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Successful Weight Loss, Weight Loss Maintenance and Psychological Characteristics in Minority Men and Women Attending an Inner-city Weight Loss Program

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Abstract

Inner-city communities are disproportionately impacted by obesity and chronic disease. The LOSE BIG Challenge is a motivational physical activity and nutrition education program offered to inner-city Grand Rapids, Michigan residents with diabetes or hypertension. Twenty-eight participants (26 women, 2 men) in a 12-week culturally-based weight loss program were studied. Before and after the intervention, height, weight, lifestyle information, readiness to change, eating behaviors, depression scores, and quality of life scores were measured. Participants were followed 4 and 6 months post intervention. At baseline, 86% of the participants were obese (BMI >30 kg/m^2), 54% watched more than ten hours of television per week, 89% did not eat breakfast, and 82% did not weigh themselves at least once a week. While mean cognitive restraint scores for men and women were relatively close, women had much higher emotional eating, uncontrolled eating and inhibition mean scores at baseline. Participants showed significant decreases in mean BMI at the completion of the 12-week program ($p<.001$) and during the maintenance period, 4 months ($p=.005$) and 6 months ($p=.001$) post-intervention. Quality of life, depression, cognitive restraint, emotional eating, uncontrolled eating, and inhibition scores all showed improvement. The results suggest that this motivational program may provide health benefits, improve quality of life and change eating habits of the participants for up to 6 months. Attendance was variable, indicating the challenges of reaching the inner-city minority community. We plan on following participants in the next LOSE BIG Challenge. The focus will be to provide

financial incentives in hopes of decreasing the attrition and variability in attendance. The program will also be adjusted to provide a stronger focus on behavioral changes such as monitoring weight, eating breakfast and decreasing TV time.

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Introduction

Prevalence of overweight and obesity in adults in the United States is at a staggering 68% for all races and over 73% for African Americans (Flegal, 2010). Obesity is a leading risk factor for numerous medical conditions, including hypertension, heart disease, diabetes, and certain cancers (Cappelleri, 2009; Wellman, 2002). It is associated with a substantial economic burden as per capita medical spending for the obese is approximately 42% higher than for those of normal weight and it is estimated that the annual medical burden of obesity is as much as $147 billion per year (Finkelstein, 2009). Research identifies obesity as outranking smoking and problem drinking as a burden to health costs, with the impact on chronic conditions significantly larger than past smoking or problem drinking (Sturm, 2002).

Disparity in overweight and obesity in the African American community translates to disparities in those diseases exacerbated by increased body mass index (BMI). According to the 2011 National Diabetes Fact Sheet, compared to non-Hispanic white adults, the risk of diagnosed diabetes was 77% higher in non-Hispanic blacks. Those African Americans that develop diabetes have a risk of developing diabetic retinopathy 46% higher than non-Hispanic whites (Kirk, 2007). African Americans' rate of complications from diabetes (amputations, blindness, and renal disease) is 2-4 times higher than non-Hispanic whites (Peek, 2007). Forty-three percent of non-Hispanic black males and 45.7% of non-Hispanic black females aged 20 and over in the United States have hypertension compared to 33.9% non-Hispanic white males and 31.3% non-

Hispanic white females (Roger et al.,2011). Death rates from coronary heart disease and stroke for black males and females between the ages of 45 and 74 years differ considerably from white males and females in the same age group. The Centers for Disease Control reported that in 2011 the death rate for those less than 75 years of age with coronary heart disease was 37.9% for black females as compared to 19.4% for white females. Over 61% of black males while 41.5% of white males died before the age of 75 due to coronary heart disease. Death rates for stroke before the age of 75 showed similar disparities with black females (39%) and black males (60.7%) compared to white females (17.3%) and white males (31.1%). (Fact sheet – CDC health disparities and inequalities report, 2011).

A unique set of barriers to weight loss and weight loss maintenance have been defined for African Americans. Low socio-economic status, the high cost of healthy foods and exercise programs, high fat culturally-traditional foods, lack of social support from family, and eating expectations all contribute to the higher prevalence in overweight and obesity in the African American population (Barnes et al., 2007; C. C. E. Blixen, 2006; Tanumihardjo, 2007). Individuals who live in low income neighborhoods have less access to larger supermarkets selling healthy foods and fresh fruits at lower prices. Supermarkets in predominantly white neighborhoods outnumber supermarkets in predominantly black neighborhoods by 4 to 1 (Morland, Wing, Diez Roux, & Poole, 2002). Those living in inner-city neighborhoods frequently have to rely on convenience stores or small local businesses that have limited availability of fresh foods and low-fat items. While these high-energy foods available in convenience stores provide the necessary calories to meet an individual's energy requirements, they lack the nutritional

value necessary for optimal health and disease prevention provided by the lower-energy, but nutrient-packed, foods such as whole grains and fresh fruits and vegetables (Tanumihardjo, 2007).

Low socio-economic neighborhoods contribute to inactivity when residents avoid outdoor physical activity due to crime or violence and traffic. These neighborhoods are less likely to have parks or recreational facilities available for residents. Residents report the risk of crime and unattended dogs as barriers to physical activity in their neighborhoods (Black, 2008).

Social and cultural norms in the African American population also present barriers to weight loss and weight loss maintenance. Lovejoy et al. found that 40% of the African American women they studied felt their figures were attractive despite being severely overweight (Lovejoy, 2001). African American women also report that men seem to prefer and complement them on their overweight bodies (C. E. Blixen, 2006). High-fat, culturally-traditional foods also contribute to higher overweight and obesity in the African American population. Many African Americans grew up on large amounts of greasy, salty foods and continue to provide the same for their families. Women report that they experience pressure from family to prepare and cook large meals like those that they were raised on and those meals communicate caring for their family (C. E. Blixen, 2006).

To combat the increasing prevalence of overweight and obesity, especially among minorities and those from lower socioeconomic status, there has been an increased interest in weight loss maintenance research. Successful weight loss and weight loss maintenance is dependent on a number of factors including eating breakfast, eating a diet

low in fat and high in carbohydrates, maintaining a consistent eating pattern, watching less than ten hours of television per week, frequent self-monitoring of weight, and regular physical activity (R. R. Wing, 2005; R. Wing, 2001). There is a correlation between low levels of internal disinhibition and increased success at weight loss maintenance (Butryn, 2009; R. R. Wing, 2005). Although no data was found to predict weight loss maintenance based on readiness to change, several studies have shown that readiness to change does predict clinical success in diabetes education and in increasing physical activity (Conroy, 2006; Rossner, 2005).

In addition to the obvious physiological benefits of weight loss and maintenance in overweight and obese individuals, there are numerous psychological benefits to maintaining weight loss and a lower BMI. Health-related quality of life scores in association with obesity are inversely related to patient BMI (de Beer, 2007; Hopman, 2007). Overweight and obese individuals experience a depressed mood due to weight-related stigma (Chen, 2007).

The Inner City Community Advocates (ICCA) was founded in 2008 as a means to educate and empower residents of the inner city community of Grand Rapids, Michigan. Noting the disparities in their community, the founding group of five African American women organized a rally to educate African Americans on voter registration, voting rights, and voting policies and procedures. The rally drew approximately 200 residents as well as major news organizations from the Grand Rapids area.

In 2009, in an effort to expand their initiative to include community health awareness, employment workshops, and youth advocacy, the ICCA launched their first LOSE BIG Challenge. The program was designed to educate men and women in inner-

city Grand Rapids, MI with diabetes and high blood pressure and cholesterol on the importance of healthy eating and exercise. Partnered with the Grand Rapids African American Health Institute and Metro Health, as well as professional fitness trainers and registered dietitians**,** the ICCA was able to offer the program at a very low cost to those in need in their community. Due to overwhelming response from the participants and the community, the ICCA has continued to establish partnerships and collaborations in an effort to offer the program annually.

In February 2011, partnered with a growing list of organizations, the ICCA offered their third annual LOSE BIG Challenge to help reduce obesity and related illnesses among the minority populations of inner-city of Grand Rapids, MI. The 2011 LOSE BIG Challenge was a twelve-week program offering nutritional and exercise support to qualified applicants. Twelve weekly meetings were held on Thursday evenings for 95 minutes. The content of these weekly LOSE BIG Challenge meetings has evolved over the past three years due to the efforts of the ICCA founders, Peggy and Valerie Hudgins, and a number of board members who are minority women and former LOSE BIG Challenge participants. The 2011 classes consisted of 45 minutes of physical activity under the direction of an African American certified fitness trainer. The majority of the meetings were held at the ICCA offices at the Life Quest Urban Center in Grand Rapids, Michigan. On four occasions, classes were held off-site at fitness locations within the Grand Rapids area. At these additional locations, participants were given the opportunity to explore different physical activities like boxing and martial arts, as well as the use of multiple types of exercise equipment. Participants also received weekly advice on healthy eating habits and lifestyle behaviors. Several African American dietitians,

who also live in the community, presented information on portion control, juicing, label reading, healthy cooking, and shopping. Organizers developed exercise and nutrition challenges throughout the program and the individual with the highest percentage of weight loss at the completion of the program was rewarded with a generous prize package.

The ICCA and the Grand Valley State University (GVSU) Biomedical Sciences Department entered into a partnership in February 2011. The academic-community research partnership is an important model to impact health disparities and study obesity interventions in African Americans. This allows those in the community who share ethnic identity, history, and experiences to work with an academic researcher for grant funding and reporting of results. For an intervention to be successful, creation of trust is essential. Research conducted solely by academic institutions may exacerbate social distance and power inequity. However, many community organizations find it difficult to obtain funding directly. The community members not only help academic partners to gain trust in the community, but also bring important knowledge and experience for a culturally appropriate intervention (Griffith et al., 2010). This was the model for our project; the ICCA developed the curriculum for the program and recruited the participants while GVSU researchers provided survey tools and incentives to the participants. GVSU researchers also provided information on nutrition and healthy eating habits and a conference room for meetings at 4 and 6 months post-intervention. This is the first study of the twelve-week program in an effort to identify the benefits of the program to its participants.

Objectives

1. Determine if readiness to change before participating in an inner city weight loss program is associated with decreased BMI at 12 weeks, four months, and six months.
2. Determine the baseline eating behavior characteristics held by those who have a decrease in BMI at 12 weeks, four months, and six months in this group of minority participants.
3. Examine changes in quality of life and depression scores as related to changes in BMI following participation by minorities in an inner city weight loss program.
4. Examine the relationship between successful weight loss/weight loss maintenance and eating breakfast daily, watching less than 10 hours of television a week, and frequent self-monitoring of weight.

Methods and Materials

Study population: Study participants were recruited in Grand Rapids, Michigan by the ICCA via advertisements in the Grand Rapids Times, fliers at local churches of minorities, e-mail, and word-of-mouth. Eligibility criteria for the program was established by the ICCA as: overweight by BMI, self-identified as minority, living in inner city Grand Rapids, on medications for health concerns related to overweight or obesity, blood pressure less than 140/80 mm Hg with or without the use of hypertensive medications, and those with a stable/supportive family structure. Any applicant whose blood pressure exceeded 140/80 mm Hg was told to seek medical advice from his or her physician and was excluded from the program and study.

Permission for this study was granted by Grand Valley State University Human Research Review Committee, reference number 11-111-H (Appendix A). Participation in the LOSE BIG Challenge was not impacted by a participant's willingness to participate in this study. All study participants signed informed consent forms prior to participation in the study (Appendix B). All participants were de-identified prior to the data being entered into Epi-Info and PASW-18.

Measures: Data was collected at the inception of the weight loss program and twelve weeks, four months, and 6 months post-intervention. All program participants received a packet of questionnaires that assessed the following:

- **Demographic and socioeconomic data:** Participants at baseline were asked to self-report address, phone number, gender, race, date of birth, and marital status. Subjects were also asked to provide their education levels and occupations as well as live-in female's/male's education levels and occupations (Appendix C).

Educational attainment and occupational prestige were used to measure socioeconomic status using the Hollingshead 2-factor index of social position (Meyers, 1968).

- **Body weight and height:** Weight and height were measured by the ICCA (Appendix D). Anthropometric measurements were taken following the removal of any heavy outer clothing. Weight was measured to the nearest tenth of a pound. Height was measured to the nearest quarter-inch. Body mass index (BMI) was calculated, following metric conversion of weight and height, as weight (kg)/height (m^2). Overweight was defined as BMI 25.0 to 29.9 and obesity was defined as BMI 30.0 or greater (National Heart, Lung, and Blood Institute, 1998) Weight was measured at weekly meetings during the 12 week program and during maintenance (4 months and 6 months).
- **Lifestyle data:** At the initial meeting and twelve weeks, four months, and 6 months post-intervention participants were asked to answer questions regarding the frequency of their self-monitoring of weight, the amount of television watched per week, and whether they eat breakfast regularly (Appendix D).
- **Readiness to change data:** At the inception of the weight loss program, all participants were given a simple questionnaire to assess their readiness based on the transtheoretical model (Prochaska, 1997). Participants were categorized, based on their responses, as belonging to one of the five stages of change: precontemplation, contemplation, preparation, action, or maintenance. Precontemplation was defined as no intention to change diet and exercise in the next six months. Contemplation was defined as intention to change diet and

exercise in the next six months. Preparation was defined as intention to make changes in diet and exercise in the next month. Action was defined as changes had been made to diet and exercise in the last six months. Maintenance was defined as changes to diet and exercise had been maintained for more than six months (Appendix D).

- **Eating behavior characteristics data:** Participants were asked to answer all questions on the Three-Factor Eating Questionnaire (TFEQ-R18) at the initial meeting and at twelve weeks post intervention (Appendix E). The TFEQ-R18 is composed of 18 questions that fit into one of three domains; cognitive restraint (6 items), uncontrolled eating (9 items), and emotional eating (3 items). Responses to each of the items were given a score from one to four based on participant response. Item 18 was recoded: responses of 1 or 2 were scored as 1, responses of 3 or 4 were scored as 2, responses of 5 or 6 were scored as 3, and responses of 7 or 8 were scored as 4. Domain scores were calculated by adding up the scores from all of the items pertaining to that particular domain. Raw scores were converted to a 0-100 scale using the following formula: (raw score – lowest possible score) ÷ (possible raw score range) x 100. Inhibition scores were calculated as uncontrolled eating scores plus emotional eating scores. Higher scores are indicative of greater cognitive restraint, emotional eating, uncontrolled eating, and inhibition.
- **Quality of life data:** Participants were asked to answer all of the 31 questions on the Impact of Weight on Quality of Life-Lite (IWQoL-Lite) questionnaire at the initial meeting, twelve weeks, and our and six months post intervention

(Appendix F). The questionnaire uses a five-point Likert scale to measure the participant's perception of how his or her weight adversely affects physical function, self-esteem, sexual life, public distress, and work. Questions were rated from 1 ("always true") to 5 ("never true") and quality of life scores were measured by summing the responses to all of the questions on the questionnaire. Lower IWQoL-Lite scores are associated with increased quality of life. IWQoL-Lite scores were used only to assess their change post-intervention and their relationship to changes in BMI. Quality of life scores were not interpreted by the researcher.

- **Depression data:** Participants were asked to answer all 21 questions on the Beck Depression Inventory II (BDI-II) questionnaire (Appendix G). Questionnaires were distributed at the initial meeting, twelve weeks, and during maintenance (four months, and six months post intervention). Depression scores were calculated by totaling the scores derived from the three-point scale for each response on the questionnaire. Lower BDI-II scores are associated with lower levels of depression. BDI-II scores were used only to assess their change and their relationship to changes in BMI in this study. Depression scores were not interpreted by the researcher.
- **Definition of weight loss and weight loss maintenance:** Weight loss is defined as a decrease in BMI from baseline to the end of the 12 week program. Successful weight loss maintenance is defined as a maintained decrease in BMI from baseline to 4 and 6 months post-intervention.

- **Qualitative data:** In addition to the questionnaires, participants were asked at baseline to comment on their diet and physical activity experiences. At the end of the program (12 weeks) and at the 4 and 6 month maintenance follow-up, participants were asked to comment on radical changes in their life since starting the program (Appendix G).
- **Statistical analysis:** Data analysis was performed using PASW-18 (SPSS, Chicago, IL). Statistical analysis was performed on the group as a whole. Analyses were also done separately for males and females as baseline eating behaviors were very different. T-tests were used to determine the significance of average change in BMI, TFEQ-R18 domain scores, IWQoL-Lite scores, and BDI-II scores. T-tests were used to compare average BMI change in those who were at the contemplation stage and those who were at the preparation or action stage, those who watched less than 10 hours of television per week and those who watched more than ten hours of television per week, those who weighed themselves at least once a week and those weighed themselves less frequently than once a week, and those who always ate breakfast daily and those that did not always eat breakfast daily. Correlations were performed to assess the relationship between change in BMI at the end of the program (12 weeks), and during maintenance (4 months, and 6 months) with change in quality of life and depression scores. Correlations were performed to assess the relationship between change in BMI at 12 weeks with change in TFEQ-R18 domain scores. Level of significance was set at $p<0.05$.

Results

A total of twenty-six women and two men began the study. Of the twenty-eight applicants to the program, two were disqualified due to non-attendance, five withdrew from the program, and one declined participation in the study after the recruitment day and prior to the 12-week meeting resulting in a total of 20 participants available for the study. Of the 20 program participants who began the study, all 20 completed the program but not all of the participants were available for screening at each of the time intervals. Subjects in attendance at each meeting varied and resulted in only 18 subjects having the variables of interest measured at 12 weeks, 16 subjects at 4 months, and 17 subjects at 6 months (Figure 1). Only fully completed questionnaires were used to calculate scores, thus further limiting sample sizes for statistical analysis.

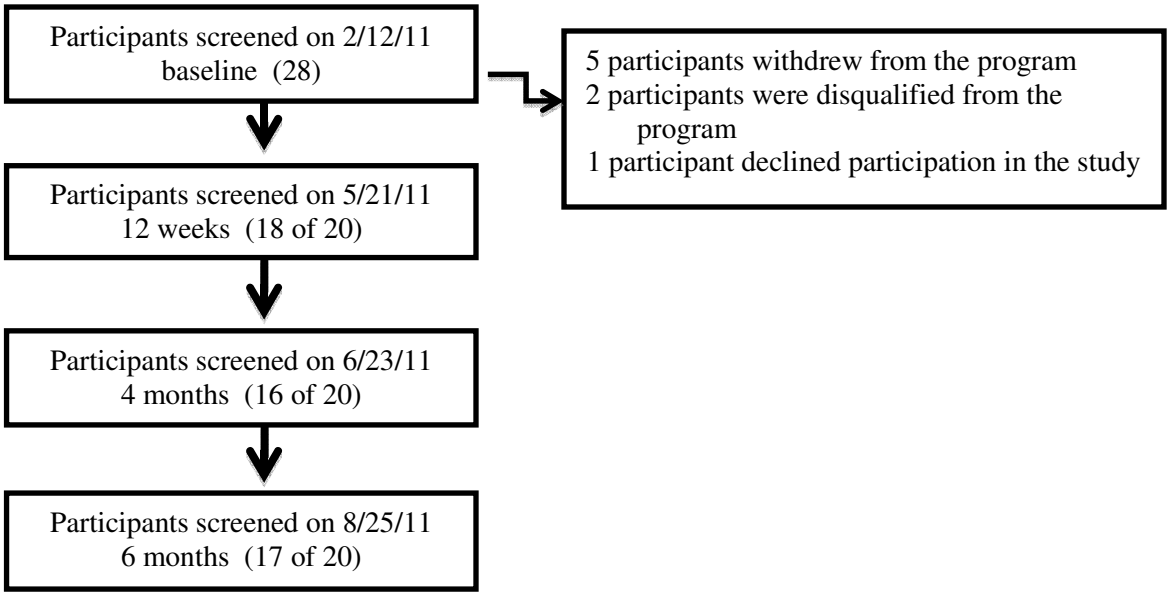

Figure 1. Flow chart of attendance

As shown in Table 1, participants were predominantly African American women. The majority (86%) of the participants were obese with a mean BMI of 36.1 kg/m^2. These subjects were likely to watch >10 hours of TV a week (54%), not eat breakfast

(89%) and not weigh themselves at least once a week (82%). The female subjects as compared to the male subjects were more likely to be in the preparation/action stage for change (n=13). The two men, one of which was the husband of a female subject, were both in the contemplation stage. While mean cognitive restraint scores for men and women were relatively close, women had much higher emotional eating, uncontrolled eating and inhibition mean scores at baseline.

Table 1. Characteristics of participants at baseline. Table gives frequencies unless otherwise noted.

Characteristics	Male (n=2)	Female (n=26)	Group (n=28)
Mean age (years)	44.0	44.1	44.1
Education			
Completed high school	0	5	5
Completed at least one year of college	1	6	7
Completed college	1	10	11
Completed graduate/advanced training	0	5	5
Race			
White	0	1	1
African American	2	25	27
Marital status			
Single	1	12	13
Married	1	10	11
Divorced	0	4	4
Mean BMI (kg/m^2)	38.7	36.1	36.3
Watched <10 hours television/week	1	12	13
Weighed themselves at least once/week	0	5	5
Ate breakfast daily	0	3	3
Mean quality of life scores[1]	36.0	63.0	60.8
Beck Depression Index			
Score 0-13	2	15	17
Score 14-19	0	3	3
Score 20-28	0	2	2
Questionnaire not completed	0	6	6
Transtheoretical Stages			
Contemplation	2	7	9
Preparation	0	9	9
Action	0	4	4
Pre-contemplation	0	0	0
Maintenance	0	0	0
No stage reported	0	6	6
TFEQ-R18[2]			
Mean cognitive restraint scores	38.5	41.3	41.1
Mean emotional eating scores	5.5	47.4	44.0
Mean uncontrolled eating scores	11.0	39.0	36.7
Mean inhibition scores	16.5	86.5	80.7

[1]Impact of Weight on Quality of Life – Lite Questionnaire

[2]Three Factor Eating Questionnaire – R18

As shown in Table 2, there was a significant increase in mean cognitive restraint (31.6; p<0.001), decrease in mean uncontrolled eating (-12.6; p=0.030) and decrease in inhibition scores (-26.1; p=0.048) at the end of the program from baseline showing improvement in all three scores. Mean baseline and twelve-week emotional eating scores did not show a significant change but values were slightly lower, suggesting improved eating behavior characteristics. Correlations for all participants between change in BMI and change in the TFEQ-R18 domain scores at the end of the program were not significant.

Table 2. Changes in Three Factor Eating Questionnaire domain scores from baseline to 12 weeks for men and women. Negative numbers indicate a decrease in the mean score from baseline to 12 weeks.

	Change from baseline to 12 weeks (n=15)		
TFEQ[1] Domain	**Mean Score**	**SD**	**p**
Cognitive Restraint	31.6	19.2	<0.001
Emotional Eating	-13.5	29.9	0.103
Uncontrolled Eating	-12.6	20.1	0.030
Inhibition	-26.1	46.7	0.048

[1]Three Factor Eating Questionnaire

The women who were available for maintenance follow-up at 6 months (n=11) continued to demonstrate a significant decrease in BMI (-1.7; p=0.005), a significant improvement in mean cognitive restraint (34.0; p<0.001) and uncontrolled eating (-14.3; p=0.048) (Table 3).

Table 3. Changes in Three Factor Eating Questionnaire domain scores from baseline to 12 weeks for women only. Negative numbers indicate a decrease in the mean score from baseline to 12 weeks.

	Change from baseline to 12 weeks (n=11)		
TFEQ[1] Domain	Mean Score	SD	p
Cognitive restraint	34.0	20.2	<0.001
Emotional eating	-15.3	33.6	0.162
Uncontrolled eating	-14.3	21.0	0.048
Inhibition	-29.5	50.6	0.082

[1]Three-Factor Eating Questionnaire

As shown in Table 4, mean quality of life scores continued to significantly improve from baseline at the end of the program (12 weeks)(p=0.018), and during the maintenance period, four month (p=0.009) and six month (p=0.018) post-intervention. Despite one outlier with a decreased quality of life, there was a significant improvement in mean quality of life scores from baseline to twelve weeks with 91% of the participants' self-reporting improvement in quality of life. BDI scores also improved significantly from baseline to the end of the program (p<0.001) and during maintenance, four (p=0.007) and six months (p=0.007). Correlation data between BMI and BDI-II and quality of life scores showed no significant correlation at any of the time intervals.

Table 4. BDI and IWQoL changes from baseline to 12 weeks, 4 month and 6 month post-intervention for men and women.

	Change from baseline to 12 weeks				Change from baseline to 4 months				Change from baseline to 6 months			
	Mean score	SD	p	n	Mean score	SD	p	n	Mean Score	SD	p	n
BDI[1]	-6.7	5.2	<0.001	14	-5.5	5.8	0.007	12	-4.8	4.9	0.007	12
IWQoL[2]	-10.5	12.3	0.018	11	-14.0	12.3	0.009	9	-12.6	14.8	0.018	11

[1]Beck Depression Inventory II
[2]Impact of Weight on Quality of Life – Lite

The women showed similar improvements in quality of life and depression scores. As shown in Table 5, mean quality of life scores for the women significantly improved from baseline to 12 weeks (p=0.017), and at 4 month (p=0.007) and 6 month (p=0.016) post-intervention. Mean BDI scores also improved significantly from baseline to 12 weeks (p=0.001), and at 4 month (p=0.008) and 6 month (p=0.009) post intervention.

Table 5. BDI and IWQoL changes from baseline to 12 weeks, 4 month and 6 month post-intervention for women only.

	Change from baseline to 12 weeks				Change from baseline to 4 months				Change from baseline to 6 months			
	Mean score	SD	p	n	Mean score	SD	p	n	Mean Score	SD	p	n
BDI[1]	-7.4	5.3	0.001	12	-5.9	5.9	0.008	11	-5.0	5.1	0.009	11
IWQoL[2]	-11.5	12.5	0.017	10	-15.8	11.9	0.007	8	-13.9	14.9	0.016	10

[1]Beck Depression Inventory II
[2]Impact of Weight on Quality of Life – Lite

As shown in table 6, participants showed significant decreases in mean BMI at the completion of the program, 12 weeks (p<.001), and during the maintenance period, 4 months (p=.005) and 6 months (p=.001) post-intervention.

Table 6. Mean change in BMI at 12 weeks and 4 and 6 months post-intervention for men and women.

	Mean change from baseline to 12 weeks				Mean change from baseline to 4 months				Mean change from baseline to 6 months			
	Mean	**SD**	**p**	**n**	**Mean**	**SD**	**p**	**n**	**Mean**	**SD**	**p**	**n**
BMI[1]	-1.5	1.4	<0.001	18	-1.2	1.5	0.005	15	-1.8	1.6	0.001	15

[1]Body Mass Index

As shown in table 7, with the removal of the male participants from the data, the women exhibited slightly lower mean BMI changes at 12 weeks, and 4 and 6 months post-intervention. Mean change in BMI was significant from baseline to 12 weeks (p=0.001), and 4 (p=0.010) and 6 months (p=0.001) post-intervention.

Table 7. Mean change in BMI at 12 weeks and 4 and 6 months post-intervention for women only.

	Mean change from baseline to 12 weeks				Mean change from baseline to 4 months				Mean change from baseline to 6 months			
	Mean	**SD**	**p**	**n**	**Mean**	**SD**	**p**	**n**	**Mean**	**SD**	**p**	**n**
BMI[1]	-1.2	1.2	0.001	16	-1.1	1.3	0.010	14	-1.6	1.4	0.001	14

[1]Body Mass Index

There was a significant difference in mean BMI change from baseline between those reported as being in the contemplation stage and those in the preparation and action stages at baseline. Those participants in contemplation stage (n=2 men, 7 women) experienced a greater decrease in BMI at all points; 12 weeks (-3.5 kg/m^2 vs. -0.9 kg/m^2) and during maintenance at 4 months maintenance (-3.2 kg/m^2 vs. -0.8 kg/m^2) and 6 months maintenance (-3.8 kg/m^2 vs. -1.5 kg/m^2) as compared to those in the preparation and action stage (n=13).

Behaviors such as eating breakfast daily, watching less than 10 hours of television per week or monitoring weight did not result in significantly greater weight loss or weight maintenance for the group as a whole or for the women only.

Some of the key comments in regards to the participants' experience at baseline and also the impact of the program as expressed at the end of the program and at the 4 month and 6 month follow-up included:

At baseline:

- "My appetite for food has increased greatly. I exercise everyday but don't lose weight. My food choices are mostly good and I watch portions. I'm not doing something right and that frustrates me! I think that it consumes my thoughts more than normal and I criticize myself because of it."
- "Experiencing disappointment in myself for not being able to reach my goals."
- "My parents are going through a divorce- it is really hard so I turn to food."

At 12 weeks post-intervention:

- "My eating habits even when I'm at someone's house or at a restaurant have changed."
- "Went from barely exercising to 3x a week."
- "Since starting the program I totally changed the way I eat and how I think about food in general."

At 4 months post-intervention:

- "5-10 times more physical activity."
- "I really watch what I eat and the amounts I make a conscious effort to eat 3 times a day and snacks in between."
- "Eating more healthy and moving."

At 6 months post-intervention:

- "This has been amazing. I have really learned to change the way I shop, prepare my food, and the way I eat. My changes in my lifestyles will have a positive effect on my daughter and my grandchildren."
- "Since I started this program I am aware of the foods that I consume and their content. I have learned to drink water. I have learned to take better care of my health."
- "More energy and confidence. Thank You!!"

Discussion

The present study is unique in that it investigates a community-based weight loss program offered to minority individuals with chronic disease. We found that such a program does result in a significant decrease in BMI, depression scores and improvement in quality of life scores not only during the 12-week program, but also during the maintenance phase (up to 6 months after the initiation of the program). We also found that this weight loss program had an impact on eating behaviors with a significant decrease in uncontrolled eating and an increase in restrictive eating by the end of the program. However, the program did not have an impact on eating breakfast, watching less television or self-monitoring weight.

Others have reported difficulty in weight loss and weight loss maintenance in minority populations**.** A study by Wing et al. of 1079 subjects, 46% of which were minority, showed that whites were more successful at weight loss than other ethnic groups. In their study, 57% of white subjects reached their 7% weight loss goal by the end of 24 weeks while less than 40% of African American subjects were able to reach their goal (Achieving weight and activity goals among diabetes prevention program lifestyle participants, 2004)**.** Kumanyika et al. also reported 2 randomized, multicenter trials supporting whites having greater success at weight loss than African Americans, losing over twice as much weight at 6 months (Kumanyika, Obarzanek, Stevens, Hebert, & Whelton, 1991). Research shows that long term weight loss is determined by initial weight loss in all races and that those who attain early success at their weight loss goals are up to 3 times more likely to achieve their long-term weight loss maintenance goals (Svetkey, 2011; Achieving weight and activity goals among diabetes prevention program

lifestyle participants, 2004).

Our mean weight loss and weight loss maintenance results, 2.7 kg at 12 weeks, 6.4 kg at 4 months, and 8.2 kg at 6 months are consistent with, and in some cases better than, other studies of culturally tailored minority weight loss programs. For example, in a similar intervention program, Agur-Collins et al reported a 2 to 2.5 kg weight loss (mean change in BMI - 0.8) at the completion of 12 weeks intervention and a 1.3 kg weight loss (mean change in BMI -0.5) at 6 months post intervention with clinically significant improvements in hemoglobin A1c. Their study consisted of 64 African Americans aged 55-79 years involved in a 12 week intervention that included 12 weekly 90-minute sessions at which a registered dietician offered nutrition education and an African American exercise physiologist provided exercise opportunities (Agurs-Collins, Kumanyika, Ten Have, & Adams-Campbell, 1997). Our findings are also consistent with a study by McNabb et al on the Pathways program, an 18 week program for inner-city black women focusing on guided learning activities involving dietary changes and increased physical activity. Their study showed a weight loss of 4.1 kg in African American women aged 41-66 years at program completion, 18 weeks (McNabb, Quinn, Kerver, Cook, & Karrison, 1997).

Participants' mean uncontrolled eating, cognitive restraint, and inhibition scores demonstrated a significant improvement following program intervention. Mean change in emotional eating scores, while not significant, did show improvement. Increased cognitive restraint scores have been associated with decreased food intake and therefore, increased success at weight loss and weight loss maintenance (Elfhag & Rössner, 2005). These findings suggest that the program provided the participants with the tools to

change their eating behaviors and their relationship with food. The lack of correlation between BMI and the domain scores is most likely due to the small number of participants, the short duration of the study, and grouping both men and women in the statistical testing. TFEQ-R18 domain scores from female participants are in line with data on TFEQ-R18 domain scores from 284 females in a general population as reported by de Lauzon et al (2004). Male domain scores could not be accurately assessed due to the low number of male participants in this study.

Participant quality of life scores at baseline were in line with scores derived from 220 male and female individuals over a large spectrum of BMIs (R. L. Kolotkin, 2002). One of the highest quality of life scores at baseline, indicating a lower quality of life, was self-reported by one of the participants with the highest BMI. As demonstrated in previous studies using the IWQoL-Lite, we found that quality of life scores improved with decreases in BMI (de Beer, 2007; R. R. L. Kolotkin, 2001; R. R. L. Kolotkin, 2002). While our results showed a significant improvement in participants' quality of life scores, additional interpretations of improved quality of life are outside the realm of the researchers and can only be performed by a qualified individual.

Mean BDI-II scores for the group were low (8.7; n=23), with the two highest scores self-reported by the two participants with the highest BMIs. Those same two participants also self-reported the lowest quality of life. Studies show that individuals who are overweight and obese are likely to have a lower quality of life and depressive mood (Kim, 2007). Depression scores for all of the participants in the group either went down or stayed the same throughout the study. The participant with the highest score, therefore highest level of depression, reported a score of 23 at baseline and a score of 7 at

6 months. The social activity of the program may have also contributed to the improved depression scores of the participants. Further interpretation of depression scores can only be performed by a qualified individual.

Studies have found that participants who self-reported as being in the action stage (already having made changes or ready to begin changing their behavior immediately), the preparation stage (ready to make changes within the next month), or the maintenance stage (maintaining changes for more than 6 months) were more successful at behavior change than those who were at the contemplation (intending to make changes in the next six months), or precontemplation (no intention of changing behavior in the next six months) stages (Peterson, 2002; Conroy, 2006). Based on these studies, one would expect that individuals at the action or preparation stage when starting weight loss intervention would have better success at weight loss and weight loss maintenance than those who were at the contemplation or precontemplation stage. The surprising results from our study were the greater weight loss by those in the contemplation stage as compared to the stage of action or preparation. We believe this resulted from the fact that the only two men in the study were in the contemplation stage, however the men lost the most weight. The greater weight loss did not appear to be from greater physical activity or diet changes than the other participants, but more due to the higher metabolism/ greater physical activity the men already engaged in at baseline. Therefore, we believe our results may not be an accurate representation of the typical relationship between stages of change and weight loss. The comments shared by the participants attest to the effectiveness of the LOSE BIG Challenge and reflect the improvements in the quality of life scores, depression scores, and eating characteristics as seen in the TFEQ-R18 scores.

There are both strengths and limitations to this study. The major strength of this study was the development of the program by members of the community and we believe our results are due in part to the culturally-tailored program. Our study has added to the limited longitudinal literature on the success of weight loss programs in African Americans. Another strength of this study was the multiple measurements obtained from each participant so that changes over the course of the program and during the maintenance period could be assessed. One limitation of this study was the number of participants accepted into the weight loss program, thus the number of participants in the study. The ICCA was limited to a small number of participants in its program due to financial constraints and attendance was highly variable over the 6-month study. It is well documented that retention in minority research studies is difficult due to a number of reasons including mistrust of investigators (Yancey, 2006). An effort was made to establish trust with GVSU researchers by attending several LOSE BIG sessions with information on the researcher's interest in the program and the importance of the study to the community. Both the small numbers and variable attendance may have resulted in our inability to find significant associations between BMI and other dependent variables (quality of life, depression, etc). Questionnaires were dependent on self-reported measures, suggesting measurement error may have occurred with participants answering in a way to please the researcher or appear more socially acceptable. The personal nature of many of the questions on the IWQoL-Lite and the BDI-II made it difficult to obtain completed questionnaires from several participants, despite providing them with their own personal space. Incomplete questionnaires prevented the calculation of quality of life and depression scores for those individuals and further limited the sample size.

We plan on following participants in the next LOSE BIG Challenge. The focus will be to provide financial incentives such as gift certificates and exercise videos in hopes of decreasing the attrition and variability in attendance. The program will also be adjusted to provide a stronger focus on behavioral changes such as monitoring weight, eating breakfast and decreasing TV time.

Appendix A: HRRC Approval Letter

GRAND VALLEY STATE UNIVERSITY
www.gvsu.edu

DATE:	February 10, 2011
TO:	Julie Hall
FROM:	Grand Valley State University Human Research Review Committee
STUDY TITLE:	[214729-2] Successful Weight Loss, Weight Loss Maintenance and Psychological Characteristics in Minority Men and Wormen Attending an Inner City Weight Loss Program
REFERENCE #:	11-111-H
SUBMISSION TYPE:	Revision
ACTION:	APPROVED
APPROVAL DATE:	February 10, 2011
EXPIRATION DATE:	February 10, 2012
REVIEW TYPE:	Expedited Review

Thank you for your submission of materials for this research study. The Human Research Review Committee has approved your research plan application as compliant with all applicable sections of the federal regulations, Michigan law, GVSU policies and HRRC procedures. All research must be conducted in accordance with this approved submission.

Approved with conditions that minor changes to consent form (see below) be implemented prior to enrolling first participant, and changes to analysis be perfomed after appropriate consultation.

1. **The tests are not appropriate for multiple measures in this project, e.g. T-tests for more than 2 groups. Also, "correlation" is broadly applicable, so careful selection of statistical measures is required for valid results and reporting out. Furthermore, a sample of 28 subjects may be underpowered; is this a pilot study that wil be added to later? If so, explicit permission for use of the data in future studies should be consented to by participants in this study. Finally, there may be significant variance in BMI which may affect the strength of the relationships between the variables. Approval is contingent on agreement to use appropriate statistical consulting services.**
2. **Why hypertension requires physician permission to enroll should be explained in the consent form.**
3. **The consent document, item 2, has a typo (is/are).**
4. **Why subject's address are collected should be explained to participants, or deleted. If zip codes are sufficient, collect only those.**
5. **Only 3 choices for relationships are offered- single, married, or divorced. Should add widowed, separated, significant others, decline to report as alternative responses.**
6. **The risks of the study may be overstated. Can a private room be found or a background sound played (e.g., music) and written communication used to maintain confidentiality?**
7. **May want to consider asking how many years of education (rather than level) to make your analysis easier. However, this may not be appropriate for Hollingshead equation. This is advisory only and does not affect approvability.**

Please make the changes indicated on the consent form, and acknowledge the use of statistical expertise in revising the study or justifying the use of T-tests, and submit as a third package.

This approval is based on no greater than minimal risk to research participants. This study has received expedited review, category 2-4 based on the Office of Human Research Protections 1998 Guidance on Expedited Review Categories.

Please insert the following sentence into your information/consent documents as appropriate. All project materials produced for participants or the public must contain this information.

> ***This research protocol has been approved by the Human Research Review Committee at Grand Valley State University. File No. 11-111-H Expiration: February 10, 2012.***

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note the following in order to comply with federal regulations and HRRC policy:

1. Any revision to previously approved materials must be approved by this office prior to initiation. Please use the *Change in Protocol* forms for this procedure. This includes, but is not limited to, changes in key personnel, study location, participant selection process, etc.
2. All UNEXPECTED PROBLEMS and SERIOUS ADVERSE EVENTS to participants or other parties affected by the research must be reported to this office within two days of the event occurrence. Please use the UP/SAE Report form.
   All instances of non-compliance or complaints regarding this study must be reported to this office in a timely manner. There are no specific forms for this report type.
3. All required research records must be securely retained in either paper or electronic format for a minimum of three years following the closure of the approved study. This includes signed consent documents from all participants.
4. This project requires continuing review by our office on an annual basis. Please use the appropriate *Continuing Review* forms when applying for approval extension.
   - Protocols that are active and open for enrollment require both the Primary Investigator and Authorizing Official to electronically sign the Continuing Review submission in IRBNet.
   - Protocols that are open for data analysis ONLY, require the Primary Investigator's signature.

If you have any questions, please contact the HRRC Office, Monday through Thursday, at (616) 331-3197 or hrrc@gvsu.edu. The office observes all university holidays, and does not process applications during exam week or between academic terms. Please include your study title and reference number in all correspondence with this office.

cc:

Appendix B: Informed Consent

Grand Valley State University
CONSENT TO PARTICIPATE IN RESEARCH

Successful Weight Loss and Weight Loss Maintenance Study

1. We are asking you to take part in this research project because we are trying to learn information on successful weight loss and weight loss maintenance in inner city minorities.

2. If you agree to be in this research project we will weigh you and measure your height. We will also ask you to tell us about you. Some of the things we will be asking you about are your relationship with food, how your weight affects your health and everyday activities, and your emotional status. Finally, we will be asking you about your demographic information (family education levels, family income levels, family occupations and living situation).

3. We will ask you to return at 12 weeks, four and six months to weigh you. You will also be asked to answer questions on additional copies of the questionnaires that you completed at the beginning of the program.

4. The risk of the study includes the chance that others might see or hear the results of your height and weight measurements. We will do our best to prevent this from happening by refraining from verbalizing your height and weight. There is also a chance that you might feel uncomfortable when completing the three factor eating questionnaire which asks questions about your relationship with food, sharing your feelings on the effects of your weight on your health and everyday activities and emotional status, and answering demographic questions as this requires you to share personal information and beliefs. In order to make this less embarrassing and uncomfortable, you will have time alone to do this part.

5. There is no benefit to you from participating in this research project, however, at the conclusion of this study we will provide you with a one-on-one meeting to share the summary of our information gathered on the changes in your television viewing, weight monitoring, and breakfast eating habits as they relate to improved weight loss maintenance. In order to meet with you, you will be asked to provide your address with your demographic information. This study may increase our knowledge on

those characteristics that make weight loss and weight loss maintenance successful in minorities as well as the benefits and improvements in the overall well-being of those who have been successful at weight loss and weight loss maintenance.

6. If you don't want to be in this research project, you don't have to participate. This research project is VOLUNTARY. If you decide to participate, you are free to withdraw out of the research project.

7. If you choose not to participate in this research project or withdraw from this project at any time, it will not impact your participation or continuation in the BIG LOSE Challenge.

8. There are no costs to you to participate in this research project.

9. Information from this research may be shared with the Office for the Protection of Research Subjects at Grand Valley State University.

10. You can ask any questions that you have about the study. If you have a question later that you didn't think of before, you can call Debbie Lown (616) 331-8919.

11. This research protocol has been approved by the Human Research Review Committee at Grand Valley State University. File No. 11-111-H
Expiration: February 10, 2012.

12. If you have any questions about your rights as a participant in this research project, you may call Grand Valley State University Human Research Review Committee at (616) 331-3197 or hrrc@gvsu.edu

13. Signing your name at the bottom means that you agree to be in this study.

You will be given a copy of this form after you have signed it.

_____ _____

Name of Subject Date

Signature	Date
Signature of Researcher Administering Consent	Date
Signature of Investigator	Date

Appendix C: Demographic Questionnaire

Address:_____
City:_____ State:_____ Zip code:_____

Phone number: _____

Gender: Male Female Age:_____ Date of Birth:_____

Race: _____

Highest completed school grade you completed: (circle)

Less than 7 years of school
Completed junior high school
Completed 10^{th} or 11^{th} grade
Completed high school
Completed at least one year of college
Completed college
Completed graduate/advanced training

Your occupation:_____

Are you?.....
1. Single
2. Married
3. Divorced

If you have a live-in partner, what is the highest completed school grade by your partner: (circle)

Less than 7 years of school
Completed junior high school
Completed 10^{th} or 11^{th} grade
Completed high school
Completed at least one year of college
Completed college
Completed graduate/advanced training

Live-in partner's occupation:_____

Appendix D: Anthropometric Questionnaires

Anthropometric Form – Initial

Anthropometric Measurements:

	Measurement 1	**Measurement 2**
Height (cm)		
Weight (kg)		

1. Currently, how often do you weigh yourself?	6= Several times a day 5= 1 time a day 4= Several times a week 3= 1 time a week 2= Less than 1 time a week 1= Less than 1 time a month
2. I eat breakfast at the start of my day.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
3. Currently, approximately how many hours of television do you watch per week.	5= 0-4 hours per week 4= 5-9 hours per week 3= 10-15 hours per week 2= 16-20 hours per week 1= More than 20 hours per week
4. During the past 7 days, have you done **at least 20 minutes of exercise hard** enough to make you breathe heavily and make your heart beat faster? (For example, hard exercise can be like jogging, fast dancing, fast bike riding, fast swimming and rumba class)	5= None 4= 1-2 days 3= 3-5 days 2= 6-7 days (every day) 1= 8 or more times (2 or more times/day)

5. During the past 7 days, have you done at **least 20 minutes of light exercise** that was not hard enough to make you breathe heavily and make your heart beat fast? (For example, light exercise like walking, biking slowly or swimming slowly)	5= None 4= 1-2 days 3= 3-5 days 2= 6-7 days (every day) 1= 8 or more times (2 or more times/day)

Please mark the statement that you agree with the most, if any.

1. I am intending to make changes in my diet and exercise in the next 6 months.
2. I am intending to make changes in my diet and exercise in the next month.
3. I have made changes in my diet and exercise in the last 6 months.
4. I have maintained changes in my diet and exercise for more than 6 months.
5. I am only here to support my friend/loved one and do not intend to change my diet and exercise in the next 6 months.

Anthropometric Form – 12 Weeks, 4 months, and 6 months

Anthropometric Measurements:

	Measurement 1	**Measurement 2**
Weight (kg)		

1. Currently, how often do you weigh yourself?	6= Several times a day 5= 1 time a day 4= Several times a week 3= 1 time a week 2= Less than 1 time a week 1= Less than 1 time a month
2. I eat breakfast at the start of my day.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
3. Currently, approximately how many hours of television do you watch per week.	5= 0-4 hours per week 4= 5-9 hours per week 3= 10-15 hours per week 2= 16-20 hours per week 1= More than 20 hours per week
4. During the past 7 days, have you done **at least 20 minutes of exercise hard** enough to make you breathe heavily and make your heart beat faster? (For example, hard exercise can be like jogging, fast dancing, fast bike riding, fast swimming and rumba class)	5= None 4= 1-2 days 3= 3-5 days 2= 6-7 days (every day) 1= 8 or more times (2 or more times/day)
5. During the past 7 days, have you done **at least 20 minutes of light exercise** that was not hard enough to make you breathe heavily and make your heart beat fast? (For example, light exercise like walking, biking slowly or swimming slowly)	5= None 4= 1-2 days 3= 3-5 days 2= 6-7 days (every day) 1= 8 or more times (2 or more times/day)

Appendix E: Three Factor Eating Questionnaire R-18

Question	Response Option
1. When I smell a sizzling steak or juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
2. I deliberately take small helpings as a means of controlling my weight.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
3. When I feel anxious, I find myself eating.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
4. Sometimes when I start eating, I just can't seem to stop.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
5. Being with someone who is eating often makes me hungry enough to eat also.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
6. When I feel blue, I often overeat.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
7. When I see a real delicacy, I often get so hungry that I have to eat right away.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
8. I get so hungry that my stomach often seems like a bottomless pit.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
9. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false

Question	Response
10. When I feel lonely, I console myself by eating.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
11. I consciously hold back at meals in order not to gain weight.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
12. I do not eat some foods because they make me fat.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
13. I am always hungry enough to eat at any time.	4= Definitely true 3= Mostly true 2= Mostly false 1= Definitely false
14. How often do you feel hungry?	1= Only at meal times 2= Sometimes between meals 3= Often between meals 4= Almost always
15. How frequently do you avoid "stocking up" on tempting foods?	1= Almost never 2= Seldom 3= Usually 4= Almost always
16. How likely are you to consciously eat less than you want?	1= Unlikely 2= Slightly likely 3=Moderately likely 4= Very likely
17. Do you go on eating binges though you are not hungry?	1= Never 2= Rarely 3= Sometimes 4= At least once a week
18. On a scale of 1 to 8, where 1 means no restraint in eating (eating whatever you want, whenever you want it) and 8 means total restraint (constantly limiting food intake and never "giving in"), what number would you give yourself?	1 2 3 4 5 6 7 8

Appendix F: Impact of Weight on Quality of Life – Lite Questionnaire

Question	Response Option
1. Because of my weight, I have trouble picking up objects.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
2. Because of my weight, I have trouble tying my shoes.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
3. Because of my weight, I have difficulty getting up from chairs.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
4. Because of my weight, I have trouble using stairs.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
5. Because of my weight, I have difficulty putting on or taking off my clothing.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
6. Because of my weight, I have trouble with mobility.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
7. Because of my weight, I have trouble crossing my legs.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true

8. I feel short of breath with only mild exertion.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
9. I am troubled by painful or stiff joints.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
10. My ankles and lower legs are swollen at the end of the day.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
11. I am worried about my health.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
12. Because of my weight, I am self-conscious.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
13. Because of my weight, my self-esteem is not what it could be.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
14. Because of my weight, I feel unsure of myself.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
15. Because of my weight, I don't like myself.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
16. Because of my weight, I am afraid of being rejected.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true

17. Because of my weight, I avoid looking in mirrors or seeing myself in photographs.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
18. Because of my weight, I am embarrassed to be seen in public places.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
19. Because of my weight, I do not enjoy sexual activity.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
20. Because of my weight, I have little or no sexual desire.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
21. Because of my weight, I have difficulty with sexual performance.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
22. Because of my weight, I avoid sexual encounters whenever possible.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
23. Because of my weight, I worry about fitting into seats in public places (e.g., theaters, restaurants, cars, airplanes).	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
24. Because of my weight, I worry about fitting through aisles or turnstiles.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
25. Because of my weight, I worry about finding chairs that are strong enough to hold my weight.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true

26. Because of my weight, I experience ridicule, teasing, or unwanted attention.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
27. Because of my weight, I experience discrimination by others.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
28. Because of my weight, I have trouble getting things accomplished or meeting my responsibilities.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
29. Because of my weight, I am less productive than I could be.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
30. Because of my weight, I don't receive appropriate raises, promotions, or recognition at work.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true
31. Because of my weight, I am afraid to go on job interviews.	5= Always true 4= Usually true 3= Sometimes true 2= Rarely true 1= Never true

Appendix G: Beck Depression Inventory Questionnaire

Instructions: Please read each group of statements carefully and pick the one statement in each group that best describes the way you have been feeling in the past two weeks, including today.

Group	**Statements- choose only one**
1. Sadness	0= I do not feel sad. 1= I feel sad much of the time. 2= I'm sad all the time. 3= I'm so sad and unhappy that I can't stand it.
2. Pessimism	0= I'm not discouraged about my future. 1= I feel more discouraged about my future in the past two weeks. 2= I do not expect things to work out for me. 3= I feel my future is hopeless and will only get worse.
3. Past Failure	0= I do not feel like a failure. 1= I have failed more than I should have. 2= As I look back, I see my life as a series of failures. 3= I feel I am a total failure as a person.
4. Loss of Pleasure	0= I get as much pleasure as I ever did from the things I enjoy. 1= I don't enjoy things as much as I used to. 2= I get very little pleasure from the things I used to enjoy. 3= I can't get any pleasure from the things I used to enjoy.
5. Guilty Feelings	0= I don't feel particularly guilty. 1= I feel guilty over many things I have done or should have done. 2= I feel quite guilty most of the time. 3= I feel guilty all of the time.
6. Punishment Feelings	0= I don't feel I am being punished. 1= I feel I may be punished. 2= I expect to be punished. 3= I feel I am being punished.

7. Self-Dislike	0= I feel the same about myself as ever. 1= I have lost confidence in myself in the past two weeks. 2= I am disappointed in myself. 3= I dislike myself.
8. Self-Criticalness	0= I don't criticize or blame myself more than usual. 1= I am more critical of myself than I used to be. 2= I criticize myself for all of my faults. 3= I blame myself for everything bad that happens.
9. Suicidal Thoughts or Wishes	0= I don't have any thoughts of killing myself. 1= I have thoughts of killing myself, but I would not carry them out. 2= I would like to kill myself. 3= I would kill myself if I had the chance.
10. Crying	0= I don't cry more than I used to. 1= I cry more than I used to. 2= I cry over every little thing. 3= I feel like crying but I can't.
11. Agitation	0= I am no more restless or wound up than usual. 1= I feel more restless or wound up than usual. 2= I am so restless or agitated that it's hard to stay still. 3= I am so restless or agitated that I have to keep moving or doing something.
12. Loss of Interest	0= I have not lost interest in other people or activities. 1= I am less interested in other people or things in the past two weeks. 2= I have lost most of my interest in other people or things. 3= It's hard to get interested in anything.
13. Indecisiveness	0= I make decisions about as well as ever. 1= I find it more difficult to make decisions than I used to. 2= I have much greater difficulty making decisions than I used to. 3= I have trouble making any decisions.

Group	Statements- choose only one
14. Worthlessness	0= I do not feel I am worthless. 1= I don't think that I'm as worthwhile and useful as I used to. 2= I feel more worthless as compared to other people. 3= I feel utterly worthless.
15. Loss of Energy	0= I have as much energy as ever. 1= I have less energy in the past two weeks. 2= I don't have enough energy to do very much. 3= I don't have enough energy to do anything.
16. Changes in Sleeping Pattern	0= I have not experienced any change in my sleeping pattern. 1= I sleep somewhat more OR less than usual. 2= I sleep a lot more OR less than usual. 3= I sleep most of the day OR I wake up 1-2 hours early and can't get back to sleep.
17. Irritability	0= I am no more irritable than usual. 1= I am more irritable than usual. 2= I am much more irritable than usual. 3= I am irritable all the time.
18. Changes in Appetite	0= I have not experienced any change in my appetite. 1= My appetite is somewhat less than usual OR My appetite is somewhat greater than usual. 2= My appetite is much less than usual OR my appetite is much greater than usual. 3= I have no appetite at all OR I crave food all the time.
19. Concentration Difficulty	0= I can concentrate as well as ever. 1= I can't concentrate as well as usual. 2= It's hard to keep my mind on anything for long. 3= I find I can't concentrate on anything.

20. Tiredness or Fatigue	0= I am no more tired or fatigued than usual. 1= I am more tired or fatigued more easily than usual. 2= I am too tired or fatigued to do a lot of things I used to do. 3= I am too tired or fatigued to do most of the things I used to do.
21. Loss of Interest in Sex	0= I have not noticed any recent change in my interest in sex. 1= I am less interested in sex than I used to be. 2= I am much less interested in sex now. 3= I have lost interest in sex completely.

Please share any radical changes in your life since starting this program.

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