Appetite 73 (2014) 197–204

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Social, dietary and lifestyle factors associated with obesity among Bahraini adolescents

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ARTICLE INFO

Article history:
Received 8 December 2012
Received in revised form 25 October 2013
Accepted 1 November 2013
Available online 11 November 2013

Keywords:
Food habits
Social factors
Lifestyle
Obesity
Adolescents
Arab region

ABSTRACT

The main purpose of this study was to explore some of the social, dietary and lifestyle factors that could be related to the risk of obesity among adolescents in Bahrain. A multistage stratified method was used to select secondary school students (15–18 years old) from governmental schools in Bahrain. The total sample selected was 735 (339 males and 396 females). A pre-validated self-report questionnaire was used to obtain information on socio-demographics, food and the lifestyle habits of adolescents. Weight and height were taken and percentiles of Body Mass Index for age and gender were used to classify the adolescents as non-obese and obese (overweight and obese), using NHANES-1 growth standard. In general, the prevalence of overweight and obesity was 29.5% and 36.8% among males and females, respectively. The risk of obesity was not consistent among male and female adolescents. Mothers' education was found to be a risk factor for obesity among both males and females ($p = 0.0167$ and $p = 0.007$, respectively). Bringing food from home to school (odds ratio (OR) = 0.54, confidence interval (CI) 0.35–0.81) was protective factor for obesity among females but not among males. Fathers' education ($p = 0.0167$), rank among siblings ($p = 0.009$), place where breakfast is eaten ($p = 0.0398$), eating between lunch and dinner ($p = 0.0152$), fruit intake ($p = 0.042$), sweet intake ($p = 0.0192$), size of burger ($p = 0.002$) and hours of watching television per day ($p = 0.004$) were significantly associated with the risk of obesity among males, but not among females. Various social, dietary and lifestyle factors were found to contribute to obesity among adolescents in Bahrain. These factors should be considered in school health policy in the country.

Introduction

The prevalence of overweight and obesity in both children and adults in the Arab Gulf countries is reaching an alarming level (Ng, Zaghloul, Ali, Harrison, & Popkin, 2011). Obesity in childhood and adolescence is of great concern from the public health point of view as excess body fat increases the risk of several non-communicable diseases in adulthood such as coronary heart disease, type 2 diabetes, hypertension and some types of cancer (World Health Organization (WHO), 2000). These non-communicable diseases have become the main causes of morbidity and mortality in the Arab Gulf countries, creating a high economic and health burden for the health authorities in these countries (World Health Organization (WHO), 2012).

Since the cause of obesity is multifactorial, any programme to prevent and control obesity, especially among adolescents, should consider several social, health and lifestyle factors (Musaiger, 2011). Excluding Saudi Arabia, studies on factors associated with obesity among adolescents in the Arab Gulf region are very limited. These studies demonstrated that some dietary habits, lifestyle and socio-economic status were significantly associated with the occurrence of obesity among adolescents (Al-Hazzaa, Abahussain, Al-Sobayel, Qahwaji, & Musaiger, 2012; Bin Zaal, Musaiger, & D'Souza, 2009; Musaiger, 1994). In Bahrain, it was reported that the prevalence of overweight and obesity has increased remarkably during the past two decades. In 1992, the prevalence of overweight and obesity was 15.6% and 17.4% among adolescent boys and girls, respectively (Musaiger, Maher, Al-kri, & Mahdi, 1993). In 2008, the prevalence had reached 29.5%, and 36.8% for the corresponding genders respectively (Bader, Musaiger, Al-Roomi, & D'Souza, 2008). The Bahraini Ministry of Health is planning to reduce the rate of weight gain among school children through the implementation of various measures, such as promoting physical activity as well as healthy eating, and controlling the foods provided by school canteens (Ministry of Health, 2012). However, these measures will not be effective without understanding the actual factors associated with obesity among school children.

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http://dx.doi.org/10.1016/j.appet.2013.11.002

Studies on the causes of obesity among adolescents in Bahrain are few and outdated. In 1999, Gharib and Rasheed (2008) showed that hours of viewing television and physical inactivity were related to obesity among school children aged 12–18 years. Some studies were carried out thereafter to determine obesity (Bader, Musaiger, Al-Roomi, & D'Souza, 2008) or the dietary habits (Musaiger, Bader, Al-Roomi & D'Souza, 2011) of school children in Bahrain, but not to establish the factors associated with a high prevalence of obesity among this age group. Therefore, the aim of this research was to determine the social, dietary and lifestyle factors that may be associated with obesity among adolescents in Bahrain.

Methods

Sampling

This is a cross-sectional study of governmental secondary school children from all governorates of Bahrain. The sample size was calculated with assumption that 50% of school children have unhealthy dietary and lifestyle habits, with 90% confidence intervals and margin error of 0.03. A multistage stratified sampling technique was used to select the participants. Detailed information on the sampling selection has been described elsewhere (Musaiger, Bader, Al-Roomi & D'Souza, 2011). In short, Bahrain is divided into 5 governorates, in each of which secondary schools were selected proportionally by a simple random method. Classes at levels 10, 11 and 12 were then randomly selected from each school for both genders. The total sample obtained was 735 students aged 15–18 years old (339 males and 396 females). This paper adds to previous paper as it studied the risk of obesity with lifestyle, while the previous paper studied the gender differences in lifestyle habits. The data was gathered during school year 2006–2007.

Ethical permission

The permission to carry out this study was obtained from the Education and Development Research Committee in the Ministry of Education, Bahrain. Selected schools were informed by this committee, and in turn the schools informed the teachers, students and their parents, about the purpose and scope of the study.

The questionnaire

Detailed information on the processes undertaken to ensure the reliability and validity of the questionnaire have been described in a previous study (Musaiger, Bader, Al-Roomi & D'Souza, 2011). In general, the questionnaire was self-report and consisted of two parts (socio-demographic details and dietary and lifestyle habits). A public health specialist who supervised the data collection explained the purpose of the study and questionnaire items to the students before they started answering the questions. The variables were selected from literature review of similar studies in the Arab Gulf countries, as they are more relevant to Bahrain, due to very similar lifestyle and food habits.

Weight and height measurements

Weight and height were taken without shoes and with minimum clothes using standard procedures (Findanza, 1991). Weight was measured to the nearest 0.1 kg using an electronic portable scale (Sepa). The scale was calibrated with a known weight on each data collection occasion to ensure the accuracy of measurement. The height of the students was measured to the nearest 0.1 cm using a portable stadiometer attached to the weighing scale.

Determination of overweight and obesity

The body mass index (BMI) for age and gender was used to determine the obesity status of the adolescents. The participants were divided into non-obese, overweight and obese according to Percentiles of National Health and Nutrition Examination Survey-1 (NHANES-1) growth standard (Must, Dallal, & Dirtz, 1991), as follows: non-obese: <85th percentile of BMI, overweight: 85th–<95th percentile of BMI and obese: $\geqslant$95th percentile of BMI, for age and gender. For the purpose of analysis, the adolescents were divided into two categories: non-obese and obese (which included overweight and obese adolescents).

Data analysis

The data were analysed using the SPSS statistical package, version 15. Binary logistic regression was used. Chi square was calculated to determine the significance of the association between obesity status and dependable variables. The odds ratio (OR) and confidence interval (CI) were used to quantify the strength of the association between obesity risk and each of dependable variables.

Results

A comparison of the distribution of the socio-demographic characteristics between obese and non-obese adolescents is presented in Table 1. The analysis shows an age trend for obesity in both male and female groups. As the age increases, the prevalence of obesity also increases. Interestingly, in both males and females, obesity appears to be more closely related to the mother's education, compared with the father's education level. Among both genders, adolescents with highly-educated mothers were more likely to be obese (OR = 2.24 and 1.69, for males and females, respectively). Obesity was also related to the rank among siblings in the family. The difference was significant particularly when the obese child was a boy who ranked more than four among his siblings (OR = 0.41, CI 0.18–0.92).

The relationship between food habits and the weight status of the adolescents is shown in Table 2. It would appear that eating during school breaks (OR = 0.52), bringing food from home (OR = 0.54), were protective factors for obesity in females, while in males the significant protecting factors were eating breakfast at home (OR = 1), eating in-between breakfast and lunch (OR = 0.22) and eating between lunch and dinner (OR = 0.46). On the other hand, eating midnight snacks was not related to obesity in the adolescents.

The possible effect of the types of food items that are consumed by the adolescents and their obesity status is explored in Table 3. The frequency of consuming vegetables, dairy products, meat, fish, chicken, legumes, canned juices and chocolates was not significantly related to obesity. This pattern was similar in both males and females. Surprisingly the frequency of intake of soft drinks and eating sweets was negatively associated with obesity in males (OR = 0.5, CI 0.34–0.93, and OR = 0.55, CI 0.33–0.94, for those who consumed soft drinks and sweets more than four times a week, respectively). Males who eat fruit more than three times a week were at less risk of obesity (OR = 0.62, CI 0.99–2.66). However, this finding was not observed among females.

The association of the habits of eating fast food and obesity in male and female subjects is presented in Table 4. Eating fast food outside home and the size of the soft drinks accompanying the fast food meal were not significantly related to obesity in males and females since the eating habits of fast food items among obese and non-obese subjects were similar. In contrast to females, the size of the burger and the portion of French fries eaten as part of the fast food meal were significantly related to obesity in males, and