

# Secondhand smoke exposure and its impact on nicotine dependence and smoking cessation among patients with psychiatric and substance use disorders

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## BACKGROUND

- Secondhand tobacco smoke (SHS) has over 7000 chemicals, some of which are known to cause cardiovascular and respiratory diseases, cancers, and premature death in over 58 million involuntarily exposed people in the US. (US Department of Health and Human Services, 2014; Homa et al., 2015)
- Nicotine exposure from SHS may further modulate the maintenance of smoking behaviors through neuroadaptations in the reward circuitries of the brain leading to dependence; independently, SHS exposure is associated with greater failed smoking cessation (SC) attempts and greater incidents of relapse. (Anthonisen & Murray, 2005; Okoli & Kodet, 2015; Chaiton et al., 2016)
- People living with psychiatric and substance use disorders (PD/SUD) have high rates of nicotine dependence (ND), cigarette consumption, withdrawal symptoms, poor SC outcomes, and tobacco-induced mortality and morbidity. (SAMHSA, 2013; CDC, 2013)
- Given the high rates of tobacco use and related-potential SHS exposure, high ND, and poor cessation outcomes among people with psychiatric disorders, our study examined the associations between SHS exposure, ND, and SC in this population. Among a sample of inpatients from a psychiatric facility, the specific aims of the study were to:
  - 1) Quantify SHS exposure.
  - 2) Examine the association of SHS exposure with ND.
  - 3) Examine the association between SHS exposure and quit attempts.

## METHODS

### Design

- A cross-sectional survey was administered to inpatients who used tobacco at a psychiatric facility in Central Kentucky.

### Sample

- We obtained responses from 118 participants of diverse psychiatric diagnoses.
- Eligible participants were 18 years of age or older, currently using tobacco products, admitted to the psychiatric facility for at least 48 hours, and were willing and able to provide informed consent.

### Procedure

- Surveys were administered between March 1<sup>st</sup> to December 20<sup>th</sup> 2016
- Prior to engaging in the survey, potential participants were screened using a Consent Capacity Questionnaire, a ten-item questionnaire that determines the ability to provide informed consent (Okoli, Mason, Brumley-Shelton, & Robertson, 2017).
- Trained research assistants then administered the 15-20 minute questionnaire.
- Participants who completed the questionnaire were entered into a drawing for one of five \$20 gift cards.
- Approvals were obtained from the UK Medical Institutional Review Board.

### Measures

- Demographic variables included age, gender, education level, ethnicity/race, marital status, history of SUD treatment, health insurance, work status, and primary psychiatric diagnosis. We also obtained information on tobacco use (type and quantity of products) and SHS (environmental, psychosocial, and perceived) exposure history.
- ND was measured using the six-item Fagerstrom Test for Cigarette Dependence (Fagerström, 2012; Heatherton, Kozlowski, Frecker, & Fagerström, 1991).
- Motivation to quit smoking/using tobacco products was assessed using three items to determine importance, confidence, and readiness to quit using tobacco products (Burke, Ebbert, & Hays, 2008).

### Main Analysis

- Multivariate linear regression analyses were used to examine the associations between SHS exposure and ND. Additionally, multivariate logistic regression analyses were used to assess associations between SHS exposure and serious SC attempts in the past year.

## RESULTS

### Sample Characteristics

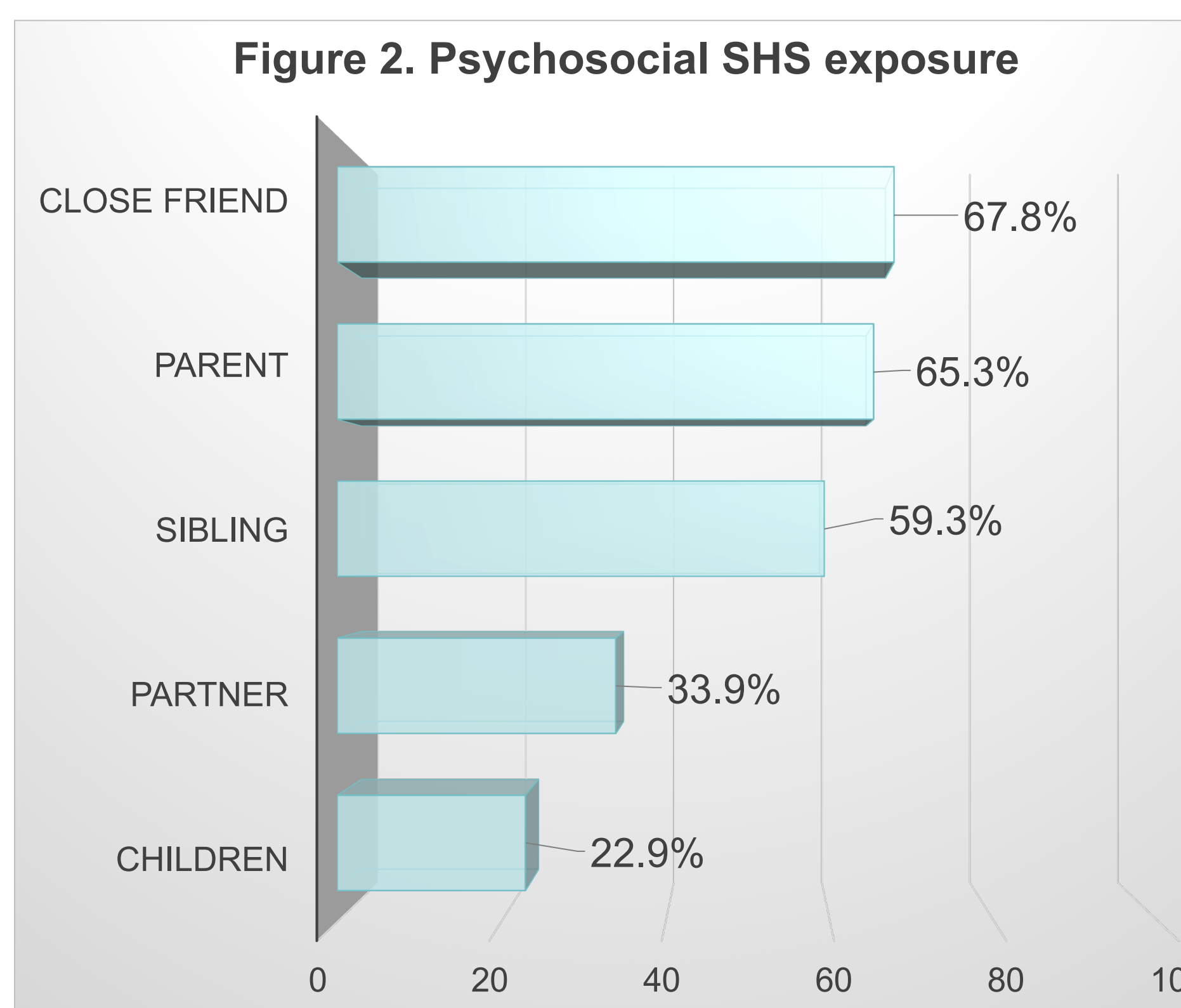
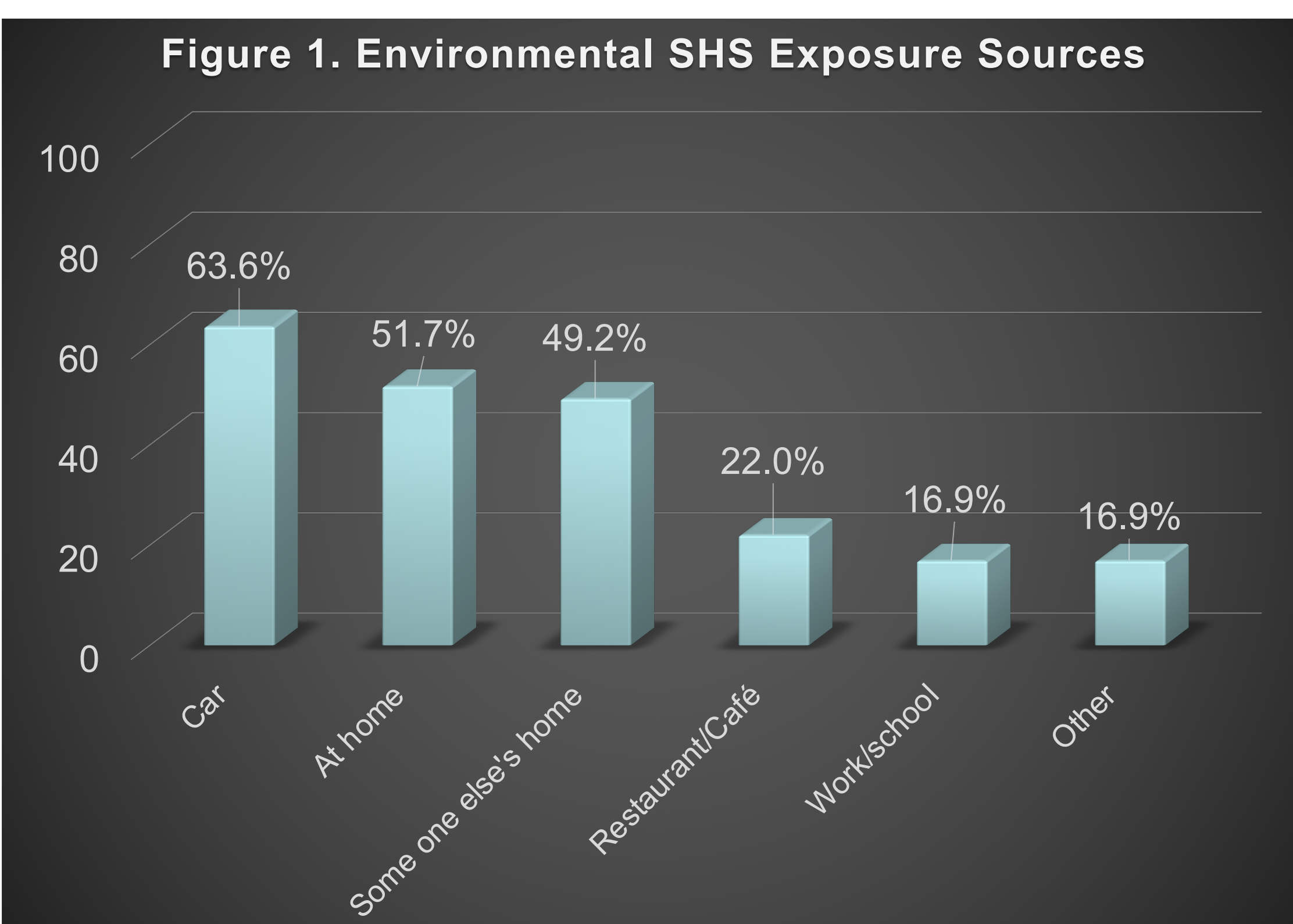
- On average, participants were 43 years of age, equally distributed by gender, white, separated or divorced, and mostly high school graduates.
- The primary psychiatric diagnosis was psychotic disorder (i.e., schizophrenia, schizoaffective disorder, psychosis not otherwise specified) and participants were moderately nicotine dependent (See Table 1).

Table 1. Sample description

	Total (N=118)	
	N	%
<b>Gender</b>		
Male	60	50.8
<b>Ethnicity</b>		
White	103	87.3
Non-white	15	12.7
<b>Education</b>		
Less than high school	32	27.8
High school or greater	83	72.2
<b>Marital status</b>		
Married/ Widowed/Unmarried couple	25	21.2
Separated/Divorced	58	49.2
Single Never Married	35	29.7
<b>Psychiatric diagnosis</b>		
Psychotic disorders	46	39.0
Depressive disorders	23	19.5
Bipolar disorders	32	27.1
Anxiety and cognitive disorders	10	8.5
Substance use disorders	7	5.9
<b>Employment status</b>		
Full/ Part time	21	18.3
Unemployed/Disability	90	78.1
Student/Volunteer	4	3.5
<b>Tried to quit in the past year (yes)</b>	46	39.0
<b>Substance use disorder treatment (yes)</b>	44	37.3
M		SD
Age (in years)	43.0	14.0
Age of smoking initiation (in years)	15.9	6.8
Cigarettes per day	21.7	14.3
Nicotine dependence score (scale of 0 to 10)	5.8	2.6
Importance of quitting	6.0	4.1

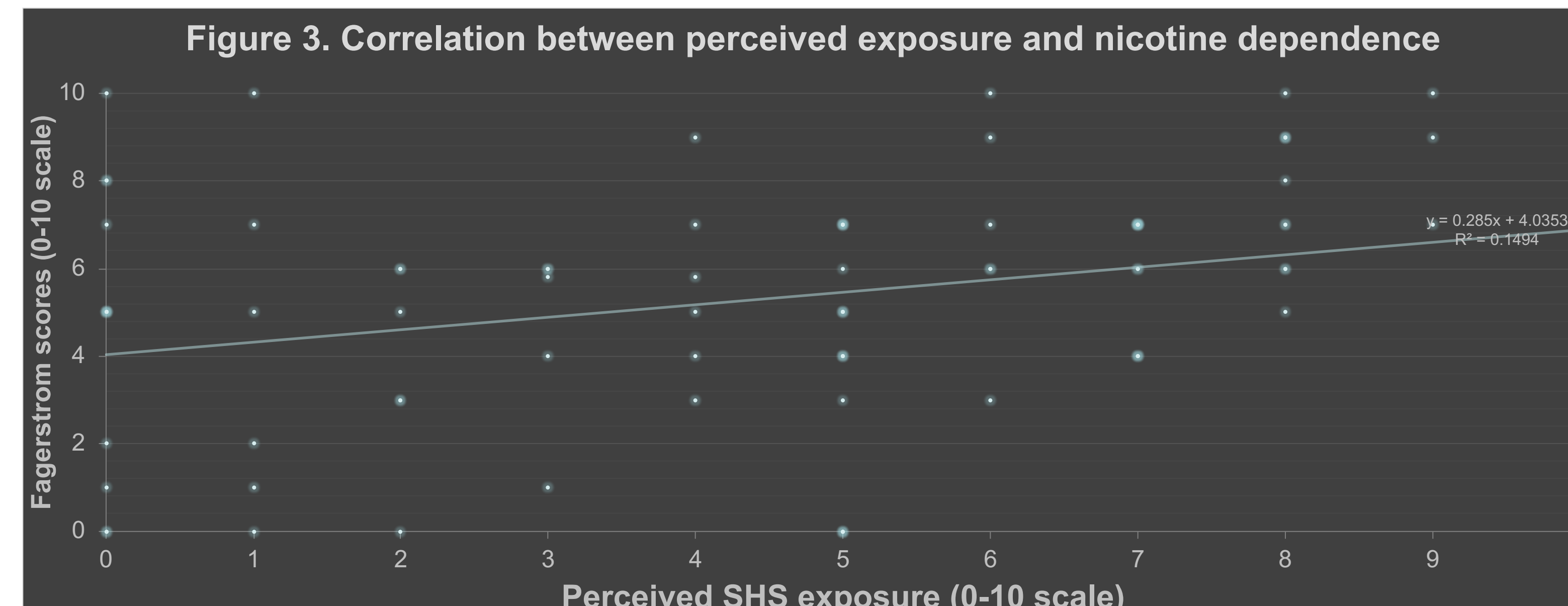
### Sources of secondhand smoke exposure

- The primary sources of environmental SHS exposure were in the car, in the home, and in someone else's home (See Figure 1).
- The primary sources of psychosocial SHS exposure were from close friends, parents, and siblings (see Figure 2).
- Participants rated moderate scores on perceived SHS exposure (M=6.2, SD=3.5).
- Psychosocial SHS exposure were significantly associated with environmental SHS exposure (r=.19, p=.036) and perceived SHS exposure (r=.28, p=.002); however, environmental SHS exposure was not associated with perceived SHS exposure (r=.05, p=.572).



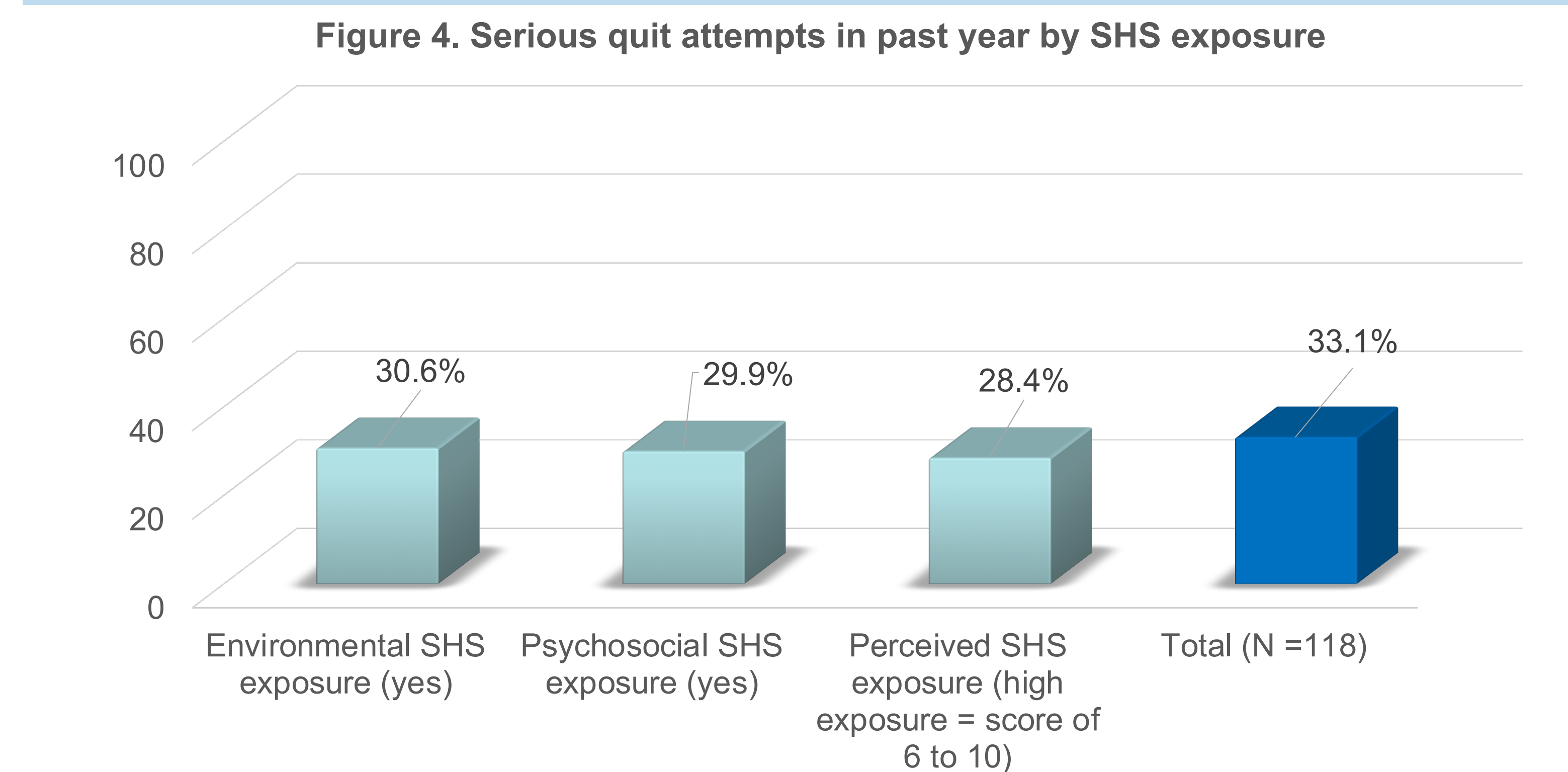
### Secondhand smoke exposure and nicotine dependence

- In the univariate analyses, total scores on environmental ( $\beta=.21$ ,  $t=2.28$ ,  $p=.025$ ), psychosocial ( $\beta=.28$ ,  $t=3.10$ ,  $p=.002$ ), and perceived ( $\beta=.39$ ,  $t=4.51$ ,  $p<.0001$ ) SHS exposure were associated with greater ND scores.
- However, in the multivariate analysis, perceived SHS exposure scores remained associated with ND ( $\beta=.34$ ,  $t=3.85$ ,  $p<.0001$ ), but environmental and psychosocial SHS exposure scores were no longer associated with ND (see Figure 3).



### Secondhand smoke exposure and quit attempts

- Environmental (OR=1.07, 95% CI=.83-1.36), psychosocial (OR=.93, 95% CI=.71-1.23), and perceived (OR=.95, 95% CI=.86-1.06) SHS exposure were not associated with reports of a serious quit attempt in the previous year (see figure 4).



## DISCUSSION AND IMPLICATIONS

### Discussion of key findings

- Psychiatric patients using tobacco products may encounter high SHS exposure, placing them at risk for higher levels of ND.
- Perceived SHS exposure is a significant predictor of greater ND scores when compared to other SHS exposure measures. However, it may not be associated with SC among those with a PD.
- Routine screening for SHS exposure may be considered as part of TT programs that target psychiatric patients.

### Implications for future research:

- Future studies may include objective measures of SHS exposure (e.g., hair and saliva cotinine samples), and extend to include psychiatric patients nationally.
- Future studies may also SHS exposure of psychiatric inpatients as compared to non-psychiatric inpatients to determine comparative SHS exposure risk profiles
- Subsequent studies will be important to further develop interventions and policies to address the disproportionately high tobacco-related morbidity and mortality among psychiatric patients.

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