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ORIGINAL ARTICLE

Preventing weight-related problems among adolescent girls: A cluster randomized trial comparing the Brazilian ‘New Moves’ program versus observation

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Summary

Purpose: To conduct a cluster randomized controlled trial comparing the Brazilian version of the New Moves program (NMP) versus observation among Brazilian adolescent girls.

Methods: Ten schools were randomly allocated to the Brazilian NMP or the observation arm. Study participants included 12–14-year-old girls. Recruitment occurred between February 2014 and March 2015. The NMP included sports, nutritional support, motivational interviews, collective lunch, and parental information materials. Our main outcome was the Body Shape Questionnaire (BSQ). Secondary outcomes included the Rosenberg Self-Esteem Scale and the Unhealthy Weight-Control Behaviors Index, as well as body mass index. Study results were evaluated through generalized estimating equations.

Results: A total of 270 adolescents participated in the study. At baseline, mean age was 13.4 years, and average BMI was 21.4. The intervention did not result in any statistically significant differences between the NMP and the observation arm, including BSQ (predicted means of 64.33 — IC 95% 59.2–69.47 vs. 62.02 — IC 95% 56.63–67.4), respectively) and our secondary outcomes. Adherence was low during the intervention (32.9%) and maintenance (19.1%) phases of the program.

Abbreviations: BMI, body mass index(BMI); BSQ, Body Shape Questionnaire; ED, eating disorders; NMP, New Moves program; RSES, Rosenberg Self-Esteem Scale; SES, socio-economic status; UWCB, Unhealthy Weight-Control Behaviors.

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Conclusion: The New Moves program did not lead to significant changes in our measured outcomes. Future studies should investigate whether changes might occur when comprehensive behavioral programs are sustained over longer periods while also being customized to local population characteristics.

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Introduction

Obesity like other weight-related problems is a major challenge to public health given its epidemic status in children and adolescents, and its association with increased morbimortality, psychosocial suffering, and high costs. Its prevalence has increased considerably in developing countries, where approximately 13% of all individuals under the age of 18 are either overweight or obese [1,2]. In Brazil, 35% of children and 20% of all adolescents are above normal weight [3].

The increasing rates of obesity at an early age are likely a consequence of changes in dietary and physical activity patterns in modern societies [4]. Obesity among young individuals is not only a risk factor for obesity later in life, but also leads to many typical adult conditions such as hypertension and diabetes [5]. Besides being exposed to many physical illnesses, obese children and adolescents often present emotional distress and low self-esteem since they encounter prejudice at school [6]. Moreover, while attempting to lose or control their weight, teenagers tend to develop self-image dissatisfaction and unhealthy weight control behaviors (e.g skipping meals, fasting, taking diet pills or smoking cigarettes, vomiting) [7,8]. These behaviors are risk factors for weight gain and the development of eating disorders (EDs), common among obese and non-obese individuals [9,10]. Although EDs present a lower prevalence when compared to obesity [11], they are becoming more frequent in developing countries [12,13]. This is of concern considering the association between EDs and increased mortality rates [14].

Programs focusing exclusively on weight control present many challenges in the prevention and/or treatment of obesity. First, this approach is ineffective, with long-term weight loss maintenance not being consistently achieved by overweight and obese individuals [15]. Second, an excessive concern with weight leads to an increased risk of eating

disorders, cyclic weight loss and gain, and stigma [16]. In contrast, integrated lifestyle interventions demonstrate promising results in the management of weight-related problems and EDs [17]. Such programs focus not only on keeping weight within recommended standards but also on stimulating healthy eating behaviors and improving self-image [18,19]. This methodology is also consistent with the complex causal mechanisms behind obesity, which involve the interaction between genetic, behavioral and environmental factors [17,20].

School-based programs are considered efficient for weight-related problems as they can simultaneously reach a large number of individuals [21,22]. Also, their connection to an educational environment has the potential to deliver a more convincing argument, ultimately benefiting from the social influence provided by teachers and peer students. However, even in such a favorable environment, school-based interventions have demonstrated inconsistent results in improving weight, body satisfaction, and nutrition quality [23,24]. Among these interventions, the *New Moves* program (NMP) has demonstrated positive outcomes amidst female adolescents in the United States. NMP did not lead to significant changes among girls in relation to body weight and percent body fat, but improvements were observed for sedentary activity, eating patterns, unhealthy weight control behaviors, and body/self-image.

The NMP incorporates principles learned in previous research in the fields of eating disorders and obesity, having demonstrated a positive impact on eating patterns, levels of physical activity, and participants' self-image [25]. Of importance, the program does not focus on weight loss as an isolated goal but targets behavioral changes associated with the long-term maintenance of a healthy weight [7]. Bandura's Social Cognitive Theory provided the primary theoretic framework for *New Moves*. It states that the people's self-perception must initially change to precipitate behavioral change. To reduce

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