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Economic evaluation of a group randomized controlled trial on healthy eating and physical activity in afterschool programs☆

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ABSTRACT

Limited information is available on the cost-effectiveness of interventions to achieve healthy eating and physical activity policies in afterschool programs (ASPs). The objective of this study is to present the costs associated with a comprehensive intervention in ASPs. Intervention delivery inputs (IDIs) associated with a group randomized delayed treatment controlled trial involving 20 ASPs serving > 1700 children (5–12 yrs) were catalogued prospectively across 2-years (2014–2015). IDIs, analyzed 2015, were expressed as increases in per-child per-week enrollment fees based on a 34-week school year in US$. Total IDIs for year-1 were $15,058 (+$0.58/child/week enrollment fee). In year-2, total costs were $13,828 (+$0.52/child/week) for the delayed group and $7916 (+$0.30/child/week) for the immediate group, respectively. Site leader and staff hourly wages represented 11–17% and 45–46% of initial training costs; travel and trainer wages represented 31–42% and 50–58% of booster costs. Overall, a 1% increase in boys and girls, separately, accumulating 30 mins/d of moderate-to-vigorous physical activity ranged from $0.05 to $0.26/child/week, while a one-day increase in serving a fruit/vegetable or water, or not serving sugar-added foods/beverages ranged from $0.16 to $0.87/child/week. Costs associated with implementing the intervention were minimal. Additional efforts to reduce costs and improve intervention effectiveness are necessary.

1. Introduction

Over the past decade, afterschool programs (ASPs) have become increasingly recognized as a setting that can contribute to solutions for childhood obesity through targeted improvements in healthy eating and physical activity during ASP operating hours.(Beets et al., 2010a; Beets et al., 2011) It is well documented that ASPs fall short of meeting healthy eating and physical activity standards.(Beets et al., 2010b; Beets et al., 2015a; Beets et al., 2015b; Beets et al., 2016b; Beets et al., 2016a) Largely absent from the intervention literature are the monetary costs associated with the delivery of interventions intended to improve healthy eating and physical activity for children in ASPs.(Cradock et al., 2014; Jago et al., 2014; Kesztyus et al., 2013; McAuley et al., 2010; Moodie et al., 2010; Pil et al., 2014; Moore et al., 2016) This information is critical by assisting providers in making informed choices about the available strategies to be adopted.(Neta et al., 2015) Moreover, cost information can be used to help providers fully understand the resource requirement for proper implementation of a chosen strategy.(Ritzwoller et al., 2009).

An important consideration with the cost of an intervention is the ability of the consumer (in this case the ASPs) to pay for trainings or materials/equipment. Once the costs are known, the ASP can decide if the new program is affordable based on the resources they currently have or are able to generate either through the acquisition of supplemental grant support, donations, or increasing user fees. Without such information, many practitioners are left to make uninformed decisions regarding the investment of limited resources.(Herrick et al., 2012; Sharpe et al., 2011).

The purpose of this study was to quantify the inputs from the delivery of an intervention to increase healthy eating and physical activity in ASPs. The intervention inputs were identified and measured prospectively in real-time data collection throughout a two-year group

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randomized controlled trial of 20 ASPs. Additionally, we provide information on cost effectiveness as it relates to changes in measures of the primary outcomes of healthy eating and physical activity. The primary outcomes associated with the intervention are presented elsewhere.(Beets et al., 2016c; Beets et al., 2017) In short, the percent of children attending ASPs who achieved 30 min/day of moderate-to-vigorous physical activity (MVPA) increased for boys and girls in the immediate treatment group by approximately 11% and 2.5%, respectively. For boys and girls in the delayed treatment group the percent of children attending ASPs who achieved 30 min/day increased by 2.3% and 6%, respectively. For healthy eating outcomes, both the immediate and delayed groups increased the number of days/week that fruits/vegetables (0.6 vs 1.7 days/week and 0.6 vs 4.4 days/week), water (2.3 vs 3.7 days/week and 2.7 vs 4.8 days/week) were served. Sugar-sweetened beverages were almost eliminated by post-assessment (1.2 vs 0.2 days/week and 3.2 vs 0.0 days/week).

2. Methods

2.1. Participants and setting

The participants and setting have been described in detail elsewhere.(Beets et al., 2016c; Beets et al., 2017; Beets and Glenn Weaver, 2014a) In brief, 20 ASPs participated in the Making Healthy Eating and Physical Activity Policy Practice study. The ASPs served over 1700 children (5–12 yrs) each school year and operated in schools, community/recreation, and faith locations. Programs were randomized to a 2 year intervention ($n = 10$, immediate group) or a 1 year delayed ($n = 10$, delayed group) treatment group. This work was supported by the National Heart, Lung, And Blood Institute of the National Institutes of Health under Award Number R01HL112787, and registered in ClinicalTrials.Gov (NCT02144519). All data collection methods and protocols reported in this study were approved by the Institutional Review Board of the lead author's university.

2.2. Intervention delivery inputs

The intervention was based-upon the STEPs (Strategies To Enhance Practice) intervention framework, details of which can be found elsewhere.(Beets et al., 2016c; Beets et al., 2017; Beets and Glenn Weaver, 2014a) In year one, the 10 ASPs in the immediate group received an initial training for program leaders and staff during the month of August. The trainings were held on-site at the programs' operating locations and were conducted by trained facilitators. Where possible, one or more ASPs attended the same training. From September to February of the first year of the intervention, each ASP also received four on-site booster sessions. The boosters consisted of a trained facilitator present for a full operating day (~3 h) to view the healthy eating and physical activity opportunities. Immediately after the program ended for that day (~6 pm), the facilitator spent ~30 min with the program leader and any available staff to review the success/challenges observed during that day (~3–6 pm). In addition to the boosters, each ASP received a phone call every two weeks to ask if any challenges needed to be addressed. All ASPs were also able to email, call, or request technical assistance at their discretion. In year one, the delayed group was asked to continue with routine practice.

In year two, both groups received on-site initial trainings during the month of August. The boosters were conducted in the same manner as year one, but the delayed group received all four boosters (same as year one for the immediate group), while the immediate group received only two on-site boosters in year two. Bi-weekly phone calls and miscellaneous technical support emails/calls/requests continued.

2.3. Intervention inputs and costs

Consistent with methodology for costing of behavioral interventions,(Ritzwoller et al., 2009) all resource use associated with STEPs were compiled in detailed diaries prospectively, in real-time, over the duration of the two intervention years (2014–2015) and were estimated separately by study year for the immediate treatment group and delayed treatment group. Intervention delivery costs were captured prospectively by identifying if the resource would be needed to deliver the intervention in routine practice.(Ritzwoller et al., 2009) For example, immediately after a trained facilitator had completed a booster session with an ASP, they would record booster-related costs (e.g., duration of booster session, staff attendance at booster, miles traveled to ASP etc.) in to a designated log-book. Intervention development costs are not considered in this paper. Separate cost by each intervention group were estimated since the location of operation, enrollment sizes, number of staff, and corresponding travel costs to the ASPs differed by group. Costs included the hourly wage for the trained facilitator and their time dedicated to traveling to on-site initial trainings and booster sessions, as well as the time dedicated to phone calls, emails, and other forms of technical support; the hourly wages and time for program leaders and staff to attend the initial trainings and booster sessions; and the mileage reimbursement for any travel associated with the trained facilitator or program leaders or staff. Information associated with phone calls, emails, boosters and other technical support requests were documented in detail in an intervention delivery log book, where the duration of the contact, the number of people present (both intervention staff and ASP staff), and any other important information that required input/resource allocation were catalogued.

The hourly rate for the trained facilitator was $30.00/h (includes benefits) for a full-time position.(Beets et al., 2014b) Hourly wages of program leaders and staff varied by program, thus the average wage for program leaders and staff (separately) was calculated and used for cost estimates. Average wages did not vary by treatment group, thus one average for program leaders and one average for staff was used across groups. Based on our sample, the average hourly wage for a program leader was $16.00/h and $8.50/h for staff. The reimbursement rate for mileage was set at $0.61/mile, based on current state reimbursement rates. All costs were grouped based on the component of the intervention delivered. These groupings were initial trainings, booster calls/emails, booster site visits, and miscellaneous contacts. The STEPs intervention did not have any equipment or printed material costs, as these were not provided as part of the intervention. Also, costs associated with the development of the intervention and its evaluation were not included in the cost of delivering the intervention in practice.

All costs were estimated based on the assumption that the time allotted for program leaders and staff to attend trainings and the time required for booster trainings which following the end of the program were in addition to, and did not replace, currently allocated time for trainings. For the boosters, only the hourly wage cost associated with program leaders and staff to remain after the end of normal program operating hours was used to estimate cost, since their time during the program was already part of the time required for routine operation. No costs were assigned during non-intervention years.

2.4. Willingness-to-pay

At the end of the study, interviews with site leaders of each ASP were conducted. During this interview, the costs associated with the intervention were presented to the site leaders and they were asked to comment on the price-tag of receiving the intervention and whether they would be willing to pass the added cost per child per week estimates on to the end user (i.e., parents) in the form of increased weekly enrollment fee.

2.5. Cost effectiveness estimates

All analyses were conducted 2015. Net costs associated with delivering STEPs were calculated and compared to the effectiveness of the