



Process evaluation for a school-based physical activity intervention for 6th- and 7th-grade boys: Reach, dose, and fidelity

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ARTICLE INFO

Article history:

Received 9 October 2012

Received in revised form 26 June 2013

Accepted 11 September 2013

Keywords:

Adolescent

Sedentary

Urban

School

Male

Exercise

Evaluation

ABSTRACT

The purpose was to evaluate the reach, dose, and fidelity of *Guys Only Activity for Life* (G.O.A.L.), a 7-week pilot intervention conducted from February to March 2011 to increase 6th and 7th grade boys' moderate-to-vigorous physical activity (MVPA). One middle school was randomly assigned to the G.O.A.L. intervention and another from the same urban school district in the Midwestern U.S. to a comparison condition. Thirty boys, ages 10–14 years, participated in each school. The intervention, guided by the Health Promotion Model (HPM) and Self-Determination Theory (SDT), consisted of a 90-min after-school physical activity club 4 days/week and one motivational interviewing session with a registered (school) nurse. Data were gathered via attendance records, club observations, heart rate monitors, audio-taping of motivational interviewing sessions, and surveys. On average boys attended the club 2.11 days/week ($SD = .86$). A trained independent process evaluator reported that the physical activity club instructors provided the boys with the opportunity for a mean of 25.8 min/day of MVPA. Using a four-point Likert scale (1 = disagree a lot; 4 = agree a lot), the process evaluator perceived that the club was delivered with high fidelity and adherence to the underlying theories ($M = 3.48$; $SD = 0.39$). Sessions with the nurse lasted an average of 13 min, 29 s. All boys attended. Two trained independent coders indicated that the nurse demonstrated at least beginning proficiency for all tasks associated with motivational interviewing, with the exception of using sufficient open- as opposed to closed-ended questions and reflections compared to questions. Fidelity related to session delivery and adherence to the theories was high ($M = 3.83$; $SD = 0.19$). The process evaluation data indicated that strategies are needed to increase attendance and boys' MVPA during the club time.

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1. Introduction

United States Department of Health and Human Services (USDHHS; 2008) recommendations call for youth to attain at least 60 min of physical activity every day, with most of the hour being spent engaging in moderate-to-vigorous physical activity (MVPA). Although boys are more active than girls during each year from the beginning of elementary through the end of high school, the percentage of boys achieving the physical activity recommendations decreases sharply from close to 49% among 6- to 11-year-olds to less than 12% by the time age 12 is reached (Troiano et al., 2008). A recently reported study involving trend analyses over close to a

12-year period (between 1999–2000 and 2009–2010) showed significant increases in both body mass index (BMI) of 12- through 19-year-old boys and obesity prevalence among boys aged 2 through 19 years per 2-year survey cycle (Ogden, Carroll, Kit, & Flegal, 2012). No increase in either BMI or obesity prevalence occurred for girls (Ogden et al., 2012).

Although schools are touted as excellent settings for promoting physical activity (Lavelle, Mackay, & Pell, 2012) to combat the overweight and obesity problem, conflicting evidence still exists on whether or not school-based physical activity interventions are effective in increasing physical activity (Dobbins, De Corby, Robeson, Husson, & Tirilis, 2009; Metcalf, Henley, & Wilkin, 2012) or reducing BMI among children and adolescents (Eather, Morgan, & Lubans, 2013; Lavelle, Mackay, & Pell, 2012). Interventions involving physical activity conducted during the school day appear promising as evidenced by some reported findings of significant post-intervention improvements in BMI among both children (Eather et al., 2013) and adolescent boys (Lubans, Morgan, Aguiar, & Callister, 2011). In many schools in the U.S.,

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however, conducting interventions to increase physical activity during the school day is not always possible due to the limited time allotted for this purpose, mainly resulting from competing demands. The need for physical activity may be perceived as a low priority compared to the time needed for academic subjects (Annesi, Westcott, Faigenbaum, & Unruh, 2005). According to the 2006 School Health Policies and Programs Study conducted by the Centers for Disease Control and Prevention (CDC), only 7.9% of all middle schools provided daily physical education (PE) or its equivalent for the recommended 225 min per week for the entire school year of typically 36 weeks for students in all grades in the school (Lee, Burgeson, Fulton, & Spain, 2007). Based on the 2009 Youth Risk Behavior Survey, only 33.3% of high school students participate in daily PE (CDC, 2010). Because opportunities for attaining adequate physical activity during the school day are limited in many schools, supplementary physical activity programs, such as those conducted after school, are needed to fill this gap (Annesi et al., 2005).

Many physical activity interventions are complex due to the inclusion of multiple components that target both individuals and social and physical environments. An individual-level component may involve a strategy for building behavioral skills, such as setting personal goals. Components related to social and physical environments may include offering opportunities to have fun with others in group classes and providing physical space or equipment for physical activity, respectively. Intervention complexity may result in low levels of implementation related to certain components and potentially unsuccessful outcomes (Young et al., 2008). The possibility also exists that positive outcomes can be achieved from an intervention administered in a manner that was very different from what was planned. Inadequate knowledge of exactly how well each component was delivered limits the ability to accurately interpret outcomes or make valid judgments (Durlak & DuPre, 2008).

In order to address this problem, process evaluation, which involves measuring the extent to which an intervention is delivered or received as planned, has become an essential part of intervention research (Glasgow & Linnan, 2008). Collecting appropriate process evaluation data is important to avoid a Type III error (Basch, Sliepcevich, Gold, Duncan, & Kolbe, 1985), which occurs when researchers erroneously conclude that an intervention was not effective when, in fact, the lack of significant research

findings was due to inferior implementation and not to the design of the intervention itself (Glasgow & Linnan, 2008).

Typically, process evaluation involves measuring intervention reach, dose, and fidelity (Linnan & Steckler, 2002; Young et al., 2008). Reach, the proportion of the intended audience that participates in the intervention or in each intervention component (Glasgow & Linnan, 2008), is usually measured by attendance and, therefore, is a characteristic of the participants (Linnan & Steckler, 2002). Dose includes what is delivered and received. The former (dose delivered) refers to what is actually delivered to participants and reflects the efforts or behaviors of the interventionists to provide the opportunity or the planned amount of intervention. Dose delivered can be measured by an evaluator using direct observation while completing a tool designed specifically for this purpose. The latter (dose received) involves the extent of engagement of the participants in the opportunity provided or the degree to which they are receptive to the intervention and actually use the resources. Similar to reach, the dose received is characteristic of the participants (Linnan & Steckler, 2002). With regard to physical activity, dose received can be evaluated via objective measures, such as monitors worn by the participants. Fidelity, a function of the interventionists, refers to the quality of intervention delivery or the extent to which the intervention was implemented in the manner and spirit in which it was intended (Linnan & Steckler, 2002). Measures of fidelity assess whether the intervention is congruent with the underlying theory (Linnan & Steckler, 2002). A thorough process evaluation can assist with understanding positive outcomes or elucidating why negative results occurred to help identify fruitful approaches for promoting physical activity in a specific population. Table 1 summarizes the process evaluation methods employed in this pilot intervention.

The purpose of this research study is to evaluate the reach, dose, and fidelity of the *Guys Only Activity for Life* (G.O.A.L.) intervention, a seven-week pilot program designed primarily to encourage low-active 6th and 7th grade boys to increase their MVPA. The G.O.A.L. intervention was based on the integration of the Health Promotion Model (HPM; Pender, Murdaugh, & Parsons, 2011) and Self-Determination Theory (SDT; Ryan & Deci, 2000). According to the HPM, a health-promoting behavior, such as physical activity, can be influenced by the following cognitive and affective variables: perceived benefits and enjoyment of physical activity; perceived barriers to physical activity; physical activity self-efficacy; and

Table 1
Summary of process evaluation methods.

Component	Characteristic addressed	Data sources	Specific instruments	Timing	Data collectors
Physical activity (PA) club	Reach	• Attendance records	• Attendance sheet	• Daily	• PA club instructors
	Dose delivered	• Lesson observations	• Lesson observation tool	• Weekly on randomly selected day each week	• Undergraduate kinesiology student serving as process evaluator
	Dose received	• Heart rate	• Heart rate monitors worn by 4 randomly selected boys each week	• Weeks 2 and 6	• Undergraduate kinesiology student serving as process evaluator
	Fidelity	• Survey instruments	• Process evaluator's 14-item survey	• Weekly on randomly selected day each week (during each observation period)	• Undergraduate kinesiology student serving as process evaluator
Motivational interviewing (MI)	Reach	• Attendance at MI sessions	• Attendance sheet, including date of each individual session	• Beginning of intervention	• Nurse
	Dose delivered and received	• Duration of MI sessions	• Start and end time of each session recorded on attendance sheet and via audiotapes/recorder	• Beginning of intervention	• Nurse
	Fidelity	• Audio-taped MI sessions and MITI Code • Audio-taped MI sessions and survey instrument	• Audiotapes/recorder • 13-item survey completed by coder	• End of intervention • Post-intervention	• Two coders • Single coder

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