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Environmental Tobacco Smoke Exposure among Smokers and Non-smokers Receiving Outpatient Substance Abuse Treatment

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Abstract

Introduction—Environmental Tobacco Smoke (ETS) has been linked to numerous health problems. While research has demonstrated high prevalence of tobacco use among individuals receiving treatment for substance use disorders (SUDs), no studies have examined ETS among individuals receiving treatment for SUDs, paying specific attention to non-smokers who may be at risk for high exposure to ETS.

Methods—Participants (N=261) enrolled in outpatient substance abuse treatment completed a survey, in which 14 items were used to quantify ETS exposure and smoking policies across several environments.

Results—Among smokers, 85% reported that their significant others also smoked as compared to 15% among non-smokers ($X^2=6.624$, $p<.05$). A logistic regression examined the characteristics that predicted smoking in the home. The overall model was significant, ($\chi^2 = 36.046$, $p < .0005$) with variables that independently predicted smoking in the home included having less than a high school diploma, being female, and living with a smoker. Income, age, and living with children were not found to be significant. Overall, 42% white collar workers 26% of service workers and 30% of blue collar workers reported no exposure to ETS. Sixty-seven percent of smokers strongly

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agreed or agreed the hazards of secondhand smoke have been clearly demonstrated versus 58% of non-smokers.

Conclusions—Smokers and non-smokers enrolled in outpatient substance abuse treatment are frequently exposed to ETS at home, work, and in social settings. The dangers of ETS should be addressed among this population through education, smoke-free policies, and cessation resources, with help from their treatment facility.

Keywords

Environmental Tobacco Smoke; Substance Abuse; Smoking bans

INTRODUCTION

The hazards of environmental tobacco smoke (ETS; i.e., smoke emanating from the cigarette and exhaled smoke) have been well documented (CDC, 2011; HHS, 2006; Kegler et al., 2012). While research has largely focused on ETS exposure in vulnerable and non-smoking populations (Florescu et al., 2007; Singh, Siahpush, & Kogan, 2010; Pirkle, Bernert, Caudill, 2006), no studies have examined ETS exposure and home and work smoking policies among individuals receiving treatment for substance use disorders (SUDs). ETS is important to examine among SUD treatment patients as these individuals may have characteristics that predict high levels of ETS exposure and elevated risks, which include low levels of education, living in disadvantaged neighborhoods (Galea, Nandi, & Vlahov, 2004) and employment in blue collar or service industry jobs (Walls, Batiste, Moore & Loy, 2009). Smoking prevalence among SUD treatment patients is common (75–97%) and well above rates found in the general population of the U.S. (19.5%) (Centers for Disease Control and Prevention, 2011; Guydish, Tajima, Chan, Delucchi & Ziendonis, 2011b; Kalman, 1998; Nahvi et al., 2006; Pajusco et al., 2012). Despite this, little attention has been given to the vulnerability to ETS exposure for these individuals both in their treatment environments and at work and home, as well as ETS conditions that may make smoking cessation more difficult. The present study addresses this gap in the literature by exploring ETS exposure among SUD treatment patients across several environments and comparing ETS exposure and characteristics between smokers and non-smokers.

METHODS

Participants and Procedures

After receiving Institutional Review Board approval, participants (N = 266) were recruited from eight urban, outpatient substance abuse treatment centers in Baltimore, MD through flyers, informational sessions held by study staff, and word of mouth. Eligible study participants were 18 years of age and older and enrolled in outpatient substance abuse treatment. The survey was administered via the internet using Survey Monkey encryption service or by paper and pencil. Participants received a small prize or \$5 for completing the survey. Information on recruitment and other study details can be found elsewhere (McClure, Acquavita, Harding, Stitzer, 2013). Five participants failed to give adequate information regarding their ETS exposure, and were excluded from the analyses, resulting in

a final sample of $N = 261$ for the current analysis. Participants were divided for purposes of analysis into current smokers ($N = 201$) and non-smokers ($N = 60$) based on self-report.

Measures

The survey consisted of 133 questions, 11 of which were devoted to ETS exposure and home and work smoking policies. Participants smoking status was determined by asking the following question: “Do you currently smoke cigarettes? Answer: Yes, I currently smoke; No, I quit within the last 6 months; No, I quit more than 6 months ago; No, I have never smoked.” Additional smoking characteristics was asked such as number of cigarettes per day and Fagerström Test for Nicotine Dependence (FTND) (Heatherton et al., 1991) was asked of participants. Information on desire to quit are reported elsewhere (McClure et al., 2014).

Four of the 11 questions to quantify ETS exposure were locally developed. These questions were:

1. Who smokes in your home? Answer: Spouse/Partner, Mother, Father, Sister, Brother, Children, Friend, Other Family Member(s), Other Non-Family, Not applicable.
2. How is cigarette smoking handled in your home? Answer: No one is allowed to smoke in my home, only special guests are allowed to smoke in my home, people are allowed to smoke only in certain areas of my home, people are allowed to smoke anywhere in my home.
3. How many days during the past 7 days were you near someone while he/she was smoking a cigarette?
4. For your most recent job, does your place of work have an official policy that restricts smoking in any way? Answer: Yes, No, Don't know

The remaining seven items to assess ETS exposure examined home, work, and social ETS exposure. These items were previously developed, utilized and found to be a valid measure of ETS exposure by Nondahl, Cruickshanks and Schubert (2005).

Additionally, questions from the Smoking, Knowledge, Attitudes, and Services questionnaire (S-KAS; Guydish, et al., 2011b) obtained via the current survey are reported elsewhere in aggregate (McClure et al., 2014), but four questions were examined individually due to the applicability to ETS exposure. Questions studied were:

1. Do clients and staff smoke together? Answer: Yes, No
2. In the program you are currently at, did any staff member ask if you smoke? Yes, No, Don't Remember
3. In the past month, how frequently did your clinician remind you not to smoke in the presence of infants or children? Answer: Never, Occasionally, Often, Very Often, Always, Don't Know, Not Applicable. (Smokers only)
4. What is your level of agreement or disagreement with the following statement: The hazards of second-hand smoke have been clearly demonstrated. Answer: Strongly disagree, Disagree, Unsure, Agree, Strongly Agree, Don't Know.

Demographic, SUD treatment characteristics, and ETS exposure characteristics of the study sample were compared between smokers (N=201) and non-smokers (N=60) with the use of Chi square tests for categorical variables and independent samples t-tests for continuous variables. Logistic regression of 250 participants with no missing data in the variables utilized was conducted to examine the characteristics that predicted smoking in the home (no smoking in the home/yes smoking in the home) among smokers and non-smokers. Variables used in this regression were gender (male/female), income (< \$15,000/ \$15,000), education (< High School Diploma/ High School Diploma, age (continuous), living with children (yes/no), and living with a smoker (yes/no). All tests were conducted in SPSS version 20.

RESULTS

Demographic information for the study sample is represented in Table 1 separated by smokers and non-smokers. The majority of participants (N = 261) were male (64%), African-American (69%), did not live with children (78%), were previous opioid users (55%), and current smokers (76%). The average age for both smokers and non-smokers was 44 years ($SD = 11.46$). Half of non-smokers reported they had never smoked at all, 22% reported they quit within the last six months and 28% reported they had quit more than six months ago. The average amount of cigarettes smoked per day was approximately 12. The average FTND score calculated for participants who answered all six items was 4.6. Participants reported their employment pattern over the past three years, and provided information on their last most recent job (i.e., blue collar, white collar, service), which is shown in Table 1. For current employment patterns, 29% reported having a full time job, 25% reported being unemployed, 17% were retired or disabled, 17% reported working part time, 9% reported being unable to work due to being in a controlled environment, and 3% were students.

Potential ETS risk characteristics of the study sample are shown in Table 2. Smokers compared with non-smokers were less likely to have a high school diploma and were more likely to use opioids. No other demographic differences existed between smokers and non-smokers. Among current smokers, 85% reported that their significant other smoked, which was the case for 15% of non-smokers. Smokers were also more likely to report living with people who smoked (parents, etc.) as compared to non-smokers.

Ninety-seven percent of smokers reported ETS exposure within the past seven days and 81% experienced exposure in a social setting once a week or more. Eighty percent reported their average ETS exposure as one hour or more. Six people were smoking, on average, during those times of social exposure ($SD = 3.6$). Among non-smokers, 83% reported ETS exposure within the past seven days, and 62% experienced exposure in a social setting once a week or more. Sixty-five percent reported their average ETS exposure as less than one hour. Five people were smoking, on average, during these times of social exposure ($SD = 3.3$).

A non-smoking policy in the home was endorsed by 35% of smokers and an additional 35% reported that smoking was only allowed in certain areas, whereas 60% of non-smokers

reported a non-smoking policy in their home and an additional 18% reported smoking was allowed in certain areas. A logistic regression of smoking and non-smoking participants ($N = 250$) was conducted to examine the characteristics that predicted smoking in the home. Analysis indicated the overall model was significant, $\chi^2 = 36.046$, $p < .0005$; Cox and Snell $R^2 = 0.134$, Nagelkerke $R^2 = 0.181$. Variables that independently predicted smoking in the home included having less than a high school diploma ($\beta = -0.83$, $p < .05$), being female ($\beta = 0.722$, $p < .05$) and living with a smoker ($\beta = -1.414$, $p = .0005$). Income, age, and living with children were not found to be significant.

Study participants employed (or recently employed) in blue collar jobs were more likely to be exposed to ETS as compared to those employed in white collar professions ($\chi^2 = 4.269$, $p < .05$), however, no significant differences were found in blue collar versus service industry or white collar versus service industry. Overall, 58% of participants who worked in white collar jobs reported exposure to ETS, as compared with 74% of participants who worked in service and 70% of blue collar workers. Blue collar workers were more likely to report that their place of work did not have an official policy that restricts smoking in any way as compared to white collar ($\chi^2 = 11.939$, $p < 0.005$), and service ($\chi^2 = 11.657$, $p < 0.005$). No significant differences in worksite smoking policies were found between white collar and service. There were no significant differences between smokers and non-smokers for ETS exposure at work and among worksite smoking policies.

Individual S-KAS items were examined due to their relevance to ETS exposure and beliefs regarding ETS. Sixty-seven percent of smokers and 58% of non-smokers strongly agreed or agreed that the hazards of second-hand smoke have been clearly demonstrated. Sixty-five percent of smokers and 60% of non-smokers reported being asked by a clinician if they smoked. More smokers reported that staff smoked with clients at their treatment program compared to non-smokers. Of eight clinics participating in this study, only one had participants that did not report any smoking with staff members. When smokers were asked how frequently their clinician reminded them not to smoke around infants and children, 63% reported they were never reminded. Of smokers who lived with children, 64% reported they were never reminded.

DISCUSSION

The results from this study demonstrated that the majority of patients who participated in the survey were current smokers and that they have substantial ETS exposure across several environments. This is consistent with previous literature demonstrating high rates of smoking (75–97%) among individuals with SUDs (see Guydish et al., 2011a; Kalman, 1998; Nahvi et al., 2006; Pajusco et al., 2012). However, these findings are discouraging as high ETS exposure rates were found among study participants. Nearly 80% of U.S. homes are currently smoke-free (Borland, et al., 2010; Hawkins & Berkman, 2011), yet the rates of home smoking bans and/or restrictions for the participants in the current study were low, even for non-smokers (60%). Previous research has demonstrated that households below the poverty line and those with less educational attainment have fewer home smoking bans in place along with higher rates of tobacco use (Mills et al., 2011; Collins et al., 2010; Hyland et al., 2009). Home smoking bans are also less likely when another smoker lives in the home

(Hawkins & Berkman, 2011; Hyland et al., 2009), and among African-American households compared to White households (Mills et al., 2011). Home smoking bans in U.S. homes are associated with significantly reduced smoking behaviors, less relapse for those who have quit, and a resulting reduction in ETS exposure (Hyland et al. 2009). The implementation of home smoking bans among SUD patients may be an important part of comprehensive smoking cessation education plan for smokers and non-smokers to minimize ETS exposure and assist in cessation.

While the implementation of home smoking bans is a decision largely under the control of the individual, these are not decisions that can be made at the workplace. Studies consistently demonstrate that service industry and blue collar employment display a greater prevalence of smoking and ETS exposure as compared to white collar. Ours was no exception. Furthermore, participants who worked in the service industry had higher rates of exposure (74%) in our study compared to a previous study (50%, Wakefield et al., 2005). Previous research has found those employments with fewer smoking restrictions or formal policies also have the highest rates of ETS exposure and the fewest resources for offering cessation assistance for employees (Uslan, Forster, & Chen, 2007; Ham et al., 2011).

ETS exposure and smoking policies are also relevant at SUD treatment programs. The pervasiveness of a smoking culture at SUD treatment facilities has been well documented (Schroeder & Morris, 2009; Ziedonis, Guldish, Williams, Steinberg, Foulds, 2006), and our study confirmed this as participants reported prevalence of staff and patients smoking together at the majority of the participating treatment programs. Smoking may also be very accessible at SUD treatment clinics, even if buildings are smoke-free. For example, Baltimore City Health Code permits smoking in designated areas of substance abuse treatment facilities (Health Code of Baltimore City, 2008; Center for Disease Control, 2013). Though detailed data on smoking policies and restrictions at treatment clinics were not collected in the current study, anecdotally, smoking in permitted areas outside of treatment clinics was common among all study sites. Staff smoking with clients poses boundary issues within the therapeutic relationship. Furthermore, staff who smoke have been found to be less likely to address smoking cessation in their clients (Guldish, Passalacqua, Tajima & Manser, 2007; Knudsen & Studts, 2010). Moreover, individuals treated at SUD treatment facilities that implement a comprehensive smoking ban (smoking banned in all indoor and outdoor areas) are 43% less likely to be a current tobacco user (Knudsen, Boyd & Studts, 2010). Unfortunately, less than 20% of SUD treatment facilities have been found to have a comprehensive smoking ban (Knudsen et al., 2010). It is vital that treatment centers shift away from a pervasive smoking culture by training providers of SUD treatment on tobacco cessation and reducing ETS exposure, providing counselors and staff members with help to quit if they smoke, and implementing comprehensive smoking bans.

This study has several limitations. While this study was anonymous and utilized a valid scale for some questions quantifying ETS and smoking policies, other questions were locally developed and had not previously demonstrated reliability and validity. Participants represented a convenience sample within a specific geographic location in the U.S. and were self-selected, thus not generalizable. Recruitment sites have ETS policies that are mandated for workplaces and treatment centers in Baltimore, Maryland. This represents a very specific

urban setting that may not generalize to other treatment centers in states with varying ETS policies and smoking restrictions. Detailed information regarding smoking policies and practices at the treatment clinic were not collected, which may be useful in further demonstrating increased risk of ETS. Finally, biochemical measures of smoking status were not collected to confirm self-reports or quantify ETS exposure in non-smokers.

This report indicates that individuals who are in treatment for substance abuse are at high risk for the detrimental health effects of smoking and ETS. Smoking restrictions in the home, workplace, and treatment clinic may help smokers to cease tobacco use during treatment episodes, and reduce ETS exposure in non-smokers enrolled in treatment. Given these results regarding ETS exposure in patients enrolled in substance abuse treatment, the harms of ETS should be part of a comprehensive tobacco cessation plan administered in substance abuse clinics.

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Highlights

- Cross-sectional survey of participants enrolled in outpatient substance abuse treatment
- ETS exposure and smoking policies in different environments were examined
- We predicted what variables impact smoking policies in the home
- We identified what work environments may impede smoking cessation

Table 1

Demographics –smokers vs. non-smokers (N = 261)

Variable	% (N) Smokers	% (N) Non-smokers
Gender	(197)	(60)
Male	62	70
Female	37	28
Transgender	1	2
Race	(193)	(58)
AA/Black	67	65
White	27	25
Other	6	10
Ethnicity	(196)	(59)
Latino	3	2
Relationship Status	(201)	(60)
Married/Long-term relationship	15	15
Divorced/Separated/Widowed	26	25
Never Married	34	35
Education	(195)	(59)
Less than HS Diploma	44	27
HS/GED	36	37
Some College or more	20	36
Employment	(165)	(56)
White Collar	12	18
Service	42	36
Blue Collar	46	46
Income	(196)	(60)
< 15,000	59	52
15,000 – 29,999	25	30
30,000	16	18
Treatment Program	(201)	(60)
IOP	43	38
OP	67	62
Type of Treatment	(200)	(60)
Drug Free	52	72
Opioid Replacement	48 (97)	28 (17)
Methadone	66	82
Buprenorphine	34	18
Primary Drug of Abuse	(192)	(57)
Alcohol	14	25
Cocaine	15	16
Marijuana	9	17
Opiates	59	42

Variable	% (N) Smokers	% (N) Non-smokers
Other	3	0
Cigarettes per day	(174)	
Mean (<i>SD</i>)	11.7 (6.72)	
FTND Score	(149)	
Mean (<i>SD</i>)	4.6 (2.1)	

Note: Intensive outpatient (IOP) includes nine or more hours of treatment per week. Outpatient (OP) refers to fewer than nine hours per week.

Table 2

Potential ETS Risk Characteristics

	Smokers	Non-smokers	χ^2	p-value	t
Less than a H.S. diploma (%)	44	27	5.437	*	
Opioid use (%)	59	42	5.306	*	
Significant other a smoker (%)	85	15	6.624	*	
Living with a smoker	81	19	5.1	*	
ETS within last 7 days (%)	97	83			
(a) In social setting (%)	81	62			
(i) Number of people smoking	6	5		***	3.818
Non-smoking policy in home (%)	35	60	11.632	**	
Smoking allowed in certain areas of home (%)	35	18		***	4.599
Smoking restrictions at worksite (%)	49	57			
ETS exposure at work (%)	77	74			
Strongly agreed/Agreed: Hazards of secondhand smoke have been clearly demonstrated (%)	67	58			
Asked if smoked by clinician (%)	65	60			
Reported clients & staff do smoke together (%)	53	38	3.967	*	

* $p < .05$ ** $p < .005$