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Training Primary Care Providers in the Use of Motivational Interviewing for Youth Behavior Change

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Abstract

Background and Purpose—Adolescent obesity is a global epidemic. Motivational interviewing (MI) is a promising strategy to address adolescent obesity risk behaviors. However, primary care providers (PCPs) tend to express discomfort with learning and adopting MI practices and with addressing patient weight issues. PCP proficiency in using MI to discuss body mass index, health screening results, and nutrition and physical activity behaviors after receiving training and coaching from an MI expert and practicing the technique was evaluated. We hypothesized that comfort with MI would increase consistently over time.

Methods—Self-assessment surveys in MI proficiency were administered to PCPs after every youth participant MI session. MI comfort as determined by proficiency was categorized into low, medium, and high comfort according to survey Likert scale responses. Data were analyzed using ANOVA and Fisher's exact tests.

Results—Two hundred twenty-seven youth were seen for MI-based discussions by four PCPs. Two hundred twenty-six surveys had complete data for analysis. As anticipated, overall PCPs reported significantly more comfort with MI from the first to the final MI session over a two to

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three month period ($p < 0.001$). Comfort scores did not increase linearly over time for all PCPs. Despite standard training practices, overall MI proficiency as measured by comfort scores varied by PCP ($p < 0.01$).

Implications for Practice—This type of MI training program should be considered for clinical nurses and nurse practitioners during their nursing education training to facilitate their ability to consistently and effectively support youth behavior change for conditions like obesity. (ClinicalTrials.gov number: NCT02502383)

Keywords

adolescent; motivational interviewing; obesity

Background

Adolescent obesity is a global public health concern. In the United States, adolescent obesity prevalence has quadrupled over the last 30 years, increasing from five percent in 1980 to nearly twenty-one percent in 2012 with a rising trend among adolescent populations (Center for Disease Control, 2015; National Center for Health Statistics, 2012; Ogden, Carroll, Kit, & Flegal, 2014; Ogden et al., 2016). An increase in the prevalence of adolescent obesity is being observed world-wide (Organisation for Economic Co-operation and Development, 2014; World Health Organization, 2016). There are both immediate and long-term health consequences associated with adolescent obesity, including bone and joint problems, sleep apnea, psychosocial problems, and long-term risk for adult obesity, cardiovascular disease and mortality, diabetes, and cancer (Barlow, 2007).

In 2010, the United States (U.S.) Office of the Surgeon General announced an urgent need to train clinicians to screen for obesity and to implement effective obesity interventions in primary care settings (United States Department of Health and Human Services, 2010, 2016). However, active primary care provider (PCP) screening for adolescent obesity was suboptimal in a nationally representative survey in the U.S. in 2011, with less than 50% of PCPs reporting that they assessed BMI with percentiles and 58% indicating that they never or rarely tracked weight over time (Huang et al., 2011; Steeves, Liu, Willis, Lee, & Smith, 2015). In 2014, in another nationally representative survey in the U.S., the majority (97%) of PCPs reported believing they had a responsibility to promote weight management with their patients, but more than half had doubts with their effectiveness to address obesity and more than two thirds felt that they lacked effective strategies (Bhuyan et al., 2015; Steeves et al., 2015). PCP and adolescent sensitivity and discomfort when talking about weight, along with the amount of time needed for those discussions, were the most significant reported barriers to managing overweight or obese adolescents in primary care settings (Bhuyan et al., 2015; Yarborough, DeBar, Wu, Pearson, & Stevens, 2012).

Motivational interviewing (MI) is a patient-centered counseling style that has promising empirical support for addressing adolescent health risk behaviors, such as poor eating and physical activity habits, that are associated with obesity incidence (Carcone et al., 2013; Keeley, 2016; Kong et al., 2013; Morton et al., 2015; Resnicow et al., 2015; Sanci et al., 2015). MI-based discussions are nonjudgmental, empathic, and collaborative, with a focus

on strength building, whereby the adolescents' own values, opinions, and argument for change are most valued, which is particularly helpful at facilitating therapeutic alliances with youth (Feldstein Ewing, Wray, Mead, & Adams, 2012). MI can be incorporated into fifteen to twenty minute clinical practice conversations and, when done skillfully, give both parties the sense of having had quality time together (Miller & Rollnick, 2014). The brevity and transportability of MI has made it fitting for use with youth in primary care medical settings because both MI and primary care seek to engage individuals in their own health (Feldstein Ewing et al., 2012).

Kong and colleagues (Kong et al., 2013) found that a weight management intervention that used MI to promote youth healthful eating and physical activity behavior change significantly improved BMI percentile and stabilized waist circumference when compared to standard care. Similarly, Ball and co-workers (Ball et al., 2011) reported that an MI-based lifestyle intervention delivered in a real world clinical setting decreased obese adolescents' BMI z-scores. Therefore, MI-based interventions have the potential to effectively address adolescent obesity.

Overall, however, there is high variability in the impact of MI intervention-based studies on outcomes of interest (Hettema, Steele, & Miller, 2005; Lundahl & Burke, 2009). W.R. Miller and Rollnick (2014) hypothesized that in the absence of quality assurance of PCP integrity and fidelity to optimal MI practices, clinical interventions may not be delivered effectively. Therefore, they recommended MI training, followed by routine recordings of all sessions with ongoing coaching to ensure MI integrity and fidelity (McCambridge, Day, Thomas, & Strang, 2011; W. R. Miller & Rollnick, 2014; Mitcheson, Bhavsar, & McCambridge, 2009). In addition to these concerns, there is a need to facilitate provider comfort and confidence with MI; PCPs tend to be reticent in adopting MI as they believe it to be more demanding and time consuming than their current methods for working with patients (Brobeck, Bergh, Odencrants, & Hildingh, 2011).

Theoretical Framework

The theoretical framework used to guide this study was King's Theory of Goal Attainment and Transaction Process (King, 1992). A basic assumption is that there is a process of human interactions whereby individuals involved in a transaction perceive each other through a common frame of reference (health care), set goals, and agree on a means to attain the mutual valued goals. Interactions, which are triggered by the identification of a problem or disturbance, lead to transactions. Transactions include communication to exchange values and expectations with the development of trust that leads to action.

The disturbance that built momentum for transactions was the adolescent obesity epidemic and the need for effective strategies to address the problem. Developing and maintaining ongoing effective, clear, and precise communication about the project specifics was key in the interaction and transaction processes for buy-in. We promptly addressed emerging problems or disturbances with purposeful interactions to engage in ongoing transactions to support consistent project implementation.

Aim and Hypothesis

The aim of this paper is to evaluate changes in PCP self-assessed proficiency (i.e., comfort) with MI over time, after having received training, coaching and practice with using MI to facilitate youth behavior change related to healthful eating and physical activity. We focused our work on PCPs in school-based health centers (SBHCs), which are an increasingly accessible source of health care for many adolescent patients (Gibson, Santelli, Minguez, Lord, & Schuyler, 2013). We hypothesized that PCPs would become consistently more proficient and thus develop more comfort with MI between their first and final participant.

Methods

Participants

Four SBHC PCPs were recruited to deliver an MI-based intervention as part of the ACTION PAC cluster-randomized controlled trial (ClinicalTrials.gov number: NCT02502383). The University of New Mexico Human Research Protections Office (HRPO) and participating schools' Institutional Review Boards approved the study protocol.

The PCP participants in this study included three nurse practitioners, and one physician assistant, each at a different SBHC site within New Mexico, one of whom is the first author (MKV). All of the PCPs were already working in SBHCs with youth, and had varying levels of experience (see Table 1). None of the PCPs had previously received any formal training in MI. Criteria for PCP inclusion and exclusion were determined by the ACTION PAC trial. All PCPs had to have been eligible to work in SBHCs at least one day per week with interest and commitment in completing the ACTION PAC research study protocol.

Motivational Interviewing Training, Implementation, and Coaching

A member of the Motivational Interviewing Network of Trainers and expert in MI for adolescent health behavior change (SWFE) trained the SBHC participant PCPs through didactic sessions, homework, role-play, and on-going coaching according to W.R. Miller and Rollnick's (2014) recommendations for MI training (McCambridge et al., 2011; W. R. Miller & Rollnick, 2013, 2014; Mitcheson et al., 2009). The participant PCPs were provided with two eight hour days of introductory training in MI, MI reading materials, and a study manual. They were also required to participate in bimonthly tele-coaching throughout the course of delivering the MI intervention to facilitate integrity and fidelity of the MI delivery. During tele-coaching, the MI expert routinely re-played, reviewed, and provided feedback of random previously recorded audio recordings of the MI intervention sessions that included the PCPs use of MI in structured discussions with ACTION PAC youth participants. Feedback focused on MI integrity (key characteristics of MI, including open-ended statements, affirmations, reflections and summary statements) and fidelity (a measure of MI quality assessing trueness to application of the key characteristics of MI) (W. R. Miller & Rollnick, 2002, 2013, 2014).

Assessment of PCP Comfort With MI

Increasing specialty health care skill knowledge, and, subsequently, proficiency, increases comfort with the skill (Homan & Chichester, 2016). As such, we assumed that MI

proficiency corresponds with comfort. Therefore, we measured comfort based on self-assessed proficiency in the application of key characteristics of MI.

To assess PCP comfort with MI, we adapted an instrument (MI Provider Self-Assessment Survey) developed by Feldstein and team (Feldstein Ewing et al., 2012). The survey focuses on key characteristics of MI and contains questions involving Likert scale responses (1–5) to assess proficiency of core skills and processes of MI as defined by W. R. Miller and Rollnick (2013). Based on average PCP self-perceived proficiency reported across all questions, overall comfort based on proficiency with MI was categorized into three categories: low comfort (1–2), moderate comfort (3), and high comfort (4–5) (Cronbach's alpha coefficient = 0.96). Although there is no specific validity or reliability information about this measure, there was no other suitable data collection measure available at the time this study was planned, based on a search of the literature (Feldstein Ewing et al., 2012; Miller & Rollnick, 2002; Strayer et al., 2011). However, the survey was specifically developed for evaluating providers' use of MI with youth in behavioral interventions (Feldstein Ewing et al., 2012). Experts in MI (SWFE) and adolescent medicine and weight management (ASK) reviewed the revised survey to confirm content validity related to healthful eating and physical activity.

We administered the MI Provider Self-Assessment Surveys after every youth session (see Table 2). PCPs did MI sessions with youth in SBHCs as part of the ACTION PAC clinical trial. The numbers of MI sessions for each PCP varied because they were determined by youth enrolled in the ACTION PAC project during year one of recruitment out of a two-year recruitment time frame at each school site. Each ACTION PAC youth participant had their first MI session (session one of sixteen) with the PCP during this time frame. At this session, PCPs used an MI-based approach to discuss anthropometric and blood pressure results for all ACTION PAC youth participants and laboratory results for youth participants with a BMI 85 percentile (overweight or obese) with a focus on facilitating and promoting healthy eating and physical activity behaviors. The PCPs explored youth motivation to maintain or get to a healthier weight through a goal directed discussion about the youth's measurement results and health behaviors.

Sample Size Calculation

The standard deviation within SBHC sites was assumed to be 0.60, which is consistent with Siddall and colleague's (Siddall, Huebner, & Jiang, 2013) adolescent global life satisfaction study. Power was set at 0.80, and alpha at 0.05 in order to detect medium to large effect sizes (0.35–0.74) for individual SBHC sites and a small to medium effect size (0.22) among time quartiles for all SBHC sites combined.

Statistical Methods

Study data were entered and managed using REDCap (Harris et al., 2009) electronic data capture tools hosted at the University of New Mexico Clinical and Translational Science Center. Twenty percent of data entry was reviewed and validated, with an error rate of less than one percent. Time was categorized into quartiles for each individual provider beginning after the first MI-based session one and ending after the final session one for the first cohort

of ACTION PAC youth participants. Analysis of Variance (ANOVA) was used to compare mean comfort scores among the four time periods and Fisher's exact test was used to compare the percentage of surveys by comfort categories. All analyses were conducted using SAS software (SAS Institute, 2012).

Results

The four PCPs saw 227 total ACTION PAC youth participants and 226 MI Provider Self-Assessment Surveys had complete data for analysis. Mean PCP comfort scores were significantly higher as time progressed, with the highest mean scores in the fourth time quartile compared to the first, second, and third time quartiles, and the biggest increase in mean scores from the third to fourth time quartile (Mean scores $M = 3.12, 3.27, 3.42, 3.70$, respectively by the four time quartiles; $F(3, 222) = 10.39, p < 0.001$). However, the process varied by provider, with fluctuating scores over the time quartiles for some providers. PCP 1's highest mean score was in the second time quartile ($M = 3.12, 3.56, 3.34, 3.39$, respectively across the four time quartiles, $p = 0.01$), PCP 2's highest mean score was in the fourth quartile ($M = 3.37, 3.56, 4.80, 4.90$, respectively, $p < 0.001$), PCP 3's highest mean score was in the fourth time quartile ($M = 3.00, 2.92, 2.83, 3.34$, respectively, $p < 0.001$), and PCP 4's highest mean score was in the fourth time quartile ($M = 3.05, 3.24, 3.32, 3.66$, respectively, $p = 0.01$; see Figure 1).

Overall, the majority of PCP survey responses fell into the moderate comfort category. By quartiles, the largest percent of the surveys completed fell in the moderate comfort category for time quartiles one, two, and three (86%, 63%, and 54% respectively), and in the high comfort category (51%) for time quartile four ($p < 0.001$; see Figure 2).

Discussion

Overall, the results of this study quantify the conventional wisdom that comfort with developing a new skill improves with training, supervision, and practice over time. As anticipated, overall, PCPs were increasingly comfortable with MI over time and comfort increased the most from the third to fourth time quartiles. These results suggest that subsequent to training, repetitive use of MI with supervision over a minimum of two to three months is needed to for PCPs to begin to develop high comfort with MI as measured by self-perceived skill. Our findings are consistent with previous literature demonstrating PCP gains in MI knowledge, skills and confidence after introductory MI training and 12 weeks of coaching with simulated patients (Fu et al., 2015).

Despite standardized training practices, providers in this study showed a significantly different range of comfort with MI, regardless of time, and the process of becoming comfortable varied between providers. PCPs 2 and 4 had fairly similar progressive increases in comfort with MI while PCPs 1 and 3 had rising, falling, and then rising MI comfort scores. This is consistent with findings from Forsberg and colleagues (Forsberg, Forsberg, Lindqvist, & Helgason, 2010), who evaluated provider skill retention in MI over two and a half years and found that skill varied among the three providers, as well as fluctuations in skill over time. Likewise, McCambridge and associates (McCambridge et al., 2011) found

differences within and between four providers in fidelity to MI after having had a 2-day training in MI and then collectively delivering one MI-based session to a total of seventy-five participants.

In the present study, perhaps the variation in provider comfort with MI can be explained by the weight status of the youth participants seen by quartile, along with previous provider experience and expertise with adolescent populations. Although a mix of healthy weight (BMI <85th percentile) and overweight/obese (BMI ≥85th percentile) youth participants were seen among time quartiles, more healthy weight youth received MI sessions in time quartiles one and two, and more overweight/obese youth received MI sessions in the third and fourth time quartiles. This was due to the need to wait for laboratory results to be available for discussions with overweight/obese youth. For example, the pattern of comfort observed for PCPs 1 and 3 (dip in comfort during the third quartile, then rebound in comfort during the fourth quartile to levels previously seen in quartile two) could be explained by the need to adjust for MI sessions with more overweight/obese youth starting in the third quartile. PCPs 2 and 4 had more clinical experience and expertise in working specifically with adolescent populations compared to PCPs 1 and 3. Accordingly, PCPs 2 and 4 likely had more exposure to and clinical experience in working with overweight and obese youth, which may have led to their progressive increase in comfort with MI over time regardless of youth BMI percentile.

A unique aspect of the ACTION PAC study, which may have aided in establishing provider comfort with MI in this context, is that providers received ongoing biweekly coaching with the MI expert throughout the same time frame that they were delivering the MI sessions to youth participants. During MI coaching, the PCPs were able to discuss challenges that they experienced with youth in the MI sessions and receive feedback, guidance, strategies, and MI specific approaches and language to discuss weight with the adolescent participants. In a study by Nightingale and co-workers (Nightingale, Gopalan, Azzam, Douaihy, & Conti, 2016), family medicine residents were trained to discuss BMI using the MI counseling style and compared them to a group of family medicine resident providers who had extensive training in MI, without having specific training to discuss BMI. The residents who received training in MI-based BMI discussions had greater increases in their use of MI approaches to managing unhealthy habits related to diabetes mellitus compared to those who did not have BMI training (Nightingale et al., 2016). Pollak and colleagues (Pollak et al., 2016) compared physicians trained in MI (intervention group) through use of audio recordings of their own patient encounters and modules addressing MI techniques to use with adolescents around weight and weight related behaviors to a control group of physicians. Patients rated physicians from the intervention group, who used more MI technique, as more empathetic, and reported that physician empathy increased their motivation to change diet and physical activity behaviors (Pollak et al., 2016).

Few other studies have longitudinally examined PCP comfort with MI subsequent to MI training and on-going coaching. Gecht-Silver and co-workers (Gecht-Silver, Lee, Ehrlich-Jones, & Bristow, 2016) evaluated third year medical students' comfort with MI after having received a four-hour training. They found that MI confidence, knowledge, and skills significantly increased based on pretest and posttest assessments, before and after training

(Gecht-Silver et al., 2016). However, they did not examine long-term change in comfort with MI over time, with practice. A meta-analysis (Schwalbe, Oh, & Zweben, 2014) and systematic review (Hall, Staiger, Simpson, Best, & Lubman, 2016) examining MI training studies found that only attending a workshop on MI does not typically engender enduring changes in clinical practice, and on-going coaching after training is likely necessary to achieve sustained practice change and MI proficiency. Martino and colleagues (Martino, Canning-Ball, Carroll, & Rounsaville, 2011) and Forsberg and associates (Forsberg et al., 2010) evaluated provider proficiency and skill in MI after having received MI training and ongoing supervision at 24 weeks and 2.5 years, respectively, and both found that beginning proficiency in MI was achieved by six and 12 months respectively. However, similar to our study, Fu and co-workers (Fu et al., 2015) demonstrated gains in PCP MI proficiency more quickly, after three months. PCPs in the study were provided a half day training workshop in MI by an MI expert with ongoing coaching using telephone interactions with simulated patients and peer coaching by MI champions, followed by an objective structured clinical evaluation (OSCE) to assess and critique performance (Fu et al., 2015).

Implications for Practice

Thus, the initial training of student nurses and nurse practitioners in MI during nursing education programs may need to be augmented with mentoring or coaching with MI specific approaches to discuss weight and weight management with patients when they are in their clinical practice training. They could receive an introductory MI training in didactic lecture. Then coaching could be provided throughout the nursing program and/or in the clinical setting over 12 weeks with periodic OSCE evaluations during the remainder of their training program to bolster and sustain MI skills as Fu and colleagues (Fu et al., 2015) demonstrated. MI training and on-going coaching may be especially essential for nurses specializing in working with adolescents and in SBHCs, as a number of studies have demonstrated that using MI with youth can enhance youth engagement with health care and disclosure of risk factors (Dean, Britt, Bell, Stanley, & Collings, 2016; M. K. Miller et al., 2016; Sanci et al., 2015). Therefore, nurses would potentially graduate with proficiency and comfort with MI before even entering independent practice.

Limitations

Our study has some limitations that should be considered in interpreting the results. While our provider sample size was small, it is consistent with another published study that implemented ongoing coaching with providers who achieved beginning proficiency in MI; however, our study implemented more MI-based discussions (Forsberg et al., 2010). A second limitation is that repeated administration of the survey may have affected our results, as providers might have felt pressure to report increased comfort over time. However, the fluctuating comfort reported by PCPs' 1 and 3 increases our confidence that providers reported their comfort accurately over time. This study was done in the context of a cluster-randomized clinical trial, and providers were required to use MI repeatedly as part of the study protocol. This could have affected their ability to push past their initial discomfort with using MI to achieve comfort.

Another limitation is that the first author (MKV) was also a PCP participant and this may have inadvertently introduced bias. She may have developed more comfort with MI than the other PCP participants because of her more extensive involvement in the project. However, her comfort scores resulted in a similar pattern to another PCP participant in the study, as previously described in the results and discussion sections. Furthermore, all of the participating providers self-selected to participate in implementing the research study, indicating that they may have had more interest in MI than the average provider. A final limitation is the varying years of PCP participant professional experience. Ideally, providers would have been more homogenous in terms of years of experience. However, fluctuating and varying PCP participant comfort scores were consistent with other published studies (Forsberg, Forsberg, Lindqvist, & Helgason, 2010; McCambridge, Day, Thomas, & Strang, 2011).

Conclusion

MI should be further explored as a behavior change strategy to incorporate into multicomponent, multidisciplinary weight management and obesity prevention for youth world-wide (World Health Organization, 2016). To increase provider adoption of and comfort with MI for weight management discussions, clinical nurses and nurse practitioners should be trained in MI by an expert, and then receive on-ongoing coaching while they implement MI consistently for at least two to three months in a clinical setting during their nursing education training.

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References

- Ball GD, Mackenzie-Rife KA, Newton MS, Alloway CA, Slack JM, Plotnikoff RC, Goran MI. One-on-one lifestyle coaching for managing adolescent obesity: Findings from a pilot, randomized controlled trial in a real-world, clinical setting. *Paediatr Child Health*. 2011; 16(6):345–350. [PubMed: 22654546]
- Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007; 120(Suppl 4):S164–192. DOI: 10.1542/peds.2007-2329C [PubMed: 18055651]
- Bhuyan SS, Chandak A, Smith P, Carlton EL, Duncan K, Gentry D. Integration of public health and primary care: A systematic review of the current literature in primary care physician mediated childhood obesity interventions. *Obes Res Clin Pract*. 2015; 9(6):539–552. DOI: 10.1016/j.orcp.2015.07.005 [PubMed: 26259684]
- Brobeck E, Bergh H, Odencrants S, Hildingh C. Primary healthcare nurses' experiences with motivational interviewing in health promotion practice. *J Clin Nurs*. 2011; 20(23–24):3322–3330. DOI: 10.1111/j.1365-2702.2011.03874.x [PubMed: 22017587]

- Carcone AI, Naar-King S, Brogan KE, Albrecht T, Barton E, Foster T, ... Marshall S. Provider communication behaviors that predict motivation to change in black adolescents with obesity. *J Dev Behav Pediatr*. 2013; 34(8):599–608. DOI: 10.1097/DBP.0b013e3182a67daf [PubMed: 24131883]
- Center for Disease Control. Healthy Schools: Childhood obesity facts. 2015. Retrieved from <https://www.cdc.gov/healthyschools/obesity/facts.htm>
- Center for Medicare and Medicaid Services. Affordable care act. 2015.
- Dean S, Britt E, Bell E, Stanley J, Collings S. Motivational interviewing to enhance adolescent mental health treatment engagement: a randomized clinical trial. *Psychol Med*. 2016; 46(9):1961–1969. DOI: 10.1017/s0033291716000568 [PubMed: 27045520]
- Feldstein Ewing SW, Wray AM, Mead HK, Adams SK. Two approaches to tailoring treatment for cultural minority adolescents. *J Subst Abuse Treat*. 2012; 43(2):190–203. DOI: 10.1016/j.jsat.2011.12.005 [PubMed: 22301086]
- Forsberg L, Forsberg LG, Lindqvist H, Helgason AR. Clinician acquisition and retention of Motivational Interviewing skills: a two-and-a-half-year exploratory study. *Subst Abuse Treat Prev Policy*. 2010; 5:8.doi: 10.1186/1747-597x-5-8 [PubMed: 20465805]
- Fu SS, Roth C, Battaglia CT, Nelson DB, Farmer MM, Do T, ... Zillich AJ. Training primary care clinicians in motivational interviewing: a comparison of two models. *Patient Educ Couns*. 2015; 98(1):61–68. DOI: 10.1016/j.pec.2014.10.007 [PubMed: 25455795]
- Gayes LA, Steele RG. A meta-analysis of motivational interviewing interventions for pediatric health behavior change. *J Consult Clin Psychol*. 2014; 82(3):521–535. DOI: 10.1037/a0035917 [PubMed: 24547922]
- Gecht-Silver M, Lee D, Ehrlich-Jones L, Bristow M. Evaluation of a Motivational Interviewing Training for Third-Year Medical Students. *Fam Med*. 2016; 48(2):132–135. [PubMed: 26950785]
- Gibson EJ, Santelli JS, Minguez M, Lord A, Schuyler AC. Measuring school health center impact on access to and quality of primary care. *J Adolesc Health*. 2013; 53(6):699–705. DOI: 10.1016/j.jadohealth.2013.06.021 [PubMed: 23954729]
- Hall K, Staiger PK, Simpson A, Best D, Lubman DI. After 30 years of dissemination, have we achieved sustained practice change in motivational interviewing? *Addiction*. 2016; 111(7):1144–1150. DOI: 10.1111/add.13014 [PubMed: 26216706]
- Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)--a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009; 42(2):377–381. DOI: 10.1016/j.jbi.2008.08.010 [PubMed: 18929686]
- Hettema J, Steele J, Miller WR. Motivational interviewing. *Annu Rev Clin Psychol*. 2005; 1:91–111. DOI: 10.1146/annurev.clinpsy.1.102803.143833 [PubMed: 17716083]
- Homan N, Chichester M. Peer to Peer Education: OB Visits the ED. *J Emerg Nurs*. 2016; 42(2):125–127. DOI: 10.1016/j.jen.2015.09.015 [PubMed: 27002199]
- Huang TT, Borowski LA, Liu B, Galuska DA, Ballard-Barbash R, Yanovski SZ, ... Smith AW. Pediatricians' and family physicians' weight-related care of children in the U.S. *Am J Prev Med*. 2011; 41(1):24–32. DOI: 10.1016/j.amepre.2011.03.016 [PubMed: 21665060]
- Keeley, R. Motivational interviewing improves depression in primary care: †A cluster randomized trial. 2016.
- King IM. King's theory of goal attainment. *Nurs Sci Q*. 1992; 5(1):19–26. [PubMed: 1538850]
- Kong AS, Sussman AL, Yahne C, Skipper BJ, Burge MR, Davis SM. School-based health center intervention improves body mass index in overweight and obese adolescents. *J Obes*. 2013; 2013:575016.doi: 10.1155/2013/575016 [PubMed: 23589771]
- Lundahl B, Burke BL. The effectiveness and applicability of motivational interviewing: a practice-friendly review of four meta-analyses. *J Clin Psychol*. 2009; 65(11):1232–1245. DOI: 10.1002/jclp.20638 [PubMed: 19739205]
- Martino S, Canning-Ball M, Carroll KM, Rounsaville BJ. A criterion-based stepwise approach for training counselors in motivational interviewing. *J Subst Abuse Treat*. 2011; 40(4):357–365. DOI: 10.1016/j.jsat.2010.12.004 [PubMed: 21316183]

- Mbuagbaw L, Ye C, Thabane L. Motivational interviewing for improving outcomes in youth living with HIV. *Cochrane Database Syst Rev*. 2012; (9):Cd009748.doi: 10.1002/14651858.CD009748.pub2 [PubMed: 22972147]
- McCambridge J, Day M, Thomas BA, Strang J. Fidelity to Motivational Interviewing and subsequent cannabis cessation among adolescents. *Addict Behav*. 2011; 36(7):749–754. DOI: 10.1016/j.addbeh.2011.03.002 [PubMed: 21440994]
- Miller MK, Champassak S, DeLurgio S, Dowd MD, Stancil S, Apodaca T, Goggin K. An emergency department intervention to increase adolescent access to key sexual health services: Feasibility and impact. *Journal of Adolescent Health*. 2016; 58(2):2.doi: 10.1016/j.jadohealth.2015.10/105
- Miller, WR., Rollnick, S. *Motivational interviewing: Preparing people for change*. 2. New York, NY: Guilford Press; 2002.
- Miller, WR., Rollnick, S. *Motivational interviewing: Helping people change*. 3. New York, NY: Guilford Press; 2013.
- Miller WR, Rollnick S. The effectiveness and ineffectiveness of complex behavioral interventions: impact of treatment fidelity. *Contemp Clin Trials*. 2014; 37(2):234–241. DOI: 10.1016/j.cct.2014.01.005 [PubMed: 24469237]
- Miller WR, Yahne CE, Moyers TB, Martinez J, Pirritano M. A randomized trial of methods to help clinicians learn motivational interviewing. *J Consult Clin Psychol*. 2004; 72(6):1050–1062. DOI: 10.1037/0022-006x.72.6.1050 [PubMed: 15612851]
- Mitcheson L, Bhavsar K, McCambridge J. Randomized trial of training and supervision in motivational interviewing with adolescent drug treatment practitioners. *J Subst Abuse Treat*. 2009; 37(1):73–78. DOI: 10.1016/j.jsat.2008.11.001 [PubMed: 19150203]
- Morton K, Beauchamp M, Prothero A, Joyce L, Saunders L, Spencer-Bowdage S, ... Pedlar C. The effectiveness of motivational interviewing for health behaviour change in primary care settings: a systematic review. *Health Psychol Rev*. 2015; 9(2):205–223. DOI: 10.1080/17437199.2014.882006 [PubMed: 26209209]
- National Center for Health Statistics. *Health, United States 2011: With Special Feature on Socioeconomic Status and Health*. 2012. Retrieved from <http://www.cdc.gov/nchs/data/healthstats11.pdf>
- Nightingale B, Gopalan P, Azzam P, Douaihy A, Conti T. Teaching Brief Motivational Interventions for Diabetes to Family Medicine Residents. *Fam Med*. 2016; 48(3):187–193. [PubMed: 26950907]
- Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011–2012. *Jama*. 2014; 311(8):806–814. DOI: 10.1001/jama.2014.732 [PubMed: 24570244]
- Ogden CL, Carroll MD, Lawman HG, Fryar CD, Kruszon-Moran D, Kit BK, Flegal KM. Trends in Obesity Prevalence Among Children and Adolescents in the United States, 1988–1994 Through 2013–2014. *Jama*. 2016; 315(21):2292–2299. DOI: 10.1001/jama.2016.6361 [PubMed: 27272581]
- Organisation for Economic Co-operation and Development. *Obesity Update*. 2014. Retrieved from <http://www.oecd.org/els/health-systems/Obesity-Update-2014.pdf>
- Pollak KI, Coffman CJ, Tulsy JA, Alexander SC, Ostbye T, Farrell D, ... Bravender TD. Teaching Physicians Motivational Interviewing for Discussing Weight With Overweight Adolescents. *J Adolesc Health*. 2016; 59(1):96–103. DOI: 10.1016/j.jadohealth.2016.03.026 [PubMed: 27155958]
- Prior M, McManus M, White P, Davidson L. Measuring the “triple aim” in transition care: a systematic review. *Pediatrics*. 2014; 134(6):e1648–1661. DOI: 10.1542/peds.2014-1704 [PubMed: 25422015]
- Resnicow K, McMaster F, Bocian A, Harris D, Zhou Y, Snetselaar L, ... Wasserman RC. Motivational interviewing and dietary counseling for obesity in primary care: an RCT. *Pediatrics*. 2015; 135(4): 649–657. DOI: 10.1542/peds.2014-1880 [PubMed: 25825539]
- Sanci L, Chondros P, Sawyer S, Pirkis J, Ozer E, Hegarty K, ... Patton G. Responding to Young People’s Health Risks in Primary Care: A Cluster Randomised Trial of Training Clinicians in Screening and Motivational Interviewing. *PLoS One*. 2015; 10(9):e0137581.doi: 10.1371/journal.pone.0137581 [PubMed: 26422235]
- SAS Institute. *SAS software version 9.3*. Cary, NC, USA: 2012.

- Schwalbe CS, Oh HY, Zweben A. Sustaining motivational interviewing: a meta-analysis of training studies. *Addiction*. 2014; 109(8):1287–1294. DOI: 10.1111/add.12558 [PubMed: 24661345]
- Siddall J, Huebner ES, Jiang X. A prospective study of differential sources of school-related social support and adolescent global life satisfaction. *Am J Orthopsychiatry*. 2013; 83(1):107–114. DOI: 10.1111/ajop.12006 [PubMed: 23330628]
- Steeves JA, Liu B, Willis G, Lee R, Smith AW. Physicians' personal beliefs about weight-related care and their associations with care delivery: The U.S. National Survey of Energy Balance Related Care among Primary Care Physicians. *Obes Res Clin Pract*. 2015; 9(3):243–255. DOI: 10.1016/j.orcp.2014.08.002 [PubMed: 25175671]
- Strayer SM, Martindale JR, Pelletier SL, Rais S, Powell J, Schorling JB. Development and evaluation of an instrument for assessing brief behavioral change interventions. *Patient Educ Couns*. 2011; 83(1):99–105. DOI: 10.1016/j.pec.2010.04.012 [PubMed: 20547030]
- United States Department of Health and Human Services. The Surgeon General's Vision for a Healthy and Fit Nation. Rockville (MD): Office of the Surgeon General (US); 2010. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK44660/?report=reader#!po=25.0000>
- United States Department of Health and Human Services. Adolescent Health | Healthy People 2020. 2016. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/Adolescent-Health>
- VanBuskirk KA, Wetherell JL. Motivational interviewing with primary care populations: a systematic review and meta-analysis. *J Behav Med*. 2014; 37(4):768–780. DOI: 10.1007/s10865-013-9527-4 [PubMed: 23934180]
- World Health Organization. Report of the Commission on Ending Childhood Obesity. 2016a. Retrieved from http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066_eng.pdf?ua=1
- World Health Organization. WHO calls for stronger focus on adolescent health. 2016b. Retrieved from <http://www.who.int/mediacentre/news/releases/2014/focus-adolescent-health/en/>
- Yarborough BJ, DeBar LL, Wu P, Pearson J, Stevens VJ. Responding to pediatric providers' perceived barriers to adolescent weight management. *Clin Pediatr (Phila)*. 2012; 51(11):1063–1070. DOI: 10.1177/0009922812459269 [PubMed: 22964862]

Figure 1.

Results of Analysis of Variance. Provider comfort with MI over time by provider based on 1–5 point Likert scale survey responses. Patients were divided into quartiles per provider by time from the first day to the last day when patients were seen.

Note: PCP = primary care provider

Figure 2.

Results of Fisher's Exact Test. Provider comfort with MI over time by the number of surveys based on 1–5 point Likert scale survey responses. Patients were divided into quartiles per provider by time from the first day to the last day when patients were seen.

Table 1

Provider Characteristics

PCPs in SBHCs	Race/Ethnicity	Experience/Expertise
PCP 1 Physician Assistant	White	4 years family medicine
PCP 2 Nurse Practitioner	Hispanic	4 years family and adolescent medicine, fellowship training adolescent medicine, 30 years nursing
PCP 3 Nurse Practitioner	Hispanic	3 years family and adolescent medicine, 10 years nursing
PCP 4 Nurse Practitioner	Hispanic	18 years family and adolescent medicine, 24 years nursing and mental health

Note: PCPs = primary care providers; SBHCs = school based health centers

Table 2

Motivational Interviewing Implementation and Administration of Surveys

PCPs in SBHCs	MI-based 20 minute sessions with youth about BMI results, ages 14–17	Dates
PCP 1	N = 66	May-June 2014
PCP 2	N = 45	April-May, September 2014
PCP 3	N = 91	October-December 2014
PCP 4	N = 25	October-December 2014

Note: PCPs = primary care providers; SBHCs = school based health centers; MI = motivational interviewing; BMI = body mass index; N = number of youth participants who received the MI-based sessions.