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Patterns and correlates of adolescent weight change in residential care

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ABSTRACT

Adolescents entering residential care have high rates of clinical weight problems; however, some aspects of the residential setting may be conducive to healthy weight management. This study aimed to examine the change in adolescent weight status from intake to discharge among a large sample of youth in a residential care program ($N = 1195$). Although weight management was not a specific target of the program, adolescents were more likely to move to a healthier weight status than a less healthy one by the end of the placement. Adolescents who were obese at the time of intake ($n = 274$) showed an average decrease of .21 zBMI units, and approximately a quarter of this group moved to a healthier weight category at discharge. These changes compare favorably to outcomes for existing treatments for adolescent weight problems and may represent clinically-meaningful improvements in weight status for many youth. Further, a decrease in psychotropic medication prescriptions was significantly associated with weight loss for adolescents who were overweight at intake. The implications of these findings, including the possible benefits of effective weight management in residential settings and the potential value of highly structured environments in promoting healthy weight among vulnerable adolescents, are discussed.

1. Introduction

Rates of obesity among adolescents in residential care facilities are higher than those in the general population, with estimates of overweight and obesity as high as 46.6% in residential settings (Chipp, Corey, Johnson, & Brems, 2010) compared to 32% in the general population (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Youth in residential care also have a high prevalence of physical and mental health issues (Nelson et al., 2011). As such, high rates of overweight and obesity are concerning as excess weight exacerbates the risk of morbidity and mortality, making youth in residential settings an especially at-risk population (Deckelbaum & Williams, 2001; Dietz & Gortmaker, 2001). Specifically, obesity in childhood and adolescence often continues into adulthood and is associated with chronic illnesses such as cardiovascular disease, Type II diabetes, and cancer (Dietz & Gortmaker, 2001; Maffeis & Tato, 2001). Examining the impact that residential care has on youth weight, therefore, is an important factor in fully understanding their psychological and physical health outcomes following treatment.

Adolescent weight problems have proven exceptionally difficult to treat in the general pediatric population, with even well-designed interventions showing limited effectiveness in reducing BMI at the end of treatment and at follow-up (e.g., Gortmaker et al., 1999; Sallis et al., 2003; Singh, Chin, Paw, Brug, & Van Mechelen, 2009; Steele et al., 2012). Obesity interventions for adolescents may be unsuccessful for a variety reasons, including the treatment setting, problems with treatment adherence, and psychosocial factors. First, the clinic or school setting in which many interventions are applied may not generalize to adolescents' home and everyday lives, as eating behaviors of youth are influenced by various factors at the individual, social, and environmental levels (Story, Neumark-Sztainer, & French, 2002). Second, structured interviews conducted by Murtagh, Dixey, and Rudolf (2006) revealed that youth identified multiple barriers to weight loss, including having to make unappealing sacrifices (e.g., giving up fatty foods), a lack of parental support, negative peer influence, and the delayed gratification of weight loss. Third, evidence suggests that adolescents associate unhealthy food with their friends and activities outside of the home, where adolescents tend to spend a great deal of time (Shepherd et al., 2006). Lastly, given the convenience, speed, cost, and taste appeal of fast food, adolescents find fast food to be a practical choice (Shepherd et al., 2006). It is also important to consider the developmental changes that occur during adolescence, a period in which youth strive for autonomy. This attempt for independence may be expressed by eating in a manner that is inconsistent with parent wishes (i.e., unhealthy, junk food; Hill, Oliver, & Rogers, 1992).

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Given the complex context in which adolescent weight management is imbedded, the minimal effects attributable to typical adolescent obesity interventions are understandable. Effecting substantial lifestyle change can be difficult and interventions that involve intensive environmental change and support for healthy behaviors may be needed to produce significant benefits. For the many children entering residential care, however, the structured lifestyle of such settings and their emphasis on treating the "whole child" (Casey et al., 2010) may promote healthy weight, even though weight loss is not a specific target of treatment. Residential facilities, such as those that follow the Teaching Family model (Wolf et al., 1976), adhere to an ecological approach to treatment, focusing on social, academic, emotional, and psychological aspects of youths' lives (e.g., Boys Town National Research Institute, 2011). Special emphasis is also placed on the physical health of youth in residential settings, as evidenced by up-to-date medical care, education in healthy behaviors (e.g., regular meals, sleep schedules, and physical activity), and healthy modeling within family homes (e.g., Boys Town National Research Institute, 2011; James, 2011). Moreover, the impact of the structured environment of residential settings on adolescent weight may be enhanced by other factors associated with weight, such as the reduction of psychotropic medications and treatment of psychosocial concerns. Residential youth often enter care on a number of psychotropic medications (Connor, Ozbayrak, Harrison, & Melloni, 1998), many of which are known to be related to weight gain and obesity (e.g., antipsychotic, antidepressant, and mood-stabilizer medications; McCloughen & Foster, 2011; Nihalani, Schwartz, Siddiqui, & Megna, 2011). Reducing the number and dosages of these psychotropic medications upon admittance into care may play a role in weight management. Moreover, addressing the myriad of mental and psychosocial concerns present in these youth (e.g., depression, ADHD, conduct disorders, impulsivity) may further enhance weight management effects of residential care by improving children's ability to make healthy choices (Connor, Doerfler, Toscano, Volungis, & Steingard, 2004).

To our knowledge, research has not yet examined the weight trajectories of youth in residential care, despite the high prevalence of overweight among these children (Chipp et al., 2010). Moreover, the physical health of many children in residential settings is significantly compromised, with more than one in three youth having a medical diagnosis at intake and rates of asthma being particularly high (Nelson et al., 2011). Given that research has demonstrated marked improvement in many physical health issues, especially asthma symptoms, after weight loss (Eneli, Skybo, & Camargo, 2008), examination of weight trajectories in residential youth is warranted. Lastly, gaining a greater understanding of children's weight changes in residential care settings will help inform the ongoing development of intake and discharge screenings and the monitoring of specific program components (e.g., meals, physical activity, sleep schedules).

The purpose of the current study, therefore, is to explore patterns and potential predictors of weight change across time for youth in residential care. Consistent with previous research in residential care populations, it was hypothesized that youth entering treatment would present with high rates of overweight and obesity. Due to the healthy structure commonly built into residential care (i.e., regular physical activity, monitored diet, and consistent sleep), in addition to the emphasis on treating the "whole child," it was also hypothesized that overweight and obese youth would lose weight while in care. Finally, demographics (i.e., age at admission, sex, ethnicity) and changes in psychotropic medications associated with weight gain were explored as potential predictors of weight change.

2. Method

2.1. Participants and procedures

Participants included 1195 youth entering Boys Town Nebraska Family Home Program from 2000 to 2009. The Family Home Program is a residential care facility for youth requiring out-of-home placement, often due to emotional and behavioral problems. The program serves youth referred from across the United States using a modified treatment family home model in which youth reside in homes with family teachers. Comprehensive behavioral, educational, and medical services are provided to all youth on campus. To allow enough time to examine weight change across care, only youth in care for at least six months were included. The six month requirement is consistent with numerous pediatric obesity intervention studies with a duration of at least six months (e.g., Epstein, Paluch, Beecher, & Roemmich, 2008; Epstein, Paluch, Gordy, & Dorn, 2000; Epstein, Roemmich, Stein, Paluch, & Kilanowski, 2005; Nova, Russo, & Sala, 2001; Rodearmel et al., 2007) and with reviews using six months as a minimum duration for inclusion (e.g., Oude Luttikuis et al., 2009). Given the challenges in addressing adolescent weight problems, this study examined youth in the difficult-to-treat age range of 12 to 19 years old ($M = 15.50$ years, $SD = 1.39$). Of the 1255 youth with data in the Boys Town National Database, 1195 (95.2%) fell within this age range. The final sample was ethnically diverse with 51.6% European American, 22.7% African American, 10.2% Hispanic American, 7% Native American, 1.0% Asian/Pacific Islander, and 7.6% multi-racial. Approximately 61% of the sample was male. Family household income data was only available for a subset of the sample ($n = 161$), with 22.4% reporting under $15,000, 48.5% reporting $15,000–$40,000, and 29.2% reporting over $40,000.

Data for the current study were drawn from the Boys Town National Database, a large systematic record of key psychosocial and health data maintained on youth in the Boys Town system. At intake into residential care, demographic (i.e., age, sex, ethnicity) and psychotropic medication prescription information was collected. Anthropometric measurements (i.e., height, weight) were also taken from each youth during an intake medical evaluation. At discharge from care, prescription medication information and anthropometric measurements were again obtained. Information collected from youth at intake and discharge was systematically entered into the Boys Town National Database by Boys Town staff. All procedures were approved by the Boys Town Institutional Review Board.

2.2. Measures

2.2.1. BMI-for-age

The body mass index (BMI) adjusted for age and sex for each youth was calculated at intake and discharge using anthropometric measurements taken at each time point. BMI-for-age calculations were based on the 2000 Center for Disease Control and Prevention (CDC) growth charts for children birth to 20 years of age. Researchers used a statistical program provided by the CDC (CDC, 2011) to convert anthropometric data into BMI-for-age percentile scores and standardized z-scores (zBMI) using a modified LMS method (Kuczmarski et al., 2002). Any BMI-for-age observations that were identified as biologically implausible values (i.e., ±5 standard deviations from mean) according to CDC fixed exclusion criteria were excluded from analyses (4 youth in this sample were excluded on this basis). BMI-for-age percentiles were then used to place youth into weight categories based on CDC guidelines. Weight categories include "underweight" (<5th percentile), "healthy weight" (5th–84th percentile), "overweight" (85th–94th percentile), and "obese" (≥95th percentile).

2.2.2. Medications associated with weight gain

All medication prescription information was obtained from records at intake and discharge. Youth often enter residential care with multiple psychotropic medication prescriptions (Griffith et al., 2010), many of which have been associated with weight gain (McCloughen & Foster, 2011; Nihalani et al., 2011). Throughout placement at Boys Town, psychotropic medication prescriptions are frequently decreased, which could potentially influence weight change across care. Therefore, psychotropic medication prescriptions associated with weight