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Impact of motivational interviewing on outcomes of an adolescent obesity treatment: Results from the MI Values randomized controlled pilot trial

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Abstract

Purpose—To examine outcomes from MI Values, a motivational interviewing (MI) intervention implemented adjunctive to obesity treatment.

Methods—Adolescents (N=99; 73% African American; 74% female; mean body mass index [BMI] percentile=98.9±1.2) were randomized to receive two MI sessions or education control. All adolescents participated in structured behavioral weight management treatment. Baseline, 3- and 6-month assessments of anthropometrics, dietary intake and physical activity were obtained.

Results—Both groups had significant reductions in BMI z-scores and energy intake and increased physical activity at 3 and 6 months ($p<.05$). MI participants reported greater reductions in 3-month energy intake compared with controls.

Conclusions—Participation in MI is associated with reduction in energy intake, consistent with better adherence to dietitian visits previously reported from MI Values. MI might be an effective adjunct to adolescent obesity treatment; future research is needed to determine if motivational interviewing can enhance BMI outcomes, via greater adherence to behavioral intervention.

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Conflict of Interest Statement

The authors have no conflicts of interest to report.

Author contributions: MKB, SEM, EPW, and KI significantly contributed to study design. MKB, and PP were involved in data collection. MKB conducted analyses and interpretation of data and drafted the initial manuscript. SEM, EPW, KI, RE, MS, PP critically reviewed the manuscript. All authors were involved with writing and editing the paper and had final approval of the submitted version.

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Keywords

motivational interviewing; adolescent obesity; intervention; randomized controlled trial; African American

Introduction

The need for obesity treatment targeting racially diverse adolescents is urgent.¹ Lifestyle interventions are the mainstay of treatment; yet interventions targeting African American and low-income adolescents demonstrate lower treatment effects and higher attrition than those targeting other populations.² Targeted strategies to increase adherence to lifestyle intervention and enhance treatment effects are needed. Motivational Interviewing (MI) has potential to enhance adolescent obesity treatment, with a need for rigorous investigations within this population.³ Establishing independence and autonomy are major tasks of adolescence.⁴ Thus MI, which is non-confrontational and emphasizes individual choice, might be particularly appropriate for engaging adolescents and facilitating behavior change, ultimately enhancing outcomes. Moreover, although additional research is needed to examine the cultural appropriateness of MI with racially and ethnically diverse adolescents, MI appears inherently culturally appropriate as it uses participants own values and beliefs in discussions about behavior change. Indeed, a meta-analysis of MI and health behavior change found a larger effect size when MI was used with racial and ethnic minority participants (primarily African American and Hispanic) versus white participants.⁵

MI Values⁶ was a randomized controlled pilot trial, designed to investigate if two MI sessions (compared with education controls) enhanced outcomes for adolescents enrolled in an obesity treatment, TEENS (Teaching Encouragement Exercise Nutrition Support). We previously reported that participation in MI Values was associated with better attendance and retention in TEENS.⁷ The current report examines 3- and 6-month effects of MI Values on: 1) dietary intake, 2) physical activity, and 3) BMI *z*-score. Study hypotheses were that participants who were randomized to the MI treatment would manifest better diet and physical activity outcomes and greater reductions in BMI *z*-scores than those randomized to an education control.

Methods

After enrolling in TEENS, adolescents were invited to participate in MI Values. Eligibility criteria included: 1) ages 11–18 years, 2) body mass index (BMI) $\geq 85^{\text{th}}$ percentile for age and gender,⁸ 3) no underlying secondary etiology of obesity (e.g., hypercortisolemia), and 4) a participating parent/caregiver. Parents and adolescents provided informed consent and assent, respectively, prior to participation. Study procedures were approved by Virginia Commonwealth University's Institutional Review Board.

TEENS was a 6-month empirically-supported behavioral weight loss treatment implemented at an academic medical center.⁹ Adolescents attended weekly sessions with a dietitian or behavior support specialist (on alternating weeks), and performed supervised physical

activity in the TEENS gymnasium 3 times per week. Adolescents were encouraged to exercise on additional days at other locations (complementary YMCA memberships were provided). Parents attended group sessions, independent from their adolescents.

MI Values was implemented adjunctive to TEENS. Detailed study rationale, design, and procedures for MI Values have been previously reported.⁶ Participants were randomized to either MI or an education control treatment. All participants proceeded with the TEENS protocol. Sessions were conducted at the TEENS clinic by trained MI interventionists (not involved in TEENS). Interventionists participated in a 2-day training led by a member of MINT (Motivational Interviewing Network of Training), conducted >30 hours of practice sessions, and received weekly supervision throughout the study. MI sessions were audiotaped and coded by blind raters to monitor treatment fidelity using the Motivational Interviewing Treatment Integrity Code (MITI) 3.0.⁹ Interrater reliabilities were high (intraclass correlations=0.72–0.99) and interventionists met or exceeded MI competency thresholds at study onset, which were maintained throughout the trial.⁷

Adolescents in the MI treatment participated in 30-minute, individual MI sessions at weeks 1 and 10 of TEENS. Interventionists followed a session roadmap, remaining adherent to MI throughout, with goals to elicit participant-determined reasons for change, highlight how engaging in TEENS is consistent with participant goals and values, and build self-efficacy. In Session 1, MI sessions included a values card sorting activity, in which participants ranked their top 5 (of 39) values. Through a series of questions and reflections, interventionists elicited the relation among participants' values and their selected weight management behavior(s), thus developing discrepancy to elicit internal motivation for change. In Session 2, interventionists explored progress in TEENS, reexamined value/behavior congruency, elicited the participants' reasons and strategies for change, and expressed confidence in the participants' abilities to achieve their goals. In the Control group, participants viewed 30-minute videos, focused on healthy eating and exercise. Control sessions were proctored by study interventionists, matched on contact, and delivered at the same intervals (weeks 1 and 10) as MI sessions.

Participants completed assessments at baseline, 3- and 6-months, per standard TEENS protocol, conducted by blinded assessors. Trained nurses measured height and weight, without shoes and in light clothing, to the nearest 0.1cm and 0.1kg, respectively (stadiometer: Holtain Limited by Crymmych Pembs; digital scale: "Health-o-meter" 2500 KL). BMI (kg/m^2) was calculated; BMI z-scores, and age and gender-specific BMI percentiles were determined using Epi Info software (CDC, Version 3.3). Dietitians assessed dietary intake with a 48-hour recall, analyzed with Nutritionist Pro. Two-day average kilocalorie (kcal) intake was used in analyses. Physical activity (total hours of moderate and vigorous physical activity performed in the previous week) was assessed with the 7-day Physical Activity Recall (PAR).¹¹ Intention to treat repeated measures ANOVAs evaluated group differences in outcomes at 3-and 6-months (SPSS v24.0; IBM Corp., Armonk, NY).

Results

Ninety-nine participants (73% African American; 74% female) were randomized and completed baseline assessments, with no baseline differences between groups (Table 1). Participants in both groups had significant reductions in BMI *z*-score and energy intake, and increased hours of moderate and vigorous physical activity at 3-months ($p<.05$). These improvements were sustained at 6-months, after a period of no MI Values contact ($p<.05$). MI participants reported significantly greater 3-month reductions in caloric intake (-290 kcals) compared with control participants (-52 kcals; $p=.025$; Table 2).

Discussion

Main findings were that MI, implemented adjunctive to adolescent obesity treatment with predominately African American, low-income adolescents, was associated with 3-month reductions in caloric intake, but did not result in differential BMI *z*-scores between conditions. We previously reported that MI Values was associated with better treatment adherence overall (and to dietitian visits, specifically) and improved retention in TEENS.⁷ The current report extends these findings and provides preliminary support for MI's role in reducing caloric intake. Although ultimately, there is a need to demonstrate MI's effect on health outcomes, understanding the impact of MI on more proximal behavioral outcomes can guide intervention development to achieve enhanced treatment effects. Limitations include self-reported physical activity assessment and inconsistent inclusion of a weekend and weekday in the dietary recalls, with about 40% of recalls including at least one weekend day. Future research should include larger samples and longer follow-up, with objective assessment of physical activity, and multiple 24-hour dietary recalls that systematically assess weekend and weekday dietary intake. Investigation of the appropriate target of treatment (parent, adolescent or combined), dose and timing (e.g., inclusion of MI beyond week 10), and delivery method (adjunctive or integrated within obesity treatment) is needed to optimize the impact of MI within obesity treatment targeting high-risk adolescents.¹²

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1Baseline characteristics of MI Values participants by treatment condition ($N = 99$)

Variable	MI Mean \pm SD or % n = 58	Control Mean \pm SD or % n = 41
Female	75.9%	70.7%
Race ^a		
African American	75.4%	68.3%
White	19.3%	19.5%
Other	5.3%	12.2%
Age (years)	13.6 \pm 1.8	14.1 \pm 1.7
BMI (kg/m ²)	36.8 \pm 6.4	36.6 \pm 5.4
BMI Percentile	98.9 \pm 1.0	98.9 \pm 1.3
BMI z-score	2.4 \pm 0.3	2.4 \pm 0.3
Parent Education ^b		
High School Graduate	19.6%	34.3%
Some College	43.1%	20.0%
College Degree	37.3%	45.7%
Family Income ^c		
<\$40,000	56.0%	48.6%
\$40,000	44.0%	51.4%

Note: Unequal group sizes were a result of attrition (before participant knowledge of group assignment) prior to the adjunctive MI Values treatment. No group (intervention vs. control) differences were found ($p > 0.05$). $N = 99$ except where noted due to missing data.

^a n = 57 MI

^b n = 35 control; n = 51 MI

^c n = 35 control; n = 50 MI

^d n = 38 control; n = 57 MI

MI = Motivational Interviewing; BMI = Body mass index

Table 2

Results of repeated measures ANOVAs examining between and within group changes in energy intake, physical activity, and body mass index z-scores from baseline to 3 and 6-month follow-up by MI Values treatment group

Variable	MI n = 58 Mean ± SD			Control n = 41 Mean ± SD			Time Effects						Group x Time Effects					
	Baseline T ₀	3 month T ₁	6 month T ₂	Baseline T ₀	3 month T ₁	6 month T ₂	T ₀ -T ₁		T ₀ -T ₂		T ₁ -T ₂		T ₀ -T ₁		T ₀ -T ₂			
							F	p	η ²	F	p	η ²	F	p	η ²	F	p	η ²
Kilocalories (kcal/day) ^a	1828 ± 545	1538 ± 498	1615 ± 435	1676 ± 523	1624 ± 507	1560 ± 495	10.67	.002	.10	9.61	.003	.09	5.20	.025	.05	.86	.357	.01
Physical Activity (hours/week) ^b	1.92 ± 2.18	3.14 ± 3.08	3.13 ± 3.25	1.70 ± 1.86	2.65 ± 2.20	2.61 ± 1.99	17.09	<.001	.16	12.89	.001	.12	.257	.614	.00	.26	.614	.00
BMI z-score	2.41 ± .32	2.37 ± .34	2.38 ± .34	2.39 ± .29	2.36 ± .29	2.36 ± .27	14.56	<.001	.13	6.63	.012	.06	.521	.472	.01	.00	.977	.00

Note: Results shown are from two group repeated measures analyses of variance to assess group differences in outcomes across baseline (T₀), 3-month (T₁), and 6-month (T₂) follow up. All models were applied using intention to treat, carrying the last observed value forward. MI Values was conducted in Richmond, VA from 2009–2011

^a Average of 2-day energy intake from 48-hour recalls; n = 98 (Control: n = 40);

^b Moderate and vigorous intensity physical activity assessed with the Physical Activity Recall; n = 93 (MI: n = 56; Control: n = 37)

BMI = body mass index; MI = Motivational Interviewing; η² = partial eta squared (measure of effect size)