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Examination of Costs for a Lay Health Educator-Delivered Translation of the Diabetes Prevention Program in Senior Centers

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Abstract

Objective: Older adults in the U.S. have high rates of obesity. Despite the demonstrated efficacy of lifestyle interventions among older adults, lifestyle interventions are not widely implemented in community settings. Program delivery by lay health educators (LHE) might support greater dissemination because of lower delivery cost and greater accessibility. We examined the costs of a LHE-delivered translation of the Diabetes Prevention Program (DPP) evidence-based lifestyle intervention for older adults in Arkansas senior centers.

Methods: This examination of costs used data from a cluster randomized control trial (conducted 2008-2010) in which 7 senior centers (116 participants) were randomized to implement a LHE-delivered 12-session translation of the DPP lifestyle intervention. We compiled direct lifestyle intervention implementation costs, including training, recruitment, materials, and ongoing intervention implementation support. Weight loss data (at 4-month follow-up) were collected from participants.

Results: Participant weight loss averaged 3.7 kgs at 4-months. The total estimated cost to implement the lifestyle intervention is $2731 per senior center, or $165 per participant. The implementation cost per kilogram lost is $45.

Conclusions: A LHE-delivered DPP translation in senior centers is effective in achieving weight loss at low cost and offers promise for the dissemination of this evidence-based intervention.

Keywords

Obesity; Aged; Costs and Cost Analysis; Community Health Workers; Intervention Studies

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Introduction

Although obesity among older adults is increasing (Flegal et al., 2010), has adverse health consequences (Villareal et al., 2005) and is associated with significant functional impairment (Jenkins, 2004), older adults are rarely the target for weight loss interventions. Efficacious evidence-based lifestyle interventions have been developed, such as the Diabetes Prevention Program (DPP), and can induce clinically significant weight losses of approximately 7% (Diabetes Prevention Program Research Group, 2002), with older adults demonstrating greater weight loss (Crandall et al., 2006) than their younger counterparts. Despite the demonstrated efficacy of lifestyle interventions, such programs are not widely implemented in community settings, perhaps due to cost (the first year costs of the DPP was estimated at $1399 per participant (Hernan et al., 2003)). The scarcity and cost of treatment providers in medically-underserved communities likely prohibit broad reach of lifestyle interventions into these high-risk communities. Program delivery by trained lay health educators (LHE) might support greater dissemination.

There have been few studies examining the costs of translating the DPP lifestyle intervention (e.g., Ackermann & Marrerro, 2007; Kramer et al., 2009), and no studies, to our knowledge, have examined the costs of a LHE-delivered DPP translation focused on older adults. Thus, in this study, we examined the costs of a LHE-delivered translation of the DPP lifestyle intervention for older adults in senior centers.

Methods

Sixteen senior centers across a rural state were cluster-randomized (NCT-01377506) to implement one of two 12-session interventions delivered by LHEs: 1) lifestyle; or 2) attention control (i.e., memory improvement), as described elsewhere (West et al., 2011). This report focuses solely on the costs associated with implementing the lifestyle intervention. Eight senior centers were assigned to implement the lifestyle intervention, although one center withdrew from the study prior to learning randomization allocation due to significant personnel changes. The lifestyle intervention utilized the DPP intervention materials adapted for group delivery (Kramer et al., 2009). The study was approved by the University of Arkansas for Medical Sciences Institutional Review Board.

Healthy older adults (age≥ 60 years) who were obese (body mass index≥ 30) and who had no significant memory problems (Mini Mental State Exam (Folstein et al., 1975) score≥23) (n=116) were recruited within senior centers. Trained LHEs (n=20, mean=2.9 LHEs per center) delivered the 12-session intervention (see Krukowski et al., 2012) for a detailed description of the training). As previously reported, 4-month weight losses among participants receiving the lifestyle intervention averaged 3.7 kilograms and were significantly greater than weight losses among the participants in the senior centers assigned to the control intervention (n=112) (West et al., 2011). Thus, the LHE-delivered lifestyle intervention was effective in producing the desired weight loss outcomes among older adults and the costs of such an intervention become of significant public health interest.

Cost measurement

Throughout the trial (2008-2010) as part of the study protocol, we compiled direct lifestyle intervention implementation costs, which are the costs faced by a senior center or a similar organization seeking to replicate this program. It assumes existing space and staff or volunteers, such as those who implemented the intervention in this study; thus, no costs were estimated for the LHEs' time. Costs are classified as start-up costs and ongoing costs. Start-up costs included training staff time to train LHEs, production of training and intervention implementation manuals for LHEs (i.e., printing, binders), a calibrated digital scale and stadiometer (Tanita WB 3000) for each senior center, and participant recruitment materials (e.g., flyers). Intervention materials for each participant included in the cost calculation were a calorie and fat counter book (2008 Calorie King), a pedometer (Accusplit AE120XL), a calculator and a lesson binder. Training staff costs were calculated based on the average hourly wage (with benefits) of the actual training staff (i.e., registered dietitians, health educators, psychology fellows). Ongoing costs were calculated based on the actual costs of printing of lesson materials and self-monitoring diaries distributed at each session, the intervention incentives given (e.g., cookbooks), as well as the personnel costs for providing on-going technical support to the LHEs by training staff.

We did not include intervention development costs in our calculations, as the DPP lifestyle intervention materials were developed over years of obesity research. With this DPP translation, no additional costs are incurred for the utilization of the intervention.

Results

Cost to implement the program

Costs contributing to the total intervention costs and per participant costs are presented in Table 1. The total estimated cost to implement the lifestyle intervention is $2731 per center, or $165 per participant. Approximately half of these costs, $1296, are training ($966) and infrastructure (i.e., scale/stadiometer-- $330) costs.

Implementation cost per kilogram lost

Participants in the lifestyle intervention lost a total of 429.2 kilograms (944.2 pounds), or an average of 3.7 kilograms (8.1 pounds) lost per participant. Thus, the implementation cost per kilogram lost is $45 ($20 per pound lost).

Discussion

Trained LHEs can successfully deliver an effective translation of the DPP lifestyle intervention to older adults in senior centers for $165 per participant. There are a few studies available on costs associated with a DPP translation with which to compare the costs in the present study. A DPP translation delivered by staff at the YMCA achieved a mean weight loss of 5.7 kg at 4-6 months of follow-up (Ackermann et al., 2008). While a formal cost evaluation was not conducted and costs were estimated including 6-8 months of a maintenance intervention, per participant costs were estimated at $275-$325 for supplies, personnel time, and program administration (Ackermann & Marrero, 2007). Thus, the costs

in the YMCA setting ($48 - $57 per kg lost) were fairly comparable to those found in the current study. In contrast, a 12-session DPP translation in the community health care setting using health professionals achieved a mean weight loss of 3.4 kg, with an estimated cost of $300 per participant including personnel time and materials (Kramer et al., 2009). Thus, the costs of implementing a DPP translation delivered by health professionals ($88 per kg lost) were approximately double those in our study when the program was delivered by LHEs.

In summary, in this first report regarding the costs associated with a LHE-delivered community-based DPP translation, the costs were approximately half as much as a professionally-delivered translation in a community setting (Kramer et al., 2009). In addition to reduced costs, LHE-delivered translations of evidence-based lifestyle interventions may offer the advantage of increased access to these programs. There are many barriers to accessing effective lifestyle interventions (typically delivered in urban university settings) or even commercial weight loss programs (frequently offered in higher income or urban areas). Thus, the availability of evidence-based weight loss programs can be particularly problematic for low-income, rural and medically underserved communities, which are disproportionally impacted by overweight and obesity (Jackson et al., 2006). These data support LHE-led DPP translations in senior centers and indicate these interventions can be effective in achieving weight loss at low cost. Senior centers offer an attractive venue for translation of evidence-based programs to reach medically-underserved communities because they are in communities across all U.S., have a focus on evidence-based health and wellness programs (Wiener et al., 2006), and offer a tradition of volunteerism. However, there is reason to expect that LHE-led DPP translations might achieve similar weight loss outcomes at low cost in other community settings (e.g., churches, community centers) or with a broader age group. Furthermore, as nearly half of the program costs were associated with training and one-time infrastructure costs, the costs of sustaining the lifestyle intervention in the same location might present an even more favorable cost per kilogram lost ratio.

There are some limitations to the current study which merit discussion. Similar to other available reports on cost estimates of DPP translations, this is not a full formal cost evaluation with consideration of participant costs nor are costs associated with extended implementation and long-term weight maintenance available. However, this study offers insights for policy makers and community sites seeking information about the costs associated with offering the program. More extensive cost evaluations of long-term outcomes should be considered for future DPP translations into community settings. Finally, it is important to note that participants in the control intervention lost an average of 0.3 kilograms (West et al., 2011), so it cannot be assumed that all of the weight lost in the lifestyle intervention was solely due to the intervention.

Conclusion

This LHE-delivered DPP translation in senior centers was effective in achieving weight loss at low cost and offers promise for the dissemination of this evidence-based intervention into community settings. LHE-delivered DPP translations, particularly in medically-underserved communities, could offer prospects for achieving greater equity in health.

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Table 1:

Direct Intervention Implementation Costs for a Lay Health Educator-Delivered Translation of the Diabetes Prevention Program Implemented in Arkansas Senior Centers in 2008-2010 (Costs in 2008-2009 Dollars)

Start-Up Costs	Quantity	Unit Costs	Total Cost	Per participant (n=116) cost
Project staff time for training	Mean 25.8 hours per center (7 centers)	$30.55 per hour of staff time	$5,517.33	$47.56
Training materials	1 per LHE * (n=20)	$58.28 per set of materials	$1,165.60	$10.05
Self-monitoring diaries for training	4 journals per LHE (n=20)	$0.95 per diary	$76.00	$0.66
Scale	1 per center (7 centers)	$330 per scale	$2,310.00	$19.91
Recruitment materials (i.e., color flyers)	25 flyers provided per center (7 centers)	$0.74 per flyer	$129.50	$1.12
Program description brochure	1 per participant (n=116)	$1.18 per brochure	$136.88	$1.18
Calorie counter	1 per participant (n=116) plus 1 per LHE (n=20)	$5.56 per calorie counter	$756.16	$6.52
Pedometer	1 per participant (n=116)	$14 per pedometer	$1,624.00	$14.00
Calculators	1 per participant (n=116)	$1.27 per calculator	$147.32	$1.27
Participant binders	1 per participant (n=116)	$2.89 per binder	$335.24	$2.89
Ongoing Costs				
Participant materials	12 session handouts per participant (n=116)	$2.86 per session handout	$3,981.12	$34.32
Self-monitoring diaries	12 journals per participant (n=116)	$0.95 per diary	$1,322.40	$11.40
Participant incentives	1 per center (7 centers)	$16.50 per incentive	$115.50	$1.00
Technical support	Mean 35 minutes for each of the 12 sessions per center (7 centers)	$30.55 per hour of staff time	$1,496.95	$12.90
Total Costs			$19,114.00	$164.78

* LHE=Lay Health Educator