Motivational Interviewing and Dietary Counseling for Obesity in Primary Care: An RCT

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abstract

BACKGROUND AND OBJECTIVE: Few studies have tested the impact of motivational interviewing (MI) delivered by primary care providers on pediatric obesity. This study tested the efficacy of MI delivered by providers and registered dietitians (RDs) to parents of overweight children aged 2 through 8.

METHODS: Forty-two practices from the Pediatric Research in Office Settings Network of the American Academy of Pediatrics were randomly assigned to 1 of 3 groups. Group 1 (usual care) measured BMI percentile at baseline and 1- and 2-year follow-up. Group 2 (provider only) delivered 4 MI counseling sessions to parents of the index child over 2 years. Group 3 (provider + RD) delivered 4 provider MI sessions plus 6 MI sessions from a RD. The primary outcome was child BMI percentile at 2-year follow up.

RESULTS: At 2-year follow-up, the adjusted BMI percentile was 90.3, 88.1, and 87.1 for groups 1, 2, and 3, respectively. The group 3 mean was significantly (P = .02) lower than group 1. Mean changes from baseline in BMI percentile were 1.8, 3.8, and 4.9 across groups 1, 2, and 3.

CONCLUSIONS: MI delivered by providers and RDs (group 3) resulted in statistically significant reductions in BMI percentile. Research is needed to determine the clinical significance and persistence of the BMI effects observed. How the intervention can be brought to scale (in particular, how to train physicians to use MI effectively and how best to train RDs and integrate them into primary care settings) also merits future research.

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WHAT'S KNOWN ON THIS SUBJECT: Childhood obesity rates in the United States remain at historic highs. The pediatric primary care office represents an important, underutilized source of intervention. There is a need to test the efficacy of motivational interviewing for pediatric obesity in primary care.

WHAT THIS STUDY ADDS: This is among the first large-scale randomized trials to show significant reductions in BMI and that motivational interviewing, delivered by trained providers in the primary care setting, can be an important and feasible part of addressing childhood obesity.

Rates of childhood obesity in the United States remain at historic highs.[1] Consensus exists that ameliorating childhood obesity rates in this country will require concerted intervention at multiple levels and in multiple settings.[2,3] The pediatric primary care office represents an important, underutilized intervention channel, as children have regular contact with their primary care providers (PCPs) during grade school. Pediatricians believe that they should be involved in the detection, prevention, and treatment of childhood overweight/obesity.[4]

Numerous family-based pediatric weight control interventions have been tested,[5–11] but most were conducted outside the primary care setting. Few have been conducted where the PCP delivered the core intervention.[7,12–18] Results of major outcome studies in primary care have not shown significant effects on BMI,[19] with 1 recent exception.[18] The latter study, conducted in Italy, comprised 5 PCP-delivered motivational interviewing (MI) sessions delivered to 372 overweight youth in primary care.

Coordinated care models recommend that dietitians be engaged through primary care to provide more intensive dietary intervention.[3] In 2 studies in which registered dietitians (RDs) were included in the care team, positive effects on adiposity were reported.[6,13]

Null effects on adiposity in previous PCP counseling studies may be related to insufficient intervention delivery.[14,15] Barriers to PCP counseling include lack of time and reimbursement.[4,20,21] Even more pivotal appears to be PCPs' perceived lack of counseling skills and the confidence to use those skills.[22] One approach to improving parent motivation and PCP counseling skills is MI.

MI is a client-centered communication style used extensively to modify health behavior and is a recommended counseling style for pediatric obesity.[23,24] However, its efficacy in treating pediatric obesity has been examined in only a few, generally small-scale studies,[13,14,18,25–30] only 2 of which showed positive effects.[13,18] There is a need to test the efficacy of MI for pediatric obesity in primary care in a fully powered trial.

This 3-group study was designed to test the efficacy of moderate-intensity (4 sessions) PCP MI-based counseling and the effect of adding 6 MI-based counseling sessions by trained dietitians delivered to parents of overweight youth aged 2 to 8 years recruited through primary care offices.

METHODS

BMI[2] (Brief Motivational Interviewing to reduce Body Mass Index) was a cluster-randomized, 3-group intervention trial with clinical practices serving as the unit of randomization and analysis. Group 1 (usual care) measured BMI percentile at baseline and at 1- and 2-year follow-up and provided routine care by the PCP, as well as standard educational materials for parents. Usual care PCPs and their study staff attended a half-day orientation session that included current treatment guidelines.[24,31] Group 2 (PCP only) included the same assessment points as group 1. In addition, group 2 PCPs received 2 days of in-person training in MI and behavior therapy led by the first author as well as an interactive MI DVD training system focusing on pediatric obesity developed for this study. PCPs in group 2 were asked to schedule 3 counseling sessions with a parent of the index child in year 1 and 1 additional "booster" visit in year 2, although they were given latitude in their appointment scheduling. Group 3 (PCP+RD) included the same intervention components as group 2 but added MI-based counseling from a trained RD who was linked to the practice. RDs were asked to deliver 6 MI-based counseling sessions over 2 years. RDs were given flexibility in scheduling counseling sessions, although again they were encouraged to provide more visits toward the beginning of the intervention. The RD sessions were delivered either in-person or by telephone. Similar to PCPs, RDs received 2 days of in-person MI and behavior therapy training and the MI DVD.

Ethics approval was obtained from the University of Michigan and the American Academy of Pediatrics (AAP). Most PROS (Pediatric Research in Office Settings) practices (n = 38) operated under the AAP Institutional Review Board, whereas the remaining practices (n = 4), obtained local institutional review board approval. All parents gave written informed consent for their and their child's participation.

Outcomes

The primary outcome was the child's BMI percentile at 2-year follow-up.

BMI Percentile

PCPs and their office assistants were trained in proper assessment of height and weight and provided with print and online resources to convert heights and weights to BMI and BMI percentile. We ensured that all practices were accurately measuring height by sending a 36-inch calibration rod. If needed, a new stadiometer was provided. All practices were provided with a digital scale. Parent BMI was calculated from self-reported heights and weights.

Demographics

Parents reported household income by using 8 contiguous categories that were collapsed into <$40 000 and ≥$40 000. Education was assessed with 7 categories, collapsed into less than college graduate and college graduate or greater. We queried insurance coverage first by asking if the child had any insurance, and then by asking about specific types.

The target population was children aged 2 to 8 with a BMI ≥85th and ≤97th percentile.[32]

Exclusion criteria were type 1 or type 2 diabetes, non-English-speaking parent, no working telephone, chronic medical disorders, chromosomal disorders, syndromes and nonambulatory conditions (such as myelodysplasia, cerebral palsy), medications known to affect growth, enrollment in a weight loss program, or seen by weight loss specialist in past 12 months. Those enrolled by practices but subsequently found to be ineligible by the study team were allowed to continue in the study, but their data were excluded in all analyses.

Reimbursement and Incentives

PCPs in groups 2 and 3 and RDs in group 3 were compensated on a fee-per-service basis. PCPs received $50 per MI session. RDs were compensated $50 per in-person visit and $35 for telephone sessions. We provided $25 for missed appointments, up to $250 per provider or RD. There were also incentives for practice participation. Group 1 received $25 per child enrolled along with a start-up incentive of $250. Group 2 and 3 practices received $500 upon initiating the study. Practices received an initial $100 incentive before the onset of year 2 rechecks in their practice. Group 1 practices received $75 for each child completing a year 2 recheck, and group 2 and 3 practices received $50 for each child completing a year 2 recheck. Any practice retaining 50% of its cohort received an additional $400, plus $400 more if they reached 80% retention.

Study Sites

All practices were recruited from the AAP's PROS network. Established in 1986, PROS is the largest US pediatric primary care research network, comprising 1676 practitioners from 712 pediatric practices. PROS practitioners are similar to their broader counterparts demographically and clinically.[33–35]

We approached PROS sites that had previously participated in at least 1 research project, excluding (1) sites offering a structured obesity treatment program and (2) clinicians with extensive experience with MI. Each practice identified an office staff member who served as the local study coordinator. This person attended the protocol training.

All practices were asked to enroll at least 20 and up to 25 eligible children. Given the higher rates of overweight and obesity in minority children, we oversampled practices with at least 25% black and/or Hispanic patients. PROS sites were matched on race and urban/suburban status, whenever possible, and then randomized to 1 of the 3 treatment arms. For the final 5 sites, we randomized using a ratio of 1:2:2 to compensate for higher dropout from the first cohort in group 2 and 3 practices.

Recruiting RDs

RDs for group 3 were selected from a registry within the Academy of Nutrition and Dietetics' Practice-Based Research Network. RDs were paired with a practice. Potential RDs were interviewed to assess their potential for implementing MI by using a simulated patient encounter. Fifteen RDs were recruited and trained in MI.

MI Intervention

MI is a patient-centered communication style that uses specific techniques such as reflective listening, autonomy support, shared decision-making, and eliciting change talk. Practitioners in groups 2 and 3 provided MI-based counseling, by using a 3-phase model developed by the lead author[36–38] that helps clinicians transition from building motivation to planning a course of action. Our MI training focused on building PCP and RD skills, including extensive practice using reflective listening and eliciting change talk. Additional details can be found elsewhere.[13]

Assessing Practitioner Fidelity

At the end of the 2-day training, all PCPs and RDs counseled a standardized patient. These encounters were videotaped and rated with a standardized MI fidelity scale (available from the first author). While at the training, the clinicians received detailed feedback from study staff about their counseling encounter. Practitioners were offered an additional supervision session by telephone.

Target Behaviors and Intervention Strategies in Groups 2 and 3

Both PCPs and RDs focused their counseling on discrete behaviors, assessed through a parent questionnaire, that have been shown to affect children's weight[39]: snack foods, sweetened beverages, fruits, vegetables, television/screen time, and physical activity/exercise. PCPs were asked to provide positive feedback for healthy behaviors and then, collaboratively with the parent, identify behaviors that might be modified. RDs received a copy of the parent baseline questionnaire responses before their first session. Group 3 PCPs and RDs were given a form to record their patient encounters, which were shared by providers.

Educational Materials

Usual care parents received a set of educational materials that addressed healthy eating and exercise. For groups 2 and 3, preexisting or new materials written in a style consistent with MI and self-determination theory[40] were used. Content emphasized child choice in making behavior change. Groups 2 and 3 also were offered self-monitoring logs for the child and/or parent to complete. For groups 2 and 3, clinicians offered

parents only the educational materials and logs that were either requested by the parent or that related to the target behavior change chosen by the family.

Sample-Size Calculations

The study was powered to detect a 3-point difference in BMI percentile between any pair of study groups at 2-year follow-up, with an assumed SD for BMI percentile between 4 and 6: power of 0.80 and 2-tailed α of .05. We inflated our sample size to account for practice-level clustering,[41] assuming a practice-level intraclass correlation between 0.01 and 0.05. On the basis of these assumptions and a projected 25% to 30% attrition at 2-year follow-up, we required 10 to 12 practices per arm (30–36 total) and an average of 15 to 20 children per practice at baseline.

Outcome Analysis

The primary outcome was BMI percentile at 2-year follow-up. To control for cluster randomization effects, we used mixed-effects regression with children nested within their practice. Although the primary analyses are based on intention to treat, we also provide post hoc exploratory results stratified by "low-dose" and "high-dose" MI received for groups 2 and 3. We used 75% of the expected dose (3 sessions for group 2 and 8 sessions for group 3) as the cutoff for low and high MI exposure. Initial covariates included child age, gender, parent BMI, and child baseline BMI either because they differed between groups at baseline or have been shown to affect BMI changes over time. We also initially included days from baseline to follow-up BMI assessment, but this was subsequently removed because its inclusion did not affect our results.

RESULTS

Sample Description

Mean baseline BMI percentile was 91.9, with values similar across the 3 experimental groups (Table 1). Mean age was 5.1, with groups 2 and 3 recruiting older children than group 1. Parent-reported BMI was highest in group 2. The child sample was 57% female, and 91% of the responding parents were mothers. Groups 2 and 3 had a greater percentage of mothers as respondents than group 1. With regard to ethnicity/race, the cohort

TABLE 1 Baseline Sample Description: BMI[2]

	Group 1 (Usual Care) (n = 198)	Group 2 (Provider Only) (n = 212)	Group 3 (Provider + RD) (n = 235)	Total (n = 645)
Mean child age (SD)[a]	4.9 (1.7)	5.1 (1.9)	5.3 (1.8)	5.1 (1.8)
Mean child BMI percentile (SD)	91.5 (3.3)	92.2 (3.3)	92.1 (3.4)	91.9 (3.3)
Mean parent BMI (SD)[a]	28.4 (6.8)	30.1 (7.4)	28.5 (6.4)	29.0 (6.9)
Child gender, %				
Male	47.0	42.9	39.6	43.0
Female	53.0	57.1	60.4	57.1
Parent respondent, %[b]				
Mother	87.2	92.4	91.7	90.5
Father	12.2	4.3	7.5	7.9
Other	0.5	3.3	0.9	1.6
Child race, %[b]				
White	67.9	53.6	59.1	60.0
Black	2.6	11.0	6.09	6.6
Hispanic	13.3	30.14	20.9	21.6
Asian	6.6	1.44	8.7	5.7
Other	9.7	3.83	5.2	6.1
Household income, %[a]				
<$40 000	27.2	38.6	29.8	31.9
≥$40 000	72.8	61.4	70.2	68.1
Parent education, %[b]				
Less than college	61.8	70.1	52.6	61.1
College or higher	38.2	29.9	47.4	38.9
Child insurance coverage, %				
Any	99.5	98.1	97.4	98.3
Private[a]	74.0	59.8	65.9	66.4
Medicaid[b]	17.4	36.4	23.0	25.7

[a] Study groups differ $P < .05$, based on analysis of variance for continuous and χ^2 for categorical variables.
[b] Study groups differ $P < .01$, based on analysis of variance for continuous and χ^2 for categorical variables.

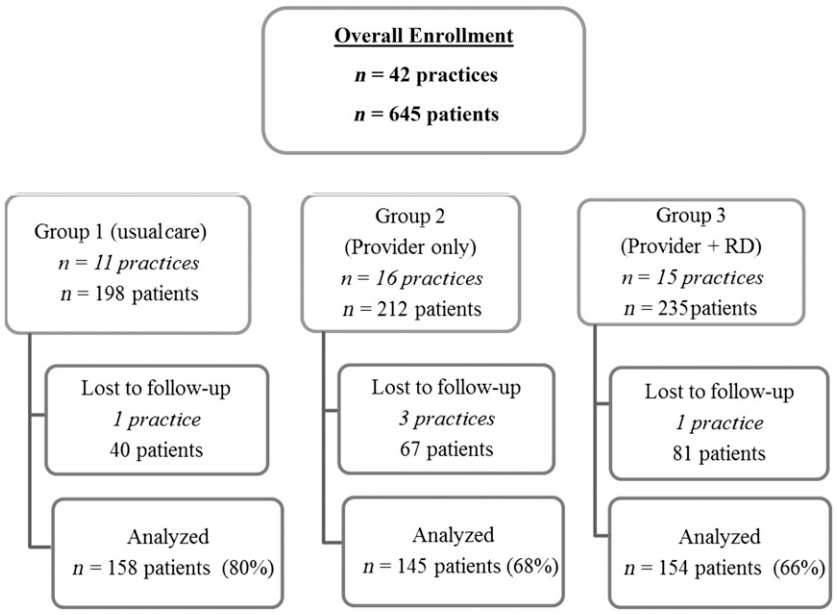

FIGURE 1
Study overview.

was 60% white, 22% Hispanic, 7% black, and 6% Asian, and the 3 groups differed significantly with regard to ethnic/racial composition. Overall, ~68% of parents reported household income at or above $40 000 per year, with group 2 significantly less likely to report >$40 000 income. Approximately 39% of the sample reported at least a college education, with group 2 having lower rates than groups 1 and 3. Group 2 was less likely to have private insurance and more likely to have Medicaid coverage.

A total of 674 participants were recruited (Fig 1). Of these, 29 were ineligible because their BMI percentile, when verified by study staff, was outside the eligible range. Of the original 42 practices, 3 group 2 practices dropped out (1 PCP died, 1 retired, and 1 declined to recruit any patients), a group 3 practice dropped out because of medical illness, and a usual care practice was excluded for not following the study protocol.

Of the 645 eligible baseline children, 2-year follow-up BMI data were obtained for 457 (71%). The retained cohort was similar to those lost to follow-up with regard to BMI percentile, age, and gender (Table 2). However, those lost to follow-up were significantly more likely to be black or Hispanic patients and to come from households with <$40 000 income and lower parental education. They were also more likely to have Medicaid. Parents lost to follow-up had higher baseline self-reported BMI. The intraclass correlation of year 2 BMI percentile due to practice level clustering was 0.04.

TABLE 2 Comparison of Cohort and Dropouts: BMI[2]

	Cohort (n = 457)	Dropouts (n = 188)
Mean child age (SD)	5.1 (1.8)	5.1 (1.9)
Mean child BMI percentile (SD)	91.8 (3.4)	92.2 (3.1)
Parent BMI (SD)[a]	28.5 (6.8)	30.3 (7.0)
Child gender, %		
Male	45.1	37.8
Female	54.9	62.2
Parent completing questionnaire, %		
Mother	90.9	89.6
Father	7.5	8.8
Other	1.5	1.6
Child race, %[a]		
White	64.0	50.0
Black	5.5	9.3
Hispanic	18.3	29.7
Asian	6.4	3.8
Other	5.7	7.1
Household income, %[a]		
<$40 000	27.7	42.5
≥$40 000	72.3	57.5
Parent education, %[a]		
Less than college	55.8	74.4
College or higher	44.2	25.6
Child insurance coverage, %		
Any[b]	99.3	95.6
Private[a]	72.4	51.4
Medicaid[a]	22.7	33.2

Dropouts defined as missing 2-year follow-up data.

[a] Cohort and dropout groups differ $P < .01$, based on analysis of variance for continuous and χ^2 for categorical variables.

[b] Cohort and dropout groups differ $P < .05$, based on analysis of variance for continuous and χ^2 for categorical variables.

MI Dose in Groups 2 and 3

The expected dose in group 2 was 4 PCP contacts, and in group 3, the expected dose was 4 PCP contacts plus 6 by RDs (10 total). The mean MI dose for PCPs was 3.4 and 3.3 (out of 4) in groups 2 and 3, respectively (Table 3). For group 3, the mean dose for RD contacts was 2.7 (out of 6). For group 2, 73% of PCPs delivered all 4 sessions, and 10% delivered 3. For group 3, the corresponding rates for PCPs were 68% and 8%. For group 3 RDs, 12% delivered all 6 sessions, and another 14% and 6% delivered 4 or 5 sessions. RDs and parents were given a choice as to in-person or telephone for conducting contacts 2 through 6, and the majority of these contacts (79%) were by completed by telephone.

BMI Percentile Results

At 2-year follow-up, the adjusted BMI percentile was 90.3, 88.1, and 87.1 for usual care, group 2, and group 3, respectively (Table 4). There was an overall group effect, P = .049. Planned post hoc contrasts showed that the group 3 mean was significantly (P = .02) lower than the usual care group. Using the difference in BMI percentile (baseline – year 2), means were 1.8, 3.8, and 4.9 BMI percentile units across groups 1, 2, and 3, respectively, with significance patterns virtually identical to that observed by using BMI percentile. The net difference between groups 3 and 1 was 3.1 BMI percentile units and 2.0 percentile units between groups 2 and 1. Using

TABLE 3 Number and Percent of MI Sessions Completed: BMI[2]

Intervention Group	n (%) of Parents Completing MI Sessions						
	0	1	2	3	4	5	6
Group 2 (n = 145)	3 (2.1)	14 (9.7)	8 (5.5)	14 (9.7)	106 (73.1)	NA	NA
Group 3 providers (n = 154)	3 (1.9)	18 (11.7)	17 (11.0)	12 (7.8)	104 (67.5)	NA	NA
Group 3 RDs (n = 154)	21 (13.6)	24 (15.6)	29 (18.8)	30 (19.5)	22 (14.3)	9 (5.8)	19 (12.3)

NA, not applicable.

TABLE 4 Two-Year BMI Percentile and BMI Percentile Change by Study Group

Study Group	*n*	Year 2 BMI Percentile[a] (SE)	BMI Percentile Difference[a,b] (SE)
Group 1	158	90.3[c] (0.94)	1.8[c] (0.98)
Group 2	145	88.1 (0.94)	3.8 (0.96)
Group 3	154	87.1[c] (0.92)	4.9[c] (0.99)

[a] Adjusted for age, race, gender, baseline BMI, household income, parent BMI, provider age, and practice effects (clustering).
[b] Subtracting year-2 BMI percentile from baseline BMI percentile.
[c] Groups with common superscript differ $P < .05$.

raw BMI units, the difference between the usual care group and groups 2 and 3 was 0.4 and 0.6 BMI units, respectively (data not shown). There was no significant interaction of intervention group by child gender, child age, child race, baseline BMI, parent income, parent education, or parent BMI.

Exploratory "completers" analyses indicated that across the 5 groups, (ie, usual care, "low" group 2 dose, "high" group 2 dose, "low" group 3 dose, and "high" group 3 dose), the mean changes in BMI percentile scores were 1.7, 3.2, 4.2, 4.6, and 5.5 (Table 5). Both group 3 high- and low-dose means were significantly greater than the usual care group. Neither group 2 high or low means differed from usual care.

DISCUSSION

Overweight children, whose parents received MI counseling from their PCPs supplemented by RD counseling, showed a significant reduction in BMI percentile over 2 years compared with children whose parents received usual care. The net difference in BMI reduction between these 2 groups was 3.1 BMI percentile units. This is among the first counseling interventions using MI and delivered in primary care to yield significant effects on adiposity.[14,15,18,19] The 1 previous positive MI study in primary care yielded a 0.3 net effect on raw BMI, whereas our net effect on raw BMI between usual care and groups 2 and 3 was 0.4 and 0.6 BMI units, respectively; their positive results were limited to girls.[18] The larger effects herein may be because that study used only PCPs to deliver the MI intervention, whereas our study also used RD counseling.

The group that received only the PCP counseling in our study showed a net difference of 2.0 BMI percentile units compared with usual care; however, this difference was not statistically significant. Whereas a 2.0 percentile reduction in BMI may confer health benefits, there are no published studies that have specifically examined the clinical impact of this size change.

In general, PCPs in both groups 2 and 3 delivered most of the recommended dose of MI counseling. The mean MI session completion rates for PCPs in groups 2 and 3 were 3.4 and 3.3 (out of 4), respectively. However, intervention completion by RDs was less successful. Out of the expected 6 RD sessions, the mean number completed was only 2.7 (out of 6). Dose-response analyses suggest that even larger effects on BMI might have been achieved had either the PCP or RD counseling been delivered at a higher rate.

Inability of RDs to complete their counseling sessions was likely due to several factors. At study's end, we interviewed 7 of the project RDs. Although RDs attempted to reach parents during the evening, parents were often too busy with family responsibilities. Anecdotal data from parents also indicted that scheduling difficulties limited their ability to complete the RD counseling. Several RDs noted that their PCPs did not share their counseling summaries, and RDs did not feel fully integrated into the care team. RDs were added to the practice solely for this study and, unlike the PCPs, were not treating their own patients. They also felt some PCPs did not adequately encourage patients to participate in the RD counseling.

One somewhat surprising finding was the relatively large BMI reduction in the usual care group: 1.7 BMI units. A few factors likely contributed to usual care response. First, the study attracted PCPs who had an interest in pediatric obesity and MI. Consequently, we recruited practitioners who were motivated to treat their overweight patients and improve their counseling skills. Usual care practitioners, based on a baseline provider survey, were younger than those in the 2 intervention arms combined: 48 vs 54 years, respectively. They were more likely to be women: 80% compared with 70% among group 2 and 3 practitioners. Finally, they were more likely to perceive their weight management counseling as effective.

TABLE 5 BMI Percentile Change by MI Dose Received: BMI[2]

Study Group	*n*	Mean BMI Percentile Change[a] (SE)
Group 1	149	1.7[b,c] (0.94)
Group 2, low dose, <3 MI	23	3.2 (2.1)
Group 2, high dose, ≥3 MI	112	4.2 (1.0)
Group 3, low dose, <8 MI	104	4.6[c] (1.03)
Group 3, high dose, ≥8 MI	37	5.5[b] (1.6)

Group 2 had a maximum of 4 provider sessions; group 3 had a maximum of 10 sessions (4 providers/6 RDs).
[a] Adjusted for age, race, gender, baseline BMI, parent gender, household income, parent BMI, and practice effects (clustering).
[b] Groups with common superscript significantly differ; $P < .05$.
[c] Groups with common superscript significantly differ; $P < .05$.

Debriefing interviews also found that some practices added an RD to their staff during the trial, and others noted that their patients were motivated to lose weight "to make their doctor look good." Together these factors at least partially explain the higher than anticipated usual care group changes.

Although the effects on BMI observed in group 2 were slightly better than the usual care group, they were not statistically significant. The policy and practice implications of this finding are somewhat unclear. Had the usual care group exhibited the degree of change we expected, then these effects would have achieved statistical significance. Thus, it is possible that the PCP intervention alone, perhaps with slightly increased dose, merits further exploration.

We lost ~30% of the baseline sample. Although this was in the anticipated range of attrition and consistent with previous studies,[42] the fact that those lost to follow-up differed on several demographic variables (eg, race, income, and education) limits generalizability. The less-than-anticipated completion of the RD counseling complicates interpretation of our results. Although completer analyses suggest that a higher dose might yield greater BMI response, such analyses are potentially confounded. Reverse causality may explain the effects among completers (ie, those families doing better may have been more likely to participate in the RD calls). Another generalizability issue is that we only enrolled PROS practices that had previously completed a research protocol. How our findings generalize to other PROS practices and the general pediatric profession merits study.

There was no attention control for the MI counseling. Thus, we cannot discern whether the effects observed in groups 2 and 3 were due to generic attention effects rather than MI per se.

CONCLUSIONS

This is among the first large-scale trials to show statistically significant reductions in BMI by using MI delivered by PCPs and RDs. Research is needed to determine the clinical significance and persistence of the BMI effects observed. Given the relatively modest dose, the intervention appears to have considerable dissemination potential, which can be explored in future studies. How the intervention can be brought to scale (in particular, how to train physicians to effectively use MI and how best to train RDs and integrate them into primary care settings) merits future research.

Ms Foster critically reviewed and revised the manuscript and conceptualized and participated in study strategy development; Ms Hollinger, Ms Smith, and Ms Mueller critically reviewed and revised the manuscript and conceptualized and participated in study strategy development; Dr Wasserman critically reviewed and revised the manuscript and conceptualized and oversaw study recruitment strategies, data collection, and data analysis; and all authors approved the final manuscript as submitted.

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CUDDLY CUDDLERS: *My wife and I have been married a long time ("forever and a day," as she likes to say) and we tend to snuggle a lot. While watching TV, before sleep, or even first thing in the AM, we like to cuddle. It seems that lots of adults like to cuddle but do not always have someone around to cuddle them. As reported in* The Wall Street Journal *(A-Hed, January 8, 2015), cuddling services have sprung up around the country to address that problem. One can now hire professionals to cuddle for a fixed rate. Professional cuddlers charge approximately 60-80 dollars an hour and 400 dollars a night, and generally use poses or positions described in a book called "The Cuddle Sutra."*

While people have always cuddled, the industry got its start in the U.S. approximately 5 years ago when a former psychology student – frustrated by restrictions against touch between therapists and their clients – started a cuddle business. Since then, interest has exploded, and now there are websites where members can swap information and find others interested in non-sexual cuddling. An app allows users to find people near them interested in cuddling. There are even plans for a cuddling convention. To date, professional cuddlers are not licensed but they must follow local ordinances regarding businesses in residential properties. While professional cuddlers are strictly platonic, enforce clothes on policies, diagram what parts of the body can or cannot be touched, and even insist on personal grooming before cuddling, not everyone is excited about the business. Since the businesses are often in private residences, neighbors sometimes worry about attracting unsavory clientele. As for me, I am happy to report that I have no need to hire a professional cuddler. My wife is doing a great job.

Noted by WVR, MD

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