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Brief Original Report

Effects of a physical activity and healthy eating intervention to reduce stroke risk factors in older adults

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ABSTRACT

Objective. To evaluate the effects of a theory-based physical activity and healthy eating intervention aimed at reducing stroke risk factors among overweight/obese and sedentary older adults.

Methods. Between 12/2009–1/2011, participants (n = 69) were randomly assigned to an 8-week group motivational intervention or biweekly newsletters by mail. Physical activity (blinded pedometer, 7-day recall) body composition, theoretical mediator, and dietary (24-hour recall) variables were measured at pre-test and post-test. The physical activity and dietary outcomes are reported.

Results. For outcome measures, the follow-up was 90% for the intervention group (n = 29) and 91% for the control group (n = 34) for this sample. Statistically significant differences in the 7-day physical activity self-report were noted at post-test in the intervention group. The dietary measures were not statistically significant at post-test; however, the intervention group increased the quantity of vegetable servings.

Conclusion. Limited efficacy testing was supported for a combined physical activity-dietary intervention, framed by a wellness-motivation theory, and designed to reduce stroke risk factors in older adults who are sedentary and overweight/obese. Limitations were identified and recommendations for additional research provided.

Introduction

Over one-third of older adults between 65 and 74 years of age meet criteria for obesity and 34% do not participate in regular physical activity (Agency for Healthcare Research and Quality, 2002). Overweight and obesity are implicated in increased stroke risk and are rooted in physical inactivity and poor dietary intake (Goldstein et al., 2006). Data support that regular physical activity (Hooker et al., 2008) and healthy diet (Boden-Albala et al., 2009) reduce the risk of stroke. Current literature suggests that motivational factors, rather than simply knowledge needs, are instrumental in efforts to change health behaviors (Brawley et al., 2003). The purpose of this paper is to report the effects of an 8-week wellness motivation intervention to increase physical activity and healthy diet in older adults at risk for stroke due to overweight/obesity and limited or no regular physical activity. This study will inform the design of a RCT. The primary (physical activity) and secondary (diet) outcomes are reported.

Methods

This study was approved by the IRB at the University of Colorado Colorado Springs. Participants lived in a metropolitan area in the southwestern United States and participated between December 2009 and February 2011.

Participants

Adults aged 60 and older were eligible if they were overweight or obese (BMI 25 to < 40), sedentary or only recently physically active (not regularly physically active or had been for less than 6 months), able to understand English, cognitively intact [passing score on the Mini-cog test] (Borson, 2000) and physically able to participate in a walking program.

Study design

Participants were randomized to either the Promoting Older Adult Wellness (POW) or attention control (AC) group. Groups were assigned using a table of random numbers. Participants were recruited and assigned based upon consecutive enrollment. Participants received a sealed envelope with their group assignment immediately following their Time 1 measurements. The research assistant (RA) was blinded to group assignment and performed baseline and post-test measures. The AC group received mailed newsletters for 8 weeks on health topics considered relevant to older adults (e.g. polypharmacy, sun safety, falls). Participants received a $25 gift card at each measurement.

Intervention design

Wellness Motivation Theory [WMT], which aims to foster social contextual resources and behavioral change process skills (Perez and Fleury, 2009), was used to design the intervention. Self-knowledge, motivation appraisal, and self-regulation are key theoretical concepts used to frame the intervention strategies (Fleury, 1996). The theoretical outcomes were measured at pretest and posttest and are reported in a separate paper. Motivational support,

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empowering education, and social network support are key theoretically-based strategies implemented in the POW intervention. The Dietary Approaches to Stop Hypertension (DASH) diet (Fung et al., 2008) and current guidelines for initiation of physical activity (USDHHS, 2008) were integrated into the POW intervention. A lay health advisor (Kim et al., 2004), an older adult recruited from the community health center, served as a role model for regular physical activity and healthy eating, and participated in each POW group session providing social and motivational support. Eight one-hour weekly sessions were facilitated by a trained interventionist. A facilitator guide and participant workbook provided resources and exercises designed to facilitate goal setting, barrier identification and strategy formation related to healthy eating behaviors and physical activity. Participants engaged in a supervised, progressive walking program that worked up to a moderately-paced, 30-minute walk. Participants were encouraged to set short and long-term goals for physical activity and healthy eating.

Measurement

Physical activity

Physical activity was measured using a 7-day pedometer and a 7-day PA self-report elicited by the research assistant (RA). The pedometer was sealed (blinded) to prevent participants from viewing results and inadvertently deleting data. The pedometer has been established as a valid and reliability means of objectively measuring physical activity (Tudor-Locke et al., 2002) and the 7-day PA self-report has been found to correlate closely with objective measures of physical activity (Blair et al., 1985).

Dietary intake

A trained RA administered the 5-pass 24-hour diet recall method which increases the accuracy of dietary recall data (Conway et al., 2004). Food Processor SQL Nutrition Analysis Software (ESHA Research, 2012) was used to analyze the key dietary components of sodium intake (mg), total fat (g), total carbohydrates (g), percent of fat calories, total calories (kcal), total cholesterol (mg), number of portions each of fruits, vegetables, dairy, protein, and grains.

Analytic methods

Frequencies and descriptive statistics were obtained for baseline data. Group differences were assessed using chi-square and t-tests. Study outcomes were assessed using analysis of covariance (ANCOVA) with the baseline measure entered as a covariate. The groups differed on age; the intervention group was significantly older (mean difference 3.59 years; $p = .038$) and, therefore, age was entered as an additional covariate in the ANCOVA analyses. Missing data were less than 2 percent of total data, random, and not imputed. Significance was set at $p < .10$ for this preliminary analysis in order to avoid type II error and missing potential hypotheses for future research. Effect sizes were assessed using Cohen's d and are presented in Table 2.

Results

Participants

The CONSORT flow diagram is presented in Fig. 1. Sixty-nine participants were randomly assigned. Three participants in each group dropped out prior to post-test measurement; drop outs did not differ significantly from other participants on baseline measures. The final sample was 29 (90%) in the POW intervention group and 34 (91%) in the AC group. As noted in Table 1, the mean age was 69.6, 82% were female, 69% were white, 36% were married, 86 percent retired; the median monthly income was between $1000 and 1399. The groups were similar in distribution of stage of change for physical activity at baseline (sedentary vs. active less than 6 months).

Table 1
Baseline demographic, physical activity, diet, and health characteristics of participants.

Characteristic	Intervention group (n = 32)	Attention group (n = 37)	*p*
Demographics (M, SD)			
Age	71.3 (7.43)	67.76 (6.66)	.040*
Female	26	31	.782
White	24	24	.699
African-American	4	7	.699
Retired	27	32	.224
Completed years education	14 (2.7)	14.4 (3.01)	.543
Married	13	12	.498
Physical activity and dietary (M, SD)			
Physical activity recall (7-day)	64.84 (80.90)	95.27 (156.80)	.326
Blinded pedometer steps (7-day)	24045 (15491)	21827 (14042)	.535
Total calories	1616.15 (764.64)	1587.27 (727.04)	.873
Sodium (mg)	2713.77 (1526.03)	3973.39 (3948.16)	.079
Cholesterol (mg)	246.72 (168.11)	247.35 (270.63)	.991
Fat (gm)	59.65 (39.58)	56.75 (33.06)	.741
Health (M, SD)			
SBP	129 (17.03)	131 (17.82)	.613
DBP	82 (9.25)	85.73 (10.61)	.166
Weight (kg)	79.15 (12.15)	83.72 (12.62)	.132
WC (in)	39.89 (3.18)	40.49 (4.40)	.513
HC	45.09 (3.69)	45.75 (3.88)	.476
BMI	30.30 (3.28)	31.96 (3.88)	.061
Percent body fat	40.44 (6.85)	41.63 (6.65)	.466

p value < .05; M = mean; SD = standard deviation.
mg = milligrams.
gm = grams
kg = kilograms.
in = inches.
Note: Participants were community-dwelling adults aged 60 and older living in Colorado Springs, CO between 2009 and 2011.

Behavioral outcomes

The 7-day physical activity self-report measure was significantly higher at post-test in the intervention group ($p = .086$). When one outlier (extremely high value; greater than 3 SD from the mean) was removed from the analysis, the significance improved ($p = .063$). Pedometer steps were not statistically significant at post-test with the outlier removed ($p = .119$). The intervention group's vegetable intake increased at post-test by nearly one-half serving (M difference .41; $p = .346$) compared to the control group which did not change (M difference .019; $p = .961$). The time and group interactions were not significant at post-test for total calories, carbohydrates, calories from fat, cholesterol, sodium, fat grams, or servings of protein, dairy, grains, or fruit.

Discussion

Significant changes were noted in the 8-week intervention group at post-test on self-reported physical activity; pedometer steps approached significance at post-test (Table 2). Dietary changes in vegetable intake were not statistically significant; however the changes may be clinically significance. For example, in the Nurses' Health Study, the addition of one serving of vegetables resulted in a 6% decrease in risk for stroke (Joshipura et al., 1999).

There are a number of possible explanations for the lack of statistical significance for the dietary variables at post-test. For this study, the 8-week duration was selected to enhance the probability that the older adult participants would have high rates of attendance and to reduce the risk of attrition. However, there is empirical support for intervention duration of at least 12 weeks to achieve behavior change (Yeom et al., 2009). Retrospective population research suggests that adults aged 60 and older are the age group most likely to adhere to the DASH diet principles (Mellen et al., 2008). Testing the intervention over a longer time period has the potential to result in positive dietary change. For example,