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Efficacy of an ED-Based Multicomponent Intervention for Smokers with Substance Use Disorders

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Abstract

The efficacy of brief emergency department (ED)-based interventions for smokers with concurrent alcohol or substance use is unknown. We performed a subgroup analysis of a trial enrolling adult smokers in an urban ED, focusing on subjects who screened positive for alcohol abuse or illicit drug use. Subjects receiving Usual Care (UC) were given a smoking cessation brochure; those receiving Enhanced Care (EC) got the brochure, a brief negotiated interview, 6 weeks of nicotine patches, and a phone call. Follow-up occurred at 3 months. Of 340 subjects in the parent study, 88 (25.9%) reported a substance use disorder. At 3 months, substance users receiving EC were more likely to be tobacco-abstinent than those receiving UC (14.6% v. 0%, P = 0.015), and to self-identify as nonsmokers (12.5% v. 0%, P = 0.03). This finding suggests that concurrent alcohol or substance use should not prevent initiation of tobacco dependence treatment in the ED.

Keywords

smoking; smoking cessation; motivational interviewing; emergency department; brief interventions

1. Introduction

Individuals with substance use disorders smoke cigarettes at rates 2–4 times that of the general population (Kalman, Morissette et al. 2005). However, in substance users, tobacco dependence is often undertreated (Schroeder and Morris 2009). Treatment for tobacco dependence in substance abuse treatment programs is feasible, with improvement in abstinence at end of treatment, although sustained quits are infrequent (Stein, Weinstock et al. 2006; Reid, Fallon et al. 2008) and many substance users are not enrolled in formal treatment programs.

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Alcohol and drug abusers frequently visit hospital emergency departments (EDs), with a consequently high burden of illness (Cherpitel and Ye 2008; Bernstein 2009). In one study of 1484 patients visiting 7 EDs in the state of Tennessee, the biochemically confirmed prevalence of use of any of 8 substances (alcohol, marijuana, cocaine, opioids, phencyclidine, stimulants, benzodiazepines, barbiturates) was 55.7% for women and 69.1% for men (Rockett, Putnam et al. 2006). The prevalence of smoking in this study was not reported, but has been reported as high as 48% in one multicenter study of general adult ED patients (Lowenstein, Koziol-McLain et al. 1998). It is unknown whether substance using individuals can have successful tobacco treatment initiated in the ED.

Because many ED patients lack regular access to primary care, investigators have focused on the ED as a clinical venue to screen and provide brief interventions for individuals with risky health behaviors (Cunningham, Bernstein et al. 2009). These activities, known collectively as Screening, Brief Intervention, and Referral to Treatment (SBIRT), have been studied most extensively for alcohol use disorders, particularly individuals with negative consequences of drinking such as injury. In these individuals, SBIRT has shown modest efficacy (Gentilello, Rivara et al. 1999; Daeppen, Gaume et al. 2007). Hence, it has been endorsed by the Substance Abuse Mental Health Services Administration (SAMHSA), the Committee on Trauma of the American College of Surgeons, and the American College of Emergency Physicians.

SBIRT-type interventions in the ED for tobacco use have been less well-studied, (Boudreaux, Baumann et al. 2007; Neuner, Weiss-Gerlach et al. 2009; Bernstein, Bijur et al. 2011). Studies have generally been negative, although interventions have been effective for certain subgroups of smokers, such as those with a tobacco-related reason for the ED visit or who believe their ED visit is tobacco-related (Bernstein, Bijur et al. 2011). These studies have generally focused on unselected populations of ED smokers. None have specifically targeted smokers with co-occurring drug or alcohol use.

The purpose of this study was to examine the efficacy of a multicomponent smoking cessation intervention featuring counseling and pharmacotherapy for adults with concurrent alcohol or drug use visiting a hospital ED.

2. Material and Methods

2.1. Overview

This is a secondary analysis of data from a randomized clinical trial conducted at an urban, academic hospital ED treating over 100,000 adults/year in a socioeconomically disadvantaged neighborhood (N=340). This study evaluated the effect of the intervention on the subgroup of participants who reported past-year alcohol or drug abuse (n=88) in addition to smoking. The parent study assessed the efficacy of a brief motivational interview, provision of nicotine patches and literature, and follow-up contacts versus clinic referral alone in promoting three-month cessation. Outcome assessment was blinded and included in-person verification with measurement of salivary cotinine or exhaled carbon monoxide. Additional details about methods have been previously reported (Bernstein, Bijur et al. 2011). The study was conducted between January, 2006 and September, 2007. This study was approved by the Institutional Review Board of (blinded), and registered in ClinicalTrials.gov (NCT00297466).

2.2. Subjects

Subjects were age 21 and older, smoked at least 10 cigarettes/day, were in the preparation or contemplation stage of change (Prochaska, DiClemente et al. 1992), and were being discharged from the ED. They spoke English or Spanish. Residence out of state, critical

illness, leaving the ED against medical advice, or primary psychiatric illness were exclusion criteria.

2.3. Intervention

Consenting subjects were randomized to Usual Care (UC) or Enhanced Care (EC). An online random plan generator was used, with group assignment concealed in consecutively numbered opaque envelopes.

2.3.1. Usual Care group—Subjects in the Usual Care group were given a brochure describing the health risks of smoking, and provided contact information for smoking cessation programs in the area, including the State Smokers' Quitline. These subjects received no additional ED intervention. Materials were provided in Spanish or English based on patient preference.

2.3.2. Enhanced Care group—This group received the same brochure as the Usual Care group. In addition, EC subjects received, from the interventionist, a 10–15 minute brief motivational interview (MI) (Miller and Rollnick 2002). EC subjects also received a follow-up telephone call from the interventionist 48–72 hours after the ED visit.

Lastly, subjects in this group were given a six-week course of nicotine patches, consisting of 14 days of 21mg patches, 14 days of 14mg, and 14 days of 7mg.

2.4. Training of the interventionist

The interventionist was a fluently bilingual (Spanish/English) peer educator trained in tobacco dependence treatment and ED-based brief interventions employing motivational techniques. She was trained by the study investigators to explain how the subject's current medical problem may be related to his/her smoking.

2.5. Follow-up

Subjects were contacted by telephone at 3 months to assess smoking status, number and duration of quit attempts and stage of change. Subjects were asked to return to the ED, for measurements of exhaled carbon monoxide and salivary cotinine.

2.6 Measurements

Standard demographic variables including age, sex, race/ethnicity, insurance status, marital/relationship status, level of education, and employment status were collected. Clinical information included chief complaint, all ICD9 diagnoses for the ED visit, and the modified PHQ-2 depression screen (Whooley and Simon 2000). Tobacco use history included daily cigarette consumption, number and timing of prior quit attempts, stage of change as measured by the Ladder of Change (Biener and Abrams 1991), the Fagerstrom Test for Nicotine Dependence (Heatherton, Kozlowski et al. 1991), presence of other smokers in household, daily cigarette consumption, beliefs addressing the relationship between smoking and illness or reason for ED use. Data on alcohol and drug use were collected via the 4-item Rapid Alcohol Problems Screen (Cherpitel 2000) and Rapid Drug Problems Screen (Cherpitel and Borges 2004). These instruments both ask about past-year guilt or remorse about substance use, whether a friend or family member ever told the subject about things done or said while using substances that s/he could not remember, failure to do things normally expected because of substance use, and whether substances are used upon waking in the morning.

The primary independent variable was assignment to the UC or EC group. The ICD9 codes used to designate subjects as having a smoking-related reason for the ED visit were those listed in the 1989 Surgeon General's report (U S Department of Health and Human Services 1989). Based on pilot work, we expected about 15% of all smokers' visits to be smoking-related.

The primary endpoint was tobacco abstinence at 3 months, defined as no smoking during the 7 days preceding the follow-up phone call. All subjects were asked to return to the ED to provide confirmatory biosamples. A positive salivary cotinine was considered to indicate smoking in the previous 7 days, unless the subject was using nicotine replacement products, in which case the carbon monoxide level was used. Losses to follow-up were counted as smokers. Secondary outcomes included quit attempt of at least 24 hours' duration, smoking in the past 30 days, attendance at the cessation clinic, and change in ladder of change score. Analysis was by intention-to-treat.

2.7 Data Analysis

Doubly-entered data were imported into SPSS 16.0 (SPSS, Chicago, IL) for all analyses. Univariate data are reported with means and medians, as appropriate. In this secondary analysis, multivariate modeling was not performed, because of the small number of endpoints and risk of overfitting (Peduzzi, Concato et al. 1996).

3. Results

Between January 2006 and September 2007, 340 subjects were enrolled. Of these, 88 (25.9%) endorsed use of alcohol or illicit drugs. Compared to subjects in the larger study, subjects endorsing concurrent use of alcohol or drugs were younger, more likely to be male, and with a higher proportion of uninsurance than other subjects. There were no differences between substance-using subjects and others with respect to race, ethnicity, daily cigarette consumption, level of nicotine addiction, or interest in quitting. Characteristics of these 88 study subjects are reported in Table 1. Baseline demographic characteristics and tobacco beliefs and practices were comparable between the substance users randomized to Usual Care or Enhanced Care.

Table 2 shows the response to the intervention. The results showed that, among substance users, the SBIRT + NRT intervention appeared more efficacious than usual care in promoting tobacco abstinence at three months, as measured by self-report of 7-day tobacco use and self-identification as a smoker, with biochemical confirmation. There was no change in 30-day abstinence rates. Of note, 3 subjects with biochemically confirmed 7-day abstinence reported smoking within the previous 30 days, suggesting smoking occurred between days 8–30 prior to outcome assessment.

Other measures of tobacco use, including quit attempts made, change in daily cigarette consumption, and use of quitline or other services, did not differ between intervention groups. Rates of telephone contact and in-person follow-up were comparable between groups.

Subjects in the treatment arm report substantially greater use of nicotine patches than subjects in the control arm, with no differences between arms in the proportion using other forms of NRT or bupropion. (Study enrollment was completed prior to FDA approval of varenicline.) The rates of self-reported medication usage in the Enhanced Care and Control arms for nicotine patches, other forms of NRT, and bupropion were, respectively, 60.4% v. 17.5% ($P < 0.0001$), 6.5% v. 0% ($P = 0.07$), and 14.9% v. 27.5% ($P = 0.07$).

4. Discussion

In this secondary analysis of data from a single-site cessation trial for adult ED smokers, smokers endorsing alcohol abuse or use of illicit substances had a higher rate of tobacco abstinence at 3 months, relative to usual care. Subjects received 6 weeks of nicotine patches, so the effect persisted beyond the end of treatment. Although the sample size is small, the effect is consistent across multiple measures of abstinence, including self-identification as a nonsmoker and 7-day point prevalence abstinence at 3 months. Statistical significance was not reached for 30-day abstinence, although the direction of the difference is consistent.

As might be expected, subjects in the treatment arm report substantially greater use of nicotine patches than subjects in the control arm, with no differences in the use of other smoking cessation medications. Thus, the study itself likely was the source of the difference in nicotine patch usage between groups, and not subsequent purchase by subjects.

Interestingly, although the quit rate improved in the intervention group, there were no differences in other measures of smoking, including quit attempts made, cigarette consumption, motivation to quit scores, and use of adjunctive cessation services such as quitlines. The meaning of this finding is unclear. It may indicate that successful quitters viewed their ED visit as a teachable moment, with sufficient change in both cognitive and affective factors to prompt a quit (Boudreaux, Baumann et al. 2007). That subjects who believed their ED visit was tobacco-related were more likely to quit supports this hypothesis (Bernstein, Bijur et al. 2011). This is consistent as well with the “cue to action” construct of the Health Beliefs Model (Glanz, Rimer et al. 2002).

Finally, it is possible that at the time of recruitment, many of these individuals were, or had been, enrolled in treatment programs for their concurrent substance use. This was not elicited at the time of enrollment. These individuals may have been more familiar, and comfortable, with behavioral and pharmacologic approaches for substance use treatment (including tobacco) than subjects without co-occurring substance use disorders. Hence, they may have been more amenable to a tobacco use treatment intervention. We did not measure subjects’ attitudes toward treatment for substance use, however. This would require confirmation through additional study.

Several limitations of the study should be noted. With only 88 subjects endorsing drug or alcohol use, of whom 7 were tobacco-abstinent at 3 months, we were unable to perform multivariate modeling to identify additional covariates that may have accounted for the association between receiving the intervention and abstinence. In the parent study, factors associated with abstinence at 3 months included having an ICD9 code related to smoking, or subjects’ belief that the ED visit was tobacco-related.

In addition, we did not assess at follow-up ongoing use of alcohol or illicit substances, so we cannot comment on changes in use of those substances. Lastly, we do not know whether the intervention prompted tobacco abstinence beyond the 3-month endpoint. The parent study was primarily a proof-of-concept trial. A larger study of ED smokers, which includes a 12-month endpoint, is currently in progress (NCT01328431).

In conclusion, smokers with an alcohol or substance use disorder receiving an intensive SBIRT-type intervention including 1 session of motivational interviewing and pharmacotherapy were more likely to be abstinent from tobacco at 3 months than those receiving usual care. This is an exploratory result that requires confirmation. The number of subjects is insufficient for multivariate analysis. It suggests that concurrent alcohol or substance use need not be a barrier to initiation of tobacco dependence treatment in ED

patients, and that SBIRT combined with pharmacotherapy may be efficacious in this highly tobacco-dependent group of individuals.

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Table 1

Subject characteristics.

Variable	Usual Care N = 40	Enhanced Care N = 48
Age (mean, years)	37.9	35.1
Sex, % male	75%	62.5%
Race/ethnicity White African-American Hispanic Asian/Other	2.5% 32.5% 52.5% 12.5%	10.4% 22.9% 62.5% 4.2%
Insurance Self-pay/none Medicaid Medicare Other/Missing	27.5% 37.5% 5.0% 30.0%	20.8% 27.1% 2.1% 50.0%
Cigarettes/day, mean (SD)	17.7 (10.8)	19.4 (9.9)
Fagerstrom score (median,IQR)	6 (5, 7)	7 (6, 8)
Interest in quitting (Ladder score, median)	5 (plan to quit in next 6 months)	5 (plan to quit in next 6 months)
PHQ2 Depression screen (+), N (%)	32 (80%)	36 (75%)
Tobacco-related ICD9	17.9%	18.8%
Believe ED visit was tobacco-related	37.5%	37.5%

Table 2

Comparison of Outcome Measures at 3 Months, Usual and Enhanced Care Groups, for Drug/Alcohol (+) Subjects.

Variable	Usual Care (N = 40)	Enhanced Care (N = 48)	P Value
7-day abstinence, N (%)	0 (0)	7 (14.6%)	0.02
30-day abstinence, N (%)	0 (0)	4 (8.5%)	0.12
Smoke not at all (vs. every or some days), N (%)	0 (0)	6 (12.5%)	0.02
24 hour quit attempt	72.5%	75.0%	0.81
Decrease, daily cigarette consumption (median)	3	5	0.88
Change, Ladder of Change score (mean)	0.1	−0.6	0.15
Called Quitline, attended cessation clinic, or discussed smoking with doctor	32.5%	33.3%	1.00
Telephone follow up, N (%)	36 (90.0%)	41 (85.4%)	0.40
In-person follow-up, N (%)	20 (50.0%)	22 (45.8%)	0.70
Agreement between self-report and biochemical measures	100%	87.2%	n/a