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Research Article

Group Lifestyle Phone Maintenance for Weight, Health, and Physical Function in Adults Aged 65–80 Years: A Randomized Clinical Trial

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Abstract

Background: Group lifestyle sessions with phone maintenance could improve weight, health, and function in vulnerable older adults.
Methods: Community-dwelling adults (N = 322) with body mass index (BMI, kg/m^2) ≥27 and additional risk factors received 12 one-hour in-person behavioral weight management group sessions then were randomized to 8 half-hour telephone sessions (n = 162) or newsletter control (n = 160) from 4 to 12 months with no treatment contact thereafter. Primary outcome was 0- to 12-month weight change. Cardiometabolic, short physical performance battery (SPPB), and self-reported activity changes were assessed at 12 and 24 months.
Results: At baseline, the mean (SD) age was 71.2 (4.3) and BMI was 33.8 (5.1). Participants were 77% women, 13% Black, 85% retired, averaging 4 medical conditions, and taking blood pressure (67.4%) and lipid-lowering (51.6%) medications. At 12 months, a greater proportion of the phone group (66.0%) achieved ≥5% weight loss compared with newsletter control (53.2%; p = .02). Mean (95% CI) weight loss was greater for phone (−6.6 kg [−7.5, −5.8]) than newsletter (−5.1 kg [−7.2, −3.0]); p = .01. Modest lipid, glucose, and blood pressure improvements were found, but did not differ significantly between groups. Small SPPB and activity improvements were maintained at 12 and 24 months in both groups.
Conclusions: Brief phone contacts compared to newsletters enhanced weight loss maintenance among older high-risk adults at 1 year, but not cardiometabolic outcomes. Modest functional improvements were observed in both. Lower-intensity maintenance contacts (phone or newsletter) for weight, health, and physical function in older adults warrant further study.
Clinical Trials Registration Number: NCT03192475

Keywords: Lifestyle intervention, Obesity, Overweight, Physical function, Telehealth

Health care utilization and costs are increasing along with the aging population in the United States (1). Overweight and obesity combined has also increased significantly among those aged 60 years and older with an estimated prevalence of more than 70% (2). Obesity prevalence alone (body mass index [BMI] ≥30 kg/m^2) exceeds 40% (3) and is associated with declines in cardiometabolic health (4), mobility (5), and independence (6). Modest weight loss through calorie-reduced healthy eating, paired with aerobic and resistance activities, represents a potentially safe, feasible, and effective intervention approach for high-risk older adults (7–9).

Many studies report the cardiometabolic and functional health benefits of weight management, but areas of controversy remain. Some research posits that higher weight may be health protective for older adults (10–12), weight loss exacerbates the loss of lean mass increasing the risk for frailty and fractures (13), and risks of caloric restriction may outweigh benefits (14,15). Nevertheless, trials with middle-aged adults, for example, the Diabetes Prevention Program (DPP) (16) and Look AHEAD (17) and other high-intensity diet and exercise interventions with older and sometimes frail adults (18–20) document health benefits. Notably, recent data from the U.S. National Health and Nutrition Examination Survey indicated that 42.7% of adults older than age 60 reported that they had tried to lose weight in the past year suggesting that practical evidence-based guidelines are important (21). In a special issue of this journal, Kritchevsky (22) argued that the rising tide of obesity in older adults should be "taken seriously" and more randomized intervention studies were needed to address the balance of potential harms and benefits.

Given prior evidence, it is important to examine the translational effectiveness of feasible, presumably safe, and efficacious programs for older adults with weight-related health conditions. Telehealth interventions have shown promise (23,24), but none focus exclusively on older adults. The primary hypothesis of this study was that weight-management follow-up utilizing a telephone group format during the maintenance phase, compared with newsletter control, would enhance weight loss at 1 year. Secondarily, we examined program effectiveness on cardiometabolic, physical function, and physical activity outcomes at 1 and 2 years from baseline.

Method

The Pitt Retiree Study was a randomized controlled trial of 2 parallel contact conditions for weight loss maintenance, group phone sessions or newsletter control, after 12 weeks of in-person behavioral weight loss induction. The primary study outcome was weight change at 12 months. All procedures were approved by the University of Pittsburgh Human Research Protections Office and all participants provided informed consent. Five consecutive cohorts were enrolled at community sites around Southwestern Pennsylvania between 2013 and 2015. The study is registered at Clinical Trials.gov (NCT03192475).

Participants

Recruitment targeted a University benefits department, a Pepper Older American Independence Center, a state pension organization, a community hospital foundation, and senior agencies. The trial enrolled and randomized 322 participants using the following prespecified inclusion criteria: age 65–80 years, high-risk men and women with overweight/obesity (BMI ≥27 kg/m^2), and at least one additional cardiometabolic risk factor (large waist circumference, hypertension or currently taking blood pressure medication, hyperlipidemia or currently taking statins, or fasting glucose ≥100 mg/dL but <126 mg/dL). Individuals with diagnosed diabetes, those taking metformin or weight loss medications, or reporting bariatric surgery within the past 2 years were excluded. Participants obtained medical clearance to enroll, were ambulatory (including cane and walker users), English speakers, with access to mobile and landline telephones. If enrolled with a spouse/partner, only one individual (n = 28) was randomly designated for the primary analysis. All research activities were conducted at community, recreational, church, municipal, and medical sites proximal to enrollees.

Intervention: Weight Loss Induction

All older adults enrolled were offered twelve 60-minute, in-person sessions, in groups of 8–12. Three part-time interventionists (Masters level, licensed registered dietitians with geriatric nutrition expertise) were trained by the Diabetes Prevention Support Center at the University of Pittsburgh (25) and used the Group Lifestyle Balance (26) intervention derived from the 16-session DPP (27). At the end of each session, a "Wisdom of the Ages" page highlighted the relevance of specific behavior changes for healthy aging. Behavioral self-regulation theory guided implementation (28), including self-monitoring and feedback, a 7% weight loss goal by 4 months, and individual maintenance goals thereafter. Daily calorie goals were assigned according to baseline weight as follows: 1200 kcal if 78.9 kg or less, 1500 kcal if 79.4–99.3 kg, 1800 kcal if 99.8–112.9 kg, and 2000 kcal if 113.4 kg or more. Dietary aims included less than 30% of total calories from fat, USDA MyPlate meal patterns as the healthy eating model, and a strong emphasis on including lean protein and dairy at each meal. Participants were encouraged to take a multivitamin and consult with their health care provider regarding other supplement needs. Physical activity guidelines for older adults emphasized a self-directed 150 minutes/week minimum aerobic activity goal and standard recommendations for strength, balance, and flexibility exercises (29,30). Safety was prioritized. Those with mobility limitations were encouraged to adapt their activities with guidance from medical providers. Group lifestyle session videos used in prior studies as the primary intervention (31,32) were provided as a make-up for missed sessions.

Randomization

Participants were stratified by age (<73, ≥73 years), race (White, non-White), and weight change at 4 months (<3.5%, ≥3.5%) using a program that randomly selected block sizes of 2. They were assigned to either phone or newsletter follow-up by the study statistician. Other investigators and assessors were blinded to this allocation scheme.

Phone Maintenance

Thirty-minute group conference-call sessions were held monthly for 8 months at a regular appointment time, for the same 4–6 participants and their original study interventionist. Maintenance materials (also derived from the DPP) and food and activity self-monitoring booklets with return envelopes were mailed 2 weeks prior to each phone session. Participants were instructed to access a dedicated toll-free conference line from their preferred device (audio-only) in locations free from distraction. No further accommodation was made for persons with hearing difficulties; however, no problems were reported. One phone session, 8 months from baseline, was dedicated to strength training. Soft-handled resistance bands and illustrated exercises were provided. If participants missed a group phone session, the interventionist made one attempt to reach them prior to the next session.

Newsletter Maintenance

Four newsletters were distributed by U.S. mail/e-mail with content similar to phone group materials. Two sessions were combined per newsletter and mailed every other month during the 8-month follow-up period. One newsletter featured strength training and provided web-links to the National Institute on Aging; however, no illustrated exercise guides or self-monitoring material was included in the newsletters.

Measurements

Baseline, 4, 12, and 24-month outcome visits were conducted by independent assessors. Primary changes of interest were for 0- to 12-month measures. A 24-month assessment documented effects in the absence of treatment contact. Participants received $25 for visit completion at baseline and 4 months, $50 at 12 months, and $75 at 24 months.

Weight and height were measured twice and averaged (to nearest 0.1 kg or cm) with street clothing and shoes removed. Waist circumference was taken twice with a Gulick tape measure and averaged.

Blood samples were collected by fingerstick after an 8-hour fast. Results were analyzed immediately using the Alere Cholestech LDX System, adhering to company-specified quality control procedures. Measures (mg/dL) included total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, triglyceride, and glucose.

Blood pressure was taken twice, in a seated position after a 5-minute rest, and averaged. An automatic inflatable digital monitor (OMRON HEM90HXC) was used and cuff size was determined by arm measurement. Participants and their physicians received results.

Physical function was measured by the Short Physical Performance Battery (SPPB), producing a total score of 0–12 (higher is better) (33). SPPB components were also examined separately for gait speed (m/s on a 4.5-m course; higher is better), and 5-chair rises (seconds to complete; lower is better), but not the standing balance test (ability to complete 4 progressively harder standing poses). Grip strength (kg per pound) measured by a Jamar dynamometer was included to assess whether weight loss was associated with decreased strength (34), as another marker of frailty (35).

Self-reported physical activity was assessed in 2 ways. The Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire for older adults (36), used in prior community-based activity studies of adults aged 60 or older (37), includes 41 items measuring the frequency and duration, per week, of recreational and activities of daily living important to older adults. Total activity (all items) and light-to-moderate intensity activity minutes per week were assessed. The latter used items ≥2.5 metabolic equivalents according to the Ainsworth compendium (38) and estimates specific to older adults (39) were computed. A single item from the Stanford Brief Physical Activity survey (40) was also used to estimate the frequency and intensity of past-month physical activities.

Statistical Analyses

Baseline characteristics of participants by intervention condition were summarized using descriptive statistics. Linear mixed-effects regression models were used to obtain maximum likelihood-based estimates of between- and within-contact condition change in the primary endpoint (weight) using all available participant data. Given that there was only 3.7% and 2.5% missing weight data at 12 months for participants randomized to phone and newsletter follow-up groups, respectively, no imputation methods were utilized. The dependent variables were the level of each outcome factor at each study visit. Independent variables, follow-up contact condition (phone vs newsletter), visit, and contact condition by visit interaction, were entered as fixed effects. Subject was entered as a random effect. All models were fit with an unstructured covariance matrix to account for within-subject clustering in the repeated measures data. Residuals were examined to verify that model assumptions were not violated. The secondary endpoints, including cardiometabolic risk factors, physical function performance scores, and self-reported physical activity, were analyzed using the same methods. In addition, we conducted a series of analyses to test whether baseline demographic or clinical measures including sex, race, age, educational attainment, BMI, or impaired fasting glucose (≥100 mg/dL) were intervention effect modifiers. All analyses used SAS version 9.4 (SAS Institute Inc., Cary, NC).

The study was powered for the proportion per follow-up group (phone or newsletter) maintaining ≥5% weight loss at 12 months, as well as the mean weight change difference between groups. It was estimated that 160 participants per arm and ≤25% attrition would provide 90% power to detect differences of 21% between the follow-up groups and 80% power for 19% differences. Using the same participant parameters, between-group mean differences of 1.9 kg weight loss yielded 90% power and difference of 1.7 kg yielded 80% power to detect significant group differences. Exploratory analyses of 24-month outcomes were also examined.

Results

Study Participants

The consort diagram (Figure 1) shows 634 individuals were phone-screened, and 414 enrolled and completed a baseline assessment. There were 54 (13%) exclusions confirmed at baseline, thus the eligible cohort was N = 360. Of these, 17 (4.7%) persons never started the intervention and were unable to be contacted, and 21 (5.8%) were lost prior to session 12 and the randomization step (most citing scheduling or family concerns). The primary outcome analysis included the 322 individuals with measured weight and cardiometabolic data at baseline, 4, and 12 months (n = 156 phone, n = 156 newsletter).

Table 1 shows that baseline characteristics were well balanced between randomized study groups. Participants were of mean age 71 years (*SD* 4.3), predominantly non-Hispanic White (86.0%), female (76.7%), and retired/unemployed (84.8%). On average, the cohort had Class 1 obesity (mean BMI 33.5, [*SD* 5.1]). The risk spectrum included BMI (n, %): 27–29.9 (100, 31%); 30–34.9 (139, 43.2%); and ≥35 (83, 26%). Most used blood pressure (67.4%) medications and about half took lipid-lowering agents (51.6%) and reported a median of 4 chronic conditions (interquartile range, 2–5). About half had a family history of type 2 diabetes and one third had

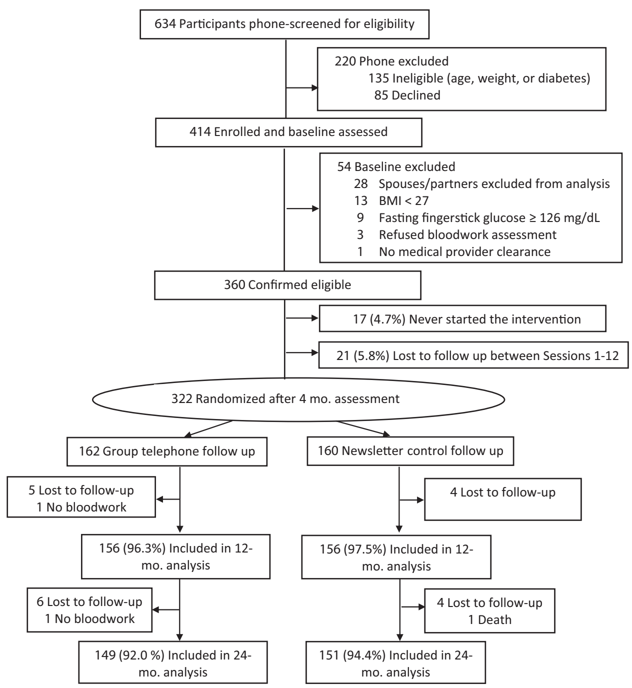

Figure 1. Flow diagram: participant screening, enrollment, and study follow-up.

Table 1. Baseline Participant Characteristics

Variable	Total Randomized (n = 322)[a]	Phone Maintenance (n = 162)	Newsletter Control (n = 160)	Lost Prior to Randomization (n = 38)
Age, mean (*SD*)	71.2 (4.3)	71.3 (4.4)	71.0 (4.2)	70.6 (5.5)
Age range, *n* (%)				
65–72.5	200 (62.1)	96 (59.3)	104 (65.0)	28 (73.7)
>72.5–80	122 (37.9)	66 (40.7)	56 (35.0)	10 (26.3)
Sex, *n* (%)				
Women	247 (76.7)	126 (77.8)	121 (75.6)	30 (79.0)
Race/ethnicity, *n* (%)				
White	277 (86.0)	141 (87.0)	136 (85.0)	29 (76.3)
Black or mixed race	42 (13.1)	21 (13.0)	21 (13.1)	9 (23.7)
Hispanic/Latino	3 (0.9)	0 (0.0)	3 (1.9)	0 (0.0)
Education, *n* (%)[b]				
High school or less	48 (14.9)	22 (13.6)	26 (16.2)	10 (26.3)
Some college/college graduate	154 (47.9)	82 (50.5)	72 (45.0)	20 (52.6)
Graduate school	119 (37.0)	57 (35.2)	62 (38.8)	8 (21.1)
Income, *n* (%)				
<% $39 999	101 (31.4)	50 (30.9)	51 (31.9)	14 (36.8)
≥$40 000	162 (50.3)	79 (48.8)	83 (51.8)	15 (39.5)
Declined to answer	58 (18.0)	32 (20.3)	26 (16.3)	9 (23.7)
Employment status, *n* (%)[b]				
Currently retired/unemployed	273 (84.8)	136 (84.0)	137 (85.6)	30 (79.0)
Employed ≤20 hours/week	30 (9.3)	11 (6.8)	19 (11.9)	2 (5.3)
Employed >20 hours/week	18 (5.6)	14 (8.6)	4 (2.5)	6 (15.8)
Household composition, *n* (%)				
Never married	26 (8.1)	15 (9.3)	11 (6.9)	2 (5.3)
Married or living together	178 (55.3)	88 (54.3)	90 (56.3)	20 (52.6)
Separated or divorced	54 (16.8)	26 (16.1)	28 (17.5)	9 (23.7)
Widowed	64 (19.9)	33 (20.4)	31 (19.4)	7 (18.4)
Body mass index, kg/m^2[c]				
Mean (*SD*)	33.8 (5.1)	34.0 (5.6)	33.5 (5.1)	33.4 (6.2)
Range	27–55	27–52	27–55	27–53
Family history type 2 diabetes, *n* (%)				
Yes	150 (46.6)	69 (42.6)	81 (50.6)	19 (50.0)
No	160 (49.7)	87 (53.7)	73 (45.6)	17 (44.7)
Do not know	12 (3.7)	6 (3.7)	6 (3.8)	2 (5.3)
Prediabetes (told by physician) *n* (%)				
Yes	84 (26.1)	39 (24.1)	45 (28.1)	8 (21.1)
No	222 (68.9)	112 (69.1)	110 (68.8)	27 (71.1)
Do not know	16 (5.0)	11 (6.8)	5 (3.1)	3 (7.8)
Fasting fingerstick glucose, *n* (%)				
≥100 mg/dL	101 (31.4)	56 (34.6)	45 (28.1)	12 (32.4)
≥110 mg/dL	26 (8.1)	12 (7.4)	14 (8.8)	1 (2.7)
Blood pressure medication, *n* (%)[e]	217 (67.4)	109 (67.3)	108 (67.5)	23 (76.7)
Lipid-lowering medication, *n* (%)[d]	166 (51.6)	82 (50.6)	84 (52.5)	13 (43.3)
Gait speed mean (*SD*), m/s	0.84 (0.17)	0.86 (0.18)	0.83 (0.16)	0.83 (0.14)
Chronic conditions, *n*, median (IQR)	4 (2–5)	3 (2–5)	4 (2–5)	4 (2–4)
CES-D ≥11, *n* (%)[e]	82 (25.6)	37 (22.8)	45 (28.3)	17 (44.7)

Note: BMI = body mass index; CES-D = Center for Epidemiological Studies-Depression scale; IQR = interquartile range.

[a]Baseline characteristics did not differ significantly between phone and newsletter conditions.

[b]Education, employment data missing for N = 1.

[c]BMI value excluded for N = 1 (extreme outlier).

[d]Medication lists not returned for N = 8 participants lost prior to randomization (percentages based on n = 30).

[e]Greater percentage of participants lost prior to randomization had elevated depressive symptoms (p < .05).

a fasting fingerstick glucose of ≥100 mg/dL. The average gait speed in this older cohort was consistent with that of community-dwelling volunteers (0.84 ± 0.17).

We also examined the baseline characteristics of the n = 38 (10.5%) of enrolled and eligible participants lost between 0 and 4 months and compared them to those who were randomized. Two features distinguished participants lost early: a lower level of educational attainment, on average, and elevated depressive symptoms (p = .05).

Primary Outcome

A significantly larger proportion of the phone group (66.0%) achieved ≥5% weight loss compared with newsletter (53.2%); p = .02. Mean weight loss (95% CI) at 12 months, adjusted for baseline BMI, was significantly greater for phone (−6.6 kg [−7.5, −5.8]) compared with newsletter intervention (−5.1 kg [−7.2, −3.0]); p = .01. Results were similar for percent weight loss (Figure 2) or BMI change (Table 2). No consistent pattern of effect modification

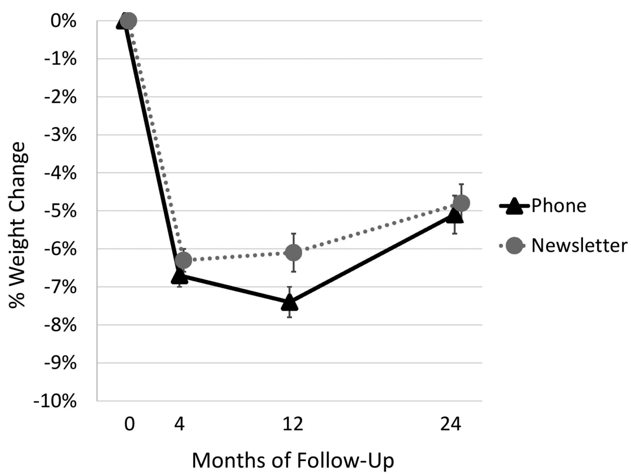

Figure 2. Changes in percent weight loss by randomized maintenance condition (phone, newsletter).

by sex, race, age, education, BMI, or impaired fasting glucose was observed (data not shown).

Secondary Outcomes

Table 2 displays all weight and cardiometabolic measures assessed. There were significant favorable changes within both phone and newsletter groups at 12 months for waist circumference, lipid, glucose, and blood pressure measures, consistent with weight loss. The phone group demonstrated significant mean (95% CI) reduction in low-density lipoprotein cholesterol mg/dL (−5.8 [−9.8, −1.9]; p = .009) at 12 months but the between-group comparison not significant (p = .09). high-density lipoprotein cholesterol (HDL) (mg/dL) levels dropped in both groups at 12 weeks, which has been documented previously as an acute effect of weight loss induction (41). HDL levels increased between baseline and 12 months. Although effect sizes were larger with phone maintenance for all measures, no between-group differences reached significance. No consistent pattern of effect modification by the baseline characteristics listed above was observed.

Table 2. Changes in Weight and Secondary Outcome Measures by Randomized Maintenance Condition (Phone, Newsletter)

Outcome Measure	Baseline Mean (*SD*)	4 Months[a] (Phone = 162 and Newsletter = 160)	12 Months[b] (Phone = 156 and Newsletter = 156)	Group p^c	24 Months (Phone = 149 and Newsletter = 151)	Group p^c
Weight (%)						
Phone	—	−6.7 (−7.5, −5.9)	−7.4 (−8.9, −5.9)	***.01***	−5.1 (−6.6, −3.5)	.57
Newsletter	—	−6.3 (−8.3, −4.3)	−6.1 (−8.6, −3.6)		−4.8 (−7.3, −2.2)	
Weight (kg)						
Phone	91.6 (16.6)	−6.1 (−6.6, −5.6)	−6.6 (−7.5, −5.8)	***.01***	−4.5 (−5.5, −3.6)	.45
Newsletter	89.8 (14.6)	−5.7 (−7.0, −4.5)	−5.1 (−7.2, −3.0)		−4.0 (−6.3, −1.8)	
BMI (kg/m^2)						
Phone	34.1 (5.6)	−2.3 (−2.5, −2.1)	−2.4 (−2.7, −2.1)	***.02***	−1.6 (−1.9, −1.2)	.61
Newsletter	33.5 (5.1)	−2.1 (−2.6, −1.7)	−1.9 (−2.7, −1.1)		−1.5 (−2.3, −0.6)	
Waist (cm)						
Phone	111.0 (12.7)	−5.2 (−5.9, −4.6)	−5.3 (−6.4, −4.2)	.15	−3.7 (−4.9, −2.4)	.51
Newsletter	110.7 (11.2)	−4.9 (−6.5, −3.3)	−4.1 (−6.8, −1.4)		−3.1 (−6.2, −0.1)	
Total cholesterol (mg/dL)						
Phone	185.7 (35.2)	−11.6 (−15.5, −7.7)	−5.0 (−9.3, −0.8)	.25	+0.8 (−3.6, +5.3)	.84
Newsletter	186.8 (39.7)	−10.9 (−20.4, −1.5)	−1.5 (−11.8, +8.8)		+0.2 (−10.5, +10.9)	
High-density lipoprotein cholesterol (mg/dL)						
Phone	55.1 (17.5)	−4.4 (−6.0, −2.9)	+4.8 (+3.2, +6.4)	.11	+5.3 (+3.6, +7.0)	***.01***
Newsletter	56.5 (16.9)	−5.6 (−9.3, −1.9)	+2.9 (−1.1, +6.9)		+2.3 (−1.8, +6.3)	
Replace with spell-out: Low-density lipoprotein cholesterol (mg/dL)						
Phone	103.9 (29.9)	−3.2 (−6.8, +0.4)	−5.8 (−9.8, −1.9)	.09	−3.2 (−7.4, +1.0)	.14
Newsletter	104.3 (32.7)	−0.7 (−9.4, +7.9)	−1.1 (−10.6, +8.4)		+1.2 (−8.9, +11.3)	
Triglyceride (mg/dL)						
Phone	133.0 (57.9)	−19.8 (−27.3, −12.7)	−20.1 (−28.2, −12.1)	.53	−9.6 (19.5, +0.3)	.60
Newsletter	129.9 (63.2)	−20.3 (−37.7, −2.9)	−16.5 (−36.0, +3.0)		−5.9 (−29.8, +18.0)	
Glucose (mg/dL)						
Phone	95.6 (9.7)	−1.2 (−2.5, +0.2)	−2.3 (−3.6, −0.9)	.21	+1.7 (+0.2, +3.3)	.89
Newsletter	94.8 (10.4)	−0.9 (−4.3, 2.4)	−1.1 (−4.3, +2.3)		+1.9 (−1.9, +5.6)	
Systolic (mmHg)						
Phone	133.0 (17.5)	−8.6 (−11.1, −6.1)	−2.6 (−5.2, +0.004)	.60	−2.2 (−5.0, +0.6)	.77
Newsletter	131.2 (16.6)	−8.7 (−14.8, −2.7)	−1.6 (−8.0, +4.7)		−1.6 (−8.4, +5.2)	
Diastolic (mmHg)						
Phone	76.7 (10.0)	−4.9 (−6.3, −3.5)	−3.5 (−4.8, −2.1)	.15	−2.3 (−3.8, −0.8)	.62
Newsletter	75.9 (8.8)	−4.8 (−8.2, −1.4)	−2.1 (−5.4, +1.2)		−1.8 (−5.3, +1.8)	

Note: BMI = body mass index. Bold/italicized numbers represent p-values at the significance level of .05 or lower.
[a]Four-month (pre-randomization) changes were not significantly different between groups.
[b]Blood specimen for 1 participant could not be processed at 12 months.
[c]All 12- and 24-month change comparisons, between groups, were adjusted for baseline BMI.

Physical function

Table 3 shows that both phone and newsletter groups evidenced modest positive changes in total SPPB scores at 12 months with no significant between-group differences. The phone group had a mean score (*SD*) of 7.9 (2.1) at baseline (possible range 0–12; 12 is best) with an increase of +0.3 (1.4; p = .001). The newsletter group had a baseline mean score of 7.7 (2.1) and increased by +0.3 (1.7; p = .02). The gait speed and 5-chair stand components of the battery showed a similar pattern with both groups demonstrating favorable changes with no significant between-group differences. Mean grip strength did not decline in either group but rather showed an increase at 12 months for phone (+0.6, *SD* = 3.1; p = .03) and for newsletter (+ 0.5, *SD* = 3.1; p = .06).

Activity

Table 4 presents 0- to 12-month changes on CHAMPS for the phone and newsletter groups. Both showed a median 30-minute within-group increase in total activity minutes per week (p = .08 and .09, respectively) and no significant between-group (p = .96) difference. In contrast, light-to-moderate minutes per week (activities rated ≥2.5 metabolic equivalents) increased more in the phone (median weekly minutes +30 [IQR −105, +210]; p = .02) compared with newsletter group (median weekly minutes +0 [IQR −105, +195]; p = .12); however, the between-group comparison was not significant (p = .49). In addition, a significantly greater proportion of the phone (70.5%) than newsletter participants (52.3%) reported higher intensity level physical activities at least 3 days per week (p = .0009) at 12 months, per the Stanford Brief Physical Activity survey.

Post hoc outcomes

Both groups demonstrated weight regain in the absence of intervention. Mean absolute weight losses (95% CI) converged for phone (−4.5 kg [−5.5, −3.6]) and newsletter (−4.0 kg [−6.3, −1.8]; p = .45) by 24 months (Table 2). The sample proportions meeting ≥5% weight loss at this time point were nearly the same: 48.3% for phone and 46.4% for newsletter groups. A single cardiometabolic marker, HDL-c (mg/dL), maintained a positive increase in the phone compared with newsletter group (+5.3 mg/dL [+3.6, +5.3] and +2.3 mg/dL [−1.8, +6.3]; p = .01). All SPPB measures (Table 4) remained favorable in both conditions and grip strength remained higher than at baseline.

Intervention Adherence

Among the 322 participants randomized, overall attendance for the 12 in-person group sessions was high (>85%). The full cohort returned an average (*SD*) of 11.4 (2.4) self-monitoring records out of 13 expected. Attendance at the 8 phone group sessions (N = 162) was also more than 85%.

Table 3. Changes in Short Physical Performance Battery (SPPB) by Randomized Maintenance Condition (Phone, Newsletter)

	Baseline Mean (*SD*)	12 Months Mean (*SD*)	*p*	Group *p*	24 Months Mean (*SD*)	*p*	Group *p*
SPPB total score (0–12)[a]							
Phone	7.9 (2.1)	+0.3 (1.4)	***.001***	.83	+0.14 (1.4)	***.05***	.30
Newsletter	7.7 (2.1)	+0.3 (1.7)	***.02***		+0.34 (1.7)	***.009***	
Gait speed (m/s)[a]							
Phone	0.86 (0.18)	+0.03 (0.12)	***.003***	.72	+0.01 (0.12)	***.05***	.26
Newsletter	0.84 (0.16)	+0.02 (0.12)	***.005***		+0.03 (0.13)	***.005***	
5-chair rise (s)[b,c]							
Phone	11.8 (3.1)	−0.32 (2.2)	.08	.67	−0.44 (2.4)	***.04***	.69
Newsletter	11.8 (2.6)	−0.19 (2.9)	.06		−0.55 (2.0)	***.002***	
Grip strength (kg per pound)[a,d]							
Phone	20.9 (6.7)	+0.6 (3.1)	***.03***	.73	+0.52 (3.3)	***.05***	.18
Newsletter	21.1 (7.0)	+0.5 (3.1)	.06		−0.005 (3.5)	.99	

[a]Higher score is better for SPPB total, gait speed, and grip strength.
[b]Lower score is better for 5-chair rise.
[c]*N* = 16 did not have chair-rise data at both 0 and 12 months: 39 at 0 and 24 months.
[d]*N* = 7 did not have grip strength data at both 1 and 12 months: 10 at 0 and 24 months.

Table 4. Changes in Community Healthy Activities Model Program for Seniors (CHAMPS) Questionnaire by Randomized Maintenance Condition (Phone, Newsletter)

	Baseline Median (IQR)	12 Months Median (IQR)	*p*	Group *p*	24 Months Median (IQR)	*p*	Group *p*
CHAMPS		Phone *N* = 155			Phone *N* = 149		
Total minutes/week		Newsletter *N* = 156			Newsletter *N* = 151		
Phone	660 (330, 1125)	+30.0 (−165, +300)	.08	.96	+45.0 (−195, +435)	***.04***	.24
Newsletter	570 (345, 885)	+30.0 (−225, +323)	.09		+15 (−225, +255)	.65	
Light–moderate Minutes/week (≥2.5 metabolic equivalents)							
Phone	240 (30, 525)	+30.0 (−105, +210)	***.02***	.49	+30.0 (−105, +180)	.16	.16
Newsletter	210 (60, 435)	0 (−105, +195)	.12		0 (−150, +120)	.64	

Note: IQR = interquartile range.

Adverse Events

Nine total adverse events were recorded during this study, and one death from lung cancer. Seven events were documented during the in-person treatment phase, prior to randomization. Four of the events, treated as outpatient, were deemed study related: knee sprain, constipation, gallstones, and exacerbation of spinal stenosis. A fifth event was reported as a nonexercise fall with torn tendon. Two additional events, leg cellulitis and inguinal hernia, resulted in participant hospitalization. From 4 to 24 months, 2 hospitalizations for minor stroke were reported, one each in the phone and newsletter conditions.

Discussion

The present study evaluated a potentially scalable 1-year behavioral lifestyle intervention, with and without maintenance telephone contact, for older adults with overweight/obesity and multiple chronic health conditions. Results showed that 12 in-person group sessions followed by 4 additional hours of group telephone contact produced significantly better weight loss at 1 year compared with those receiving newsletter follow-up only, although the difference (1.5 kg) was modest. Both the telephone and newsletter maintenance interventions were associated with modest favorable changes in some health risk indices and self-reported physical activity. It was evident that 12 sessions of in-person intervention alone followed by newsletters resulted in clinically meaningful weight loss in this cohort of 65- to 80-year-old adults, and many cardiometabolic, physical function, and physical activity measures were not significantly different between the phone and newsletter groups at 12 or 24 months. Post hoc analysis showed that in the absence of treatment contact from 12 to 24 months, weight regain was evident, although both groups maintained clinically meaningful average weight losses of about 5%.

A recent United States Preventive Services Task Force evidence synthesis (42) pooled results of 67 trials of adults aged 18 and older and showed an average 2.39 kg greater weight loss (*SD* estimates of 5.1–8.0 kg) for behavioral interventions compared with no-treatment control at 12–18 months. In the current study, participants were randomized after a common treatment interval, thus between-group differences were smaller (1.5 kg; *SD* 3.0–7.5), but significant and clinically meaningful. The average percent weight changes for both phone and newsletter follow-up at 1 year were robust (−7.5% and −5.8%, respectively) and comparable to results observed in the original DPP trial (16).

Especially in the wake of COVID-19 (43), translational research is needed to determine the most cost-effective and sustainable delivery modes and frequencies of contact to optimize weight, health, and physical function outcomes among older adults with multimorbidity, including supported use of remote delivery technologies (44). For convenience and scalability, weight-management studies have examined longer-term telephone/telehealth delivery as a primary treatment modality but few focus exclusively on older adults. The SHINE study (23) compared the group with individually delivered telephone intervention in middle-aged patients with metabolic syndrome over 24 months. Results showed larger, but not significantly different, weight losses between the group- and individual phone coaching mode at 12 months (−4.5% vs −3.8%, respectively) but differences widened by 24 months and group-telephone was superior (−5.6% vs −4.2%, $p \le .001$). Donnelly et al. (45) demonstrated a −7.4% weight loss for a group conference call approach compared to −8.5% weight loss with intensive face-to-face implementation at 18 months. Our intervention study of late-life adults, although not intrinsically novel, adds to these findings and highlights that group contact may be important including for maintenance of physical activity. Even brief group telephone sessions provide potentially potent yet scalable, weight, health, and physical function maintenance opportunities. Future telehealth interventions for high-risk older adults must also address best practices for safely delivering and monitoring (46) home-based aerobic and resistance training activities in the setting of modest weight loss. The current study offered only one maintenance session focused on strength training. This component can and should be amplified to enhance functional performance outcomes (eg, use of tailored video materials).

In addition, the Pitt Retiree study documented that a behavioral lifestyle intervention was not associated with physical functional declines and indeed promoted physical performance and physical activity outcomes in a favorable direction over 24 months, although not as strongly as highly structured center-based aerobic and resistance training regimens (9,19). Adverse events were within the expected range for this population and did not differ significantly between the follow-up groups. Intensifying the self-directed home-based activity component could increase effect size but also the adverse event rate. An average increase of +0.3 SPPB points was shown for both conditions (*SD* estimates ranging 1.4–1.7) representing the lower bound of clinically meaningful change reported in prior studies. Research by Villareal et al. (9) measuring body composition, bone density, and SPPB shows that good adherence to supervised aerobic and resistance training sessions in the context of an average 9% weight loss among older adults with frailty and obesity was most beneficial for physical function and preservation of lean mass. Ascertainment of muscle mass or bone change was not practical in the Pitt Retiree study, but small improvements in SPPB and grip strength in a setting of a 5% maintained weight loss over 24 months run counter to the argument that harms were occurring.

The strengths of the study included community-based recruitment, a large sample size of older adults older than the age of 65 years, and a 24-month duration of follow-up. Consistent with a translational effectiveness approach, exclusion criteria were minimized, and the resulting sample was representative of older adults with weight-related comorbidities, but not diabetes, who seek out weight management in the community. These findings contribute to the growing literature on U.S. Medicare-reimbursable DPP interventions and indicate that phone groups, with the same interventionist, represent an effective alternative to in-person delivery only. Worth noting, in the Diabetes Prevention Program Outcomes Study, older adults who achieved ≥5% weight loss in the first year of intervention had better long-term weight loss and lower rates of diabetes up to 15 years later compared with their younger counterparts (47).

Limitations

The Pitt Retiree study had several limitations. It was a single-site study of urban and suburban communities in southwestern Pennsylvania. Participants were mostly female, White, and middle-income, and results may not generalize to others with obesity-related health disparities. Notably, 10.5% of enrolled participants who were lost to follow-up within the first 4 months were found to have lower education levels and a higher degree of depressive symptomatology compared to those who were retained. Baseline assessment of coexisting obesity and depressive symptoms and referral to integrated interventions may promote better engagement and retention (48). No objective assessment of physical activity was used, although the subjective questionnaire (CHAMPS) was designed to capture the range of activities common among older adults. The cardiometabolic and physical performance outcomes, along with the rate of adverse events, would suggest that the group lifestyle intervention, as conducted, was potentially safe for those 65–80 years; however, body composition assessments (eg, DEXA) would provide greater safety assurances. Finally, the 12-session prevention program facilitated by expert dietitians is costlier than that currently covered in many delivery settings. However, safety, feasibility, effectiveness, and cost need to be balanced for older adults seeking weight management.

Conclusions

A potentially scalable and apparently safe 1-year community-based multi-component weight intervention for older adults with obesity and chronic conditions shows that group telephone maintenance contact after in-person treatment improves weight maintenance. Some cardiometabolic health, physical function, and activity outcomes improved in both follow-up conditions. These findings have immediate implications for preventive clinical health practice for the large number of older adults with overweight and obesity who seek out weight management. Further study of telehealth interventions and other scalable contact modes such as newsletter communications to sustain weight, health and function benefits beyond 1 year, should be examined not only for their continuing effectiveness, but also for their safety and feasibility.

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Conflict of Interest

M.D.M. reports that she is a board member of WW International and receives compensation. There are no other competing financial interests to report.

Author Contributions

E.M.V. is responsible for the concept and design of the study. She, along with M.D.M., has drafted the manuscript. In addition, R.G.M., V.C.A., B.R.-W., and S.L.G. have participated in the analysis and interpretation of the data and critical revisions for important intellectual content. All authors have given final approval of this manuscript. E.M.V. has full access to all data in the study, takes primary responsibility for the integrity of the data, and remains accountable for the accuracy and integrity of the study protocol.

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