Psychiatry Research 253 (2017) 64–70

Contents lists available at ScienceDirect

Psychiatry Research

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

Temporal changes in the prevalence of disordered eating behaviors among adolescents living in the metropolitan area of Rio de Janeiro, Brazil

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ARTICLE INFO

Keywords:
Binge eating
Strict dieting
Fasting
Compensatory behaviors
Low socioeconomic status

ABSTRACT

To investigate temporal changes in the prevalence of disordered eating behaviors among adolescents, and their association with socio demographic factors and overweight. Using probability sampling, two population-based cross-sectional surveys were conducted: one in 2005 (n=511) and the other in 2010 (n=314). The frequency of disordered eating behaviors (binge eating, strict dieting or fasting and compensatory behaviors) was investigated using a self-administered questionnaire. The presence of binge eating increased by 18.4% in the 5 years between the two surveys. In 2005, girls were 1.95 times more likely to engage in strict dieting or fasting than boys, and this difference increased to 7.02 times in 2010. Overweight adolescents were 2.29 times more likely to undertake strict dieting than non-overweight adolescents in 2005 and 3.65 times more likely to do so in 2010. No significant associations were found for compensatory behaviors. A pronounced increase in the prevalence of binge eating was observed, and girls and overweight adolescents were more likely to engage in strict dieting or fasting.

1. Introduction

Eating disorders are psychiatric conditions that may be associated with morbidity and mortality and result in both socioemotional impairment as well as damage to the metabolic and endocrine systems (AAP, 2003). Eating disorders have a multifactorial etiology characterized by disturbed eating behaviors, and excessive preoccupation with weight and body shape (APA, 2006). According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (APA, 2013), the types of eating disorders are anorexia nervosa, bulimia nervosa, binge eating, and other specified feeding or eating disorders (OSFED).

The disordered eating behaviors, namely, strict dieting or fasting, binge eating, and compensatory behaviors (laxative and diuretic misuse and self-induced vomiting), are more frequently observed than full syndrome of eating disorders (Neumark-Sztainer et al., 2011; Leal et al., 2013). Although they can be present at all ages (Hay et al., 2008; Mitchison et al., 2014), they are more frequent during adolescence (Smink et al., 2012; Ferreira et al., 2013).

Adolescents are more vulnerable to specific problems such as dissatisfaction with body image, especially body weight, and may develop inadequate eating behaviors with the aim of achieving an idealized body image, which increases the risk of developing eating disorders (Galindo and Carvalho, 2007). This dissatisfaction is more pronounced in the modern society, where in on one hand, the prevalence of overweight and obesity is increasing and on the other hand, there is social pressure for individuals to remain thin as a form of achieving success and personal and professional accomplishment (Oliveira et al., 2003).

The increase in the prevalence of obesity in young people has been observed worldwide (WHO, 2013). In Brazil, the number of overweight adolescents increased by approximately 15% points over the last three decades, with the highest increase occurring between 2003 and 2008 (IBGE, 2010). Therefore, this increase could be associated with an increase in disordered eating behaviors in a short period of time. Other countries have also reported an increase in the prevalence of disordered eating behaviors (Hay et al., 2008; Neumark-Sztainer et al., 2011; Mitchison et al., 2014; Nakai et al., 2014), however in Brazil no information regarding changes in behaviors associated with eating disorders is available. Studies in Brazil have focused exclusively on increasing excess weight, without information about changes in disordered eating behaviors.

In 2005, a cross-sectional survey performed in the municipality of Rio de Janeiro, where the population predominantly belongs to the lower social classes, showed that 16.8% of adolescents were overweight and 7.2% were obese. Furthermore, 20% of adolescents engaged in binge eating, 3.3% in compensatory behaviors engaged in to compen-

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http://dx.doi.org/10.1016/j.psychres.2017.03.042
Received 13 July 2016; Received in revised form 26 January 2017; Accepted 21 March 2017
Available online 21 March 2017

sate for potential weight gain resulting from binge eating (e.g., self-induced vomiting and use of laxatives or diuretics), and 18.9% in strict dieting. Binge eating and strict dieting were more prevalent in overweight adolescents (Ferreira et al., 2013). In 2010, another study similar to the 2005 study was held in the same city, which evaluated the temporal changes in these behaviors. The results of the study may contribute to future interventions for obesity prevention, as well as prevention of disordered eating behaviors, which can pose a serious health risk to adolescents.

The present study aimed at investigating whether temporal changes occurred in the prevalence of disordered eating behaviors in adolescents over a period of 5 years, and determining the association of these behaviors with sociodemographic variables and overweight.

2. Methods

2.1. Population and sampling

The present study used data from two population-based cross-sectional surveys, one conducted in 2005 and the other, in 2010 in the second district of the municipality of Duque de Caxias, state of Rio de Janeiro. The chosen variables were investigated by household interviews.

The surveys were performed using probability samples of 1125 households, that were selected in 3 stages (census sector, household, and individual). In both 2005 and 2010, sample size was determined on the basis of an estimated prevalence of extreme poverty of 14.5%, with a relative maximum error of 5%. More details about the sampling criteria were described in a previous study (Salles-Costa et al., 2008).

The second survey was performed in 2010, using inverse cluster sampling (census sector, households, and individuals) (Haldane, 1945). During the first selection stage, the same 75 census sectors were sampled using a new screening to update the age groups. Households with children were then randomly selected (maximum 8 households per sector), followed by random selection of households with adults and/or adolescents, until a total of 15 households per census sector (second selection stage) were selected. During the third selection stage, one individual from each group (child, adolescent, or adult) was selected from each households.

For the present study, data from adolescents aged 12–18.9 years were considered. For the two surveys, eligibility criteria included absence of physical deficiencies that would prevent the performance of anthropometric measurements and application of the questionnaires, and absence of pregnancy. In 2005, 573 adolescents residing in households randomly selected were invited to participate in the study, however 561 eligible adolescents were initially interviewed (response rate, 97.9%). Fifty adolescents were excluded due to inconsistencies in answering the questionnaires; the data from 511 adolescents were analyzed (91.0% of questionnaire respondents). In 2010, 347 adolescents were invited to participate in the study, however 314 eligible adolescents were interviewed (response rate, 90.5%); their data were then analyzed.

Considering an estimated prevalence of approximately 20% for disordered eating behaviors (Dunker and Philippi, 2003; Sampei et al., 2009; Ferreira et al., 2013), 95% confidence interval, with 5% absolute precision for 2005 and 4% absolute precision for 2010, and the design effect for cluster sampling, the used sample sizes of 511 and 314 allowed estimation of the prevalence of disordered eating behaviors for the adolescent population evaluated.

2.2. Data collection

In both the 2005 and 2010 surveys, data collection was performed by a team of trained interviewers. Household interviews and measurements were performed following the signing of a free and informed consent form by the household head, and only willing adolescents participated. The study was approved by the Research Ethical Council of the Institute of Social Medicine of the State University of Rio de Janeiro.

The questions used to identify disordered eating behaviors were adapted from the interview script by Hay (1998), which was developed for analyzing the prevalence of these behaviors in an Australian community; this interview script had previously shown good reproducibility in a study including students from public schools from another municipality of Rio de Janeiro (Ferreira and Veiga, 2008b). The questions were aimed at identifying the occurrence of the following behaviors over the previous 6 months: binge eating, compensatory behaviors (laxative and diuretic misuse, and self-induced vomiting), and strict dieting or fasting to control weight.

Binge eating was assessed based on the definition proposed in the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (APA, 1994) using the following: “Have you ever eaten an amount of food greater than that most people would eat in a period of two hours or less? If so, did you feel unable to stop eating or to control how much you were eating?” In order to determine whether respondents engaged in strict dieting or fasting and purging behaviors at least once per week, respondents were asked the following question: “Over the last six months, did you regularly use any methods to control your weight such as laxatives, diuretics, self-induced vomiting, or very strict diets, or fasting?” In the 2005 study, the response options were yes and no; in the 2010 study for the same question, the response options were as follows: never, less than once a week, once a week and two or more times a week. For the purpose of comparison of the two studies, the option of “never” in the 2010 study was considered as the option of “no” in the 2005 study; the other options in the 2010 study were considered as the option of “yes” in the 2005 study.

Weight and height were measured in both surveys, and measurement were taken with the participants barefoot and dressed in light clothing. Weight was measured using an electronic scale (Kratos PPS®; São Paulo, Brazil), with a 150 kg capacity and 50 g readability. Height was measured twice to the nearest 0.1 cm using a portable stadiometer (Leicester®; United Kingdom), with a maximum variation of 0.5 cm between twomeasurements, and the average was calculated. Body mass index (BMI) was calculated using the following equation: BMI = weight (Kg)/height (m^2). Adequacy of weight was classified according to the sex- and age- specific BMI cut-off points proposed by the World Health Organization (low weight: Z-score < -2; adequate weight: Z-score ≥ -2 and ≤ 1; overweight: Z-score > 1 and ≤ 2; and obesity: Z-score > 2) (de Onis et al., 2007).

The sociodemographic factors evaluated were gender, age, and skin color (black/brown and white). The monthly family income per capita (total household income divided by the number of household members) was used as a socioeconomic indicator and was expressed as multiples of the minimum wage: R$300.00 in 2005 (US $111.4 in January 2005) and R$510.00 in 2010 (US $286.8 in January 2010).

2.3. Data analysis

Data from the two surveys were entered into CSPro 2.5 version (Washington DC, USA) (2005survey) and CSPro 3.3 (Washington DC, USA) version (2010 survey), with restriction mechanism of improbable data entry, and were analyzed using the SPSS 19.0 version software (Chicago, IL, USA). The sampling weight of each individual (calculated by the inverse of the probability of selection, i.e., sample weight =1 - probability of selection of each individual in the sample) was used to expand the sample, and the design effect for cluster sampling was taken into account for all analyses (Beckett et al., 1992; Sousa and Silva, 2003), using the Complex Sample procedure from SPSS.

A descriptive analysis was performed considering the frequencies and 95% confidence intervals (95% CI) for the variables investigated for the two surveys (2005 and 2010): presence or absence of binge eating, compensatory behaviors (self-induced vomiting, use of laxatives