the town has 16 governmental and 12 private schools. The total number of adolescent students attending schools is 20,886, of which 10.985 were female.

Sampling and Source Population

A school based cross-sectional study was conducted with adolescents attending school in Jimma town. The sample size was calculated by using a single population formula with 5% margin of error, 95% confidence interval and the proportion adolescent girls who were reported to be overweight (20.2%) in Hawassa town (Teshome, Singh, & Moges, 2013). By adding a 10% non-response rate and considering the design effect the total sample size projected for 546.

A multistage stage stratified random sampling technique was employed to select the study subjects. The schools were stratified into governmental and private schools according to their ownerships. At the first stage a total of eight schools, five government and three private schools, were selected by lottery from each. Secondly, one section per grade was selected by using a lottery method from each selected school. Then, the sample size was proportionally allocated for male and females. Finally, participants were selected by using computer generated simple random sampling techniques.

Data Collection and Analysis Methods

Interviewer-administered questionnaires were used to collect data. A qualitative food frequency questionnaire modified from WHO-STEP wise approach was used to gather information on the frequency of consumption of different food groups from each participant. This technique was considered to obtain qualitative descriptive data on typical consumption of foods and food groups over extended periods of time. Finally, data were collected to categorize participants based on detailed information regarding food choices and dietary diversity (WHO, 2003).

The Global Physical Activity Questionnaire (GPAQ) developed by WHO for physical activity surveillance was used to assess the physical activity pattern among school adolescents in three domains, including activity at work, travel to and from places, recreational activities and sedentary behavior through face-to-face interviews with the respondents. The activity level of the study participants was evaluated according to the WHO total physical activity. Vigorous exercise was defined as activity that causes large increases in respiratory or heart rate, such as carrying or lifting heavy loads, digging or construction work, running or jogging, high-intensity aerobic classes, and competitive full-field sports (soccer) or basketball (Bull, Maslin, & Armstrong, 2009).

The weight of each student was measured using the UNICEF Seca digital weighing scale (Germany) with light clothing and recorded to the nearest 0.1 kg. Height was measured using a portable Stadiometer (Seca, Germany) and recorded to the nearest 0.1 cm. During height measurement shoes, bulky clothing, pins and braids from the hair that could affect the measurement were removed. Height was measured with the head of participants at the Frankfurt plane, knees straight and the heels buttocks and the shoulder blades touching the vertical surface of the stadiometer.

Data were collected by fluent speaker of local languages (Afan Oromo and Amharic) after training them. Mock interviews and practical field exercise were practiced with data collectors to ensure the quality of the field operation. During data collection, the supervisors followed data collectors and performed quality checks with the principal investigator. The questionnaire was prepared in English and translated to Amharic and Afan Oromo, then back translated to English to ensure the consistency of the questions.

The data entry was done using Epi-Data version 3.1. The data were checked for missing values, outliers and analysed using SPSS version 20 and WHO Anthro-Plus (version 1.0.4.0). Descriptive statistics were used to examine the frequency distributions of selected study variables. Principal component analysis was used to assess household wealth status and components were developed using items with Eigen values greater than one. Finally, household wealth status was ranked as low, medium and high based up on variable factor scores. Overweight and obesity were determined using the WHO's age and gender specific growth reference for children aged 5–19 years (WHO, 2003). To allow for comparisons with other studies, overweight and obesity were also re-analysed using both CDC 2000 and IOTF criteria. A general chi-square for independence was used to investigate the association between