

Diabetes Prevention Program Community Outreach

Perspectives on Lifestyle Training and Translation

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Abstract: The gap between what is known from clinical efficacy research and the systematic community translation of diabetes prevention programs is narrowing. During the past 5 years, numerous randomized and nonrandomized dissemination studies have evaluated the modified delivery of structured Diabetes Prevention Program (DPP) interventions in diverse real-world settings. Programs of sufficient dose and duration, implemented with fidelity, have reported weight losses in the range of 4%–7% with associated improvements in cardiometabolic risk factors at 6 and 12 months from baseline. The current article describes some of the experiences and perspectives of a team of University of Pittsburgh researchers as they have engaged in these efforts.

(Am J Prev Med 2013;44(4S4):S339–S345) © 2013 American Journal of Preventive Medicine

Introduction

It has been 1 decade since the publication of the main outcomes of the Diabetes Prevention Program (DPP) RCCT.¹ The DPP study of more than 3000 participants with impaired glucose tolerance demonstrated that an individually administered 16-session lifestyle intervention, followed by monthly contacts for an average of 2.8 years (in-person visits alternating with mail and phone communication), resulted in modest, sustained weight loss and a significant reduction in cumulative diabetes risk compared to medication or placebo treatments. These findings generated renewed hope and enthusiasm for the possibility that diabetes could be delayed or prevented through behavioral means.

Moreover, recently published economic analyses have suggested that DPP lifestyle interventions compared to placebo treatments have potential to be cost effective from the payer perspective.² Although the dissemination of evidence-based diabetes risk reduction programs has been slow and halting, there has been considerable momentum, particularly in the last several years, with well over 15 original research reports describing the translation of DPP lifestyle interventions in a variety of community contexts.³ The purpose of this article is to reflect on some of the experiences of a team of University of

Pittsburgh investigators as they have traversed the road between efficacy trials and the translation of DPP-adapted interventions in the community.

From Clinical Trials to Community Centers: How Wide Is the Gap?

Perhaps the most encouraging finding from the DPP trial was the breadth and diversity of individuals for whom the lifestyle intervention protocol was able to demonstrate a benefit. Nonetheless, a common viewpoint has been that the procedures for implementing treatments in clinical trials, including the DPP, give little guidance on how to intervene in the real world under less-than-optimal conditions.⁴ Some also perceive that extraordinary measures were needed to achieve the results demonstrated in programs such as the DPP, making transfer of lifestyle intervention methodologies improbable.⁵

It has been the current authors' experience that the gap has been somewhat overstated. In other words, in both clinical trials and translation studies, the most-effective lifestyle intervention elements have often been more ordinary than extraordinary. The authors have observed that the success of community-based implementation of DPP-adapted lifestyle interventions frequently hinges on dynamic balancing of the priorities and abilities of a particular delivery system or platform, the barriers faced by the at-risk communities being served, and fidelity to the conceptual framework of evidence-based behavioral methods. Thus, the most-effective DPP translation programs have incorporated strong behavioral strategies, in programs of sufficient dose and duration, and addressed

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0749-3797/\$36.00

<http://dx.doi.org/10.1016/j.amepre.2012.12.014>

practical delivery issues by adapting programs in ways that do not sacrifice key elements.^{3,6}

The authors' training and implementation experience in RCCTs and community translation programs alike suggests that individuals struggle, predictably, with internal and environmental impediments. In most settings, those working to self-regulate their eating and activity behavior travel a slippery slope in the face of a toxic lifestyle environment, incomplete social and instrumental support, personal motivation that ebbs and flows, and new challenges that arise after an initial period of weight loss. The most-effective lifestyle programs (and interventionists) seem to employ a supportive, participant-centered, cognitive-behavioral approach regardless of whom the intervention is for (e.g., a single working mother facing multiple family obstacles versus a businessman with a supportive spouse).³ The current authors believe that the behavioral principles and methods that have been used in centrally organized and well-resourced delivery contexts continue to provide a good roadmap for the planning and implementation of community-based interventions; it does not appear that a completely different paradigm is needed. There are, nonetheless, a variety of delivery issues to be considered when attempting to establish a sustainable infrastructure for lifestyle interventions within community settings.

Roots in Behavioral Obesity Intervention

When moving forward with community-based interventions, it is important to consider the empirical and theoretic foundation on which the intervention is based. The DPP lifestyle intervention embodied a strong behavioral modification emphasis that has long exemplified state-of-the-art obesity treatments⁷ grounded in social-cognitive learning theory.⁸ In the DPP, there was a clear rationale for specific weight-loss and physical activity goals and a comprehensive protocol for achieving them. These features of the DPP lifestyle intervention have been discussed extensively in other reports.^{9–11}

To guide these efforts, the DPP Lifestyle Resource Core was established at the University of Pittsburgh under the original direction of Dr. Rena Wing and the more recent direction of Dr. Elizabeth Venditti. The original curriculum materials were developed in collaboration with the multicenter study group under the auspices of the NIH National Institute of Diabetes, Digestive and Kidney Diseases (NIH-NIDDK). In addition to excellent documentation of the research evidence, materials for the original DPP and its derivatives are now readily available for those who want to establish an infrastructure for diabetes risk reduction programs (three online resources are: www.bsc.gwu.edu/dpp/manuals.html; www.diabetesprevention.pitt.edu/glbmaterials.aspx; and www.cdc.gov/diabetes/prevention/index.htm).

These materials reflect the considerable multidisciplinary expertise in areas of behavioral health psychology, nutrition, physical activity, public health epidemiology, and self-management of diabetes and other risk factors for cardiovascular disease that was integral to the success of the DPP. They provide a clear outline for dissemination work. Although it is not essential to have this level of professional expertise available to deliver effective lifestyle programs in the community, there is broad consensus that it is important to obtain high-quality training, guidance, and supervision on how to use an intervention approach that truly reflects this expertise.

Development of the University of Pittsburgh Diabetes Prevention Support Center

At the time of the DPP main outcomes publication, a team of University of Pittsburgh DPP investigators began exploring the possibilities for translation of the successful lifestyle intervention to community settings. Grant funding from the Department of Defense (U.S. Air Force) enabled updating and adapting of the DPP lifestyle intervention materials for group delivery in the community. This funding also enabled the development of a training program health professionals (primarily nurses, dietitians, clinical diabetes educators, and other individuals with work experience in a health-related field) to deliver the adapted program and evaluate the intervention in a series of primary care practices.¹² The resulting diabetes risk reduction program entitled Group Lifestyle Balance™ (GLB) was designed for dissemination in both military and civilian settings.

This initial translation experience allowed for consideration of the key components that made the DPP lifestyle intervention so successful, specifically: (1) a sound, evidence-based curriculum with participant materials designed to be simple, understandable, and written for approximately a Grade-5 reading level; (2) standardized, expert training of coaches for intervention delivery; and (3) ongoing program support for trained coaches. It was concluded that a plan for more widespread dissemination would benefit from establishing a mechanism for lifestyle training and support similar to that provided by the Lifestyle Resource Core in the DPP. Thus, the multidisciplinary Diabetes Prevention Support Center (DPSC) was established at the University of Pittsburgh, with the primary goal of offering regular training opportunities and guidance for other researchers and community entities working on DPP translation (www.diabetesprevention.pitt.edu).

Group Lifestyle Balance Curriculum Development

The Group Lifestyle Balance (GLB) Program is a comprehensive lifestyle behavior change curriculum adapted directly from the DPP 16-session program (© 1996) but also reflective of new and emerging standards in the areas of nutrition, physical activity, and public health. All participant materials are available in Spanish. The current GLB program has evolved to a recommended optimal delivery schedule of 22 sessions during a 1-year period (Table 1). However, an initial step in this translation process involved consolidating the original DPP 16-session curriculum into 12 sessions. Research evidence suggests that a greater number of in-person sessions during the first 6 months of intervention will be associated with larger percentage weight losses,^{3,6,7} and this remains the gold standard. However, there continues to be demand from employers; payers (e.g., major insurers, benefit planners); and community-based health-delivery systems to streamline content based on their own economic directives and bottom lines. The initial consolidation was in response to these requests. On the ground, there also appears to be interest in experimenting with mixed-delivery models (e.g., face-to-face plus telephonic or web-based delivery), and it remains an empirical question as to how effective such alternate delivery mechanisms will be. The authors are often asked: *How far can program delivery methods or the number of sessions deviate from the standard of care modeled by the DPP and still be effective?* At present, the short answer is “not very much” if, in fact, the goal is to achieve $\geq 5\%$ weight loss in the service of diabetes prevention.

Indeed, the authors' translational research^{12–15} and that of many others^{16–20} suggests that 4%–7% weight losses and associated changes in biomarkers can be achieved in diverse settings and populations, utilizing well-supervised community health workers as well as healthcare professionals as providers. However, it does appear to be the case that the further one moves away from research-affiliated settings and into the community, the more “drift” there may be in fidelity to the original DPP methods, which may (at least partially) explain the less-robust weight-loss outcomes.^{21,22} Presently, attendance, weight, and biometric outcomes are the major standards by which most translational programs have been evaluated and compared. A future quality-improvement measure would be to create simple (nonburdensome) but standardized process evaluation measures that would have utility for community-based programs to measure fidelity to DPP-adapted programs.

The GLB 12-session curriculum was designed to include all of the learning objectives and fundamental

Table 1. Group Lifestyle Balance 22-Session Program

	Recommended delivery schedule	Core sessions
1	Weekly (four per month)	1: Welcome to the Program 2: Be a Fat and Calorie Detective 3: Healthy Eating 4: Move Those Muscles
2	Weekly (four per month)	5: Tip the Calorie Balance 6: Take Charge of What's Around You 7: Problem-Solving 8: Four Keys to Healthy Eating Out
3	Weekly (four per month)	9: Slippery Slope of Lifestyle Change 10: Jump Start Your Activity Plan 11: Make Social Cues Work for You 12: Ways to Stay Motivated
Core transition sessions (fade frequency)		
4	Biweekly (two per month)	13: Prepare for Long-Term Self-Management 14: More Volume, Fewer Calories
5	Biweekly or monthly	15: Balance Your Thoughts
6	Biweekly or monthly	16: Strengthen Your Exercise Program
Support sessions (variable sequence)		
7	Monthly	17: Mindful Eating
8	Monthly	18: Stress and Time Management
9	Monthly	19: Standing Up for Your Health
10	Monthly	20: Heart Health
11	Monthly	21: Stretching: The Truth About Flexibility
12	Monthly	22: Looking Back and Looking Forward

self-management strategies of the original DPP curriculum, but, by definition, provided less time for participants to reach the 7% weight loss and 150-minute weekly physical activity goals. When using a consolidated program, outcomes expectations should be adjusted accordingly. Other modifications to core content included promoting calorie and fat goal-setting and self-monitoring from the first session contact, a broad behavioral focus on methods for healthy food choices and meal planning rather than a specific emphasis on the U.S. Department of Agriculture

food pyramid (now MyPlate; www.choosemyplate.gov/), and earlier inclusion of the pedometer as a tool to enhance self-awareness and motivation for increasing the proportion of active time relative to sedentary time in one's daily routine.

For researchers and community programs choosing to offer extended intervention, four transition sessions were reincorporated to amplify the learning objectives of the initial 12 sessions, allow more time to achieve weight loss and physical activity goals, and prepare participants for longer-term self-management. This newer curricula accentuates the importance of high-fiber, low-caloric-density (e.g., plant-based) foods,²³ managing self-defeating thinking patterns,²⁴ and incorporating strength-training (e.g., resistance band) exercises for a complete physical activity regimen in line with current national recommendations.²⁵

Finally, monthly support sessions were added (Table 1). It should be noted that the major function of contacts in the second 6 months of a lifestyle intervention is to enable continued weight, diet, and activity monitoring and accountability. Regardless of specific session content, the key element in longer-term interventions is the provision of support and problem-solving in coping with personal barriers. This has been a central tenet in the obesity treatment literature,²⁶ but diabetes prevention translational studies are only just beginning to grapple with cost-effective ways to provide longer-term support.^{27,28}

In addition to print materials for in-person group delivery, a DVD and CD-ROM version of the GLB program was developed in collaboration with the Center for Excellence in MultiMedia (CEMM) of the U.S. Air Force. The DVD/CD-ROM presents a staged version of the 12 weekly sessions of the GLB intervention program, with the leader and group members portrayed by professional actors. In addition, the series includes educational information about prediabetes, diabetes, and the metabolic syndrome. A companion CD provides supplemental knowledge challenges, games, calculation tools, and a glossary of terms. The DVD was shown to be effective in a small pilot study of high-risk patients in primary care when delivered in conjunction with weekly individual telephone coaching,¹³ suggesting potential for this alternative delivery route.

Overall, the authors have observed that one size does not fit all when it comes to the most desirable delivery platforms, intervention schedules, and allocation of provider efforts. Group implementation generally has been thought to be more cost effective when compared to individual, and many translation efforts (including those of the authors) have been oriented in this direction. However, in a digitally oriented, "on-demand" society, flexibility of delivery mode and the ability to reach at-risk individuals through multimedia formats (when and

where the participant chooses) is increasingly likely to become part of the scope of translational intervention practice.

Building a Competent Lifestyle Workforce: Dissemination of Training Programs

The University of Pittsburgh DPSC has been offering GLB training workshops since 2004, initially as a way to provide standardized instruction to health professionals in primary care practices that were grant-funded to implement obesity and diabetes prevention initiatives. Increasingly, individuals from a variety of health promotion, health education, and clinical intervention backgrounds have become interested in DPP-adapted intervention training programs. Many organizations seeking training are part of established medical care infrastructure, others are more community-based or "grass-roots" in their orientation. We continue to advocate for a comprehensive behavioral training approach including scientific rationale, interactive clinical education and evaluation, and continued program support. As a result, the workshops have retained a standardized format and sequence that addresses the following: (1) the scope of the global diabetes risk problem and the empirical background for diabetes prevention efforts during the last decade; (2) the DPP/DPPOS study design, methods, and clinical outcomes; (3) the rationale for the DPP and GLB lifestyle intervention goals and methods; (4) guidance on how to deliver each of the curriculum sessions, including interactive demonstrations; and (5) small group opportunities for workshop participants to do problem-solving regarding their own program development barriers and approaches.

It has been the authors' stance that diabetes prevention programs rooted in, or linked to, the healthcare system (payers and providers) will be the most sustainable if the focus remains on efforts to train those individuals with healthcare backgrounds and/or established linkages to these networks (e.g., nurses, dietitians, clinical diabetes educators, exercise specialists, psychologists, pharmacists, physicians and other primary care providers, community public health workers). At present, the DPSC offers GLB training workshops for health professionals approximately 2–3 times per year at the University of Pittsburgh, as well as onsite trainings for local communities who wish to train larger groups. Continuing education hours are available for nurses, registered dietitians, social workers, and certified health educators.

All trainees developing program infrastructure are strongly encouraged to understand and meet the standards of the CDC's National Diabetes Prevention Program (NDPP; www.cdc.gov/diabetes/prevention/). These standards are designed to pave the way for potential third-party

reimbursement.²⁹ The CDC Diabetes Prevention Recognition Program (DPRP) aims to ensure quality and consistency of program delivery (based on the consistency of attendance, weight loss, and health outcomes) and maintain a registry of organizations that are recognized for their proven track record.

Common Implementation Challenges and Practical Considerations

Through provision of these workshops over the past 8 years, the authors have gained some insight regarding the practical issues for delivery of lifestyle programs in the community. Across settings, there are similar concerns regarding funding and staffing, screening and eligibility criteria and recruitment of at-risk participants, space and time issues for group meetings, best marketing practices, and ongoing program evaluation. Trainees have been encouraged to direct their resources and programs toward individuals with prediabetes or the metabolic syndrome because that is where cost effectiveness has been demonstrated, and because targeted screening and enrollment remains important for program evaluation and comparative-effectiveness studies. Nonetheless, some community programs have chosen to include participants with diagnosed diabetes, stating that it will be more expedient in their delivery systems based on the number of trained and qualified interventionists available to implement programs, the demand to provide such lifestyle interventions to a wider array of participants, and the rate at which screening and recruitment occur.

Other common concerns involve how much to tailor local program delivery (based on directives of the organization) and sustain a proficient workforce of lifestyle coaches. To address the latter, the authors have begun to train experienced GLB providers to become specialists who can then train others within their organization to deliver the program (a “train-the-trainer” model). Presently, the authors are working with the military (Air Force CEMM) to expand GLB specialist training with the creation of a comprehensive online training program for health professionals. It is anticipated that these developments will facilitate program sustainability over the long run by reducing barriers (time, travel) to training.

Further Consideration of Training Standards

There are additional issues to contemplate with regard to offering training for lifestyle intervention delivery, especially in anticipation of the potential for third-party reimbursement. For example, what kind of training standards should be considered when disseminating DPP-adapted interventions in the community? The NDPP recognition program requires that those applying for recognition

complete training using a recognized curriculum; however, there are no specific guidelines, as yet, regarding what constitutes an adequate training curriculum (e.g., hours, post-training evaluations, continuing education requirements).

There is also a wide range of potential providers who can be targeted for training, and it is not entirely clear what type of quality assurance standards should be in place. Healthcare professionals already have self-regulating organizational guidelines and requirements, but it is not readily apparent what mechanisms and procedures should be in place to guide lay educators or community health workers outside of a supervised research environment. It is anticipated that as the NDPP gets off the ground and organizations become part of a registry and recognized for successful program delivery that the “lifestyle training market” also will undergo similar scrutiny and refinements.

Funding and Sustainability

Clearly, sustainable funding for prevention programs is an enormous rate-limiting step in the diabetes translation field.²⁹ Indeed, it has been the authors’ observation that although some community groups have secured funding for program development and delivery, it is more often the case that they start out with small pilot demonstration projects, often with their own employees, in hopes of making a business case to administration and other potential payers. The authors have witnessed enthusiasm from the major health insurance plans, but most have been slow to commit to targeted diabetes prevention.

These are the central issues and questions most related to the sustainability of a high-quality and well-trained lifestyle coach workforce and certainly will require further attention as the GLB and other DPP-adapted training curricula continue to be updated and improved. The funding and distribution of necessary supplies, including the choice of interventionists for program delivery, is in the end an organizational decision, to which the DPSC can offer only guidance based on collective training experience. All print materials are publicly available for download (see above) and the DPSC has established relationships with preferred distribution sources for intervention-related products (e.g., calorie counters, pedometers). Bulk rates are made available when possible.

Ongoing Support for the Systems Using the Group Lifestyle Balance Program

To date, the DPSC team has trained more than 1200 health professionals and associated community health workers across the U.S. and internationally. Collectively,

the trainees represent the broad array of settings in which diabetes prevention programs have been disseminated, including primary care offices; outpatient hospital centers; hospital foundations; wellness and fitness centers; military bases; churches; senior and other community centers; HMOs; Indian Health Service (IHS); state departments or ministries of health; and others. Presently, there are more than 40 established GLB intervention programs being offered in these settings. The DPSC provides ongoing support and consultation following training, and the website contains a special portal for those who have completed training. In addition to intervention materials, other useful resources such as slide sets, marketing tools, recommended screening and recruitment measures, supply ordering information, and a message board have been designed to support implementation.

Conclusion

Although it is clear that the DPP intervention model has provided a course on which to move forward, there are multiple ongoing challenges. Important questions remain regarding the best, most cost-effective ways to train and mobilize an adequate workforce in an otherwise fragmented healthcare delivery system. The public health demand for services is large, and there are numerous social and environmental influences on health behavior change (e.g., health literacy, economic disparities, social and cultural norms) that pose distinct community challenges.

As translation researchers and intervention trainers, the authors are often asked to advise others on abbreviated programs due to payer, funding, and other resource limits, or the perception that it is not possible to engage community members for very long (“attendance/adherence seems to be dropping off so we will shorten the program to six sessions”). Some communities have indicated that they see a need to omit key elements such as calorie goals or teaching about energy balance because they believe their target audience will not be able to comprehend the concepts adequately or use them effectively. Others wish to prioritize specific elements (e.g., stress management, meal-planning on a budget) because those are the problems thought to be most pertinent.

All of these represent legitimate concerns. However, it has been the authors’ experience (and scientific bias) that the most-effective programs retain the essential structure, sequence, and social learning elements of the DPP lifestyle intervention, while permitting some flexibility for local needs. Fortunately, comprehensive national efforts toward the dissemination of DPP-adapted programs have and will continue to expand; high-quality lifestyle training efforts will need to keep pace with this forward movement.

Publication of this supplement was supported by Joslin Diabetes Center and Novo Nordisk.

The authors thank other members of the University of Pittsburgh Diabetes Prevention Support Center (DPSC), Andrea Kriska, PhD, Linda Semler, RD, MS, and Trevor Orchard, MD, for their collaboration in the dissemination of diabetes prevention programs in the community. The authors also acknowledge Rena Wing, PhD, Bonnie Gillis, RD, MS, Linda Siminerio PhD, the Center for Excellence in MultiMedia (CEMM) of the U.S. Air Force, and the late U.S. Representative John P. Murtha (D-Pennsylvania) for all of their work on behalf of diabetes prevention and treatment.

No financial disclosures were reported by the authors of this paper.

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