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A Pilot Test of Motivational Oral Health Promotion with Alcohol-Dependent Inpatients

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Abstract

Objective—Motivational interviewing (MI) is an effective intervention for improving health behavior in a number of domains, and evidence suggests that it may be useful for promoting oral health. The current pilot study was designed to provide initial evidence that, compared to a didactic control intervention, a brief MI-based intervention (BMI), delivered by dental practitioners, can yield greater improvements in oral hygiene, health care utilization, and health outcomes in a population at heightened risk for oral disease.

Method—60 individuals in inpatient treatment for alcohol use disorders were randomly assigned to receive either the control intervention or BMI, delivered either by a dentist or a dental hygienist. Data were obtained by self-report and by examination at baseline and 4-, 12-, and 24-week follow-up assessments.

Results—BMI participants reported significantly more frequent toothbrushing during follow-up than control participants. No other significant effects were found.

Conclusions—These findings indicate that a brief intervention using MI methods can be delivered by dental professionals and has potential utility for promoting improved oral hygiene. Additional research to investigate and further develop MI's potential for promoting oral health appears warranted.

Keywords

oral health; motivational interviewing; alcohol use disorders; patients; randomized controlled trial

Although dental and craniofacial diseases can have a profound impact on health, many can be prevented through proper oral hygiene (USDHHS, 2000). Practitioners typically respond to poor self-care in patients by instructing them to improve oral hygiene. However, a prescriptive approach does not reliably lead to change (Freeman, 1999). An alternative approach can be found in motivational interviewing (MI; Rollnick, Miller, & Butler, 2008),

in which patients choose their own goals for change (Freeman, 1999; Koerber, 2006). Research has shown MI to be effective for promoting change in diet, exercise, and diabetes care, and to have promise for promoting oral health (Martins & McNeil, 2009). Still needed, however, is evidence that brief MI interventions, delivered by dental health professionals, can promote oral health.

Individuals who misuse alcohol are at risk for oral health problems (Lages et al., 2012) due to biological processes as well as behavioral factors such as poor hygiene (Kwasnicki, Longman, & Wilkinson, 2008). Although individuals in treatment for alcohol use disorders (AUDs) have a heightened oral disease risk (e.g., Amaral, Luiz, & Leão, 2008; Araujo, Dermen, Connors, & Ciancio, 2004), little work has been done to address oral health issues in this context (D'Amore et al., 2011). The present study sought to test whether a brief MI-based intervention (BMI), compared to a traditional, didactic control intervention, would yield improved oral hygiene, health care utilization, and health outcomes among individuals in inpatient treatment for AUDs.

Method

Participants and Procedure

Study procedures were approved by the University at Buffalo Health Sciences Institutional Review Board. Participant flow is depicted in Figure 1. Sixty patients with AUDs recruited from an inpatient treatment program were at least 18 years of age, able to read and speak English, and free of severe impairments as well as conditions requiring antibiotic pre-medication. We sought to show a post-intervention between-group difference in gingival inflammation scores of at least 20% (ADA, 1997). Using pilot data (Araujo et al., 2004), we calculated that this difference would yield a Cohen's d of .74, which for $N = 48$ (at 20% attrition) would yield power = .72 at $\alpha = .05$.

At the inpatient facility, patients were told that they could receive dental exam results and participate in a dental health information session. Eligible, consenting participants were interviewed, scheduled for a 15-minute exam and 30-minute intervention session, and told not to brush on the day of the exam. The examining dentist, with a dental hygienist recording (both blind to condition), visually inspected the teeth, gingiva, tongue, and oral mucosa, and palpated the head, neck, and oral cavity. Afterwards, an envelope was opened indicating random assignment to receive the control or BMI from either the dentist or hygienist ($n = 15$ per combination). Participants then were given exam feedback (overall status, plaque, calculus, gingivitis, caries [if detected visually], and structural or soft-tissue abnormalities), told about actions that would improve oral health, and given a list of sources of reduced-cost dental care. Information was delivered to control participants using a didactic approach commonly employed in dental health settings (see Freeman, 1999; Sheiham & Croucher, 1994). Participants in the BMI condition were offered this information by a practitioner employing MI methods (Rollnick et al., 2008): eliciting permission; inviting the patient to share concerns, ask questions, and discuss the importance of oral health; offering to share information; eliciting reactions; and eliciting ideas and plans for change. Control participants were provided with all clinically relevant information; BMI participants were provided only with information that they expressed an interest in. Follow-

up assessments (4, 12, and 24 weeks after intervention) were conducted at the Center for Dental Studies of the University at Buffalo School of Dental Medicine by non-intervention staff, blind to condition. Participants received gift cards worth \$10, \$50, \$50, and \$75, respectively, for the initial session and three follow-ups.

One dentist and one hygienist were trained to conduct both interventions. Training was conducted by an experienced MI trainer, an MI counselor, and a senior dental practitioner. Control training focused on ensuring that practitioners made exclusive use of a didactic approach; training in BMI employed a manual based on the work of Rollnick and colleagues (2008). Practice sessions were followed by additional training. Ongoing supervision involved trainer review of all session recordings and additional instruction and role-playing as needed.

Measures

Brushing and interdental cleaning items employed six response options (*less than once a week to more than twice a day*), which were converted into “per day” units. Dental visits were assessed at baseline by asking about time since last visit (*Never to 6 months or less*) and during follow-up by asking whether the participant had visited a dentist since the prior interview. Six teeth (Ramfjord, 1967) were used for evaluation of oral health. Gingival inflammation was evaluated using modified gingival index (MGI) scores (Lobene et al., 1986) employing a 5-point scale (0 = *absence of inflammation* and 4 = *severe inflammation*). Plaque was assessed using the plaque index (PI; Löe, 1967), employing a 4-point scale (0 = *absence of plaque* and 3 = *heavy accumulation of soft matter*). To calibrate assessment, the second author served as the “gold standard” and examiners rated clinical photographs. Agreement Kappas ranged from .79 to .84. Calculus was measured in mm by the Volpe-Manhold method (VM; Volpe, Manhold, & Hazen, 1965). Baseline smoking was assessed by asking about time since the participant last smoked (*Never to Less than a month*). Baseline alcohol and other drug use were assessed using a 90-day Timeline Follow-Back (Sobell & Sobell, 1996) interview. For alcohol, proportion of days abstinent (PDA) and drinks per drinking day (DDD) were calculated; only PDA was calculated for drug use. The extent to which participants felt well-treated and believed the intervention was helpful was assessed at follow-up. Adherence to MI and condition discrimination were assessed using Motivational Interviewing Treatment Integrity scale (Moyers et al., 2007) ratings of “global spirit” (GS), percent MI-adherent behavior (%MIA), percent open questions (%OQ), percent complex reflections (%CR), and reflection-to-question ratio (RQR). Two expert coders, blind to condition, each rated 40 sessions (10 for each condition-practitioner combination); half were rated by both raters. Intraclass correlation coefficients ranged from .62 to .92.

Statistical Analyses

Chi-square tests and *t*-tests gauged randomization success and intervention acceptability, helpfulness, and feasibility. Repeated measures ANCOVAs addressing hygiene and health outcomes employed baseline levels of dependent variables as covariates, condition and practitioner as between-subjects factors, and data from follow-up as dependent measures. Restricted maximum likelihood estimation methods made use of all available follow-up data. To evaluate the condition effect on visiting a dentist, a logistic regression analysis

employed the same analytic design as the ANCOVAs, except that the baseline assessment of time since last visit served as the covariate and a single dichotomous variable served as the dependent measure.

Follow-up data were obtained from 75% of the sample. Attrition was unrelated to baseline variables and condition assignment, except that non-followed participants had fewer DDD (M drinks = 6.6, 9.9, SD s = 4.3, 7.1, respectively), $t(40.7) = -2.17$, and a greater PDA from drugs (M = .83, .66, SD s = .20, .39, respectively), $t(46.6) = 2.11$.

Results

Forty-eight men and 12 women had an intervention session. Mean age was 36.4 (range = 18 to 58). Most were White (65%) or Black (28%), reported household income < \$20,000/year (52%), and reported smoking in the past month (72%). Their mean DDD was 9.1 (SD = 6.7) and mean PDA from alcohol and other drugs were .56 and .70 (SD s = .33, .36), respectively. Most reported brushing one or two times per day (M = 1.6, SD = 0.8) and reported interdental cleaning less frequently (M times per day = 0.4, SD = 0.6). One-fourth had visited a dentist within the prior six months. Mean MGI, PI, and VM scores at baseline were 0.82, 0.69, and 0.56 (SD s = 0.46, 0.35, and 0.47), respectively. Characteristics did not differ by condition.

Most participants were “very satisfied” (80%) with the information and quality of care and felt that intervention staff were “very helpful” (89%); responses did not differ by condition. Adherence ratings showed discrimination between conditions, all F s (1,56) > 17.4, ps < .001; MI style was employed with BMI but not control participants (respectively, GS M s = 3.9, 1.4, SD s = 0.8, 0.6; %MIA M s = 89.9, 15.1, SD s = 13.1, 17.9; %OQ M s = 38.0, 6.4, SD s = 15.2, 8.2; %CR M s = 35.9, 17.3, SD s = 13.7, 24.1; RQR M s = 1.3, 0.4, SD s = 0.8, 0.4). Analysis of BMI sessions showed that one practitioner met “beginning proficiency” levels in %MIA, %CR, and the RQR, and the higher “competency” level in GS ; the other met proficiency in two categories (GS and RQR) and the competency level in none. The former practitioner had greater adherence than the latter on GS and %CR, t s (28) = 2.59, ps = .015. BMI ran 12.6% longer than control sessions (M min = 33.30, 29.58, SD s = 8.25, 5.03, respectively), t (48.0) = 2.10, p = .041. There was no practitioner effect on session length and no relationship between length and outcome.

Practitioner and follow-up wave had no significant effects on any outcome. Mean outcomes by condition are presented in Table 1. Participants in the BMI condition reported more frequent brushing during follow-up than those in the control condition, F (1,41) = 8.14, p = .007, d = .45, 95% CI [.14, .75], but did not differ from control participants in interdental cleaning frequency, F (1,41) = 3.17, p = .082, d = .28, 95% CI [−.03, .58]. The proportion who visited a dentist at least once during follow-up also did not differ by condition, χ^2 (1) = 0.04, p = .850, OR = .88, 95% CI [.22, 3.44]. No condition differences were detected on oral health outcome measures (MGI, PI, VM), F (1,41) = 0.18, p = .676, d = .07, 95% CI [−.24, .37], F (1,41) = 0.69, p = .412, d = −.13, CI [−.44, .18], F (1,38) = 1.19, p = .282, d = .18, CI [−.14, .50], respectively.

Discussion

This pilot trial has provided the first experimental evidence that a brief intervention employing MI methods and delivered by dental health professionals to individuals at risk for oral disease is feasible and more efficacious than didactic methods for improving hygiene. However, the observed between-group difference in follow-up brushing (2–3 additional occasions per week among BMI participants) did not yield a significant effect on clinical indices of oral health. Although less than optimal statistical power may have contributed to this result, it may be also that participants were not sufficiently thorough in their brushing. Future studies of BMI may benefit from increasing the emphasis on proper brushing technique. Providing a baseline dental cleaning also may increase the ability to detect the health impact of improved oral hygiene.

Condition had no significant impacts on flossing frequency outcome or on participants' likelihood of visiting a dentist. Moreover, the estimated mean brushing frequency among participants in both conditions fell short of the common recommendation to brush twice per day. These results may reflect intrinsic challenges of addressing oral health behaviors of individuals in substance abuse treatment. Nevertheless, additional work appears warranted to evaluate the potential of MI for facilitating improvements in oral health. Future studies may find a greater impact of BMI by employing practitioners exposed to this approach early in their careers. Future research also might address limitations of the present study by employing larger participant and practitioner samples and by exploring the feasibility of further shortening the intervention.

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Figure 1.
Flow of participants through the study.

Estimated Marginal Means/Proportions for Oral Hygiene, Oral Healthcare-seeking, and Oral Health during Follow-up

Table 1

	BMI group			Control group		
	M/Proportion	SE	95% CI	M/Proportion	SE	95% CI
Toothbrushing frequency per day ^a	1.87	.10	[1.68, 2.06]	1.50	.09	[1.32, 1.67]
Interdental cleaning frequency per day ^a	0.55	.08	[-.38, .71]	0.34	.08	[-.19, .50]
Proportion who visited dentist ^b	.37	.11	[-.18, .60]	.40	.11	[-.20, .63]
MGI ^a	1.44	.07	[1.31, 1.57]	1.40	.06	[1.28, 1.52]
PI ^a	1.32	.07	[1.19, 1.46]	1.40	.06	[1.28, 1.53]
VM ^c	0.72	.11	[-.50, .95]	0.55	.11	[-.34, .76]

Note. MGI = Modified gingival index; PI = Plaque index; VM = Volpe-Manhold calculus score. All values represent covariate-adjusted estimates of outcome, collapsed across practitioners and follow-up waves.

^a n = 45.

^b n = 41.

^c n = 42.