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Are standard behavioral weight loss programs effective for young adults?

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Abstract

Objective—To compare the enrollment, attendance, retention and weight losses of young adults in behavioral weight loss (BWL) programs with older participants in the same trials.

Methods—Data were pooled from three NIH-funded adult BWL trials from two clinical centers in different regions of the country (total $N=298$); young adults were defined as those aged 18–35 years. Both young adults and adults were compared on session attendance, retention at the 6-month assessment, weight loss and physical activity at 6 months.

Results—Young adults represented 7% of the sample, attended significantly fewer sessions than did adults (52 vs 74%, respectively; $P<0.001$) and were less likely to be retained for the 6-month assessment (67 vs 95%, respectively; $P<0.05$). Controlling for demographic variables, study and baseline weight, the mean weight losses achieved were significantly less for young adults compared with adults (-4.3 kg (6.3) vs -7.7 kg (7.0), respectively; $P<0.05$); fewer young adults achieved $\geq 5\%$ weight loss at 6 months compared with older participants (8/21 (38%) vs 171/277 (62%); $P<0.05$). After controlling for session attendance, differences in the mean weight loss were not significant ($P=0.81$). Controlling for baseline values, study and demographics, changes in total physical activity over the initial 6 months of treatment were less for young adults compared with adults, but these differences only approached statistical significance ($P=0.07$).

Conclusion—These data indicate that standard programs do not meet the weight control needs of young adults. Research is urgently required to improve recruitment and retention efforts with this high-risk group.

Keywords

young adults; behavioral weight loss; emerging adulthood

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Conflict of interest

The authors declare no conflict of interest.

Introduction

Obesity has reached staggering proportions in the United States, and the young adult years are a time of particularly high risk.^{1–4} In fact, young adulthood is associated with an average weight gain of 1–2 lb per year, with the largest gains occurring during the early to mid-twenties, particularly among those who are already overweight.^{2–3} Furthermore, data indicate that more than half of the individuals between the age of 20 and 39 years are already overweight or obese.¹ This is of particular concern because weight gain and obesity during young adulthood is associated with increased cardiovascular risk later in life.^{2–4} Clearly, this period in the developmental lifespan is a key time for intervention; yet, few programs have targeted this group, and those that have been developed typically focus on weight gain prevention.^{5–8}

Lack of effective treatment for this population could have serious consequences, both on the individual and on a public health level; yet to date, no weight loss programs have been developed specifically to address the needs of this age group. Recently, researchers have argued for a national young adult health agenda, including research and programs designed specifically to target health issues in this period of the lifespan.⁹ Weight loss treatment programs exist which specifically target children, as well as adolescents, but individuals over the age of 18 years are typically considered ‘adults’ and therefore are enrolled into standard adult programs with participants aged up to 65–70 years. Given developmental considerations and the multiple transitions faced during these years, this practice may warrant reconsideration.

Indeed, it is quite possible that standard behavioral programs need to be modified to address the weight control needs of young adults. However, to our knowledge, no studies have formally examined how young adults fare in comparison with older participants in behavioral weight loss (BWL) programs. Thus, the purpose of this study was to examine the enrollment, attendance, retention, physical activity and weight losses of young adults in BWL programs and compare their outcomes with adult participants in the same trials.

Materials and methods

Participants and procedure

Participant data were pooled from three ongoing or recently completed National Institutes of Health (NIH)-funded BWL trials (namely HL77082 in Providence, RI (Gorin, PI), USA; DK074721 in Providence, RI (Raynor, PI), USA; and DK064596 in Minneapolis, MN (Jeffery, PI), USA); young adults represented 5, 8.5 and 7.5% of the total participants in these trials, respectively. For this study, only participants randomized to BWL interventions with a standard format and contact schedule were included, resulting in a total sample of 298 participants. Participants were 63% female and 80% non-Hispanic White, with a mean age of 50.9 (9.9) years and a mean baseline weight of 100.9 kg (17.9).

Components of standard BWL programs

Standard BWL programs consist of weekly group meetings for the first 6 months (24 weeks), typically followed by biweekly or monthly meetings for an additional 12–24 months. Participants receive daily calorie and fat gram goals on the basis of their entry weight designed to produce 0.5–1.0 kg weight loss per week, and are instructed to gradually increase their exercise with the goal of engaging in ≥ 200 min of moderately intense activity (for example, brisk walking) each week. In addition, all participants receive training in core behavior modification skills, including self-monitoring, goal setting, stimulus control, problem solving and relapse prevention. For a more detailed description of BWL programs, please refer recent review articles on this topic.^{10–11}

Studies included in analyses

All participants included in this secondary analysis had been randomized to a BWL program that included the components described above. The eligibility criteria differed slightly between studies, although all studies enrolled adult participants who were overweight or obese and without medical conditions that would contraindicate treatment. The eligible body mass index ranges for the studies were 27–45, 25–50 and 30–39 kgm⁻². Two of the studies enrolled participants ≥18 years of age, and ≥21 years of age was the lower limit for age in the third study. The contact schedule for the initial 6 months of treatment was consistent across studies, with all groups meeting weekly during this initial phase. We selected 6 months as our primary end point to maximize retention in both age groups and because the greatest weight losses are typically observed at this point.

Measures

Weight—Weight was measured objectively with participants wearing light clothes and without shoes on calibrated scales at baseline and 6 months.

Demographics—Participants were asked to self-report demographic information, including race, ethnicity, gender and age.

Attendance—Attendance data were recorded over the 6-month period. For each of the weekly sessions, attendance was coded as either attended (1) or not attended (0). All participants met weekly during this phase; however, the actual number of sessions offered during the initial 6 months varied slightly across studies/waves (for example, 21 vs 24 sessions) because of holidays, etc. Therefore, attendance data were presented in terms of the percentage of sessions attended.

Retention—Retention at the 6-month assessment was coded as either retained (1) or not retained (0).

Physical activity—Physical activity was assessed in all three studies using the Paffenbarger Physical Activity Questionnaire¹² at 0 and 6 months. For this study, we examined differences between groups in total energy expenditure at baseline (total kcal per week), as well as change in total kcal from baseline to 6 months, controlling for baseline values. The Paffenbarger Questionnaire has satisfactory reliability and is sensitive to physical activity change in intervention studies.¹³

Statistical analyses

Age was treated as a categorical variable for all analyses using 18–35 years of age as the criteria for young adults and >35 years of age as the criteria for adults. We selected 35 years of age as our upper limit because data indicate that in the United States, among adults aged between 25 and 74 years, weight gain over 10 years was highest at ages 25–34 years.¹⁴ Exploratory analyses were also conducted examining enrollment and retention for young adults ≤25-years-old (that is, emerging adults). Study was included as a covariate in all analyses.

The outcomes of interest were attendance, retention, weight loss and physical activity during the initial 6 months of treatment. Before conducting comparisons between young and older adults, demographic variables were examined as potential covariates. Initial χ^2 analyses found no significant differences between age groups for gender, but did show significant differences between age groups on race and ethnicity, as well as marital status; the proportion of minorities was significantly higher in the young adult age group and more older adults were married compared with young adults. Thus, all subsequent analyses

controlled for race, ethnicity and marital status when comparing young with older adults. A one-way ANCOVA (analysis of covariance) on baseline weight was nonsignificant, indicating no differences between age groups.

Attendance data were analyzed by conducting an ANCOVA on percentage of sessions attended over 6 months, with age group as the between-subjects factor, and study, race, ethnicity and marital status included as covariates. Retention data were analyzed with a χ^2 test using age group (young adult/adult), minority status (yes/no), married (yes/no) and attended assessment visit (yes/no) as categorical variables.

To assess the effect of age on weight loss outcomes, an ANCOVA was conducted on weight change from baseline to 6 months, with age group as the between-subjects factor, and baseline weight, study, marital status, race and ethnicity included as covariates. Differences in weight loss were also assessed by conducting a χ^2 test using age group and achieved 5% weight loss (yes/no) as categorical variables. Weight change analyses were conducted using the intention-to-treat principle, and missing weight data were imputed using the baseline-carried-forward method. Subsequent weight loss analyses were conducted using only participants who completed the 6-month assessment.

To assess the effect of age on change in physical activity, an ANCOVA was conducted on change in total kcal per week from baseline to 6 months, with age group as the between-subjects factor, and baseline activity, study, marital status, race and ethnicity included as covariates. All analyses were conducted with the full data set as well as with a matched data set in which each young adult was matched to a randomly selected adult participant on study, gender, race and ethnicity. All analyses were conducted using SPSS, Version 14 (SPSS, Chicago, IL, USA).

Results

Demographic data are presented for both young adults and adults in Table 1. Across studies, young adults ≤ 35 years of age represented 7% of the sample (21/298), and there were no differences between the three trials in terms of the proportion of young adults enrolled ($P=0.63$). Exploratory analyses examining young adults ≤ 25 years of age separately showed that this group represented $<1\%$ of the current sample (4/298).

Attendance and retention

As shown in Table 2, young adults attended fewer sessions than did older participants ($P<0.001$). The proportion of young adults who were retained for assessment at 6 months was also significantly less compared with older participants ($P\leq 0.05$). Exploratory analyses examining young adults ≤ 25 years of age showed that three of the four participants in this age group were lost to follow-up at the 6-month assessment.

Weight loss

As shown in Table 2, mean weight losses achieved by young adults were significantly less than those achieved by older participants at 6 months ($P<0.05$), and fewer young adults achieved $\geq 5\%$ weight loss at 6 months compared with older participants ($P<0.05$). After controlling for session attendance, there were no significant differences between age groups in the mean weight loss achieved (data not shown; $P=0.81$).

When examining treatment completers only, the mean weight losses achieved by young adults were less than those achieved by older participants, but this difference was not statistically significant ($P=0.20$; see Table 2). Furthermore, there were no significant differences in the proportion of young adults achieving a 5% weight loss compared with

older participants ($P=0.56$), and after accounting for attendance, there were no significant differences between groups in mean weight loss (data not shown; $P=0.98$).

Physical activity

As shown in Table 2, there were no significant differences between age groups in total kcal expended through physical activity at baseline ($P=0.23$). Similarly, there were no significant age group differences when examining baseline physical activity by intensity level (that is, kcal expended through light-, medium- or high-intensity activity; data not shown). Changes in overall physical activity are shown in Table 2; controlling for baseline values and demographics, increases in total activity from baseline to 6 months were lesser among young adults, but this difference only approached statistical significance ($P=0.07$).

Matched analyses

Given the demographic differences and the substantial discrepancy in sample size between the two age groups, all analyses were also conducted using a matched data set in which each of the 21 young adults was matched to an older adult on gender, race, ethnicity and study ($n=42$); all matched analyses controlled for marital status. See Table 1 for descriptive data for the matched sample.

Consistent with findings in the full sample, young adults attended significantly fewer sessions over 6 months ($P<0.05$) and were less likely to be retained at the 6-month assessment (see Table 3; $P<0.05$). As shown in Table 3, mean weight losses achieved by young adults at 6 months were lesser than those achieved by the matched sample of older participants ($P<0.05$); and differences between groups in the proportion of participants who achieved a 5% weight loss approached significance ($P=0.06$). Contrary to findings in the full sample, these differences remained significant when examining only treatment completers (see Table 3; $P<0.05$). However, after controlling for session attendance, differences in the mean weight loss achieved were no longer statistically significant (data not shown; $P=0.28$). Consistent with findings in the full sample, there were no significant differences between groups in total kcal expended through physical activity at baseline ($P=0.39$), but after controlling for baseline values, increases in total activity from baseline to 6 months were significantly lower among young adults (see Table 3; $P<0.05$).

Discussion

Findings from this secondary analysis indicate that young adults are dramatically underrepresented in BWL trials. Only 7% of all participants were ≤ 35 years of age. Furthermore, those few young adults who did enroll did not fare as well as older participants, as evidenced by poorer attendance and retention rates, and poorer weight losses. Moreover, these differences remained even after matching both young adults and adults on gender, race, ethnicity and study, indicating that age contributes uniquely to these disparities above and beyond related demographic variables. It is important to note that although weight losses achieved by young adults in these trials were significantly lesser than those achieved by older participants, differential attendance and retention seems to be driving these findings. That is, differences in weight loss were no longer significant when observing only treatment completers in the full sample, or after adjusting for session attendance in both full and matched samples. This suggests that for the few young adults who enrolled in these programs and remained engaged over time, standard BWL programs were effective in producing initial weight loss. However, young adults who both enroll and are retained over time represent a very small percentage of participants, which raises concerns about the overall effectiveness of standard format BWL programs for the young adult population.

It is probable that recruitment strategies need to be modified considerably to reach this age group. Although data were not available as to how each individual participant was recruited, it is noteworthy that all three trials in this study primarily used print newspaper advertisements for recruitment. Many BWL programs recruit through newspaper advertisements and other print media, which may not reach young adults, who may be more likely to view their news online or through other mediums, such as the radio. Furthermore, although recruitment advertisements focusing on health-related messages and the positive effects of weight loss on one's health may be effective in recruiting older adults, the perceived health consequences of obesity are likely more distal to younger adults. Thus, health-related messages may not be as effective in recruiting this age group. However, little is known about what recruitment outlets and/or strategies would be most effective in attracting young adults to treatment, and to our knowledge, no studies have conducted formative work to inform recruitment efforts with this population.

The clear discrepancy between young adults and adults in terms of overall attendance and retention suggests that we need to do a better job not only of attracting young adults to treatment initially but also in keeping them engaged in treatment over time. Attendance, which has been shown to be related to greater weight loss,¹⁵ was significantly worse among young adults compared with adults; and only 67% of young adults were retained at the 6-month assessment. Indeed, there may be variables with regard to the treatment and retention protocol that need to be adapted to keep this age group engaged over time and retain them for assessments. For instance, it is possible that a less intensive contact schedule and/or an alternative delivery format (for example, the internet) may be more effective in attracting younger participants to treatment and retaining them over time, thereby improving weight losses in this age group. In addition, the homogeneity of groups may be an important factor. That is, it may be important both for recruitment and retention success that group members are closer in age. For example, of the 16 groups across the 3 trials included in this study, the number of young adult participants in each group ranged from 0 to 3, with young adults on average representing only 8% of the total group membership. The lack of other young adults within the group may have had a substantial impact on their experience and level of engagement in the program. It is possible that the presence of other participants of similar age, as well as lesson content and group discussions that reflect issues and problematic behaviors commonly experienced during these years may be important in improving retention with young adults.

We recently showed that young adults could be recruited and retained in a brief weight loss program by targeting this age group specifically and by making several relatively simple modifications to standard BWL programs (for example, limiting enrollment to young adults, shorter duration of treatment, emphasizing topics of particular relevance to this age group). Attendance and retention were excellent across groups, and participants in both conditions achieved significant weight losses over the 10-week program (>6 kg) and maintained them at 20-week follow-up.¹⁶ These findings, coupled with those from the current investigation, suggest that recruitment methods, as well as the duration and format of treatment programs need to be modified to better address the needs of young adults. However, these issues have not been adequately addressed through formative work with the target population; future studies in this area should seek to do so, perhaps through the use of qualitative research. Qualitative research methods, such as focus groups, offer a unique opportunity to formally assess the needs and preferences of overweight young adults who may not be willing to present for an extended clinic-based intervention. This type of data could be quite valuable in helping to develop and refine recruitment and intervention protocols for this age group.

The differences observed between young adults and adults in increased energy expenditure over the initial 6 months of treatment were remarkable. As shown in Table 2, after

controlling for demographic variables and baseline levels of activity, young adult participants reported an average increase in energy expenditure roughly equivalent to 12 kcal per day, compared with an average increase by adult completers of ~140 kcal per day; and these differences were even more pronounced in the matched sample (see Table 3). This suggests that the few young adults who do engage in standard programs perhaps have more difficulty, or are less interested in, the activity component of BWL programs. Given the importance of high levels of physical activity for the maintenance of weight loss, and the well-documented decline in physical activity associated with the transition into young adulthood,¹⁷ this is an important area to consider in future work with this age group.

It is noteworthy that participants ≤ 25 years of age represented $< 1\%$ of the current sample, and no participants under 23 years of age were enrolled in any of the three NIH-funded trials. Furthermore, exploratory analyses showed that three of the four participants who were ≤ 25 years of age were lost to follow-up by 6 months. Although we cannot draw inferences on the basis of such small numbers, the lack of participants ≤ 25 years of age is quite striking. The apparent difficulty reaching this age group is particularly concerning, given recent Behavioral Risk Factor Surveillance System (BRFSS) data that indicate 40% of young adults aged 18–25 years are already overweight or obese,¹⁸ placing them at considerably higher risk. Recently, researchers have argued that late teens and early twenties should be considered as a distinct period of the life course, often referred to as emerging adulthood, owing to the considerable distinctions between late teens/early twenties and the thirties in terms of education, work environment, marriage and family status.^{19–20} Furthermore, data indicate that the emerging adulthood period is a particularly risky time for the development of unhealthy eating and activity habits.²¹ Given developmental considerations, the high risk for weight gain and unhealthy weight-related behaviors during these years, as well as the present data that suggest that individuals ≤ 25 years of age are noticeably absent from adult BWL programs, it may be important to examine emerging adults as a separate group in future weight control studies.

The current findings should be interpreted in light of some limitations. First, although we pooled data from three large NIH-funded trials, the sample of young adults was quite small. However, the proportion of young adults enrolled was consistent across all three studies, and the poor representation of young adults in these trials highlights the evident difficulty in recruiting this age group into BWL programs. Second, the present sample was predominantly non-Hispanic White and was drawn from only two clinical centers. Although the generalizability of these data may be limited, the composition of this sample is consistent with many BWL trials, and data were drawn from two different regions of the country. Furthermore, we conducted analyses in which both young adults and adults were matched on race and ethnicity (in addition to other variables), and the results of the matched analyses were consistent with the results using the full sample. Finally, given that these data represent a pooled analysis of several different trials, data on diet and eating behavior were not available because assessment measures were not consistent across studies. These data would have added to the present findings and should be explored in future studies.

Despite these limitations, the current findings represent a valuable contribution to the literature. It is commonly accepted among obesity researchers that young adults are a particularly challenging group to recruit and retain, but to our knowledge, this is the first study to formally compare the outcomes of both young adults and adults in BWL programs. These data indicate that standard programs do not meet the weight control needs of young adults. Research is urgently required to better understand how to attract this high-risk group to treatment and how to keep them engaged over time.

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Table 1

Descriptive data

Full sample	Adults (n =277)	Young adults (n =21)	P-value
Mean age (s.d.); range	52.5 (8.1); 36–76	29.3 (3.9); 23–35	<0.001*
Percentage female	62%	71%	0.39
Percentage married at BL	73%	24%	<0.001*
Percentage completing high school or beyond	99%	100%	0.71
Baseline weight in kg (s.d.)	100.7 (18.2)	103.0 (13.1)	0.57
Baseline BMI (s.d.)	34.96 (4.4)	35.78 (4.7)	0.41
Percentage non-Hispanic White	83%	57%	<0.05*
Matched sample	Adults (n =21)	Young adults (n =21)	P-value
Mean Age (s.d.); Range	51.8 (7.0)	29.3 (3.9)	<0.001*
Percentage Female	71%	71%	1.00
Percentage married at BL	65%	24%	<0.05*
Percentage completing high school or beyond	100%	100%	1.00
Baseline weight in kg (s.d.)	98.2 (17.8)	103.0 (13.1)	0.32
Baseline BMI (s.d.)	33.47 (3.9)	35.78 (4.7)	0.09
Percentage Hispanic	14%	14%	1.00
Percentage white	57%	57%	1.00
Percentage Black/African American	28.5%	28.5%	1.00
Percentage Asian American	5%	5%	1.00
Percentage biracial/other	9.5%	9.5%	1.00

Abbreviation: BL, baseline; BMI, body mass index.

* indicates significant difference between age groups.

Table 2

Outcome data for full sample by age group

Full sample	Adults (n =277)	Young adults (n =21)	P-value
Session attendance	74%	52%	<0.001 ^a
Retention at 6 months	95%	67%	<0.05 ^a
ITT—weight loss at 6 months (s.e.)	-7.7 kg (0.40)	-4.2 kg (1.5)	<0.05 ^a
ITT—achieved 5% weight loss	62%	38%	<0.05 ^a
Completers—weight loss at 6 months (s.e.) ^b	-8.1 kg (0.41)	-5.7 kg (1.8)	0.20
Completers—achieved 5% weight loss ^b	65%	57%	0.56
Baseline PA—mean kcal per week expended (s.e.)	946.9 (69.1)	618.3 (264.7)	0.23
Change in total mean kcal per week expended at 6 months (s.e.)—completers only	+982.4 (114.5)	+81.0 (484.7)	0.07

Abbreviations: ITT, intent-to-treat; PA, physical activity.

^a Analyses significant after adjusting for study and demographic variables. Weight and physical activity change analyses also adjusted for baseline values.

^b For completers only analyses, older participants (n =264) and young adults (n =14).

Table 3

Outcome data for matched sample by age group

Matched sample	Adults (n =21)	Young adults (n =21)	P-value
Session attendance	80%	51%	<0.01 ^a
Retention at 6 months	95%	67%	<0.05 ^a
ITT—weight loss at 6 months (s.e.)	-9.2 kg (1.3)	-3.5 kg (1.3)	<0.05 ^a
ITT—achieved 5% weight loss	71%	43%	0.06
Completers—weight loss at 6 months (s.e.) ^b	-9.5 kg (1.3)	-5.0 kg (1.4)	<0.05 ^a
Completers—achieved 5% weight loss ^b	70%	43%	0.11
Baseline PA—mean kcal per week (s.e.)	936.59 (232.5)	641.42 (226.4)	0.39
Change in total mean kcal per week at 6 months (s.e.) —completers only	+1236.76 (274.1)	+126.23 (311.1)	<0.05 ^a

Abbreviations: ITT, intent-to-treat; PA, physical activity.

^a Analyses significant after adjusting for marital status (participants were matched on study and all other demographic variables). Weight and physical activity change analyses also adjusted for baseline values.

^b For completers only analyses, older participants (n =19) and young adults (n =14).