

Evaluation of Nicotine Dependence Among Oral Health Care–Seeking Cigarette Smokers Using Fagerstrom Test

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ABSTRACT

Title

Evaluation of Nicotine Dependence among Cigarette Smokers seeking Oral health care Using Fagerstrom test.” Introduction: The evaluation of nicotine dependence among cigarette smokers is crucial for developing effective cessation programs. The Fagerstrom test for Nicotine Dependence (FTND) is a widely used tool to assess the intensity of physical addiction to nicotine.

Objective

This study aims to evaluate the level of Nicotine dependence among Cigarette Smokers using

Fagerstrom test visiting oral health care facilities and to assess the levels of nicotine dependence and its association with demographic parameters.

Materials and Methodology

This is cross-sectional study with a sample of 200 participants with the habit of cigarette smoking . Nicotine dependence scores were assessed by Fagerstrom test . IBM SPSS version 22.0 software used for data analysis. The Chi square test and Kruskal wallis of variance done to analyze the study data. $P \leq 0.05$ considered statistically significant.

Results

The mean FTND score was 4.5 ± 2.1 . A positive correlation was observed between age and FTND score, an inverse relation was noted between FTND and socioeconomic status where lower middle socioeconomic status showed higher FTND. The majority of participants reported smoking <10 cigarettes per day and they were ≤ 24 years of age.

Conclusion

The study participants demonstrated moderate nicotine dependence. The assessment of nicotine dependence scores a preliminary step in tobacco cessation counselling is essential to effectively articulate customized cessation strategies.

Keywords

Fagerstrom Test, Smokers, Oral health, Nicotine.

INTRODUCTION

A descriptive cross-sectional study was conducted at the Tobacco Cessation Center of the Buddha Institute of Dental Sciences and Hospital (BIDSH), Patna, Bihar. The study population comprised cigarette smokers who reported to the tobacco cessation center during the study period. A total of 159 participants were selected using a convenience sampling method. The duration of the study was one month, conducted in June. Participants who were current cigarette smokers and who provided written informed consent were included in the study. Individuals using smokeless forms of tobacco and those who did not provide written informed consent were excluded.

Ethical approval for the study was obtained from the Institutional Ethics Committee of Buddha Institute of Dental Sciences and Hospital, Patna (IEC No. 99/BIDSH/IEC/2024-25). Written informed consent was obtained from all participants prior to data collection.

Data were collected using a structured, close-ended questionnaire consisting of 19 items. The questionnaire was administered through face-to-face interviews after explaining the purpose of the study and the procedure for completing the questionnaire to the participants. Each interview required approximately three minutes to complete. The questionnaire comprised four sections: sociodemographic characteristics, oral hygiene practices, tobacco use patterns, and assessment of nicotine dependence using the Fagerström Test for Nicotine Dependence (FTND). Prior to the main study, a pilot study was conducted among ten cigarette smokers attending the tobacco cessation clinic to assess the clarity, validity, and feasibility of the questionnaire. The pilot study indicated that the questions were clear and easily understood. The participants included in the pilot study were excluded from the final analysis.

Nicotine dependence was assessed using the Fagerström Test for Nicotine Dependence, a validated six-item instrument developed by Heatherton et al. The FTND assesses smoking behavior, compulsion to smoke, and nicotine dependence. The total score ranges from 0 to 10, with higher scores indicating greater nicotine dependence. Based on the FTND score, nicotine dependence was categorized as low (1–2), low to moderate (3–4), moderate (5–7), and high (≥ 8). The collected data were entered into Microsoft Excel and subsequently analyzed using IBM SPSS Statistics version 22.0. Descriptive statistics were used to summarize the data. Inferential analysis was performed using the Chi-square test, Mann–Whitney U test, and Kruskal–Wallis test. A P-value of ≤ 0.05 was considered statistically significant.

RESULTS

The present study was conducted to evaluate nicotine dependence among cigarette smokers seeking oral health care using fagerstrom scale in Tobacco cessation clinic of Buddha Institute of Dental Sciences and Hospital Patna, Bihar. The data obtained from the study were subjected to tabulation followed by subsequent statistical analysis. The results are presented under the heading of various parameters considered for this study. The present study was conducted among 159 participants reported to the tobacco cessation clinic of Buddha Institute of Dental Sciences and Hospitals, Patna Bihar.

In the present study, out of 159 participants, all individuals aged ≤ 24 years (100%) exhibited low to moderate nicotine dependence. Among participants aged 25–34 years, 84.2% showed moderate dependence, followed by those aged 35–44 years (13.3%) and 55–64 years (1.3%). The association between age group and level of nicotine dependence

was not statistically significant ($P = 0.982$) showed in Graph 1. An association between socio-economic status and Fagerström Test for Nicotine Dependence (FTND) scores was observed in the present study as shown in Table 1. Showing 159 participants, moderate nicotine dependence was reported among 24 individuals (15.2%) belonging to the upper-middle socio-economic class and 134 individuals (84.8%) from the lower-middle socio-economic class. This association was found to be statistically significant ($P < 0.001$). Table 2 shows the association between duration of tobacco use and Fagerström Test for Nicotine Dependence (FTND) scores. Of the 159 participants, moderate nicotine dependence was observed among 137 individuals (86.7%) who had been consuming tobacco for less than one year and among 21 individuals (13.3%) with a duration of tobacco use of 2–5 years. The association between duration of tobacco use and FTND score was not statistically significant ($P = 0.696$).

Graph 1: Association between age and Fagerstrom test nicotine dependence among cigarette smokers

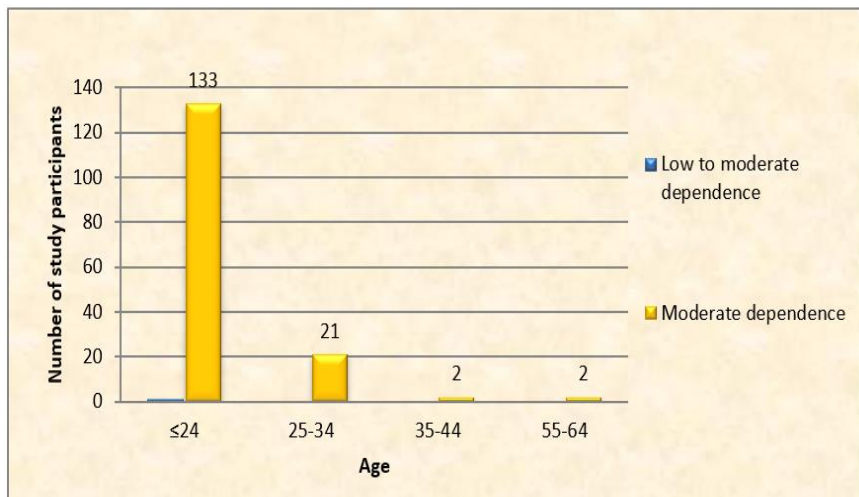


Table 1: Association between Socio- Economic Status and Fagerstrom Test Nicotine Dependence score among study participants

SES	FTND Score				Total	
	Low to moderate dependence		Moderate dependence			
	n	%	n	%	n	%
Upper Middle	0	0.0	24	15.2	24	15.1
Lower Middle	0	0.0	134	84.8	134	84.3
Lower	1	100.0	0	0.0	1	0.6
Total	1	100.0	158	100.0	159	100.0
Chi-square value = 159.000 P value = 0.000 Significant						

Table 2: Association between duration and Fagerstrom Test Nicotine Dependence score among study participants

Duration	FTND Score				Total	
	Low to moderate dependence		Moderate dependence			
	n	%	n	%	n	%
<1 year	1	100.0	137	86.7	138	86.8
2-5 Year	0	0.0	21	13.3	21	13.2
Total	1	100.0	158	100.0	159	100.0
Chi-square value = 0.153 P value = 0.696 Not significant.						

DISCUSSION

In the present study, the majority of tobacco users (84.9%) were under 24 years of age, while 12.6% belonged to the 25–34 years age group, 1.5% to 35–44 years, and 1.0% to 55–64 years. This variation may be attributed to the fact that men often adopt tobacco use at a younger age due to peer pressure or to cope with stress while earning a livelihood, whereas women may initiate tobacco use later in life, often influenced by partners or midlife stressors. A survey by Shekhar et al. (2020) reported that more than 50% of their participants were aged 25–44 years, which contrasts

with the findings of the present study. Most tobacco users in this study resided in urban areas (68.8%), compared to 31.2% in rural areas. This aligns with the tertiary hospital setting of the study, as rural participants may face challenges accessing urban healthcare facilities. However, Kumar et al. reported that 64.6% of their subjects in Lucknow were from rural areas. Regarding marital status, 94.5% of smokers in this study were unmarried, compared to 5.5% who were married. This may reflect the increased responsibilities and stress associated with

married life, which can limit tobacco use. This finding is consistent with Shekhar et al., where 87.59% of participants were unmarried. Socioeconomic status (SES) is strongly associated with tobacco use, with smoking considered a marker of deprivation. In this study, the majority of participants (85.9%) belonged to the lower middle class, followed by 13.6% from the upper middle class, and 0.5% from the upper or lower classes. Similarly the study findings of M. Siahpush et al., who reported higher nicotine dependence were among lower socioeconomic groups.

Tobacco smoking is a known risk factor for periodontal disease, affecting its initiation, progression, and treatment outcomes. In this study, most smokers (91.5%) used a toothbrush, 99.5% used toothpaste, and the majority brushed once daily using a horizontal technique. Similarly, Baishya et al. reported that most participants brushed once daily (78.9%) with a toothbrush (51.5%) and toothpaste (41.2%). Cigarettes were the most common form of smoked tobacco in this study (78.9%), consistent with findings by Dierker et al. (2008). Additionally, 69.8% of participants had consumed tobacco for less than one year. Around 17.82% had been smoking for five years or less, indicating a potential for high dependence, as adolescent dependence is often linked to the intensity of recent cigarette consumption. Based on the Fagerström Test for Nicotine Dependence (FTND), most participants showed moderate nicotine dependence, scoring between 4 and 6. These individuals may experience significant cravings and withdrawal symptoms but are less dependent than heavy smokers. Although moderate dependence presents challenges for cessation, studies indicate that these smokers have a higher likelihood of quitting

compared to heavily dependent individuals, especially with appropriate support. Dental practitioners are encouraged to use the 5 A's model—Ask, Advise, Assess, Assist, and Arrange—to support cessation efforts, which is particularly effective for moderately dependent smokers.

This study offers valuable insights into nicotine dependence among dental patients using the standardized Fagerström Test and comprehensive demographic data. Conducted at a single tertiary hospital, its findings may not be generalizable to wider populations, and self-reported smoking habits could introduce bias. The low representation of female participants limits gender-specific analysis. Nevertheless, the results emphasize the importance of incorporating tobacco cessation strategies into routine dental care.

CONCLUSION

The study conclude that cigarette smokers attending dental clinics show varying levels of nicotine dependence, with a notable proportion having moderate dependence. Dental professionals play a key role in identifying smokers and providing tailored cessation support. The Fagerström Test effectively assessed dependence and guided interventions, with moderate-dependent smokers benefiting from combined behavioral and pharmacological strategies. Integrating cessation support within dental settings, alongside collaboration with primary care and deaddiction services, may improve oral health and enhance quitting success. Future studies should evaluate the long-term impact of such interventions on cessation outcomes and oral health improvement.

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