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High proportion of 6 to 18-year-old children and adolescents in the United Arab Emirates are not meeting dietary recommendations[☆]

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ARTICLE INFO

Article history:

Received 8 May 2012

Revised 23 March 2013

Accepted 29 March 2013

Keywords:

Children

Adolescents

Diet quality

Nutrient intakes

Emirati

United Arab Emirates

ABSTRACT

In the United Arab Emirates (UAE), overweight, obesity, and associated chronic diseases have recently emerged as major public health concerns among all age groups, including children and adolescents. We hypothesized that although energy needs might be met by the majority of Emirati children and adolescents, their diet quality and intakes of certain micronutrients may not meet recommendations. A cross-sectional design was used to assess dietary intakes of 253 children (6–10 years of age) and 276 adolescents (11–18 years of age) in the UAE. Trained dietitians collected a 24-hour food recall in the homes of the participants. Nutrient intakes were compared with the Dietary Reference Intakes, and food group consumption was compared with MyPyramid recommendations. Results showed that 9 to 13-year-old females consumed 206 kcal/d from candy and sweets and nearly 264 cal/d from sugar-sweetened beverages. The proportion of participants with percentage energy from saturated fat greater than the recommendation ranged from 27.6% (males 9–13 years) to 45.9% (males 6–8 years). Mean intakes of vitamins A, D, and E were lower than the Estimated Average Requirements for all the subgroups. Mean calcium intake was lower than recommendations for all age and sex subgroups. The proportions of participants whose intakes were less than the recommended number of servings from the food groups were substantial: more than 90% of each of the 6 subgroups for the milk group and 100% among 9 to 18-year-old males for vegetables. In conclusion, the results of this study indicate the need for interventions targeting 6 to 18-year-old children and adolescents in the UAE to improve their diet quality.

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Abbreviations: AI, Adequate Intake; AMDR, Acceptable Macronutrient Distribution Range; DRIs, Dietary Reference Intakes; EAR, Estimated Average Requirement; EER, Estimated Energy Requirement; Emirati, United Arab Emirates national or citizens of the United Arab Emirates; IOTF, International Obesity Task Force; MET, metabolic equivalents; PA, physical activity level; SE, standard error; UAE, United Arab Emirates.

[☆] This work was supported by the United Arab Emirates Environmental Agency, Abu Dhabi.

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1. Introduction

In the United Arab Emirates (UAE), overweight, obesity, and associated chronic diseases have recently emerged as major public health concerns among all age groups, including children and adolescents [1–6]. The rapid socioeconomic developments in the UAE in the past 4 decades and elsewhere in the Arab Gulf region have led to physically inactive lifestyles and dietary patterns that are higher in fat and calories [7,8]. A study involving 16,391 UAE national (Emirati) school children and adolescents [2] found that 10-year-old UAE boys and girls had 1.7 and 1.8 times, respectively, higher prevalence of obesity than the international reference values for childhood overweight and obesity [9]. Metabolic diseases related to obesity and low physical activity levels (PAs), such as type 2 diabetes [10,11], hypertension [12], and metabolic syndrome [13], are also emerging among adolescents in the UAE. Furthermore, previous studies in the UAE reported low PAs among Emirati children and adolescents [4,14,15].

Overweight and obesity during childhood and adolescence are of particular concern because pediatric obesity often tracks into adulthood obesity [16] and childhood obesity is a strong predictor of adulthood obesity and related diseases [17–22]. Identifying the role of diet as contributing factor to the high prevalence of overweight and obesity among the various sectors of the Emirati population is crucial in planning preventive measures to tackle diet-related chronic diseases in the country. To date, very few studies have examined the dietary habits of Emirati children and adolescents. Bin Zaal et al [23] reported associations between obesity and fast food consumption among females aged 12 to 17 years. Another study found that 60% of primary school children ate low-nutritive snacks (eg, chocolates and chips) daily compared to only 28% reporting daily consumption of vegetables [15]. Moreover, it has been previously reported based on data from the current study that 43.2% of Emirati girls and 38.2% of the boys 6 to 10 years old consumed more calories than needed [24]. Despite the perception that rapid dietary changes are major contributors to childhood obesity in the UAE, there remain gaps in the research related to diets of Emirati children and adolescents, specifically on energy intakes, nutrient adequacy, and diet quality.

The main objectives of this study were to assess energy intakes, nutrient intake adequacy, and diet quality of a nationally representative sample of 6 to 18-year-old Emirati children and adolescents. We hypothesized that although energy needs might be met by the majority of Emirati children and adolescents, their diet quality and intakes of certain micronutrients may not meet recommendations.

2. Methods and materials

2.1. Study design and participants

This cross-sectional study included 529 randomly selected children and adolescents (6–18 years) from 629 nationally representative Emirati households. Detailed sample selection has been previously described [24]. The sample included both

urban and rural Emirati households representing all the 7 emirates of the UAE and was selected using stratified random sampling from the 2005 and 2008 UAE national census.

Participants were grouped into 6 subpopulations—boys aged 6 to 8 years, girls aged 6 to 8 years, boys aged 9 to 13 years, girls aged 9 to 13 years, boys 14 to 18 years, and girls 14 to 18 years—based on sex and age group specific dietary recommendations [25]. Informed consent was obtained from the child's father or head of the household. The research protocol was approved by the UAE University Faculty of Medicine and the University of North Carolina-Chapel Hill Institutional Review Board.

2.2. Data collection

Details of the anthropometric and PA measurements have been previously published [24]. Trained interviewers using standardized protocols established for the research project [24] measured height and weight of the participants. The International Obesity Task Force (IOTF) cutoffs [9] were used to classify the participants into normal weight, overweight, or obese. Physical activity levels were assessed using the Short Version of the International Physical Activity Questionnaire [26]. To ensure relevance, examples of physical activity types that are more reflective of the Arabian Gulf region and appropriate for children and adolescents, such as ice-skating in the malls or at skating centers, were included in the questionnaire as in a previously reported project [24].

A single 24-hour food recall was used to obtain information of food intake during the previous day as previously described [24]. Mothers and/or other family members who were knowledgeable about the child's food intake were asked to provide types and quantities of food and beverages the child had consumed within the 24-hour period preceding the interview. Adolescents responded for themselves. Food models and household common measuring tools (eg, bowls, spoons, and cups) were used to assist in food portion estimations. To standardize the data collection process, dietitian interviewers were trained to use the US Department of Agriculture Multiple Pass Method for dietary interviews [27] and an adapted version of the Kuwait Food Instruction Booklet [28] for the UAE. In addition, dietitian field supervisors routinely conducted interview checks to ensure data quality. All interviews were conducted in the family homes of the participants.

2.3. Dietary data analysis

Trained dietitians coded and analyzed the 24-hour recalls using the ESHA Research Food Processor SQL and ESHAPort SQL software, which already contained a food composition database of more than 35,000 food items with data from more than 1500 sources, including the latest US Department of Agriculture Standard Reference database, items from the US individual consumption survey databases, manufacturer's data, data from fast food companies, and data from literature sources [29]. The study team updated this with detailed nutritional information from more than 100 composite Kuwaiti dishes that underwent nutritional analysis by the Kuwait Institute for Scientific Research [30–34] to provide data

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