ARTICLE

Engaging Overweight Adolescents in a Health and Fitness Program Using Wearable Activity Trackers

Marian Wilson, PhD, MPH, RN-BC, Samantha Ramsay, PhD, RDN, LD, & Kimberly J. Young, MS, RDN, LD

ABSTRACT

Introduction: Our objectives were to (a) examine feasibility and receptivity of overweight adolescents joining a community-based group fitness program and (b) test preliminary efficacy of a 12-week pilot intervention designed to promote health, fitness, and self-efficacy for the identified teens.

Methods: The 12-week fitness program for overweight adolescents was developed and included planned physical activities, nutrition classes, and goal-setting sessions. A one-group pre-/posttest study design evaluated 20 participants from grades 10 through 12 who enrolled in the program pilot study. Participants were given a wearable activity tracker that captured data using an Internet-based platform. Outcome measures included body mass index, screen time, fitness, and cardiovascular measures.

Results: A community fitness program for overweight adolescents was successfully implemented. High school students were receptive to the intervention and reported high program satisfaction. Positive effects included measurements of strength, systolic blood pressure, weight, and screen time behaviors.

Discussion: This study provides evidence to support the feasibility, acceptance, and preliminary effects of the pilot program with overweight adolescents. J Pediatr Health Care. (2017) ■, ■-■.

KEY WORDS

Adolescent, fitness tracker, internet, obesity, overweight, wearable activity tracker

Marian Wilson, Assistant Professor, College of Nursing, Washington State University, Spokane, WA.

Samantha Ramsay, Associate Professor of Foods and Nutrition, Margaret Ritchie School of Family and Consumer Sciences, University of Idaho, Moscow, ID.

Kimberly J. Young, Registered Dietitian Supervisor, Panhandle Health District, Hayden, ID.

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Correspondence: Marian Wilson, PhD, MPH, RN-BC, College of Nursing, Washington State University, PO Box 1495, Spokane, WA 99210-1495; e-mail: marian.wilson@wsu.edu.

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Childhood obesity is a global health concern. Approximately 170 million children (<18 years of age) are estimated to be overweight (World Health Organization [WHO], 2012). Obesity has nearly doubled worldwide since 1980 (WHO, 2012); 20.5% of U.S. adolescents ages 12 to 19 years are estimated to be overweight or obese (Centers for Disease Control and Prevention [CDC], 2015). Childhood overweight and obesity carries into adulthood, increasing risk for preventable diseases that kill 2.8 million adults annually (WHO, 2012). Obesity has immediate and long-term consequences on the health and quality of life of adolescents. Immediate impacts include greater risk for experiencing psychosocial problems such as depression, poor self-image, and low self-esteem and physical

health complications such as insulin resistance, joint problems, and sleep apnea (Daniels et al., 2005).

Prevention has been called the only feasible solution for children in developed and developing countries (Lobstein, Baur, &, Uauy, 2004). However, effective interventions for children who are currently overweight and obese are necessary to address their suffering and health risks as well. Generally, in Western cultures, the burden remains on the primary care provider to manage the care of an obese person, despite the absence of a known cure (Whitlock, Williams, Gold, Smith, & Shipman, 2005). Treatment often requires a multidisciplinary professional team including a dietitian, exercise physiologist, physician, and psychologist (Lobstein et al., 2004). Behaviorally based interventions focused on modifiable lifestyle factors are considered first-line treatments for obese adolescents and can improve weight and adiposity (Whitlock, O'Connor, Williams, Beil, & Lutz, 2010). However, how teens are to access these treatments remains unclear. Such treatments in the United States often require a primary care referral and a third-party payment plan, leaving them inaccessible to many. Additionally, many primary care providers lack confidence in skills such as motivational interviewing that are needed to engage their patients in behavior changes (Gonzalez, 2016). Development and promotion of early detection and treatment programs for childhood and adolescent obesity are considered crucial to addressing the obesity epidemic and associated obesity-related noncommunicable diseases (WHO, 2012). Although schools have been identified as an optimal environment to implement exercise and diet programs (Hsieh & FitzGerald, 2005; Flynn et al., 2006), limited information is available on how to develop and deliver sustainable and cost-effective programs. Because of the complex nature of obesity interventions, age-appropriate, feasible, culturally sensitive, and effective multidisciplinary curriculums are needed that can be reproduced in communities of all socioeconomic levels (Gonzalez, 2016; Militello, Melnyk, Hekkler, Small, & Jacobson, 2016).

Therefore, this article describes the development, implementation and evaluation of a 12-week health and fitness program targeting students in a U.S. public high school who were classified as *overweight* using current body mass index (BMI) charts. The primary purpose of the project was to evaluate how a community-based health and fitness program could be successfully delivered to address unmet needs. The objectives of this study were to (a) test the feasibility of a novel weight management intervention that would pool community and school resources using Internet-based activity tracking and online support; (b) measure participants' receptivity using satisfaction surveys, level of attendance, and participation; and (c) determine whether any changes could be detected in health, fitness, weight, and healthy behavior assessment measurements over time.

THEORETICAL FRAMEWORK FOR DEVELOPMENT OF THE COMMUNITY FITNESS PROGRAM

A key element of many successful chronic health interventions is increasing self-efficacy (Wu, Wu, Wang, Kao, & Yang, 2012). *Self-efficacy* arose from Bandura's social cognitive theory and is the confidence in one's ability to successfully carry out an action (Bandura, 1997). Programs based on self-efficacy aim at obtaining the highest level of physical functioning and have been useful for patients with a variety of chronic conditions including diabetes, asthma, and cardiac disease (Grey, Knafl, & McCorkle, 2006). This is accomplished, in part, by setting health-directed goals, achieving them, and watching others do the same. Short-term goal setting teaches participants to break larger objectives into smaller, attainable steps. Obesity interventions that are short term and simple have shown the most promise in randomized controlled trials (Stice, Shaw, & Marti, 2006). The pilot program tested here was structured to teach participants short-term goal setting of self-identified, achievable aims. Wearable activity tracking devices were used as a tool to aid engagement and progress. Selected variables included self-efficacy with a host of healthy behaviors and measurements that would show meaningful gains and confidence in new skills.

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METHODS

Development and Content of the Community Fitness Program

The community fitness program, titled Wellness Incentive to Health (WITH), was developed through team meetings led by the primary investigator that included university faculty and students with expertise in the topic (registered dietitian, adolescent obesity researchers, registered nurses, epidemiologist), school nurses, a personal trainer, and community members with expertise in youth health and fitness programs. The final content and plan were based on well-established theoretical concepts of self-efficacy (Bandura, 1997) by asking participants to set goals related to diet and physical activity. The program was delivered through a combination of group sessions, e-mail or text message reminders, and homework with reinforcement rewards.

The pilot WITH program was different from traditional U.S. interventions for overweight and obese adolescents in that it was designed outside of a clinic and within a school setting as a community collaboration. Resources for the pilot program were drawn from a

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