Evaluation of the *Raleigh Wellness Project*: a Community-Based Group Lifestyle Modification Program

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Abstract

Background

Obesity is associated with increased risk for comorbid conditions. Loss of 5% of body weight is associated with improved health but making lifestyle modifications to facilitate weight loss is challenging for many adults. The Raleigh Wellness Project was founded by a primary care physician in Raleigh, North Carolina to assist individuals in overcoming barriers to living healthier lifestyles. We evaluated the Raleigh Wellness Project to assess the program's effectiveness in 1) facilitating weight loss, 2) improving physical capacity and 3) reducing clinical markers of comorbid conditions among overweight and/or obese individuals.

Methods

We identified participants who completed the Raleigh Wellness Project, a twelve-week group-based lifestyle modification program, from 2012-2014. Using STATA version 11 we conducted a pre-post intervention analysis using paired t-tests to compare participant data at baseline and after program completion.

Results

Among the 100 participants included in the evaluation, the average age was 62 years, 59% were male, 85% were Caucasian, and 59% were commercially insured. Forty-two percent of participants had ≥5% weight loss (average 4.6%). In the pre-post intervention analysis, program participation was associated with significant reductions in weight ($p<0.00001$), BMI ($p<0.00001$), waist circumference ($p<0.00001$), systolic blood pressure ($p<0.00001$), diastolic

blood pressure ($p=0.0001$), and triglycerides ($p=0.001$). There was also a significant increase in the total number of laps participants walked in 30 minutes ($p<0.00001$).

Conclusion

The Raleigh Wellness Project, a community-based group lifestyle modification program, was effective in facilitating participant weight loss with resultant improvements in blood pressure, triglyceride levels and physical activity capacity. The program addresses challenges encountered by many adults who attempt lifestyle modifications in solitude.

INTRODUCTION

More than 30% of the US adult population's weights exceed ideal weight recommendations.[1] As the number of overweight individuals increases, so do weight-related healthcare costs and comorbidities.[2,3] Obesity can affect all organ systems.[2,3]

A cost effective, low-risk strategy to prevent disease onset, avoid exacerbation, and reverse adverse outcomes is maintaining a healthy weight.[2,4,5] A 3-5% weight loss is associated with improved health outcomes.[2,6] However, making modifications to facilitate weight loss is challenging for individuals who lack motivation or face challenges to implementing health-beneficial behaviors.[7] Behavioral lifestyle modification programs empower overweight individuals to modify their lifestyles through behavioral therapy, dietary restriction, and increased physical activity.[6,8-10]

The Raleigh Wellness Project, a community-based twelve-week group lifestyle modification program was created in 2009 by an internal medicine physician in North Carolina to address chronic disease by eliminating the root causes instead of simply managing the symptoms. The physician, with community providers and organizations, developed a program to help patients make better choices in their respective environments to improve their health outcomes.

The program which includes mandatory group sessions and YMCA membership and strongly encouraged but optional nutritional and psychological counseling is unique in two ways. First, providers participate in the aerobic group exercise sessions alongside participants. Second, there

is buy-in from insurance carriers. Our objective was to evaluate the Raleigh Wellness Project to assess its effectiveness in 1) facilitating weight loss, 2) improving physical capacity and 3) reducing clinical markers of comorbid conditions among participants.

METHODS

Population

We were asked to analyze data that the program facilitators started collecting in 2011, two years after the program began. Due to large quantities of missing data in the first year, we began the program evaluation with participants newly enrolled in the 2012 cohort. We evaluated data collected from 100 unique individuals who completed the 12-week program between 2012 and 2014 for the first time. We excluded the data from the second time individuals (n=2) completed the program. Individuals with at least one weight-related comorbidity were eligible to participate if they were referred by their provider. Comorbidities included hypertension, hyperlipidemia, impaired fasting glucose, diabetes mellitus type 2, sleep apnea, osteoarthritis, gout, coronary artery disease and gastroesophageal reflux disease. Referred individuals met with program facilitators to learn more about program requirements. To enroll, individuals paid a $50 participation fee and agreed to attend weekly sessions including one hour of health education facilitated by community health professionals and one hour of group exercise facilitated by YMCA staff. The early health education sessions focused on obesity awareness and decision-making for good health and the latter sessions focused on specific obesity-related medical conditions. The health professionals that facilitated the program, including primary care and specialty providers, nutritionists, and psychologists were encouraged to participate in the exercise session with the group; the founding internist participated regularly. For each session,

insurance claims were made and participants paid a copayment for a primary care group visit. Individual nutritional and psychological counseling visits were billed separately. Participants paid any uncovered expenses.

Measures

Weight and blood pressure were measured weekly during the group session by a program staff member with the same scale and monitor. Blood pressure was measured with the participants in the seated position. Data collected during the baseline and final assessments also included waist circumference, cholesterol levels, hemoglobin a1c, and the number of laps walked in 30 minutes. Fifteen laps is equivalent to one mile on the track. Data entry was performed by a program assistant.

Statistical Analysis

Participant characteristics were assessed with descriptive statistics. We performed a pre-post intervention analysis using paired t-tests to compare the participants' baseline and final data. *P-value* <0.05 denotes significance. We performed all analyses in April 2015 using STATA statistical software (version 11; StataCorp; College Station, TX). The Institutional Review Board at the University of North Carolina approved evaluation of the program data.

RESULTS

On average, sixteen individuals participated in each 12-week cycle of the program. Of the 100 included individuals, average age was 62 years; most were male, Caucasian, and commercially

insured (Table 1). More than half of participants had at least three comorbid conditions; hyperlipidemia was the most common (80%).

In twelve weeks, participants visited the YMCA on average sixteen times (range 4-56 visits). The average weight loss was 4.6%. Most participants (70%) lost at least 3% of their baseline weight and 42% of participants lost at least 5% of their baseline weight.

In the pre-post intervention analysis, program participation was associated with a significant reduction in weight ($p<0.00001$), body mass index (BMI) ($p<0.00001$), waist circumference ($p<0.00001$), systolic blood pressure ($p<0.00001$), diastolic blood pressure ($p=0.0001$), and triglyceride levels ($p=0.001$) (Table 2). There was also a significant increase in the total number of laps participants walked in 30 minutes. Participation was not associated with significant reductions in hemoglobin a1c, total cholesterol, high-density and low-density lipoprotein.

DISCUSSION

We evaluated the Raleigh Wellness Project, a community-based twelve-week lifestyle modification program, for its effectiveness in achieving the founding primary care physicians goal of assisting individuals with weight-related comorbidity in modifying their lifestyles and improving their health. The program evaluation showed lifestyle modification was achieved through the components of the program including program leadership participation in weekly group educational and exercise sessions alongside participants, unlimited YMCA access for the program duration, and access to nutritional and psychological counseling. Overall, individuals who participated in the program had significant reductions in weight, waist circumference,

systolic blood pressure, diastolic blood pressure, and triglycerides and a significant increase in the total number of laps they completed in 30 minutes. However, hemoglobin a1c, total cholesterol, high-density lipoprotein and low-density lipoprotein were not significantly reduced.

Our findings, like other studies show participants in group lifestyle modification programs, of varying lengths, improve their weight and health outcomes.[9,11-13] As shown in the Raleigh Wellness Project program evaluation, lifestyle modification program participants commonly have significant reductions in weight,[11,14] BMI,[12,15] waist circumference,[12,16,17] and blood pressure[12,14-19] and improved physical activity capacity.[12,20] Furthermore, in other studies participants reported improvement in measures we did not assess including mood,[17] overall health-related quality of life,[17] and job satisfaction.[21]

While our evaluation did not show statistically significant reductions in hemoglobin a1c, total cholesterol, high-density lipoprotein and low-density lipoprotein, there are studies that do.[14-16,18,22] Dissimilarities in outcomes for participants in the Raleigh Wellness Project and comparable programs may be explained by differences in weight loss, intervention duration, disease severity at baseline, and adherence to disease management. While we assessed participant involvement in the lifestyle intervention, we did not assess adherence to medication regimens. Knowledge of participant medication adherence, especially for individuals with diabetes, would have been a valuable means to understanding changes in hemoglobin a1c and could have strengthened our evaluation.[22]

At its inception, psychological counseling was not a component of the Raleigh Wellness Project. However, it was added due to dietitians experience in one-on-one sessions with early participants seeking guidance on overcoming obstacles to their progress. While individuals with excess weight and comorbidities know they need to change their knowledge, attitudes and beliefs regarding dietary and physical activity regimens, internal and external factors may deter action.[7] Barriers to change include competing work and domestic demands,[23] time,[24] and discouragement after repeated failures in making sustainable modifications.[7] Identifying, understanding and addressing barriers to change and motivation is necessary in order to catalyze effective lifestyle modification.

The Raleigh Wellness Project is unique in its multidisciplinary approach including program leadership participating in activities alongside participants. Provider involvement may have contributed to the programs' effectiveness in motivating participants to transform knowledge into action.[10] Hypertensive patients' trust in their physician is associated with increased effort in making suggested lifestyle modifications.[25,26] Having a multidisciplinary team is also associated with improved participant motivation to change.[27,28] Specifically, participants in lifestyle modification programs report nutritional and psychological counseling as a source of empowerment, satisfaction and motivation to persevere.[23] Furthermore, YMCA collaboration is valuable because gym-based resistance training yields greater systolic blood pressure reduction than home-based training.[29]

Prevention of excess weight is likely less costly in time, resources, and finances than comorbid disease treatment. Interestingly, insurers supported program participation. While we did not assess cost, another unique characteristic of this program is the mutually beneficial partnership with insurers to support participation. For Medicare beneficiaries, a study on cost savings associated with a weight loss program to prevent disease estimated net lifetime healthcare savings of 7 to15 billion dollars.[30]

Limitations

Our findings must be considered in the context of limitations. Program participants are volunteers who want to change. Therefore, their results may vary from a less motivated population. Billing insurers may limit participation by uninsured individuals. Older participants (average participant age 62 years) are more likely have time to participate in the program which may limit generalizability to younger individuals with more competing demands. Although the anthropometric measurements were assessed weekly with the same instruments, there may be variations in measurements due to the absence of standard measurement guidelines other than measuring blood pressure with the participant sitting. Also, we did not assess the counterfactual— outcomes in non-participants. Finally, our evaluation of the program is based solely on previously collected data which did not include variables which could have strengthened the evaluation including the rate of participation by individuals who are referred to the program, the rate of uptake of nutritional and psychological counseling, the average cost of participation, an assessment of adherence, program dropout rate, sustainability of lifestyle changes, and other outcomes of behavioral change including dietary change.

Conclusion

The Raleigh Wellness Project, a group-based lifestyle modification program developed by a primary care physician in North Carolina to address root causes of weight-related comorbidities, was effective in facilitating participant weight loss with resultant reduction in blood pressure and triglyceride levels and improvement in physical activity. This program addresses challenges encountered by many adults who attempt lifestyle modifications in solitude. Future studies should assess sustainability of the lifestyle modifications, weight loss, and improved health outcomes and assess changes in quality of life associated with program participation. Finally, modeling the programs' collaboration with community organizations and insurers in communities outside of Raleigh, North Carolina could have far reaching effects for improving population health.

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Table 1: Baseline Characteristics of Individuals Who Completed the Raleigh Wellness Project Lifestyle Modification Program (2012-2014)

Variables	**Value**
Total number of participants	n = 100
Male (%)	59
Age mean years ± SD (range)	62 ± 11 (29 – 80)
Race (%)	
Caucasian	85
African American	11
Refused to report	3
More than one race	1
Insurance Carrier (%)	
Commercial insurance	59
Medicare	40
Medicaid	1
Comorbidity (%)	
Hyperlipidemia	80
Hypertension	58
Impaired Fasting Glucose	47
Other[a]	34
Diabetes Mellitus Type II	24
Sleep Apnea	17
Osteoarthritis	15
At least THREE weight-related comorbidities (%)	55

Abbreviations: SD, Standard Deviation

[a]Other comorbidity includes non-osteoarthritis, gout, insomnia, coronary artery disease and gastroesophageal reflux disease

Table 2: Pre- and Post- Intervention Analysis of Data from Participants in the Raleigh Wellness Project (2012-2014)

Variable	Pre-intervention (Mean ± SD)	Post-intervention (Mean ± SD)
Weight (lbs)***	217.1 ± 53.6	207.2 ± 51.5
Waist circumference (in)***	43.7 ± 6.2	42.1 ± 6.1
BMI (kg/m^2)***	33.2 ± 6.3	31.7 ± 6.1
Systolic BP (mmHg)***	140.4 ± 20.1	130.7 ± 17.3
Diastolic BP (mmHg)***	76.6 ± 12.9	71.6 ± 10.1
Hemoglobin a1c (%)	6.3 ± 1.1	6.2 ± 1.3
Total cholesterol (mg/dL)	178.2 ± 41.7	173.0 ± 44.3
Triglycerides (mg/dL)**	132.6 ± 64.2	112.0 ± 56.8
HDL (mg/dL)	52.3 ± 18.2	52.6 ± 16.9
LDL (mg/dL)	99.8 ± 34.9	98.7 ± 37.0
Total number of laps walked in 30 minutes***	25.0 ± 4.5	28.5 ± 5.6

Boldface indicates statistical significance (*p<0.05, **p<0.01, ***p<0.001)

Abbreviations: BMI, Body Mass Index; BP, Blood Pressure; dL, Deciliter; HDL= High-Density Lipoprotein; in, Inches; kg, Kilogram; lbs, Pounds; LDL= Low-Density Lipoprotein; m, Meter; mg, milligram; mmHg, millimeters of mercury;