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# Adapting the Diabetes Prevention Program Lifestyle Intervention for Delivery in the Community

## The YMCA Model

### Abstract

The Diabetes Prevention Program (DPP) demonstrated that a structured diet and physical activity intervention that achieves and maintains modest weight loss for overweight adults with impaired glucose tolerance can significantly reduce the development of diabetes. Although tens of millions of American adults could benefit from access to the DPP lifestyle intervention, there currently is no available model for nationwide dissemination of this highly beneficial and cost-effective approach to diabetes prevention. In this article, the authors describe the evolution of adaptations to improve DPP lifestyle intervention implementation and dissemination by a strong community partner, the YMCA. They also provide information about early field research and an ongoing clinical trial that will provide information about the feasibility and effectiveness of applying this new model on a national scale.

More than 20 million American adults have diabetes.<sup>1-5</sup> Moreover, another 41 million have prediabetes, defined by impaired glucose tolerance (IGT) or impaired fasting glucose, placing them at substantially increased risk for developing diabetes.<sup>1-4,6</sup> The prevalence of diabetes in the United States is expected to double over the next 30 years, making it a public health priority.<sup>7</sup> A tremendous mounting challenge for the health of America is to develop population-based strategies to prevent the development of diabetes.

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The Diabetes Prevention Program (DPP) demonstrated that a structured diet and physical activity intervention that achieves and maintains modest weight loss for overweight adults with IGT can significantly reduce the development of diabetes.<sup>8</sup> Unfortunately, this intensive and costly lifestyle intervention was designed for efficacy and not for sustainable delivery by a community organization.<sup>8-10</sup> The design of an effective real-world model for implementing the DPP lifestyle intervention will require a collaborative effort that balances fidelity to the DPP design with elements that optimize effectiveness, minimize cost, and improve sustainability for a capable community partner.

With exceptional reach into diverse US communities and a history of implementing a wide variety of successful lifestyle programs, the YMCA is a capable partner. Over the past 3 years, the authors have collaborated with the YMCA of Greater Indianapolis to design, implement, and evaluate a group-based adaptation of the DPP lifestyle intervention. This article describes the approach to adapting the DPP for feasible and sustainable YMCA delivery.

## The Traditional DPP Lifestyle Intervention

The design of the DPP lifestyle intervention was derived from extensive past weight management research and incorporated several guiding behavioral principles. The rationale and procedures used in the intensive lifestyle intervention have been described previously,<sup>11,12</sup> and implementation guidelines and participant materials are publicly available (<http://www.bsc.gwu.edu/dpp/manuals.htmlvdoc>).

The DPP used a goal-based intervention to achieve loss and maintenance of 7% of baseline body weight. The recommended pace of weight loss was 1 to 2 lb per week. Lifestyle goals included modest dietary restriction and at least 150 min/wk of moderate-level physical activity. The primary approach to diet restriction involved a recommendation for low-fat (<25% fat) intake. If fat restriction did not produce weight loss to goal, calorie restriction was also recommended. Brisk walking was emphasized to achieve the activity goal, but any activity of similar intensity could be applied to the goal. Although most participants completed activities on their own, 2 supervised exercise classes were offered each week.

Each participant was assigned an individual case manager or lifestyle coach, who followed a structured intervention protocol to help the participant achieve and maintain lifestyle goals. Lifestyle coaches were registered dietitians or had at least master's degree training in exercise physiology, behavioral psychology, or health education.

The core of the intervention involved a structured, face-to-face, 16-lesson curriculum that was completed over 20 to 24 weeks. Lessons ranged from 30 minutes to 1 hour and included a private weigh-in, review of self-monitoring records, presentation of a new topic, identification of personal barriers to weight loss and activity, and development of an action plan for the next session. The first 8 lessons presented intervention goals, taught information about modifying energy intake and increasing energy output, and helped participants to self-monitor diet and physical activity. The latter 8 lessons focused on the psychological, social, and motivational challenges involved in maintaining healthy lifestyle behaviors in the long term.<sup>11</sup>

The core curriculum was followed by a maintenance program that was individualized to meet the unique characteristics of each participant. This included individual sessions, group courses, and motivational campaigns. Participants were expected to meet with the lifestyle coach at least bimonthly, with telephone contact at least once between these visits. Group courses were offered 3 times yearly. Motivational campaigns were conducted 3 to 4 times yearly and often involved competition among local participant teams or DPP centers for the best attendance, self-monitoring, weight loss, or physical activity minutes. Throughout the intervention, about \$100 per year was also available for toolbox strategies to help each participant achieve and maintain lifestyle goals. Example toolbox strategies included in-home physical activity videos, healthy cookbooks, grocery store vouchers for portion-control foods, and payment of fees to enroll in a community exercise class.

## Intervention Adaptations After the DPP Clinical Trial

At the close of the DPP trial, the lifestyle intervention core curriculum was offered to all remaining study participants. At that time, individual DPP study sites introduced changes to the intervention delivery format because costs and time requirements prohibited offering

the traditional intervention format to all participants. At the Indiana University DPP study site, a new intervention format was adopted that retained the DPP approach to behavior change but introduced modifications that were supported by prior research demonstrating that weight loss effectiveness and maintenance could be enhanced by group social support and use of training partners to increase accountability for regular participation and goal-directed efforts.<sup>13-15</sup> This adapted DPP intervention (1) shifted the core curriculum to a group-based delivery format, (2) eliminated many costly toolbox incentives used to enhance goal achievement, (3) introduced a formal exercise training partner system, and (4) delivered exercise components of the program using local fitness club staff trained in behavioral counseling rather than specialized lifestyle coaches.

## **Foundations for Delivery of the DPP Lifestyle Intervention by the YMCA**

Translating the DPP lifestyle intervention to the broad public sector will require the program to be adapted for delivery by community organizations and agencies. Such groups need to have the resources and capability to deliver a multifaceted program that is accessible to a broad segment of residents from diverse communities. The YMCA is one such organization. With more than 2500 YMCA facilities serving more than 10 000 US communities, the YMCA has exceptional community penetration and is well positioned to become a vehicle for nationwide program dissemination. Moreover, the YMCA maintains a policy to turn away no person because of inability to pay and offers financial assistance on an as-needed basis to expand program access or membership for low-income persons. This is extremely relevant for a lifestyle intervention to prevent diabetes because low-income groups are disproportionately burdened by diabetes risk and might enjoy program access only if fees are significantly reduced or eliminated.

The authors have worked with the YMCA of Greater Indianapolis since 2003 to design, implement, and evaluate a group-based adaptation of the DPP lifestyle intervention for delivery in YMCA branch facilities. As a part of this collaboration, the YMCA was assisted to review DPP intervention materials and refine session format and content to improve long-range sustainability, and a structured program for training YMCA personnel in the principles

of intervention delivery was developed. The authors are now collaborating with the YMCA in 2 National Institutes of Health–funded studies to evaluate the effectiveness, adoption, implementation, and maintenance of this modified DPP lifestyle intervention, which is called the Group-Organized YMCA Diabetes Prevention Program (GO-YDPP).

## **Description of the GO-YDPP**

The GO-YDPP model combines prior experience and theory-driven adaptations to the DPP intensive lifestyle intervention with additional modifications to enhance sustainability by the YMCA. GO-YDPP has retained the same physical activity and weight loss goals of the original DPP lifestyle intervention and follows the premise that long-term changes in diet and exercise and sustained motivation to maintain behavioral change require (1) basic training in diet, exercise, and behavior modification skills; (2) an emphasis on self-esteem, empowerment, and social support; (3) use of a structured protocol (in which all participants receive certain common information) with the ability for tailoring to meet individual needs; and (4) diet and physical activity interventions that are flexible, culturally sensitive, and acceptable in the context of local communities in which they are implemented.

GO-YDPP incorporates these principles across 3 major phases of intervention: (1) a 16-lesson core curriculum phase, (2) a 4-week training and refinement phase, and (3) a long-term maintenance phase. Each of these phases is described below:

### **GO-YDPP Core Curriculum**

The GO-YDPP core curriculum involves the same 16-lesson approach as the original DPP,<sup>11</sup> but lessons are delivered in groups of 10 to 12 participants and are held over just 16 weeks. During the final 6 sessions, participants are encouraged to work more closely with the YMCA group instructor to develop a more explicit physical activity action plan and to enhance self-efficacy and problem-solving skills that are essential for successful lifestyle maintenance. This includes active participation by group members to share experiences about safe, accessible, and low-cost community-based physical activity outlets, as well as 1 or more visits into the

YMCA facility to introduce other classes and resources that are available to members or nonmembers.

### **GO-YDPP Training and Refinement**

Following the core curriculum, participants are encouraged to meet twice weekly at preferred community locations for exercise sessions with their training partner or as a group. Exercise preferences may involve both YMCA and non-YMCA outlets. Participants electing not to become YMCA members during the core curriculum may be offered a discounted or trial membership for expanded facility access during the maintenance phase. For 4 weeks after the core curriculum, YMCA group instructors maintain close contact with participants to assist them with tailoring the exercise program, problem solving, and refinement.

### **GO-YDPP Maintenance**

Following the core curriculum and refinement phases, all participants are encouraged to continue ongoing physical activity sessions with training partners or groups. In addition, participants and their family members are invited to attend monthly group sessions held at the YMCA. These sessions focus on a series of maintenance themes that are negotiated by group members at the end of the core curriculum. Group maintenance sessions often involve a guest presenter or sponsor (eg, a local health food store), include a private weigh-in, and offer an opportunity for group leaders to address individual issues for maintaining program goals. Examples of maintenance session themes have included “Keeping With Your Goals: The Key to Preventing Diabetes” and “Holding a Healthy Memorial Day Cookout.” Guest presenters have delivered mini lectures focusing on topics such as a recipe swap, holiday entertaining, and controlling emotional eating. Participants also receive a quarterly newsletter highlighting other YMCA-wide activities relevant to goal maintenance, as well as nutrition and training tips with motivational messages.

GO-YDPP uses many of the tools designed for the original DPP intervention. Examples include a personalized copy of all core curriculum lesson plans, weekly food and activity tracking logs, guidebooks for fat and calorie content and portion sizes for common restaurant and self-prepared foods, measuring cups and spoons, and food scales. In addition, the program provides a pedometer to facilitate physical activity self-monitoring.

Although GO-YDPP does provide t-shirts and other small incentives for attending maintenance sessions, it limits the scope of costly toolkit strategies that were used in the DPP. Basic maintenance activities are currently offered free of charge, and the program encourages use of broader, cost-free community resources, such as walking clubs and Parks and Recreational facilities. Although YMCA nonmembers may gain access to some additional YMCA resources free of charge or at a nominal fee, some additional YMCA resources are available only to those who elect to become YMCA members.

### **Sustainability and Dissemination of the GO-YDPP Model**

The overarching goal for the GO-YDPP intervention has been to develop a model for broad, community-based delivery of the DPP lifestyle intervention in a manner that retains the guiding behavioral principles of the traditional DPP approach but offers a format that is sustainable by the YMCA. A major emphasis of this effort has been to develop an approach that would allow the YMCA to recover all costs that it invests to operate the program. The YMCA has estimated the total cost for supplies, personnel time, and program administration during year 1 to be \$275 to \$325 per participant. This estimate contrasts with a cost of more than \$1400 for the original DPP intervention<sup>16</sup> and is comparable to the cost of many commercial weight loss programs. It is unknown at this time if adults with prediabetes will be willing to pay a substantial portion of this cost to access the program. Ongoing formal evaluation is designed to provide essential information about whether the program will provide a cost-effective and feasible model for implementing a community-based DPP lifestyle intervention. Recent economic modeling studies suggest that even if this adapted intervention is only half as effective as the original DPP approach, it may prove not only to be cost-effective but also to achieve short-term return on investment for a private health insurer that pays for the program.<sup>17,18</sup> If effective as a lower cost alternative for delivering the wide array of intervention benefits observed in the DPP, GO-YDPP holds promise for providing a badly needed model for broad national dissemination of an effective approach to prevent diabetes and reduce cardiovascular disease risk for millions of American adults at high risk for diabetes today.

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