Comparative Assessment of Obsessive Compulsive Smoking Scale – A Cross-Sectional Study among Private Bus Drivers of Namakkal District, Tamil Nadu

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Abstract

Background: Assessment of tobacco-induced preoccupation and compulsive drive may help us to better diagnose addictive behavior, enhance cessation treatment, and predict smokers at the greatest risk of relapse. **Objective:** This study attempted to make a comparative assessment of the Obsessive Compulsive Smoking Scale (OCSS), which measures compulsive smoking with the Modified Fagerstrom Test for Nicotine Dependence (FTND) Scale. **Methodology:** The cross-sectional study included 250 private bus drivers of Namakkal district, Tamil Nadu, who were current smokers. OCSS and Modified FTND Scale were used to collect the data on nicotine dependence. Ordinal regression analysis was used to compare OCSS and FTND scales with smoking dependence predictor variables. **Results:** About 79% of the drivers exhibited high OCSS scores. The OCSS scores were significantly associated with variables such as duration of smoking, the number of cigarettes/bidis consumed, time of consumption of first cigarette, age when first smoked, age of daily smoking, and the number of quit attempts. Ordinal regression analysis revealed a higher statistically significant proportional odds ratio associated with the OCSS scale compared to the FTND scale ($P < 0.05$). **Conclusion:** The results suggest that the OCSS scale offers a better measure of nicotine dependence than the Modified FTND scale. Further studies are needed to conclude that the OCSS scale has better advantages over the FTND scale in clinical settings and thus be used as an effective tool in cessation programs.

Keywords: *Bus drivers, compulsive drive, Obsessive Compulsive Smoking Scale, preoccupation, tobacco smoking*

Submitted: 05 October, 2020
Revised: 19 February, 2021
Accepted: 22 April 2021.
Published: 26 June, 2021.

Introduction

Tobacco is one of the leading preventable causes of morbidity and mortality in India today.[1] Each year an estimated seven million deaths are attributed to the use of tobacco.[2] The GATS 2 report reveals that every tenth adult in India smokes tobacco – 11.9% in rural areas and 8.3% in urban areas. The survey also showed that second-hand smoke is gradually becoming a major cause of concern in India. More than one-third (35%) of nonsmokers were exposed to second-hand smoke at home.[3]

Access this article online

Quick Response Code:

Website: www.jicdro.org

DOI: 10.4103/jicdro.jicdro_64_20

A striking feature in India though is the higher incidence of oral cancer, as opposed to lung cancer, among tobacco users. India alone accounts for almost half of all oral cancer cases in the world.[4]

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How to cite this article: Kumar K, Shavi GR, Sanga R, Shankar S, Lalithambigai G, Santhakumari S. Comparative assessment of obsessive compulsive smoking scale – A cross-sectional study among private bus drivers of Namakkal District, Tamil Nadu. J Int Clin Dent Res Organ 2021;13:52-7.

Nicotine is the primary reinforcing component of smoking tobacco as it drives tobacco addiction.[5] Addiction is characterized by repeated drug use, notwithstanding negative health consequences. Coping with craving is identified by the majority of smokers as the most difficult aspect of quitting.[6] Like other drugs of abuse, nicotine escalates the levels of neurotransmitter dopamine in the reward circuits of the brain which reinforces the behavior of taking the drug.[7] Repeated exposure alters the circuits' sensitivity to dopamine and leads to changes in other brain circuits involved in attention, stress, and self-control.[8] These changes lead to craving and compulsive drug use, eventually leading to dependence. Long-term brain changes induced by continuous nicotine exposure results in withdrawal symptoms when abstained from smoking.[9] The persistent thoughts and difficulties experienced with quitting give rise to compulsive drug seeking and use thus conceptualizing nicotine addiction as "a disease of compulsion and drive."[10]

However, there exists a lack of specific instruments or scales that measure compulsive use of tobacco. Assessment of craving may help us to diagnose addictive behavior, enhance cessation treatment, and predict smokers at the greatest risk of relapse.

In a study done by Hitsman *et al*., the Obsessive Compulsive Smoking Scale (OCSS), which was derived from Yale brown Obsessive Compulsive Scale, was concluded to be a valid and reliable inventory for assessing compulsive tobacco use.[11]

To assess the utility of the OCSS in the local population, a sample of private bus drivers was chosen to collect the data on tobacco dependence. The bus drivers are subjected to occupational stress due to high psychological demands, little decision-making control, and low social support on the job, the stress associated may lead to regular use of tobacco among them.

Thus, the aim of the present study was to comparatively assess the OCSS with the Modified Fagerstrom Test for Nicotine Dependence (FTND) Scale which is the current most popular scale used to assess tobacco dependence in tobacco cessation counseling centers.

Methodology

A cross-sectional study was conducted among 250 private bus drivers of Namakkal district, Tamil Nadu, who were current smokers, for a period of 3 months. The study population was chosen assuming high smoking addiction among them. The participants were chosen through the Cluster Random Sampling. Namakkal district comprises 7 taluks. By Simple random sampling, one taluk was picked from the seven taluks through lottery method. In the selected taluk, the private transport offices were taken as clusters. Cluster random sampling was done and three private transport offices were chosen. All drivers who were current smokers were included from the selected transport offices for the study.

Sample size calculation

$$n = \frac{Z^2_{\left(1-\frac{\alpha}{2}\right)} p\left(1-p\right)^2}{d^2}$$

$Z_{(1-\alpha/2)} = 1.96$

P = 66% (Prevalence of tobacco use because of its addiction among auto drivers of Chennai by Francis 2017).[12]

q = 1 − P = 34%

d = Relative error (6%)

$$n = \frac{(1.96)^2 \times 0.66 \times 0.34}{(0.06)^2} = 250$$

Informed consent was obtained from the participants who had voluntarily agreed to take part in the study. Sociodemographic details and smoking history were obtained from the study participants with the help of a prevalidated questionnaire. Modified FTND Scale and OCSS were used to collect the data on nicotine dependence. The OCSS is a 10-item questionnaire designed to measure compulsive smoking. The OCSS was validated in the study done by Hitsman *et al*.[11] Associations observed between the OCSS scale and other widely used smoking measures thus supporting construct validity. Higher OCSS scores were associated with greater craving, several aspects of nicotine dependence, and intensity of smoking thus supporting concurrent validity. Participants of the present study responded to each of the ten OCSS items by choosing from five options with corresponding scores from 0 to 4. "Obsessive" items were the following: time per day occupied by thoughts, frequency of thoughts per day, interference of thoughts with social and work activities, level of distress associated with thoughts, effort to resist thoughts, and control over thoughts. "Compulsive" items were level of distress if prevented from smoking, effort to resist smoking, the strength of urges, and control over smoking.[11] Modified FTND Scale comprises 6 questions – the first one deals with the time of use of the first cigarette, followed by the difficulty to refrain from smoking in public places, the most difficult cigarette to give up in a day, cigarettes consumed per day, frequency of use during morning hours, and use of cigarettes during illness.[13]

Data were collected during their free hours at the respective bus transport offices. An educational talk was then given to the participants regarding the ill effects of tobacco use and IEC materials were distributed among them. They were given appointments for the initiation of tobacco cessation counseling at our institute.

Statistical analysis

Analysis of data was conducted with the help of IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. (IBM Corp., Armonk, New York, USA). The level of statistical significance was kept at $P < 0.05$. The Chi-square test was performed to analyze the significance of the association between the variables. Ordinal regression analysis was used to compare OCSS and Modified FTND scales with smoking dependence predictor variables.

Ethical Clearance

Ethical approval for this study(VDCW/IEC/172/2019) was provided by the Institutional Ethics Committee of Vivekanandha Dental College for Women, Elayampalayam, Tiruchengode, Namakkal on 22 July 2019.

Results

About 62.8% of study participants were in the age group of 41–60 years. About 49.2% had completed high school education and 67.6% of the drivers belonged to the lower middle socio-economic class (Kuppuswamy's socioeconomic status scale 2018). About 56.4% of participants had a smoking duration of more than 10 years. About 40.8% consumed 5–10 cigarettes/bidis per day while 17.2% consumed more than 20 cigarettes/bidis per day. About 56% of the drivers smoked their first cigarette/bidi within 5 min of waking up in the morning. About 57.6% had made numerous attempts to quit smoking but experienced frequent relapses. About 62.8% of the drivers first smoked tobacco between 21 and 25 years of age.

Table 1 displays the significance of the association between variables using the Chi-square test. Tables 2 and 3 show the results of ordinal logistic regression analysis. The proportional odds ratio estimates were higher for OCSS scores when compared to FTND scores in terms of all tobacco dependence predictor variables.

Discussion

Tobacco smoking is one of the leading preventable causes of oral health-related morbidities. The habit has had huge economic impacts, especially in low- and middle-income nations. Since tobacco smoking is addictive, an effective tool that measures preoccupation and compulsive drive related to smoking is the need of the day to better identify addictive behavior and control relapse rates.

This study was undertaken to assess the OCSS by comparison with the Modified FTND Scale.

The current study revealed that about 56.4% of study participants had a smoking duration of more than 10 years. Thus about half of them had longer durations of tobacco use. In a study by Hitsman B *et al.* (2010),[11] the average number of years of smoking by veterans was 30 years. About 40.8% of drivers consumed 5–10 cigarettes/bidis per day while 17.2% consumed more than 20 cigarettes/bidis per day, while the average number of cigarettes consumed was 20.5 according to the study by Hitsman B *et al*. (2010).[11] Thus, tobacco use largely amounted to 1–2 packs of cigarettes or 1–2 rolls of bidis per day for more than half of the study participants. About 56% of the participants smoked their first cigarette/bidi within 5 min of waking up in the morning. This highlights the intensity of nicotine addiction in the participants. About 57.6% had made numerous attempts to quit smoking but experienced frequent relapses. About 62.8% of the drivers first smoked tobacco between 21 and 25 years of age. About 73.2% of drivers began daily smoking between 26 and 30 years of age. This indicates that most of the drivers became smoking addicts in a very short period and at an early age. The average age of first use of smoking tobacco and age of daily smoking was 13.5 and 17.2 respectively according to the study by Hitsman B *et al*.[11]

About 68.4% of the study participants were preoccupied with smoking-related thoughts for more than 8 h a day. Since the bus drivers always worked in shifts, they had free hours in the day which was occupied by intense thoughts of smoking. For 76% of participants, the frequency of thoughts was more than eight times a day and during most hours of the day. However, 88.4% of the drivers agreed that the thoughts never interfered in their social or work functioning. This might be attributed to the fact that the study participants took to smoking due to their associated job demands. The nicotine acted as a perfect stimulant that helped them during their rides to ward off sleepiness. Thus, nicotine was used to perform their job well rather than act as a deterrent. About 69.6% completely and willingly gave in to all the thoughts and found it very difficult and rarely successful to divert the thoughts. Thus, we find that majority of the participants experienced frequent and intense thoughts which drove them to nicotine repetitively to quench the thoughts.

About 42% felt anxious or irritated when prevented from smoking, 71.6% completely and willingly gave in

Table 1: Significance of association between sociodemographic and smoking predictor variables with Obsessive-Compulsive Smoking Scale scores - Chi-square test results

Variables	OCSS score				χ^2	*P*
	Sociodemographic and smoking predictor variables					
	0–10, *n* (%)	11–20, *n* (%)	21–30, *n* (%)	31–40, *n* (%)		
Age (years)						
20–40	8 (33.3)	0	16 (66.7)	0	42.766	0.000*
41–60	8 (5.1)	8 (5.1)	119 (75.8)	22 (14)		
Above 60	17 (24.6)	11 (15.9)	39 (56.5)	2 (2.9)		
Education						
Illiterate	0	0 (0)	2 (100)	0	23.237	0.026*
Primary school	7 (8.9)	4 (5.1)	57 (72.2)	11 (13.9)		
Middle school	5 (11.1)	9 (20)	28 (62.2)	3 (6.7)		
High school	20 (16.3)	6 (4.9)	87 (70.7)	10 (8.1)		
Graduate	1 (100)	0	0	0		
Number of members in the family						
<4	28 (16.3)	10 (5.8)	112 (65.1)	22 (12.8)	13.712	0.003*
>4	5 (6.4)	9 (11.5)	62 (79.5)	2 (2.6)		
Socioeconomic status						
Lower middle	26 (15.4)	15 (8.9)	115 (68)	13 (7.7)	5.161	0.160
Upper lower	7 (8.6)	4 (4.9)	59 (72.8)	11 (13.6)		
Duration of smoking (years)						
<20	33 (25.4)	4 (3.1)	89 (68.5)	4 (3.1)	49.807	0.000*
>20	0	15 (12.5)	85 (70.8)	20 (16.7)		
Number of cigarettes/bidis/day						
<15	32 (19.8)	19 (11.7)	99 (61.1)	12 (7.4)	32.363	0.000*
>15	1 (1.1)	0	75 (85.2)	12 (13.6)		
Minutes to first cigarette/bidi (min)						
After 60	22 (44)	2 (4)	25 (50)	1 (2)	12.292	0.000*
31–60	7 (19.4)	8 (22.2)	21 (58.3)	0		
6–30	4 (16)	6 (24)	6 (24)	9 (36)		
Within 5	0	3 (2.2)	122 (87.8)	14 (10.1)		
Number of quit attempts						
No attempts made	28 (44.4)	2 (3.2)	28 (44.4)	5 (7.9)	83.968	0.000*
<10 times	2 (5.4)	8 (21.6)	25 (67.6)	2 (5.4)		
Numerous attempts	3 (2)	9 (6)	121 (80.7)	17 (11.3)		
Age when first smoked (years)						
<15	0	2 (1.7)	96 (82.8)	18 (15.5)	16.482	0.000*
15–20	7 (7)	11 (11)	76 (76)	6 (6)		
>20	26 (76.5)	6 (17.6)	2 (5.9)	0		
Age of daily smoking (years)						
<20	3 (4.3)	6 (8.6)	39 (55.7)	22 (31.4)	76.524	0.000*
20–25	2 (3.5)	1 (1.8)	53 (93)	1 (1.8)		
26–30	16 (23.9)	8 (11.9)	42 (62.7)	1 (1.5)		
>30	12 (21.4)	4 (7.1)	40 (71.4)	0		

*P<0.05. OCSS=Obsessive-Compulsive Smoking Scale

to all smoking, about half of them experienced a very strong urge to smoke and 42.8% experienced difficulty in controlling or delaying smoking. This difficulty in delaying smoking has led to high OCSS scores and relapse rates among the participants.

The tobacco dependence predictor variables – duration of smoking in years, number of cigarettes/bidis used per day, number of quit attempts, age when first smoked, age of daily smoking and minutes to first smoke-revealed statistically significant associations with the OCSS scores in the Chi-square test results [Table 1].

An ordinal regression analysis was used to comparatively assess the OCSS with the Modified FTND Scale. The predictor variables were tested *a priori* to verify there was no violation of the assumption of no multicollinearity.

Table 2: Comparison of Obsessive-Compulsive Smoking Scale scores with smoking dependence predictor variables through ordinal regression analysis

	Estimate	SE	Significant	95% CI	
				Lower bound	Upper bound
OCSS score categories					
OCSS score 11–20	1.194	0.763	0.117	−0.300	2.689
OCSS score 21–30	5.755	0.834	0.000	4.120	7.390
OCSS score 31–40	6.747	0.876	0.000	5.030	8.465
Predictors					
Duration of smoking	1.139	0.269	0.000*	0.612	1.666
Number of cigarettes/bidis/day	0.235	0.317	0.459	−0.387	0.857
Quit attempts	1.278	0.257	0.000*	0.775	1.780
Minutes to first smoke	1.477	0.175	0.000*	1.133	1.820
Age when first smoked	−1.073	0.241	0.000*	−1.545	−0.601
Age of daily smoking	−0.537	0.150	0.000*	−0.831	−0.243

*P<0.05. SE=Standard error, CI=Confidence interval, OCSS=Obsessive-Compulsive Smoking Scale

Table 3: Comparison of Fagerstrom test for nicotine dependence scores with smoking dependence predictor variables through ordinal regression analysis (original)

	Estimate	SE	Significant	95% CI	
				Lower bound	Upper bound
FTND score categories					
FTND score 3–4	3.261	0.723	0.000	1.843	4.678
FTND score 5–7	6.127	0.787	0.000	4.584	7.669
FTND score≥8	6.848	0.813	0.000	5.255	8.441
Predictors					
Duration of smoking	0.949	0.309	0.002	0.345	1.554
Number of cigarettes/bidis/day	0.007	0.277	0.979	−0.535	0.550
Quit attempts	0.666	0.226	0.003	0.224	1.109
Minutes to first smoke	0.343	0.168	0.061	0.014	0.673
Age when first smoked	0.313	0.222	0.158	−0.122	0.748
Age of daily smoking	−0.158	0.132	0.232	−0.416	0.101

*P<0.05. SE=Standard error, CI=Confidence interval, FTND=Fagerstrom test for nicotine dependence

In the first model comparing smoking predictor variables with OCSS scale, the proportional odds ratio of the duration of smoking, quit attempts, and minutes to first smoke favored a positive relationship of 1.139 (95% confidence interval [CI] [0.612–1.666]), 1.278 (95% CI [0.775–1.780]) and 1.477 (95% CI [1.133–1.820]) fold increase, respectively, of OCSS score for every one unit increase of the variables, and the results were statistically significant ($P < 0.05$). The age of first use of tobacco and age of daily smoking exhibited an inverse relationship with OCSS score. The proportional odds ratio was 1.073 (95% CI [−1.545 to −0.601]) and − 0.537 (95% CI [−0.831 to − 0.243]), respectively, indicating that as the age of first cigarette use and age of daily smoking decreased, the OCSS score increased. Although the number of cigarettes or bidis per day contributed to the model, the results were not statistically significant.

In the second model comparing smoking predictor variables with the Modified FTND Scale, the results were statistically significant only for two predictor variables – duration of smoking and quit attempts [Tables 2 and 3].

The regression coefficients indicate that the OCSS has a better predictive value of tobacco dependence than the FTND scale.

Limitations

The limitations of the study should be taken into consideration. First, a distinction was not made between different forms of smoking tobacco being consumed. Cigarettes and bidis have varying nicotine content and this can largely influence the development of nicotine dependence among smokers. Second, only six smoking dependence predictor variables were included in the analysis of the study.

Conclusion

Smokers are found to be associated with tobacco-associated preoccupation and compulsive drive which prevents them from quitting the habit.

The OCSS measures the important aspects of tobacco dependence. Further studies are required so that the scale could be used as an effective tool in tobacco cessation programs. Effective smoking cessation can reduce oral health-related morbidities widely prevalent in smokers.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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