Original Article

The Prevalence, Effective Factors, and Nicotine Dependence Among Medical Students: A Cross-sectional Study

Mahdi Zarei1, Milad Asheghi2, Amin Abbasi2, Maryam Baradaran Binazir1*

1. Social Determinants of Health Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.
2. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran.

* Corresponding Author:
Maryam Baradaran Binazir, MD.
Address: Social Determinants of Health Research Center, Tabriz University of Medical Sciences, Tabriz, Iran.
Tel: +98 (914) 4011749
E-mail: maryam_baradaran@hotmail.com

ABSTRACT

Introduction: Cigarette smoking, quite common among medical students, may downgrade their academic performance. Additionally, initiation of smoking at an early age can increase the likelihood of developing nicotine addiction. This study aims to identify the contributing factors to smoking prevalence and nicotine dependence among medical students in East Azerbaijan Province, Iran.

Materials and Methods: This cross-sectional study collected data after obtaining participants’ consent and receiving the code of ethics. A checklist was used to meet the inclusion and exclusion criteria. Subsequently, the information was entered into SPSS software and analyzed.

Results: Out of the 334 individuals who participated in the research, 150(44.9%) were male, and 58(17.4%) were smokers. Significant correlations were observed between smoking, gender, and educational level. The level of nicotine dependence was categorized as very low in 10 individuals (3%), low in 8(2.4%), moderate in 15(4.5%), high in 16(4.8%), and very high in 9(2.7%). Significant relationships were found between nicotine dependence in medical students and their gender and educational level.

Conclusion: There is a relatively high rate of cigarette smoking among medical students, strongly associated with male gender and educational level. As a result, collaborative planning across departments seems necessary to implement preventative, advisory, and therapeutic measures at the societal and university levels.
Introduction

Smoking refers to the act of inhaling and exhaling compounds resulting from the burning of tobacco in cigarettes or pipes. Smoking can either be occasional or become a physical and psychological dependence on tobacco nicotine [1]. Nicotine dependence is expressed by a set of symptoms, including an urge to consume tobacco, resistance to cessation, withdrawal symptoms during abstinence, and loss of control over smoking duration or amount [2]. Withdrawal symptoms include depression, irritability, anxiety, hopelessness, craving to smoke, difficulty concentrating, and restlessness [3].

The model of nicotine dependence suggests young people transition from occasional use to regular daily use and, ultimately, dependence on cigarettes or nicotine [2]. Nicotine imitates acetylcholine and binds to cholinergic receptors, leading to long-term physical, mental, behavioral, and physiological changes [4, 5]. Smoking stands out as one of the leading causes of death and disease globally [6]. The widespread production and consumption of tobacco have led to numerous physical and mental health issues, including lung cancer (causing 65% of deaths globally), chronic obstructive pulmonary disease (44% of deaths), and smoking-related ischemic heart events (22% of deaths) [7-9]. Most deaths caused by smoking occur in developing countries, with an estimated increase from 4.8 million in 2006 to 8.3 million in 2030 [10]. However, it is most logical to prevent smoking as it is the most significant preventable risk factor in non-communicable diseases.

Smoking imposes a significant economic burden on individuals and healthcare systems globally. The costs are chiefly related to illnesses, premature death, and reduced productivity, reaching up to $500 billion annually. This amount can account for 1.5% of a country’s gross national product and 15% of total national health expenses [11].

Demographic factors such as age, gender, marital status, and family circumstances can also impact smoking. Therefore, health policymakers must take into account various factors that influence smoking and its detrimental effects. Interestingly, smoking among healthcare professionals is particularly significant for two reasons. Firstly, hospitals play a crucial role in assisting individuals to quit smoking, so their staff must not use tobacco themselves. Secondly, doctors are responsible for leading anti-smoking initiatives within society and are critical players in shaping health policies [12]. People exemplify physicians as role models; they act at the forefront of preventing smoking, so practical measures should be implemented to establish smoke-free environments in hospitals and medical offices.

Researchers know little information regarding the prevalence of smoking among hospital staff and medical students in recent years, particularly in the northwest region of Iran. As a result, we embarked on identifying the factors influencing smoking habits, determining the prevalence rate, and assessing nicotine dependence among medical students in East Azerbaijan Province, Iran. Our findings will help evaluate the circumstances and reasons contributing to this issue and enable the development of suitable strategies to decrease smoking among medical students.

Materials and Methods

This cross-sectional study was conducted to identify the prevalence of nicotine dependence among medical students in East Azerbaijan Province, Iran, in 2022. The study also aimed to determine the factors contributing to nicotine dependence. The target population included medical students at all levels of education (basic sciences, physiopathology, externship, and internship) in the universities of East Azerbaijan Province. Sampling was done using a convenient method, and 334 participants completed the questionnaires. The inclusion criteria were voluntary participation and being a medical student in the province during the specified year. The exclusion criteria included incomplete questionnaires and unwillingness to participate. The questionnaire included demographic data (age, sex, marital status, educational level), smoking habits, and the Fagerstrom standard nicotine dependence questionnaire. The latter measures dependence on nicotine/cigarettes using 6 questions, with scores ranging from 0 to 10. The score interpretation ranges from very low to very highly dependent. To assess the level of dependence on cigarettes or nicotine, the scoring system is as follows: A score of 0 to 2 indicates very low dependence, 3 to 4 indicates low dependence, 5 indicates moderate dependence, 6 to 7 indicates high dependence and a score of 8 to 10 is considered very highly dependent. After receiving ethical approval, the questionnaire was distributed electronically through the Google Form platform.

The Fagerström nicotine dependence questionnaire investigates smoking, and numerous studies have been conducted to assess its reliability and validity. In a study by Azizi et al. involving 118 participants, this questionnaire demonstrated good internal consistency, with a Cronbach α value of 0.835 and a positive correlation
with variables measuring nicotine dependence [13]. The questionnaire was administered electronically to medical professional doctorate students in East Azerbaijan Province. The participants first answered questions about their demographic characteristics and smoking prevalence. Only smokers completed the second part of the questionnaire, based on inclusion and exclusion criteria.

After collecting the study data, the continuous variables were analyzed using Mean±SD. Also, frequency and percentage were used to analyze categorical variables. The relationship between qualitative variables was checked using the chi-square test in the inferential analysis. Statistical significance was set at P<0.05, and data analysis was conducted using SPSS software, version 20.

Results

The study involved 334 participants with a mean age of 22.7±2.3 years, including 150 males (44.9%). Also, 81.7% of participants were single, 23.4% were at the basic sciences level, 16.5% were at the physiopathology level, 26% were externs, and 34.1% were interns. Of the total participants, 17.4% were smokers.

The chi-square test revealed a significant association between smoking, gender, and educational level. However, no significant correlation was found between smoking and marital status (Table 1).

Among the participants, 3% had very low nicotine dependence, 2.4% low dependence, 4.5% moderate dependence, 4.8% high dependence, and 2.7% very high dependence based on their score rank (Table 2).

Discussion

This study showed that 17.4% of 334 medical students from different educational levels were smokers. Also, the study found a significant association between smoking, gender, and educational levels. However, marital status had no significant association with smoking among students.

Several research studies explored to determine the prevalence of smoking among students, particularly medical students, revealed a relatively high prevalence of smoking among this group. In the studies conducted by Ghodsi et al. and Khani Moghadam et al., the prevalence of smoking was found to be 23% [14, 15]. Panahi et al. [16] and Shrestha et al. [17] reported the prevalence of smoking as 23.8% and 30.1%, respectively. In Europe and Asia, studies have shown that the prevalence rates of smoking among medical students are 21.9% and 11%, respectively [16, 18]. The difference in the prevalence of smoking in the current study can be attributed to various factors, such as the methodology and cultural, geographical, and legal factors in each region. For example, the legality of tobacco use in universities and dormitories is one of the important influencing factors in the prevalence of smoking among medical students [19, 20].

The current study found a significant correlation between smoking and gender, which is consistent with previous studies conducted by Divsalar et al. [21], Khani et al. [22].

Table 1. Relationship between smoking, gender, marital status, and educational level of the participants

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Smoking Status</th>
<th>No. (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No Smoking</td>
<td>Smoking</td>
<td>Total</td>
</tr>
<tr>
<td>Male</td>
<td>105(70)</td>
<td>45(30)</td>
<td>150(100)</td>
</tr>
<tr>
<td>Female</td>
<td>171(93)</td>
<td>13(7)</td>
<td>184(100)</td>
</tr>
<tr>
<td>Single</td>
<td>225(82)</td>
<td>48(18)</td>
<td>273(100)</td>
</tr>
<tr>
<td>Married</td>
<td>51(84)</td>
<td>10(16)</td>
<td>61(100)</td>
</tr>
<tr>
<td>Basic sciences</td>
<td>67(86)</td>
<td>11(14)</td>
<td>78(100)</td>
</tr>
<tr>
<td>Physiopathology</td>
<td>48(87)</td>
<td>7(13)</td>
<td>55(100)</td>
</tr>
<tr>
<td>Externship</td>
<td>63(72)</td>
<td>24(28)</td>
<td>87(100)</td>
</tr>
<tr>
<td>Internship</td>
<td>98(86)</td>
<td>16(14)</td>
<td>114(100)</td>
</tr>
</tbody>
</table>
Moghadam et al. [15], and Shojaa et al. [18]. The results suggest that in addition to the high prevalence of smoking among medical students, boys are more likely to smoke than girls. This finding highlights the need for universities of medical sciences to develop plans for advisory, preventive, and therapeutic measures to address smoking, particularly in boys’ dormitories.

The study found no significant correlation between smoking and the marital status of the students, which is consistent with previous studies by Panahi et al. [16] and Ghodsi et al. [14]. However, it contradicts the findings of Ansari et al. [22]. The difference in the sampling method and cultural variations could be the reason for this inconsistency. The young age at which students start smoking may explain the lack of relationship between smoking and marital status. Early initiation of smoking can lead to stronger nicotine dependence and continuous use compared to those who start later [16]. As a result, it is crucial to develop counseling programs for new university students to reduce smoking consumption and early initiation.

Our research discovered a significant correlation between education level and smoking, which is in line with previous studies conducted by Ansari et al. [22] and Kutlu et al. [23]. In a study conducted by Kutlu et al., the prevalence and dependence on smoking among higher-grade medical students was more frequent [23]. Ansari et al.’s study also revealed a statistically significant trend of smoking among university students, with male student smoking prevalence increasing from 2% in the first semester to 34% by their final year [22]. This issue could be attributed to internet addiction, inadequate implementation of preventive and counseling programs, and stress experienced during educational courses, particularly in clinical settings [23, 24].

**Table 2.** The level of nicotine dependence in medical students based on the Fagerstrom questionnaire

<table>
<thead>
<tr>
<th>Nicotine Dependence</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>10(3)</td>
</tr>
<tr>
<td>Low</td>
<td>8(2.4)</td>
</tr>
<tr>
<td>Moderate</td>
<td>15(4.5)</td>
</tr>
<tr>
<td>High</td>
<td>16(4.8)</td>
</tr>
<tr>
<td>Very High</td>
<td>9(2.7)</td>
</tr>
<tr>
<td>Total</td>
<td>58(17.4)</td>
</tr>
</tbody>
</table>

**Table 3.** The relationship between nicotine dependence score and demographic characteristics

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Nicotine Dependence</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Low</td>
<td>Low</td>
</tr>
<tr>
<td>Males</td>
<td>4(8.9)</td>
<td>4(8.9)</td>
</tr>
<tr>
<td>Females</td>
<td>6(46.2)</td>
<td>4(30.8)</td>
</tr>
<tr>
<td>Single</td>
<td>8(16.7)</td>
<td>5(10.4)</td>
</tr>
<tr>
<td>Married</td>
<td>2(20)</td>
<td>3(30)</td>
</tr>
<tr>
<td>Basic sciences level</td>
<td>4(36.4)</td>
<td>0(0)</td>
</tr>
<tr>
<td>Physiopathology level</td>
<td>3(42.9)</td>
<td>0(0)</td>
</tr>
<tr>
<td>Externship</td>
<td>3(12.5)</td>
<td>4(16.7)</td>
</tr>
<tr>
<td>Internship</td>
<td>0(0)</td>
<td>4(25)</td>
</tr>
</tbody>
</table>
Most smoking students in the study had moderate to high dependence on nicotine and cigarettes, which is consistent with previous research conducted in the community by Heydari et al. [25] and Chenary et al. [26]. Beginning to smoke at a young age can result in greater nicotine dependence. As the addiction to nicotine and cigarettes becomes stronger, the chances of quitting smoking decrease, leading to further harm to individuals [27, 28].

In the conducted study, there was a significant relationship between nicotine dependence and the gender of the participants, which was not consistent with the results of some studies, such as the study by Demiralay [29] and Doganay et al. [30] In Demiralay’s study, the level of dependence was higher in female students [29], and in Doganay et al.’s study, no significant relationship was found between these two variables [30]. The reason for this difference may be due to the higher prevalence of early initiation of smoking among male students in this study. On the other hand, this issue can also be justified by the negative view of society towards tobacco use by women. Furthermore, a significant correlation was observed between nicotine dependence and the educational level of students. This concept was consistent with the study of Huang and colleagues [31]. This finding may be related to the longer duration of study for these students, the stress of the educational and work environment [32], and the higher prevalence of smoking among them, which necessitates more effective interventions like the student mentoring program [33].

Conclusion
Smoking is a prevalent issue among medical students, particularly among male students and those with higher levels of education. Many students had a moderate to increased dependence on nicotine. To minimize the harmful effects of smoking, particularly among young people, and to avoid any negative impact on the education of medical students who are responsible for promoting health, it is essential to establish interdepartmental strategies for providing advice, preventing smoking, and offering treatment within both society and universities. Additional research is necessary to determine the prevalence of smoking in other medical universities, understand why students use tobacco and assess effective social factors and solutions.

Study limitations
Although this study offers valuable information for health professionals and policymakers regarding the effective factors, prevalence, and nicotine dependence among medical students, it has some limitations. The sampling method was convenient and does not include all medical students. Additionally, the study was only conducted in the universities of East Azerbaijan Province, so further studies are needed to generalize the results to the entire country.

Ethical Considerations

Compliance with ethical guidelines
The study proposal was registered in the Ethics Committee of Tabriz University of Medical Sciences (No.: IR.TBZMED.REC.1401.1104), and the study protocol was approved by Social Determinants of Health Research Center, Tabriz University of Medical Sciences (Code: 69955).

Funding
The study was supported by Social Determinants of Health Research Center, Tabriz University of Medical Sciences.

Authors’ contributions
Study design and methodology: Mahdi Zarei and Maryam Baradaran Binazir; Drafting the manuscript: Mahdi Zarei, Milad Asheghi, and Amin Abbasi; Supervision: Maryam Baradaran Binazir; Final approval: All authors.

Conflict of interest
The authors declared no conflict of interest.

Acknowledgments
The authors would like to thank all the faculty members and students who assisted in conducting this study.

References


