Research Article

Associations Between Early Onset of Smoking, Drug, Alcohol Abuse, Nicotine Dependence and Substance Use Disorder Severity: An Inpatient Study

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Introduction: This study assessed the association between early onset of smoking and substance abuse with nicotine dependence, the extent of substance abuse, and the probability of relapse.

Methods: Self-reported data were collected from 632 patients from 5 drug treatment facilities in the Philippines from July 2019 to September 2019, selected locations into two National Capital Region-Manila, Region VI and VII (Southwestern Tagalog Regions), and XI (partly BARMM-Bangsamoro Autonomous Region in Muslim Mindanao) Davao City Treatment Rehabilitation Center for Drug Dependents.

Results: The 5th Edition of the Addiction Severity Index and the Fagerström Test for Nicotine Dependence were used to assess drug and alcohol use and nicotine dependence severity, respectively. The sample consisted of approximately 45.57% non-nicotine-dependent former smokers and 54.43% nicotine-dependent current smokers. The prevalence rates of smoking onset (starting at age ≤10 years) for males and females were a odds ratio (OR)=20.9, 95% confidence interval (CI)=7.6-57.6 and aOR=26.7, 95% CI=7.4-95.9, indicating significant (P<.05) low to moderate nicotine dependence. The prevalence rates of high alcohol severity, methamphetamine lifetime use, and cannabis lifetime use were aOR=2.17, 95% CI=0.95-4.97), aOR=1.17, 95% CI=0.41-3.31, aOR=3.23, 95% CI= (1.10-9.46), which were found to be significant from the onset of smoking and substance use (P<.05).

Conclusion: This study suggests the need for firmer implementation of nicotine cessation programs and bans on any type of smoking activity by patients both within and outside therapeutic drug treatment rehabilitation centers in the Philippines.

Keywords: nicotine, Fagerström Test for Nicotine Dependence, nicotine dependence, Addiction Severity Index, addiction severity, addiction, onset

INTRODUCTION

Among the substance use disorders (SUDS), nicotine dependence is the most difficult to overcome and requires the longest recovery time 1,2. According to the National Institute on Drug Abuse, cigarette smoking increases the likelihood of relapse among people in recovery programs. Cigarettes, which contain harmful chemical compounds, are extensively used by substance abusers, and the use of cigarettes increases health risk and mortality in this group 3. Despite the joint efforts of the World Health Organization Framework Convention on Tobacco Control and the Philippines Department of Health to regulate tobacco use and their endorsement of a plan to the tobacco tax, tobacco kills at least 87,600 Filipinos each year (240 deaths per day), one-third of whom are in the prime of their lives 4. Furthermore, despite evidence of nicotine's addictive nature, addiction treatment and rehabilitation centers as well as psychiatric units have been reluctant to incorporate the relevant dependence treatment modalities into their programs 5,6.

The 5th Edition of the Addiction Severity Index (ASI) 7 and the Fagerström Test for Nicotine Dependence (FTND)8 have been widely used to assess the severity of chemical dependence 3. It has been reported that those who are dependent on drugs or alcohol are more likely than those who are not to be smokers 9,10. These individuals are also more likely to be heavy smokers who experience nicotine dependence 11. In this context, awareness campaigns and efforts to promote smoke-free rehabilitation centers are urgently needed. Although the literature depicts the interconnected relationship between cigarette smoking and the use of addictive substances such as alcohol, cocaine, heroin, cannabis, amphetamines, and methamphetamine 3,5,12 there is still a need for further studies on nicotine dependence and the application of methods of overcoming it in treatment programs for dependence on other substances 13.

RESEARCH PROBLEMS

This study aimed to: (1) investigate the association of nicotine dependence with early onset of smoking and use of other addictive substances, (2) in the drug treatment and rehabilitation center setting, make inferences regarding the role of nicotine dependence in SUDs based on the onset of smoking, and (3) make inferences regarding the likelihood of relapse and its severity.

METHODS

Study Design

The survey respondents were 632 patients (ranging in age from 14 to 60 years) who were participating in a therapeutic program for 6 to 12 months, depending on whether their treatment was voluntary or mandatory due to criminal conviction, respectively. Logistic regression was used to analyze the inferences of the onset of smoking.

Ethics

This study was approved by the Institutional Review Board of Sahmyook University (approval no. #2-1040781-AB-N01-2017106HR). Coordinating clinical supervisors, trained medical staff, and field data researchers obtained written informed consent from the participants.

Measures

Data were analyzed using STATA/MP 14.0 (STATA Corp., College Station, TX, USA), using a significance level of <.05. Respondents with a history of cigarette use were classified as non-nicotine dependent former smokers (those who had smoked at least 100 cigarettes over their lifetime but who no longer smoked), and nicotine-dependent current smokers (those who had smoked at least 100 cigarettes over their lifetime and still smoked). According to National Institute on Drug Abuse, time frames for diagnosis depended on the preliminary assessment, and ranged from 6 months to 24 months 14-16. Multivariate logistic regression was conducted to make inferences regarding outcomes and describe potential practical results for each independent variable. We also considered the possibility of multicollinearity during result interpretation. The variance inflation factor was 2.65 and 2.11 for males

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and females, respectively. The interaction effect produced an improvement in the Hosmer-Lemeshow goodness-of-fit test, indicating that the p-value for the overall model average predicted probabilities of Chi-squared= 396.11 (p=0.05) and Chi-squared=240.8 (p=0.0003). The degree of freedom (DF) for each model for the onset of smoking in males and females was 390 and 229, respectively.

Variables and Definitions

In this study, early onset of nicotine dependence was described as the initiation of smoking at the age of 10 or under, when at least one entire cigarette was first smoked 17-19. The variables examined in this study included sociodemographic characteristics, regional location, marital status, educational attainment, income defined as poor: below 7,890 PHP low ($156.38 USD): 7 890 to 15,780 PHP low to moderate ($156.38-$312.83 USD): 15,780 to 31, 560 PHP ($156.38-$624.90 USD) , and moderate to high: 31,560 to 78,900 PHP ($624.90-$1,562.10 USD) 20, living status, number of dependents, and occupation, gathered from the inpatients' self-reports prior to admission.

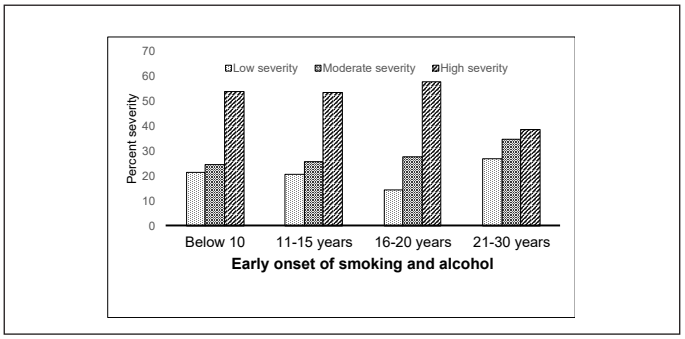
RESULTS

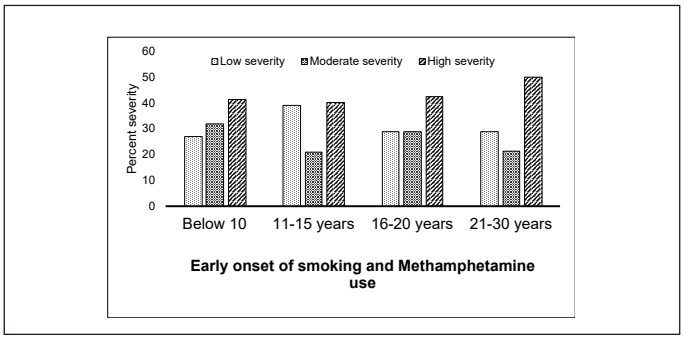
Table 1 depicts the characteristics of the sample. The 632 inpatients included 395 (62.50%) males and 237 (37.50%) females. The age range was 14 to 60 years, with an average age of 34.1 years (standard deviation [SD]=9.11). Of all the inpatients in the 5 treatment facilities, 288 (45.57%) were non-nicotine-dependent former smokers and 344 (54.43%) were nicotine-dependent current smokers. The average mean number of years since onset of smoking and substance use (drugs or alcohol) was 12.13 years (SD=8.12) and 17.9 years (SD=8.15), respectively. Based on the inpatients' self-reports regarding alcohol or drug use over the past 30 days and over a lifetime (number of years), average alcohol use (any use at all, 30 days) was 15.5 days (SD=7.80) and 5.91 years (SD=5.57), respectively. Average methamphetamine use was 15.07 days (SD=8.65) and 6.22 years (SD=5.84), respectively. The average cannabis (marijuana) use was 15.54 days (SD=7.80) and 6.22 years (SD=5.84), respectively.

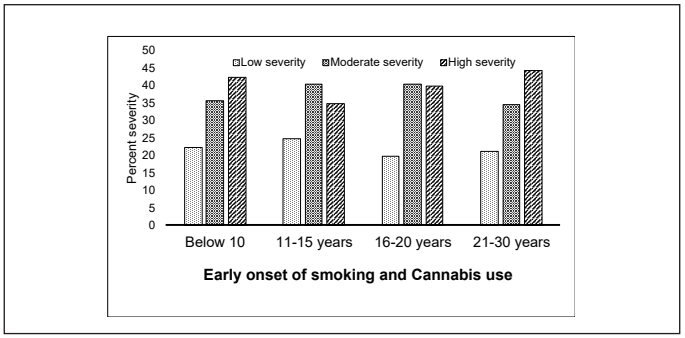
Table 1. Characteristics of the Participants

Characteristic	Percentage or Mean ±SD
Age	34.10±9.11
Gender	
Male	395 (62.50%)
Female	237 (37.50%)
Education	2.21±0.79
Income	1.26±1.38
Living status	1.02±1.04
Marital status	0.75±1.16
No. of dependents	1.17±1.80
Department of Health Drug Treatment and Rehabilitation Center	
Treatment duration	6.48±1.66
Fagerström Test for Nicotine Dependence	
Former smoker, non-nicotine dependent	288 (45.57 %)
Smoker, nicotine dependent	344 (54.43 %)
Onset of smoking/age of initiation	12.13± 8.12
5th Edition of the Addiction Severity Index (primary substance use)	
Alcohol (any use at all, 30 days)	15.5±7.80
Alcohol (number of years)	5.91±5.57
Methamphetamines (number of days)	15.07± 8.65
Methamphetamines (number of years)	6.22±5.84
Cannabis (marijuana) number of days	15.54±7.80
Cannabis (marijuana) number of years	3.88±2.70
Onset of alcohol and illicit drug use	17.9± 8.15

As depicted in for the prevalence rates of moderate nicotine dependence, the odds ratio (OR) was 17.84 and the 95% confidence interval (CI) was 6.77-47.02 among the males, and the aOR was 9.70 and the 95% CI was 2.43-38.7 among the females, after adjusting for age, sex, and socioeconomic factors. The severity of nicotine dependence increased to an aOR of 18.03 and a 95% CI of 6.63-49.07 among the males and an aOR of 31.39 and a 95% CI of 8.58-114.8 among the females. Moreover, having an occupation was significantly higher among males (aOR=3.39, 95% CI=1.53-7.49) compared with females (aOR=3.39, 95% CI=0.99-11.52). Figure 1 to 3, presents the early onset of smoking (below 10 years old) and the increasing use of alcohol, methamphetamine and cannabis substance use severity as age progress.







DISCUSSION

Previous studies have reported a history of cigarette smoking among as many as three-fourths of adults with SUDs 18,21-23. Several possible reasons have been cited for the increase in the likelihood of relapse owing to smoking, such as cigarette smoking becoming a "pull" for illicit drug use and nicotine dependence leading to increased alcohol and drug use 18,24. This study supports findings of the National Institute on Drug Abuse that indicate nicotine dependence increases the likelihood of relapse among inpatients with SUDs 25. In our study, early onset of nicotine dependence was described as the initiation of smoking at the age of 10 and below, and when at least one entire cigarette was first smoked 17,26,27. Likewise, the early onset of alcohol consumption and use of drugs such as methamphetamine and cannabis are significant factors of nicotine dependence in adult (lifetime) SUD 19,21,28. In recent years, the government has taken active measures to reduce the use of tobacco in the Philippines 4,29. Smoking onset before 10 and below years of age has been found to be strongly associated with nicotine dependence, supporting the research identifying onset age as a potential risk factor for SUD relapse among patients with alcohol use (53%),

methamphetamine use (41%), and marijuana use (42%) 18,19,22. For current smokers, nicotine dependence increases the risk of drug recurrence by 53.43%. Nonetheless, 45.57% of non-nicotine-dependent former smokers still had a high risk of drug relapse while under treatment for 6 to 12 months. Sociodemographic factors included as covariates, such as regional location, marital status, education, income, living status, occupation, and number of dependents, varied widely in their association with smoking behavior. 30,31 Occupation, however, was significantly associated with onset of smoking, nicotine dependence, and severity of substance use in males (aOR=3.39, 95% CI=1.53-7.49) and females (aOR=3.39, 95% CI=0.99-11.52). Self-report surveys often document the respondent's occupation. These occupations may be connected to "drug peddling" or "crime-related cases," which have given rise to the government's "drug war"32 and could be their reason for landing in rehabilitation facilities. Nevertheless, the main goal of this study was to infer the outcome severity of nicotine and substance use from the onset of smoking 33. The onset of smoking also gives rise to the likelihood of the onset of the use of other substances or vice versa 21,34-36. It was hypothesized that the onset of smoking would be positively associated with the severity of nicotine dependence and substance use (summary score; alcohol, methamphetamine, and cannabis; in days and years), indicating higher odds of substance relapse during treatment and recovery among inpatients 12,37,38. The strength of this study is the use of standardized tools (the ASI 7 and FTND 39) in the examination of a nationwide cross-section of the population of interest. Our findings fill a literature gap by examining the association between early onset of nicotine use and nicotine dependence, and the possibility of substance abuse relapse among inpatients with SUD in the Philippines.

LIMITATIONS

This study had some limitations, such as the likelihood of memory bias inherent in the use of self-reported data. Addiction Severity Index summary score response levels vary by area due to substance use 7,40 . Therefore, future longitudinal studies should be conducted to validate our results.

CONCLUSION

This study suggests the necessity of stricter implementation of nicotine cessation programs and a complete bans on any type of smoking activity by patients both within and outside therapeutic drug treatment rehabilitation centers in the Philippines 13. Smoking interventions and follow-ups from 6 months to 2 years should be recommended to inpatients, irrespective of whether they still smoke. 41,42 The FTND should be used in every facility, should be included in all brief substance-related interventions 5, and should be routinely applied in clinical practice 38 .

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AVAILABILITY OF DATA AND MATERIALS

All data and instruments used were kept and stored in Sahmyook University – Department of Addiction Science and can be obtained upon written request.

DECLARATION OF INTERESTS

The authors declare no competing interests.

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