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Journal

Western Journal of Nursing Research, 31(6)

ISSN

0193-9459

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Publication Date

2009-10-01

DOI

10.1177/0193945909338851

Copyright Information

Peer reviewed

Correlates of Heavy Smoking Among Alcohol-Using Methadone Maintenance Clients

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Abstract

The purpose of this cross-sectional study was to examine predictors of heavy smoking among 256 male and female methadone maintenance therapy (MMT) clients from five MMT clinics in the Los Angeles area. We found that females reported lower rates of heavy smoking than males (47% vs 54%, respectively), in concordance with current literature pointing to gender-differences in smoking behaviors. In particular, males who reported heavy drinking, fair/poor health, and recent heroin use were more likely to report heavy smoking compared to males not reporting these factors. On the other hand, females who reported recent heroin use, a lifetime history of sex trade, and who had been ill enough to require a blood transfusion also had greater odds of reporting heavy cigarette-smoking. Findings from this study may direct us to not only design gender-based smoking cessation program for MMT clients but also to address the gender-based issues related to smoking in such a population.

Keywords

Smoking; Cigarettes; Alcohol; Methadone Maintenance Therapy

Introduction

Smoking and heavy alcohol use are associated with adverse health outcomes. According to the Surgeon General, smoking is the single greatest cause of morbidity and mortality in the United States, while alcohol use has been associated with a variety of biological, psychological, nutritional and social problems (Fryar et al., 2006). Alcohol-abusers frequently smoke; this dual use is attributed to the fact that alcohol and nicotine have combined effects on reward and analgesic pathways, and the fact that nicotine counteracts

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some of the adverse effects of alcohol (Kenna, Nielsen, Mello, Schiesl & Swift, 2007). Nicotine and alcohol appear to share common genetic determinants, providing evidence that some persons may have a genetic predisposition for both alcohol and tobacco abuse (Madden, Bucholz, & Martin, 2000).

Studies have shown that health risks are higher among people who both smoke and drink, compared to the risks with single substance use (Ulrich et al., 2007). Moreover, among persons with a history of drug addiction, those who smoke experience greater mortality and disability compared with those who do not smoke (Richter, Choi, McCool, Harris, & Ahluwalia, 2004).

Prevalence estimates for cigarette smoking among methadone maintenance therapy (MMT) clients range from 71–98% (McCool, Richter, & Choi, 2005; Richter et al., 2004; Shadel et al., 2005; Shoptaw et al., 2001). While it is not known why the majority of MMT clients are cigarette smokers (Richter at al., 2007), it has been suggested that smoking is a way to cope with cravings for other substances such as heroin and cocaine (Wapf et al., 2008). In addition to substance use, a number of complex behavioral and emotional factors, such as hormonal status, impulsivity, and novelty-seeking impact smoking among this population (Carrol et al., 2009). Alcohol abuse is another serious problem found among MMT clients and the estimated rates of alcoholism vary from 20–50% (Caputo et al., 2002; Dobler-Mikola et al., 2005; Hillebrand, Marsden, Finch, & Strang, 2001; Senbanjo, Wolff, & Marshall, 2006; Stenbacka, Beck, Leifman, Romelsjo, & Helander, 2007). Alcohol has been shown to increase the urge to smoke (Kenna et al., 2007), and this interrelationship may result in smoking behavior among alcohol-using MMT clients. It has also been suggested that methadone itself may be a risk factor for smoking, as increases in methadone doses for MMT clients have been associated with increases in smoking behavior (Stein, Anderson, & Niaura, 2006; Stein et al., 2006).

Several risk factors for smoking have been identified among MMT clients, including lower socioeconomic status, less education, being male, and not being married (Fryar et al., 2006). Depression (Dierker, Avenevoli, Merikangas, Flaherty, & Stolar, 2001), living with another smoker, and being younger have also been associated with smoking (Clemmey, Brooner, Chutuape, Kidorf, & Stitzer, 1997). Many risk factors for smoking have also been associated with drinking behavior among MMT clients (Fryar et al., 2006). Interestingly, while male gender appears to be a correlate of smoking among MMT clients, little is known about smoking by female MMT clients.

To date, few studies have addressed smoking and alcohol use among MMT clients. In particular, it is unclear if heavy smoking correlates are similar for men and women. Federal guidelines (Substance Abuse and Mental Health Services Administration, 2002) require that staff of MMT programs have an understanding of effective strategies for the treatment of alcohol and other substance abuse. However, these guidelines do not address tobacco use. This study seeks to identify correlates of heavy smoking (among alcohol-using MMT men and women), to determine whether gender-specific alcohol prevention strategies should be included in future MMT programs.

Methods

The sample consisted of 256 MMT clients who completed baseline assessments in a NIH-funded study designed to assess the impact of two motivational interviewing programs vs a health promotion program on reduction of moderate-to-heavy alcohol use. Data collection was conducted from February 2007 to May 2008. Heavy smoking was defined as smoking 10 or more cigarettes per day while moderate smoking was defined as less than this stated

amount. The study and all study-related materials were approved by the institutional human subject protection committee.

Sample and Setting

Clients were eligible if they had been receiving methadone for at least three months, were 18–55 years of age, and were moderate-to-heavy alcohol users. The sample was about half male (50%), and half African American (45%). Two-thirds were 50 or older. Less than one-fifth of the sample were educated beyond high school.

Procedure

Information about the study was posted in each of the MMT clinics. Clients who were interested in the study approached research staff members, who were stationed in a private area in each of the clinics based upon a schedule that was made known to each clinic. An intensive formative phase of research was conducted prior to the data collection period with clients, and separately, with staff and directors of the MMT clinics (Nyamathi et al., 2008). This procedure was followed to assure cultural sensitivity of the planned intervention and to understand the best ways to integrate the study. A total of 456 clients were screened and 256 were enrolled? Among the screened, 16% (n = 75) were not eligible due to not meeting the criteria as moderate or heavy drinkers. The remaining did not report back for enrollment procedures, or left the treatment program.

Interested clients were provided a detailed summary of the study, and questions were answered by the research staff. If interest continued, informed consent for the screening phase was procured. Thereafter, the outreach workers administered a brief two-minute structured questionnaire composed of socio-demographic characteristics, a screener for severity of alcohol use and a hepatitis-related health history. After the initial screening was completed, reinforced information was provided about the study and consent for the blood testing was obtained. MMT clients who met eligibility criteria and wished to participate completed a third consent form prior to enrollment in the study. The baseline survey was administered one-on-one by trained research staff prior to randomization into one of three groups: Motivational-Single, Motivational-Group or Health Promotion.

Measures

Socio-Demographic information, collected by a structured questionnaire, included age, gender, race/ethnicity, number of children, marital status, and education.

Smoking was measured by number of cigarettes smoked per day over the past month. Heavy smoking was defined as smoking10 or more cigarettes per day.

Health History and Health Utilization Factors included history of hospitalization, having health insurance and health care utilization. The latter was measured by self-reported use of physical and mental health services and medications over the previous six months.

Health Risks included poor health status, as measured by self-reported general physical health (Stewart, Hays, & Ware, 1988). The response set was a five-point Likert scale. We also assessed MMT clients' history of victimization, including sexual harassment and sexual abuse; poor health habits such as eating from a dumpster during the last six months and prior blood transfusion.

Depressive Symptoms were assessed with a short version of the Center for Epidemiological Studies Depression (CES-D) scale (Radloff, 1977). The 10-item self-report instrument was designed to measure depressive symptomology in the general population and has been

validated for use in homeless populations (Nyamathi, Christiani, Nahid, Gregerson, & Leake, 2006; Nyamathi, et al., 2008). Each item measures the frequency of a symptom on a 4-point response scale from 0 "Rarely or none of the time (Less than 1 day)" to 3 "Most of the time (5–7 days)". After reverse-scoring appropriate items, scores were summed, giving an overall scale that could range from 0 to 30. The scale was dichotomized at a frequently used cut-point of 8, indicating a need for further evaluation of depressive symptomatology. The internal reliability of the scale in this sample was .79.

Emotional Well-Being was measured by the five-item mental health index (MHI-5), which has well-established reliability and validity (Stewart et al., 1988) and is frequently scored on a scale of 0–100. An established cut-point of 66 (Rubenstein et al., 1989) was used to identify participants with poor emotional well-being. Cronbach's alpha was 0.80.

Social support was assessed by 9 items used in the RAND Medical Outcomes Study (Sherbourne & Stewart, 1991). Cronbach's alpha for the support scale in this study was 0.94. Individuals who reported any social support were asked whether their support came primarily from drug users, non-users of drugs or both.

Alcohol use was assessed by the question: "During the last six months, how many drinks did you consume on a typical day?" Alcohol abuse was synonymous with Heavy drinking; defined as consumption of four or more drinks per day on an average day, and moderate drinking was defined as less than four drinks per day. All participants were moderate or heavy drinkers.

Drug use was assessed as the sum of the number of days drugs were used in the last 30 days for heroin, other opiates, cocaine, marijuana, barbiturates, hallucinogens, and amphetamines. Drug use was not adjusted for time in jail or in a hospital. Participants who were found to be in the upper median score were considered to be heavy drug users.

Data Analysis

Associations between categorical variables in Table 1 and heavy use of cigarettes was examined with chi-square tests. Initially, variables that were associated with heavy smoking at the .15 level were used in stepwise backward multiple logistic regressions to identify independent correlates of heavy smoking. The retention level was .10. "Other" and Mixed racial/ethnic groups were excluded from the regression analyses due to low sample sizes. Two-way interactions involving gender and several other covariates were examined; a number of these interactions were important. Consequently, we divided the sample into males and females and repeated the chi-square testing and the regression procedure for each subsample. Initial covariates in the stepwise backward logistic model for males were recent heroin use, recent injection drug use, more than four drinks per day, taking prescription medication, having a drug-using partner, lack of social support and social support from drug users, fair/poor health, and spending more than $100 in the past month on alcohol and drugs. Corresponding covariates for females were recent heroin use, education, receipt of general relief and lifetime measures of hospitalization, transfusion and sex trade. Final covariates in the models for each gender and for the total sample were examined for multicollinearity and the Hosmer-Lemeshow test was used to assess goodness of fit for each model.

Results

The majority of the sample (59%) were male and either African American (45%) or Hispanic (27%) (Table 1). Nearly two-thirds of the sample reported fair or poor health. In terms of alcohol consumption, nearly half reported drinking heavily, and nearly one-third reported spending $100 or more a month on alcohol purchases. Close to half the sample

reported heroin use in the past month, despite being in treatment, and they spent a similar dollar amount per month on drug use. Mental health was problematic: 84% met the cut-off of 8 for depressive symptomatology, indicating a need for further evaluation and nearly or slightly over one-quarter had experienced either physical or sexual abuse or sexual harassment. Over one-third traded sex for other benefits.

Heavy smokers were more likely to be female and to have spent $100 or more on alcohol and drugs in the past month as compared to their counterparts who smoked less. They were also more likely to report heavy drinking, and fair or poor health, than non-smokers or those who smoked fewer cigarettes. In terms of risk behavior, heavy smokers were more likely to have traded sex for money or other things, to have injected drugs, and more specifically, to have used heroin in the last 30 days, compared to their counterparts who smoked less. No differences were noted between heavy and lighter smokers in terms of ethnicity, age, education, recently engaging in alcohol abuse treatment or taking of prescribed medication. However, heavy smokers were more likely to report experiences of physical and sexual abuse and harassment, as well as depression, compared to lighter smokers/non-smokers.

Multivariate Analysis

Separate regression models were fit for males, females and for the total sample based on preliminary analyses for each group. Males who reported heavy drinking had nearly two and a half times greater odds of heavy smoking compared to those who drank less (Table 2). In addition, those who reported recent heroin use had two and a half times greater odds of heavy smoking compared to their counterparts. Fair/poor health was also associated with heavy smoking for males.

Among women, recent heroin use was also found to be associated with heavy smoking (OR: 3.8). Women who reported having had a blood transfusion had over three and a half times greater odds of heavy smoking than those who did not report this procedure. In addition, women who reported lifetime sex trade had nearly five times greater odds of smoking heavily than did those not reporting this work. Correlates of heavy smoking in the total sample included recent heroin use, lifetime sex trade, fair or poor health and spending at least $100 on alcohol in the previous month.

Discussion

This study sought to find correlates of heavy smoking among alcohol-using, MMT clients receiving treatment in Los Angeles. In the overall sample, we found that more than half reported heavy smoking. This pattern is consistent with findings from other studies (Kalman et al., 2005; McCool et al., 2005); the former of whom found that over 75% of drug and alcohol-dependent persons tend to be heavy smokers. We also found that nearly half of the sample reported heavy drinking and about one-third reported that they spent $100.00 or more in the past month on alcohol purchases, nearly half reported heroin use in the past month, while about the same reported to have been involved in trading sex. We also found that 84% of the sample reported depressive symptoms; a finding consistent with other reports (Dierker et al., 2001). Overall, we found that MMT clients who reported fair or poor health, who were involved in the sex trade, reported recent heroin use or spent heavily for alcohol were more likely to be heavy smokers, versus those who did not report these experiences. As findings among persons with a history of drug addiction reveal that smokers are more likely to experience premature mortality compared with non-smokers (Richter et al., 2004), a greater focus on health promotion and reduction in cigarette smoking is timely within MMT sites.

Particularly among males, we found that those who reported heavy drinking and those who reported recent heroin use were two-and-a-half times more likely to be heavy smokers compared with their counterparts who did not report these experiences. Consistent with our findings, Kenna and colleagues (2007) found that alcohol-dependent men are three times more likely to be nicotine-dependent, versus non-alcohol-dependent men. Contrary to this though, Ulrich and colleagues (2007), showed that substance use was not more prevalent among smokers or alcohol-abusers versus those who did not drink or smoke in a risky way. However, it is important to note that their sample was representative of the general population whereas our sample represents a low socio-economic population, at high risk for substance abuse.

Finally, our findings revealed that women who reported recent heroin use and lifetime trading sex and those whose health had necessitated a blood transfusion had over three and a half times greater odds of heavy smoking that their respective counterparts. The similarities with men and women in terms of smoking are clearly around heroin use and fair/poor health; the latter of which is most likely related to the need for a blood transfusion among women.

Study Limitations

One study limitation is the self-reported data, which are subject to reporting bias. We based our findings on participant response to structured questionnaires. We did not observe alcohol, cigarette use, or drug behaviors. The other study limitation is our small convenience sample which may reflect self-selection bias and thus limit the generalizability of our findings. Finally, our definition of alcohol abuser was based upon self report of 4 or more drinks at baseline and not a DSM IV-based definition.

Conclusion

Our study has important ramifications. We have identified correlates of heavy smoking among alcohol-abusing MMT clients, but more importantly, we found that these correlates are different for men and women. Gender differences in smoking are not surprising, they have been observed in the literature (Bauer et al., 2007). But the fact that the correlates of smoking are different for males and females in this population is quite interesting and exciting. In particular, we found that alcohol use is a strong correlate of smoking for men but not for women. Gender differences in alcoholism and alcohol consumption are well-known in the literature (Clark & Midanik, 1982; Wilsnack, Klassen & Wilsnack, 1986; Wilsnack et al., 2000). Also, smoking has been known to be positively associated with heavy alcohol use (Alati et al., 2004).

Smoking, in this population, may represent a strategy for coping with cravings for other substances. The statistically significant gender difference we found goes with the well-established gender-difference theory in smoking. The goal of this paper is to draw attention to the importance of designing gender-based smoking cessation programs in this population, in particular with an eye to the correlates of smoking within each gender to adequately address the factors that may have strong ties with smoking within that subpopulation. Addressing smoking, without addressing its correlates, may show improvement in smoking but only to lead to worsening of other conditions. It is thus important to design not only a gender-based intervention to smoking in this population but also to address the correlates of smoking within each gender.

Acknowledgments

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Table 1

Demographic Characteristics by Smoking History for Methadone Maintained Adults

Characteristic	Heavy Smoking 10 cigarettes per day (N = 144)		Light/Mod Smoking < 10 cigarettes per day (N = 112)		Total Sample (%) (N = 256)	
	N	Percent	N	Percent	N	Percent
Age:						
50+	86	60.0	77	68.8	163	63.9
14 Years School	18	12.6	19	17.0	37	14.5
Ethnicity:						
Black	64	44.4	51	45.5	115	44.9
White	32	22.2	16	14.3	48	18.8
Hispanic	35	24.3	34	30.4	69	27.0
Mixed	5	3.5	2	1.8	7	2.7
Other	8	5.6	9	8.0	17	6.6
Female *	67	46.5	37	33.0	104	40.6
Spend $100 past month On alcohol **	54	37.5	22	19.6	76	29.7
Spend $100 past month On drugs **	59	41.0	28	25.2	87	34.1

Characteristic	Heavy Smoking[a] (N = 144)		Light/Mod Smoking[b] N = 112		Total Sample (%) (N = 256)	
	N	Percent	N	Percent	N	Percent
Heavy Drinking **	78	54.2	41	36.6	119	46.5
Injection Drugs past month *	67	46.5	35	31.3	102	39.8
Heroin past month ***	78	55.3	38	34.6	116	46.2
Fair/Poor health *	95	66.0	59	52.7	154	60.2
Depressive Symptoms *	97	88.2	61	77.2	158	83.6
Blood Transfusion *	46	31.9	20	17.9	66	25.8
Any Prescribed Medications	91	63.2	76	67.9	167	65.2
Traded Sex, Lifetime ***	65	45.5	28	25.0	93	36.5
Forced Sex, Lifetime *	44	30.6	19	17.0	63	24.6
Sexual Harassment **	36	25.0	13	11.6	49	19.1
Physical Assault *	48	33.3	24	21.4	72	28.1

Characteristic	Heavy Smoking[a] (N = 144)		Light/Mod Smoking[b] N = 112)		Total Sample (%) (N = 256)	
	N	Percent	N	Percent	N	Percent
Lack of Social Support	15	10.4	5	4.5	20	7.8

[a] = 10 cigarettes per day

[b] = < 10 cigarettes per day

*
p < .05, chi-square for group differences

**
p < .01, chi-square for group differences

***
p < .001 chi-square for group differences

Table 2

Logistic Regression Results for Smokers Stratified by Gender and Total Sample

Variable	Male (N = 152)			Female (N=104)			Total (N =256)		
	AOR	95% CI	P value	AOR	95% CI	P value	AOR	95 % CI	P value
Heavy drinking	2.90	1.45–5.81	.01				2.50	1.35–4.65	.02
Fair/poor health	2.03	1.01–4.10	.05				1.78	1.03–3.09	.04
Recent heroin use	2.40	1.20–4.81	.02	3.78	1.34–10.67	.02	2.51	1.45–4.35	.001
Lifetime sex trade				4.76	1.85–12.26	.01	2.64	1.48–4.70	.001
Blood transfusion				3.62	1.21–10.84	.03			