Annals of Epidemiology 25 (2015) 753–759

Contents lists available at ScienceDirect

Annals of Epidemiology

journal homepage: www.annalsofepidemiology.org

Original article

The role of underestimating body size for self-esteem and self-efficacy among grade five children in Canada

Katerina Maximova PhD [a,*], Mohammad K.A. Khan MSc [a], S. Bryn Austin ScD [b,c,d], Sara F.L. Kirk PhD [e], Paul J. Veugelers PhD [a]

[a] School of Public Health, University of Alberta, Edmonton, Canada
[b] Division of Adolescent and Young Adult Medicine, Boston Children's Hospital, Boston, MA
[c] Department of Pediatrics, Harvard Medical School, Boston, MA
[d] Department of Social and Behavioral Sciences, Harvard School of Public Health, Boston, MA
[e] School of Health and Human Performance, Dalhousie University, Halifax, Canada

ARTICLE INFO

Article history:
Received 20 March 2015
Accepted 13 July 2015
Available online 30 July 2015

Keywords:
Body size perceptions
Self-esteem
Self-efficacy
Children
Prevention
Public health

ABSTRACT

Purpose: Underestimating body size hinders healthy behavior modification needed to prevent obesity. However, initiatives to improve body size misperceptions may have detrimental consequences on self-esteem and self-efficacy.
Methods: Using sex-specific multiple mixed-effect logistic regression models, we examined the association of underestimating versus accurate body size perceptions with self-esteem and self-efficacy in a provincially representative sample of 5075 grade five school children. Body size perceptions were defined as the standardized difference between the body mass index (BMI, from measured height and weight) and self-perceived body size (Stunkard body rating scale). Self-esteem and self-efficacy for physical activity and healthy eating were self-reported.
Results: Most of overweight boys and girls (91% and 83%); and most of obese boys and girls (93% and 90%) underestimated body size. Underestimating weight was associated with greater self-efficacy for physical activity and healthy eating among normal-weight children (odds ratio: 1.9 and 1.6 for boys, 1.5 and 1.4 for girls) and greater self-esteem among overweight and obese children (odds ratio: 2.0 and 6.2 for boys, 2.0 and 3.4 for girls).
Conclusions: Results highlight the importance of developing optimal intervention strategies as part of targeted obesity prevention efforts that de-emphasize the focus on body weight, while improving body size perceptions.

Introduction

The prevalence of overweight and obese children in developed countries has more than doubled since 1980. In Canada, there are nearly 2 million (31%) children aged 5 to 17 years classified as overweight or obese [1]. Despite these trends and associated health risks [2,3], an estimated 70% to 80% of children underestimate their weight, and this discrepancy is particularly common among overweight children [4–6]. Among obese children aged 7 to 10 years presenting for treatment at a hospital-based weight management program, nearly 40% did not perceive themselves as obese (28% and 11% considered themselves to be "average weight" and "underweight", respectively) [7]. Previous studies have found child's younger age, lower socioeconomic status, living in rural areas, Hispanic background, and increased peer weight to be associated with less accurate perceptions of overweight [8–11]. Body size perceptions also appear to be gender patterned. Studies report that normal-weight girls perceive their body size more accurately than boys [12–16],, and overweight and/or obese girls underestimate their body size more than boys [6]. However, other studies do not replicate this gender difference in body size misperceptions [4]. Body size misperceptions have also been linked with engaging in unhealthy weight-control behaviors (e.g., meal skipping, excessive dietary restrictions, use of laxatives, and diet pills, self-induced vomiting, and binge eating) among overweight and obese children [5,14,17–21]. For example, inaccurate perceptions have been

The authors have indicated they have no potential conflicts of interest to disclose.

* Corresponding author. School of Public Health, University of Alberta, 3-268 Edmonton Clinic Health Academy, Edmonton, AB T6G 2T4, Canada. Tel: +1-780-248-2076; fax: +1-780-492-8934.
E-mail address: katerina.maximova@ualberta.ca (K. Maximova).

http://dx.doi.org/10.1016/j.annepidem.2015.07.009
1047-2797/

reported to be associated with exercising for less than 60 minutes five times per week, and consuming food with more calories, including less than five servings of fruits and vegetables [14,17] nor having taken recent action to lose weight [22]. In fact, perceiving oneself as overweight, rather than objective weight status, was the strongest predictor of the intention to lose weight [17]. Targeting body size awareness has been suggested as an important leverage point for interventions designed to prevent overweight or reduce obesity [7,23,24], on the premise that it promotes the adoption and maintenance of healthy behaviors [25]. However, opponents of this strategy are concerned that such interventions may have detrimental consequences, such as low self-esteem, self-efficacy, and other psychological sequelae related to excess weight (e.g., anxiety, depression) [26].

The ability to make and maintain healthy behavior changes may be compromised by poor psychosocial health, particularly lower self-efficacy [27]. Yet, overweight has been linked prospectively with compromised psychosocial health among children [28]. Overweight and/or obese children, particularly girls, are found to be at high risk for depression and anxiety through psychosocial processes involving weight-related stigmatization, social isolation, and body dissatisfaction [12,20]. However, the role of underestimating excess weight for psychosocial health in children has not been previously considered. Before targeting inaccurate body size perceptions to improve the effectiveness of interventions to prevent overweight and reduce obesity in children, we need to know whether underestimating excess weight may be protective against poor self-esteem and self-efficacy among children, and whether this relationship varies by weight status. Moreover, we need to consider gender dynamics because both inaccurate weight perceptions [11,12,14] and the negative impact of overweight and/or obesity on psychosocial health in children [29] are gender patterned. In the present study, we examined the importance of underestimating weight versus accurate weight perceptions for self-esteem and self-efficacy in a large provincially representative sample of grade five school children in Nova Scotia, Canada.

Material and methods

Study population

Children's Lifestyle And School-performance Study (CLASS) II is a large, serial cross-sectional, provincially representative study designed to evaluate the nutrition and dietary behavior, physical activity, mental health, and school performance of grade five students in Nova Scotia, Canada in 2011. The vast majority of the grade five-student population in Nova Scotia attends public schools; all public schools were invited to participate. Of 286 schools, 269 (94.1%) agreed to participate; and 5913 parents provided their consent, resulting in an average response rate of 67.4% per school. Children were on average aged 11 years (range, 9 to 13 years). Students completed questionnaires administered at school. Detailed protocols which describe all data collection procedures, including questionnaires, are available online at http://www.nsclass.ca. The Health Research Ethics Board at the University of Alberta and Dalhousie University approved the CLASS study protocol and data analyses of the present study.

Measures

Outcomes

Self-esteem. Self-esteem was assessed using a three-point scale consisting of 10 items (four positive and six negative), where children were asked to choose an answer that best describes them [30–32]. Positive descriptors were as follows: "My future looks good to me"; "I like the way I look"; "I like myself"; and "If I have problems there is someone I trust to go to for advice". Negative descriptors were as follows: "I feel like I do not have any friends"; "I feel unhappy or sad"; "I worry a lot"; "I am in trouble with my teacher(s)"; "I have trouble paying attention"; and "I have trouble enjoying myself". Response categories included the following: "never or almost never", "sometimes", and "often or almost always" and were each assigned a score from 1 to 3. Negative descriptors were reverse scored. An aggregate measure of self-esteem was created by summing scores across the 10 items to create a scale ranging from 10 to 30, with higher values indicating greater self-esteem [33]. The scale appears to be internally consistent (Cronbach alpha = 0.70). Factor analysis with varimax rotation of these items extracted two factors (one including all the positive descriptors and another including all the negative descriptors) with loadings greater than 0.60 for each, and each accounted for more than 40% of the total variance.

Self-efficacy. To assess self-efficacy for healthy eating and self-efficacy for physical activity, students were asked nine questions as follows: "If you wanted to, how confident are you that you could…": be physically active no matter how tired you may be; be physically active even if you have a lot of homework; ask your parent or other adult to play a physical activity or a sport with you; and be physically active for at least 60 minutes on 5 more days per week; eat healthy food if at school; choose a healthy snack between school and dinner time; eat healthy food if you are alone at home; choose a healthy snack when you are bored; and choose a healthy snack when you are sad [34,35]. Response categories included "not at all confident", "a little bit confident", "quite confident", and "very confident' and were each assigned a score from 1 to 4. An aggregate measure of self-efficacy was created by summing separately scores (5 for healthy eating and 4 for physical activity) across the items to create a scale ranging from 4 to 16 for physical activity and 5 to 20 for healthy eating, with higher values indicating greater self-efficacy. The internal consistency of the scales was acceptable (Cronbach alpha, 0.69 and 0.84, respectively). Factor analysis with varimax rotation of the items for physical activity and healthy eating analyzed separately, extracted one factor with loadings more than 0.60 and more than 0.70, respectively, and accounted for 52% and 60% of the total variance.

Exposure

Inaccurate body size perceptions. Weight status was based on measured height and weight. Height was measured to the nearest 0.1 cm without shoes using a stadiometer and weight to the nearest 0.1 kg using a calibrated digital scale. Body mass index (BMI) was calculated to the nearest 0.01 kg/m^2. BMI z scores and weight status categories (underweight, normal weight, overweight, and obese) were created according to the World Health Organization age-specific and gender-specific reference values [36].

Perceived body size was assessed using the Stunkard body rating scale, a visual analog scale consisting of seven sex-specific drawings of the same height, with weight ranging from underweight to obese [37]. Participants selected the drawing they perceived best corresponded to their current appearance. Perceived body size categories (underweight, normal weight, overweight, and obese) corresponded to drawings 1–2; 3–4; 5; and 6–7, respectively [38–40].

Two body size perceptions categories (underestimate vs. accurate) were created and treated as a categorical variable in regression analyses, with the latter as a reference category. Specifically, normal weight, overweight, and obese children who selected silhouettes 1–2; 1–4; and 1–5, respectively, were classified as underestimating body size (weight status > perceived body size). Normal weight, overweight, and obese children who selected silhouettes 3–4; 5;