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Effectiveness of Motivational Enhancement Therapy for Smoking Cessation during Buprenorphine Maintenance Treatment

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Abstract

Objective: Motivational Enhancement Therapy (MET) is effective for smoking cessation in the general population but not during Buprenorphine Maintenance Treatment (BMT). We hypothesized that MET performed by psychiatrists in a BMT setting will be effective for smoking cessation.

Methods: This is a retrospective chart review (N=60) of smoking outcomes after 10 MET sessions in patients (N=40) versus patient controls (N=20) treated "as usual".

Results: After 6 months, 9 (22.5%) "MI" patients quit smoking and 29 (72.5%) were cessation medication-compliant, while no control quit and only 8 (40%) were compliant.

Conclusions: MET plus evidence-based pharmacotherapy for smoking cessation in BMT is more effective than treatment as usual. MET could improve life expectancy and compliance in patients during BMT.

Keywords: Motivational enhancement therapy; Smoking cessation; Buprenorphine maintenance treatment

Introduction

The aim of this study was to investigate the effectiveness of a 10 session Motivational Enhancement Therapy (MET) intervention performed by psychiatrists for smoking cessation in an office-based Buprenorphine Maintenance Treatment (BMT) setting.

Motivational Enhancement Therapy is based on Motivational Interviewing (MI) and assessment feedback [1]. Motivational Interviewing (MI) is a patient-centered form of individual psychotherapy originally developed by William Miller to treat alcohol abuse [1]. It is a non-confrontational, humanistic form of psychotherapy, focused on resolving ambivalence, while eliciting and strengthening change talk from the patient [1]. MI has amplified effectiveness when integrated with other evidence-based treatment methods1 like medication management. MI has now been successfully applied for treatment of several substance use disorders (e.g. alcohol use disorder) and across a wide range of target behavior changes (e.g. weight loss). 1 However, there was no evidence for the effectiveness of MI in smoking cessation until recently, when a meta-analysis showed a significant positive effect in the general population [2,3].

Smoking is one of the most difficult target behaviors to change. Nicotine has a high addictive potential with associated intense cravings.4 In fact, onset of physical dependence occurs even before a high "use volume". On average, physical dependence sets in at a smoking frequency of 2 cigarettes weekly [4]. Also, the latency to withdrawal continues to shorten with repeated tobacco use, from weeks to days to minutes [4]. This shortening leads to increased smoking frequency [4]. Even in cases of successful smoking cessation, the cravings still persist for a long time, and can even be lifelong [4]. While evidence-based medical treatments such as nicotine replacement therapy and varenicline have been employed, patients' motivation can diminish over time because of unpleasant adverse effects (e.g. nausea, irritability) and anxiety secondary to nicotine withdrawal [4]. Thus, it may be beneficial to integrate psychotherapy with medication management to maximize the benefits of smoking cessation interventions.

Smoking cessation is particularly challenging during office-based Buprenorphine Maintenance Treatment (BMT), with over 80% of patients actively smoking and low utilization of smoking cessation options [5]. Smoking severity tends to increase in a dose-dependent manner during BMT [6] and it is associated with BMT non-compliance [7].

These challenges provided an opportunity to test our hypothesis that ten brief Motivational Enhancement Therapy sessions, administered by a psychiatrist during buprenorphine maintenance treatment in combination with nicotine replacement therapy, may be effective for smoking cessation in this special patient population.

Methods

The Institutional Review Board of Crouse Hospital provided approval for this study.

Study design: This study is a retrospective chart review comparing self-reported smoking cessation outcomes of patients who received at least 10 sessions of brief MET (N=40) versus patients who did not receive the brief MET intervention (N=20) and were treated "as usual" by the same providers in an office-based buprenorphine maintenance program. The chart review involved cases from July 2015 to December 2018.

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Intervention: The brief MET sessions were 20 minutes long and delivered weekly in the first month and bi-weekly in the second and third months. Both psychiatrists providing the interventions (ZSM and TA) were trained in MI. In addition, every patient was offered nicotine replacement therapy or a prescription for bupropion or varenicline at the beginning of treatment.

Subject selection: The study included male and female patients between the age of 18 and 90, who had tobacco use disorder at the time of buprenorphine induction and remained in treatment for at least 6 months. Patients with neurocognitive disorders, autism, schizophrenia or schizoaffective disorder were excluded from the study. We also excluded patients who did not have documented smoking status at baseline.

Patients who received the brief MET intervention were seen at CNY Services Dual Recovery Program (Syracuse, NY), between 2015 and 2017. Patients in the "treatment as usual" control group were seen at the Buprenorphine Medication Assisted Treatment Program of Crouse Hospital between 2017 and 2018 (Syracuse, NY).

Study procedures: Participants on buprenorphine maintenance who were eligible for the study were identified from patient lists. Initials, age, race, gender, smoking status at 3 months and at 6 months after buprenorphine induction, and medications prescribed for smoking cessation (nicotine replacement therapy, bupropion, varenicline) were recorded.

Outcome measures: Self-reported smoking status at 3 months and 6 months after starting buprenorphine maintenance. Number of patients taking medications (nicotine replacement, bupropion or varenicline) for smoking cessation at the end of the 6th month.

Statistical methods, data analysis and interpretation: Using Fisher's exact test, we compared patients who quit smoking in both treatment and control groups (after 6 months). Similarly, we compared medication compliance between both groups. We also calculated relative risk of smoking in both groups (95% CI). We compared means by a two-sample t-test and proportions by a chi square test. The significance level was $p<0.05$.

Results

The number of patients who quit smoking by the 24th week was significantly higher in the MET intervention group (9 of 40, 22.5%) compared to the "treatment as usual" group, where no one quit smoking (Fisher's exact test p=0.02) (Table 1). The quit rate in the MET intervention group after 6 months was 20% among female patients (4 of 20), and 25% among male patients (5 of 20). The number of patients who were taking medications for smoking cessation by the end of the 6th month was 72.5% (29 of 40) in the MET intervention group and 40% (8 of 20) in the "treatment as usual" group. This difference was also significant (Fisher's exact test p=0.02).

The groups had a similar age range (23-59 controls, 22-64 intervention). However, the intervention group was slightly younger (mean 34.9 years, S.D. 9.2) compared to the control group (mean 39.7 years, S.D. 10.8). This difference was not significant. Those who successfully quit smoking were slightly younger (mean 31.7 years, S.D. 6.3, range 25-43 years) than those who did not quit smoking in the MI group (mean 35.8 years, S.D. 9.6, range 22-64 years). These age differences were non-significant.

In terms of compliance, females were more likely to be non-compliant with smoking cessation medications in both the control and intervention groups. In the intervention group, 6 females were non-compliant (30%) and 5 males were non-compliant (25%). In the control group, 4 females out of 5 were non-compliant (80%) and 8 males out of 15 were non-compliant (53%). These compliance differences by gender were non-significant. Compliance was thus, worse in the control group (8/20, 40%) as compared to the intervention group (29/40, 72.5%).

Discussion

Prior studies have demonstrated effectiveness of MET for smoking cessation in the general population.2,3 However, to our knowledge, this is the first study demonstrating effectiveness of a brief, 10 session MET intervention by psychiatrists for smoking cessation in patients

		MI Intervention Group	"Treatment as Usual" Control Group	Significance
SAMPLE SIZE	Number of patients	40	20	
GENDER	Males	20	15	p=0.07 NS[a]
	Females	20	5	p=0.07 NS[a]
ETHNICITY	African American	3	3	p=0.37 NS[a]
	Caucasian	32	16	p=1 NS[a]
	Hispanic	5	1	p=0.37 NS[a]
	Other	1	0	p=0.48 NS[a]
AGE	Age Range	22-64	23-59	
	Age Mean	34.9 (S.D. 9.2)	39.7 (S.D. 10.8)	p=0.07 NS[a]
QUITTERS	Number of patients	9 (22.5%)	0	**p=0.02**[b]
	Males	5 (25%)	0	p=0.06 NS[a]
	Females	4 (20%)	0	p=0.55 NS[a]
AGE BY QUIT STATUS	Quitters	Mean 31.7 (S.D. 6.3) Range 25-43		p=0.24 NS[a]
	Non-Quitters	Mean 35.8 (S.D. 9.6) Range 22-64		
COMPLIANCE AFTER 6 MONTHS		29 (72.5%)	8 (40%)	**p=0.02**[b]
COMPLIANCE BY GENDER	Males	15 (75%)	7 (47%)	p=0.16 NS[a]
	Females	14 (70%)	1 (20%)	p=0.12 NS[a]
AGE BY COMP-LIANCE STATUS	Compliant	Mean 36.2 (S.D. 9.9) Range 23-64	Mean 43.1 (S.D. 11.3) Range 23-55	p=0.10 NS[a]
	Non-Compliant	Mean 31.2 (S.D. 4.7) Range 22-38	Mean 37.4 (S.D. 9.3) Range 26-59	p=0.06 NS[a]

Table 1: Demographic and Clinical Characteristics.

undergoing BMT. Both quit rate and compliance with medications improved significantly by the end of the 6 month observation period.

It is interesting to note that smoking cessation is thought to be more difficult to achieve in females compared to males [7]. Our study is underpowered to detect gender differences, but we observed a trend towards lower quit rates in females, with a slightly lower quit rate in the intervention group (20% among female patients vs. 25% among male patients). Also, the quit rate in this study (22.5%) lies within the range found in a recent meta-analysis (0 to 59.7%, average 16.9% for the intervention group and 0 to 34.1% in controls, average 14.2%).2

Smoking cessation, in conjunction with BMT offers many benefits for this challenging patient population as well as the healthcare system at large. Individual benefits include decreased risk of comorbidities (e.g. cancer, diabetes and cardiovascular disease), as well as improved compliance with medications and increased likelihood of abstinence from illicit drug use [8]. Studies have shown the profound impact of smoking cessation on decreasing healthcare utilization and increasing life expectancy. Healthcare utilization increases in the first year after smoking cessation but progressively declines later, and after 4 years, it is below those who continue to smoke [9]. Also, life expectancy increases among quitters relative to those who continue to smoke, with a gain of 10, 9 and 6 years of life after quitting at ages 25-34, 35-44, or 45-54 years respectively [10]. Smokers are thought to lose about 10 years of life expectancy. Quitting before 40 years of age reduces smoking associated mortality by about 90% [10].

Conclusions

In summary, a 10-session, brief MET intervention by psychiatrists was found to be effective for smoking cessation during BMT. Offering MET for smoking cessation in BMT clinics as a routine procedure may significantly improve smoking cessation outcomes and medication compliance in this special patient population. Further studies are needed to determine the cost effectiveness of this intervention in BMT and the longer-term benefits: decreased medical utilization and improved life expectancy.

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