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Does adherence to a motivational counseling program impact weight loss?

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ABSTRACT

Objective: Given the health-care cost and prevalence of preventative health disparities across today's population, it is not surprising that the recent health-care legislation has aimed to address preventative health initiatives. Specifically, weight management counseling is a preventative health initiative that the affordable care act has emphasized. We evaluated motivational counseling (MC) for weight management in a college aged population and to what extent adherence to the program impacts the magnitude of weight loss.

Methods: A total of 120 southeastern US college students from 2009 to 2013 participated in weekly counseling sessions lasting 15-30 min focused on weight management.

Results: The study findings indicated a 51% greater weight loss in participants with greater adherence to the MC program. There were no differences across gender or race.

Conclusion: These findings indicate that motivation counseling is an effect modality for addressing obesity-related preventive health disparities.

Keywords: College health, motivational counseling, preventive health, weight management

Introduction

The increasing prevalence of obesity is of particular concern, in part, because it has the potential to influence the health of and health-care cost of today's generation. Internationally, the World Health Organization states approximately 1.9 billion adults in 2014 were as overweight.[1] Preventive services are critically important for early diagnosis of these aforementioned health problems and for promoting healthy behaviors that can reduce the occurrence of chronic conditions.[2]

Motivational counseling (MC) is a technique designed to enhance an individual's central understanding of the counseling topics, and it is being applied to various types of behavior-change counseling, including obesity-related behaviors.[3] The purpose of the current study was to determine whether the level of adherence to MC sessions within a weight management program in a group of college aged individuals enhances long-term weight loss.

Methods

Design and subjects

A total of 156 college aged participants who visited the University student health center (Mississippi, USA) from 2009 to 2013 and were referred for weight management counseling were enrolled in the study design prospective longitudinal study. Preliminary enrollment criteria included a body mass index (BMI) of 27 or greater. They were told about an on campus weight loss program, but it was up to the participant to initiate study participation. Participants were required to complete a full lipid profile panel, blood pressure, blood glucose, cholesterol (low-density lipoprotein [LDL] and high-density lipoprotein [HDL]), and triglyceride test before the initiation of the MC sessions.

A total of 120 students (69 males and 51 females) received individual meetings with an obesity-related health promotion practitioner for an initial motivational counseling session, lasting 20-30 min. Each participant continually attended a brief, weekly individual meeting of approximately 15-20 min to follow-up on each weekly health behavior change initiated by the participant. The availability of the sessions mirrored the academic calendar, allowing students to meet when the University was open. The number of interventions each participant completed varied on each's ability to commit to weekly meetings, which may be cancelled per the student's request due to illness, academic and/or personal obligations. Some students individually rescheduled when prior notice to scheduling conflicts was made, whereas others may

have missed their weekly session. The number of sessions each student encountered depended on his/her individual consistency. During these meetings, the participant had time to ask questions and receive personal feedback on perceived barriers/obstacles. Specifically, the focus of the MC sessions was focused on discussions related to behavioral changes and the individual's commitment, while engaging in discussions of what motivated change, the uncertainty about changing eating and exercise habits, and how behavioral changes might be consistent with the participant's personal values and future goals. At the end of each MC session, the participant's weight was recorded and the following MC session was scheduled. The on-going sessions continued until the student graduated or no longer wished to participate; there was no limit to the time one may continue to be in the program. Written consent was acquired from each participant. This study was approved by University Institutional Review Board.

Statistical analysis

We test the impact of MC on weight loss using both uni- and multi-variate tests using Stata 13.0 (Stata Corp, College Station, TX). Furthermore, we test the relation between gender, race, and the degree of adherence to the MC sessions on weight loss controlling for common health examination measures. We conduct a standard independent univariate comparison between gender and change in weight and race and change in weight. We compute the change in weight from the initial session to the ending session of the program and run a *t*-test of the mean (Student *t*-test). We examined the impact the level of attendance to the MC sessions had on weight loss, controlling for race, gender, and other common measures. Our multivariate analysis follows a linear regression framework using the following equations:

$$\Delta Weight_{intial\text{-}final} = \beta_0+\beta_1 Height_{inital}+\beta_2 HDL_{inital}+\beta_3 LDL_{inital}+\beta_4 Triglyceride_{inital}+\beta_5 Blood\text{-}Sugar_{inital}+\beta_6 Systolic_{inital}+\beta_7 Diastolic_{inital}+\beta_8 Gender+\varepsilon_{i,t}$$

$$\Delta Weight_{intial\text{-}final} = \beta_0+\beta_1 Height_{inital}+\beta_2 HDL_{inital}+\beta_3 LDL_{inital}+\beta_4 Triglyceride_{inital}+\beta_5 Blood\text{-}Sugar_{inital}+\beta_6 Systolic_{inital}+\beta_7 Diastolic_{inital}+\beta_8 Race+\varepsilon_{i,t}$$

$$\Delta Weight_{intial\text{-}final} = \beta_0+\beta_1 Height_{inital}+\beta_2 HDL_{inital}+\beta_3 LDL_{inital}+\beta_4 Triglyceride_{inital}+\beta_5 Blood\text{-}Sugar_{inital}+\beta_6 Systolic_{inital}+\beta_7 Diastolic_{inital}+\beta_8 Attendance+\varepsilon_{i,t}$$

The dependent variable is the ΔWeight from the initial visit to the final visit. Recognizing the need to control for physiological differences in participants we include the initial height ($Height_{inital}$) of the participant, the initial high-density lipoprotein (HDL_{inital}), the initial low-density lipoprotein (LDL_{inital}), the initial triglyceride ($Triglyceride_{inital}$), the initial blood sugar (Blood-Sugarinital), and the initial blood pressure measures ($Systolic_{inital}$) and ($Diastolic_{inital}$). We recognize three variables of interest: (1) Gender, which is an indicator variable equal to one for males, zero otherwise, (2) race which is an indicator variable equal to one for whites, zero otherwise, and (3) attendance which is the percentage of attendance to MC sessions. Each session counted as one record of attendance if the participant was present for the weekly MC session. The date of the session was recorded, noting any absences as well. If there are differences across gender or race in weight loss, we would expect a significant coefficient in either or both. Similarly, if attendance to the MC sessions impacts weight loss we would expect a positive and significant coefficient. We further extend our regression analysis by examining the relation between gender and race and the degree of attendance to the MC sessions as follows:

$$\Delta Weight_{intial\text{-}final} = \beta_0+\beta_1 Height_{inital}+\beta_2 HDL_{inital}+\beta_3 LDL_{inital}+\beta_4 Triglyceride_{inital}+\beta_5 Blood\text{-}Sugar_{inital}+\beta_6 Systolic_{inital}+\beta_7 Diastolic_{inital}+\beta_8 Gender \times Attendance+\varepsilon_{i,t}$$

$$\Delta Weight_{intial\text{-}final} = \beta_0+\beta_1 Height_{inital}+\beta_2 HDL_{inital}+\beta_3 LDL_{inital}+\beta_4 Triglyceride_{inital}+\beta_5 Blood\text{-}Sugar_{inital}+\beta_6 Systolic_{inital}+\beta_7 Diastolic_{inital}+\beta_8 Race \times Attendance+\varepsilon_{i,t}$$

Results

Table 1 shows descriptive statistics. Columns 1 and 2 report characteristics based on gender, while columns 4 and 5 reports characteristics based on race. Columns 3 and 6 report the differences. There were statistically significant differences in initial weight and ending weight between males and females, whereas initial physiological characteristics across gender and race were insignificant.

Table 2 illustrates the impact of motivational counseling on weight loss across race and gender specifically across attendance levels to the MC sessions. To gauge the amount in which a participant attended sessions, we stratify adherence to the MC sessions as attending >75% of the sessions (Adhere 1), 50% of the sessions (Adhere 2), and <50% of the sessions (Adhere 3), significant differences between initial weight and exit weight were found. Table 3 shows significant differences across the attendance groups. Although there are no significant differences in initial weight, we reported significant differences in exit weight. Specifically, we reported participants in the higher attendance groups realized greater weight loss.

Table 4 presents regression findings. Columns 1-3 report gender, race, and adherence, respectively. Similar to Tables 2 and 3, we reported an insignificant relationship between gender and race to change in weight. However, controlling for physiological characteristics we reported a positive and significant relationship of adherence and change in weight. We further reported no differences across gender or race and adherence to weight loss. As such our findings are consistent with the idea adherence to MC sessions impact weight loss regardless of gender or race.

Table 1: Demographic characteristics and differences in means

Demographics	Male	Female	Δ Male-female	White	Black	Δ White-black
Initiation weight (lbs)	244	189	55***	194	201	7
Exit weight (lbs)	231	170	61***	183	187	4
Height (in)	69	64	5	66	68	2
HDL	52	59	7	58	62	4
LDL	108	126	18*	114	129	15*
Triglyceride	118	121	3	122	131	9
Blood sugar	97	104	7	101	113	12*
Systolic	74	82	8	82	84	2
Diastolic	128	124	4	116	122	6
N	69	51	18	63	57	6

***P=0.001, *P=0.1. LDL: Low-density lipoprotein, HDL: High-density lipoprotein

Table 2: Differences in means for gender and race by change in weight across adherence to MC sessions

Gender	Adhere 1 (>75%)			Adhere 2 (>50%)			Adhere 3 (<50%)		
	Initiation weight (lbs)	Exit weight (lbs)	Δ (lbs)	Initiation weight (lbs)	Exit weight (lbs)	Δ (lbs)	Initiation weight (lbs)	Exit weight (lbs)	Δ (lbs)
Male	236	212	24***	238	228	11**	236	232	4
Female	187	168	19***	181	174	7*	179	175	4
White	192	162	20***	199	184	15*	186	183	3
Black	198	187	11*	204	188	16**	194	191	3

***P=0.001, **P=0.05, *P=0.1

Table 3: Differences in means by differences in adherence to MC sessions

Gender	Adhere 1	Adhere 2	Adhere 3	Δ Adhere 1-2	Δ Adhere 1-3	Δ Adhere 2-3
	Initiation weight (lbs)	Initiation weight (lbs)	Initiation weight (lbs)	Initiation weight (lbs)	Initiation weight (lbs)	Initiation weight (lbs)
Male	236	239	236	3	0	3
Female	187	181	179	6	8*	2
White	192	199	186	7	1	13**
Black	198	204	194	6	4	10*
Gender	**Adhere 1**	**Adhere 2**	**Adhere 3**	**Δ Adhere 1-2**	**Δ Adhere 1-3**	**Δ Adhere 2-3**
	Exit weight (lbs)	**Exit weight (lbs)**	**Exit weight (lbs)**	**Exit weight (lbs)**	**Exit weight (lbs)**	**Exit weight (lbs)**
Male	212	228	232	16**	20***	4
Female	168	174	175	6*	7*	1
White	162	184	183	22**	21***	1
Black	187	188	191	1	5*	3

***P=0.001, **P=0.05, *P=0.1

Discussion

The findings of the current study showed that the level of adherence to a MC weight management program plays role in the amount of weight an individual may lose. Previous research has focused on a one to one comparison of MC to a non-MC group. These studies showed positive results across a myriad of health disparities and disease from diabetes to smoking cessation.[4-6] While other studies have examined the effectiveness of MC and its ability to reduce comorbidities associated with overweight/obesity in a primary care clinic,[7] our study is one of the first to evaluate college aged individuals and the level of adherence to the MC program across race and gender.

The favorable impact of MC has been reported in as few as 2 MC sessions with greater weight loss being proportional to the length of the program. Our results extend these findings by not only supporting the notion that adherence to a program impacts weight loss, but the level of adherence to the program is a driving factor to overall weight loss. These findings can impact the motivational discussions of behavioral changes impacting attendance to MC sessions.

West *et al*.[8] reported MC amplified weight loss by increasing attendance at group sessions, which improved the self-monitoring aspects of the program. Streit *et al*.[9] showed a significant relationship between self-monitoring and weight loss,

Table 4: Regression analysis

Demographics	ΔWeight					
	[1]	[2]	[3]	[4]	[5]	[6]
Height (in)$_{initial}$	0.134 (0.321)	0.157 (0.167)	0.142 (0.248)	0.201 (0.125)	0.189 (0.125)	0.164 (0.143)
HDL$_{initial}$	1.242** (0.046)	1.121** (0.036)	1.387* (0.087)	1.136** (0.032)	1.006* (0.059)	1.027* (0.071)
LDL$_{initial}$	−0.987*** (0.000)	−0.874* (0.087)	−0.899* (0.067)	0.765-0.412	−0.675** (0.024)	−0.589* (0.066)
Triglyceride$_{initial}$	1.132** (0.026)	1.147* (0.068)	1.231 (0.173)	1.065* (0.071)	1.265* (0.059)	1.306* (0.041)
Blood sugar$_{initial}$	0.623 (0.312)	−0.614 (0.211)	0.547 (0.289)	0.541 (0.116)	0.844 (0.203)	0.741* (0.079)
Systolic$_{initial}$	−0.134* (0.084)	−0.321 (0.147)	−0.341 (0.313)	0.242 (0.177)	−0.264* (0.091)	−0.154 (0.202)
Diastolic$_{initial}$	0.211 (0.136)	0.411 (0.202)	0.263 (0.128)	0.231 (0.201)	0.311 (0.113)	0.213 (0.116)
Gender	0.587 (0.231)			0.301 (0.142)		0.411 (0.119)
Race		0.265* (0.077)			0.523 (0.317)	0.327 (0.223)
Adherence			0.256** (0.006)	0.402** (0.032)	0.298*** (0.000)	0.506** (0.034)
Gender × adherence				−0.231 (0.131)		
Race × adherence					−0.362 (0.245)	
Race × gender × adherence						0.631 (0.294)
Adjusted R^2	0.326	0.339	0.327	0.299	0.254	0.311

***P=0.001, **P=0.05, *P=0.1

further suggesting that attendance at MC sessions may play a role in long-term weight loss. The study findings directly tested this notion by measuring the actual attendance of participants across the length of the program and find that the actual percentage of attendance days relative to the whole program is a significant factor in change in weight. These findings are particularly interesting as prior work has shown long-term adherence is an important factors while not directly testing attendance to the MC sessions. These findings have strong implications for the structure of discussions in the MC sessions about the importance of regular attendance and not just adherence to the behavioral changes discussed in the MC sessions.

MC has been shown to elicit an individual's intrinsic motivation in a directive way shown to be effective in eliciting and sustaining behavior change.[10] Prior research by Gourlan *et al*.[11] indicates adolescents not only decrease BMI after six sessions of MC sessions during a weight loss program, but an increase in physical activity and autonomy as well. While our study shows that MC significantly influences the magnitude of weight loss observed in college-aged individuals who consistently participate in MC sessions compared to individuals who participate at a lesser rate, we also report no differences in gender and few differences in race. An important aspect that has been reported across MC papers is the difference in outcomes across race. Wing and Anglin[12] reported African–American women experienced significantly less weight loss than white women in MC weight loss studies. These findings were consistent with previous studies of obesity treatment studies of diabetic populations and in obese individuals.

These findings have practical implications in following Resnicow *et al*.[13] who show a culturally tailored program yields greater results than a standard program of a generic form. In summary, using MC is an effective method that should be used when designing and implementing weight loss programs.

Conclusions

The findings of our study are consistent with previous work showing increased weight loss was apparent in both white and black women over 12 months period, however black women did not realize the same long-term benefits as white women over the next 12 months. These findings combined with our results indicate a slight cultural bias in MC sessions and more importantly in the adherence to the program.

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