**Original Research Article**

**Smoking Behaviours, Awareness and Attitude Among University Students in Jeddah, Saudi Arabia: A Cross-Sectional Study**

**Abstract**

**Background:** Smoking remains a significant global health concern that results in millions of deaths annually. Despite its widely known health consequences, smoking remains highly prevalent among young adults, including university students. This study investigates smoking behavior, knowledge, and attitudes among university students in Jeddah, Saudi Arabia—a context affected by unique cultural and regulatory factors.

**Methods:** A cross-sectional questionnaire-based study was conducted among 115 university students in Jeddah, Saudi Arabia. The questionnaire assessed demographic data, smoking status, initiation age, knowledge of the risks of smoking, secondhand smoke exposure, and attitudes toward quitting programs. Data were collected and subsequently analyzed through SPSS software.

**Results:** Most respondents were male (67.8%) students over 21 years old, mainly enrolled in graduate programs (60.9%), with most studying health sciences or business. The smoking rate among the participants was 66.1%, and most initiated tobacco use in the 18-20 years age group. Although 75.7% of the students reported knowing the health risks of smoking, this did not predict a decrease in smoking. Surprisingly, 40% of the smokers smoked every day, suggesting high nicotine addiction. Besides, 47.8% of the students had been exposed to smokers at home, approximately 90.4% had often been exposed to smoking by relatives or friends. Exposure was high even with university smoke-free policies. Encouragingly, 52.2% of the smokers indicated interest in participating in cessation programs.

**Conclusion:** The prevalence of smoking among Jeddah university students, despite their reported health hazard awareness, is a call to action for locally focused public health interventions. Targeted interventions that recognize determinants at the cultural, social, and psychological levels are necessary to ensure smoking abstinence and minimize tobacco-induced health outcomes among this population.

**Keywords:** Smoking, University students, Tobacco use, smoking cessation, Attitude

**1. Introduction**

Smoking remains a major worldwide public health issue, resulting in millions of deaths annually due to tobacco use. Despite its dangers being widely recognized, and thoroughly documented for over fifty years (1), the World Health Organization (WHO) estimates that there are over one billion smokers worldwide, 80% of whom are living in poor and middle-income countries. If present trends continue, it is estimated that deaths due to tobacco will exceed eight million annually by the year 2030 (2). The adverse health effects of smoking are enormous, particularly its association with a multitude of cancers. In the United States, for instance, smoking accounts for nearly 90% of lung cancer fatalities, and lung cancer kills more women annually than does breast cancer. These statistics highlight the pressing global demand for more robust tobacco control policies (3).

Smoking among university students is a serious public health concern influenced by social, psychological, and environmental determinants in conjunction (1,4). The age group is particularly vulnerable to adopting and maintaining smoking due to peer pressure, stress, curiosity, and social acceptance. The socio-cultural practices and strict tobacco control regulations in Saudi Arabia differ considerably from those of most Western countries, yet the prevalence of smoking among young adults, especially university students, remains surprisingly high (5). These factors present a unique socio-cultural environment that must be considered when planning tobacco control and cessation interventions (6,7).

The chronic health effects of smoking go beyond personal results, imposing significant costs to public health systems and leading to more advanced cases of respiratory infections, cardiovascular diseases, and other forms of cancers (8,9). Such risks highlight the necessity for population-specific interventions. For success with such programs, they must be founded on an improved level of understanding regarding the behavior, attitudes, and incentives underlying smoking patterns among Saudi Arabian university students.

Despite the growing body of research focusing on tobacco use among different population segments, there remains a significant lack of studies targeting smoking habits among Saudi Arabian university students in particular. Existing research is often not taking into consideration the specific cultural context, thereby reducing its relevance and effectiveness in this given environment (5-11). Thus, a detailed understanding of the trends in student smoking in Jeddah is crucial in informing the implementation of policies and intervention programs that are context-sensitive as well as evidence-based. Correspondingly, the aim of the present study is to investigate the prevalence, behavior, and attitudes towards smoking among university students in Jeddah, Saudi Arabia. Through the identification of the attitude and behaviours related to tobacco use among the studied population.

**2. Methods**

**2.1. Study design and setting**

A descriptive cross-sectional observational study was carried out in Jeddah, Saudi Arabia, from September to November 2024. The study aimed at undergraduate and postgraduate students who were attending various public and private colleges and universities within the city.

**2.2. Study participants**

The study population included male and female undergraduate students aged 18 years and older who were enrolled in universities in Jeddah during the study period. Participation was voluntary, and students who declined to consent or were not currently enrolled were excluded from the study.

**2.3. Sample size calculation and sampling technique**

The sample size was calculated based on the total undergraduate student population in Jeddah, a confidence level of 95%, and an error margin of 5%. A standard formula for proportion estimation in a finite population was employed, with a modification to accommodate potential non-response (response of distribution of 10%) (12-14). The calculated sample size was 138 students. A non-probability convenience sampling approach was utilized to recruit the participants, drawing on university networks and online media to optimize reach and accessibility.

**2.4. Data collection method**

Data were collected via a self-administered electronic questionnaire created with Google Forms. The survey tool was patterned from the Global Adult Tobacco Survey (GATS) and had the following components:Demographic data (e.g., gender, age, study level, course of study)**,** Smoking and tobacco use habits (e.g., kind of tobacco consumed, frequency, age at initiation), and secondhand smoke exposure (e.g., residing with smokers or having smoking close friends) (15,16).In this study, a "smoker" was defined as a person who smoked at least one tobacco product ((like cigarette, e-cigarettes or vaping products) on a regular daily basis (daily or almost daily use for the past 30 days), and a "passive smoker" was defined as a person who was regularly exposed to secondhand smoke from family members or close friends (15,16).

**2.5. Data analysis**

Data was analyzed using IBM SPSS Statistics, version 23.0 (IBM SPSS Inc., Chicago, IL). Descriptive statistics was utilized to express the data in the form of percentages and frequencies. Pearson's Chi-square test and cross-tabulations were utilized to examine the relationship between variables. Any p-value less than 0.05 was taken as statistically significant.

**3. Results**

**3.1. Sociodemographic characteristics of the participants**

Of the 138 questionnaires distributed, 115 were completed and returned by participants, resulting in a response rate of 83.3%. The sample consisted of 115 university students in Jeddah and revealed that most of the respondents were above 21 years of age, with a large portion falling in the age bracket of 21-23 years (17.4%) and above 26 years (60.9%). The gender distribution of the sample had a larger proportion of male students (67.8%) than female students (32.2%). Many respondents are enrolled in graduate programs (60.9%), followed by master's (12.2%). Regarding fields of study, the most prevalent occurrence is in health sciences (26.1%) and business (17.4%) (Table 1).

**Table 1.** Distribution of students according to their Demographic Information (N= 115)

|  |  |  |  |
| --- | --- | --- | --- |
| **Demographic Information** | | **Frequency** | **Percent** |
| **Age** | Under 18  18-20  21-23  24-26  Over 26 | 2  4  20  19  70 | 1.7  3.5  17.4  16.5  60.9 |
| **Gender** | Male  Female | 78  37 | 67.8  32.2 |
| **Year of Study** | Freshman  Junior  Senior  Graduate Student  Master’s degree  Employee | 5  9  9  70  14  8 | 4.3  7.8  7.8  60.9  12.2  7 |
| **Field of Study** | Health Sciences  Business  Accounting  Engineering  Sciences  Arts and Humanity  English Language  Social Sciences  Education | 30  20  2  12  20  7  2  15  7 | 26.1  17.4  1.7  10.4  17.4  6.1  1.7  13.0  6.1 |

**3.2. Tobacco use**

The data in Table 2 show that 66.1% of the students claimed to be tobacco users (smoker), with the initiation of tobacco use most frequently happening in the 18-20 years age group (30.4%). Out of all, 35.7% are active smokers of tobacco, and 33.9% have never smoked. Daily cigarette smoking is frequent among 40% of the smokers, and 24.3% of them smoke 1-5 cigarettes daily. Even though 50.4% of the total sample does not smoke, a few of the students smoke occasionally (9.6%) or rarely (13.9%).

**Table 2.** Distribution of students according to Tobacco use (N= 115)

|  |  |  |  |
| --- | --- | --- | --- |
| **Tobacco Use** | | **Frequency** | **Percent** |
| **Tobacco Use (Smoker)** | Yes  No | 76  39 | 66.1  33.9 |
| **Age When Start Using Tobacco** | Not smoker  Under 15  15-17  18-20  21 or older | 39  8  11  22  35 | 33.9  7  9.6  19.1  30.4 |
| **Current Smoking Status** | Never smoked  Current smoker  Former smoker  Quit but Occasionally Use Tobacco Products  Occasional smoker | 39  41  15  16  4 | 33.9  35.7  13.0  13.9  3.5 |
| **Frequency of Smoking** | Never smoke  Rarely  Monthly  Weekly  Daily | 39  16  3  11  46 | 33.9  13.9  2.6  9.6  40.0 |
| **Cigarette Consume Per Day** | Not applicable  1-5  6-10  more than 15  11-15 | 58  28  11  11  7 | 50.4  24.3  9.6  9.6  6.1 |

**3.3. Smoking Behaviors**

Most of the smokers in the sample are males, and most are smoking cigarettes (33.9%), followed by 16.5% who smoke e-cigarettes or vaping products, and some others who smoke alternative tobacco products like cigars (3.5%), chewing tobacco (1.7%), nicotine patches (1.7%), and Shisha (5.2%). The average duration of tobacco use is significant as 32.2% have smoked for more than five years. Interestingly, 52.2% of smokers indicated that they wanted to quit and 27% had attempted to do so, with the most frequent method being the "cold turkey" method (27%) (Table 3).

**Table 3.** Distribution of students according to Smoking behaviors (N= 115)

|  |  |  |  |
| --- | --- | --- | --- |
| **Smoking Behavior** | | **Frequency** | **Percent** |
| **Type of Tobacco** | Never smoke  Cigarettes  E-cigarettes or other vaping devices  Cigars  Chewing tobacco  Quit smoking  nicotine patch  Shisha | 39  39  19  4  2  2  6  4 | 33.9  33.9  16.5  3.5  1.7  1.7  5.2  3.5 |
| **Duration of Tobacco or Cigarette Use** | Never smoke  Less than 1 year  1-2 years  3-4 years  5 years or more | 39  10  13  16  37 | 33.9  8.7  11.3  13.9  32.2 |
| **Trying to Quit Smoking or Tobacco Using** | Never smoke  Yes  No | 39  60  16 | 33.9  52.2  13.9 |
| **What Method Used Trying to Quit Smoking or Tobacco Use** | Never smoke  Cold turkey (quit without assistance)  Never tried quitting  Prescription medication  Behavioral counseling or therapy  Nicotine replacement therapy | 39  31  16  4  7  18 | 33.9  27.0  13.9  3.5  6.1  15.7 |

**3.4. Exposure to Secondhand Smoke**

Secondhand smoke exposure is common among the students, with 49.6% living with a smoker and 90.4% having relatives or friends who smoke. 31.3% of the students are sometimes exposed to secondhand smoke in enclosed areas, while 13.9% are frequently exposed. However, 45.2% of the students reported that their universities have smoke-free policies strictly enforced, with a further 27% reporting that policies were in place, but not necessarily enforced (Table 4).

**Table 4.** Distribution of students according to their exposure to secondhand smoke (N= 115)

|  |  |  |  |
| --- | --- | --- | --- |
| **Exposure to Secondhand Smoke** | | **Frequency** | **Percent** |
| **Live With Someone Who Smokes** | Yes  No | 57  58 | 49.6  50.4 |
| **Close Freind or Family Member Who Smokes** | Yes  No | 104  11 | 90.4  9.6 |
| **Exposed To Tobacco in Enclosed Area** | Never  Sometimes  Often  Always  Rarely | 19  36  16  17  27 | 16.5  31.3  13.9  14.8  23.5 |
| **Any Smoke-Free Polices Applied in Your University** | Yes, strictly enforced  Yes, but not strictly  No | 52  31  21 | 45.2  27.0  18.3 |

**3.5. Attitudes and Awareness About Smoking**

As indicated in Table 5, most of the students (75.7%) consider themselves very knowledgeable about the dangers of smoking. Moreover, 86.1% of the participants acknowledge the health-damaging consequences of smoking. Yet, despite this awareness, only 52.2% of them manifested their willingness to join a smoking cessation program if it were available at their university. A small number of students (5.2%) do not consider smoking harmful to health, whereas 1.7% are not sure.

**Table 5.** Distribution of students according to their attitude and awareness about smoking (N= 115)

|  |  |  |  |
| --- | --- | --- | --- |
| **Attitudes and Awareness** | | **Frequency** | **Percent** |
| **Smoking Risk Knowledge** | Very knowledgeable  Somewhat knowledgeable  Not very knowledgeable  Not knowledgeable at all | 87  26  1  1 | 75.7  22.6  0.9  0.9 |
| **Believe That Smoking Has Impact on Health** | Yes, definitely  No, I do not believe so  Unsure  Yes, but not sign | 99  6  2  8 | 86.1  5.2  1.7  7.0 |
| **Interest in Smoking Quit Program if Offered in University** | Yes  No  Maybe | 60  21  34 | 52.2  18.3  29.6 |

**3.6. Comparison of Demographics and Smoking Status and Smoking Risk Knowledge**

The examination of smoking status in relation to demographic factors (Table 6) fails to show any notable relationship of smoking prevalence with age or sex. The smoking status is slightly varied by study years but without statistical difference (p=0.275). The study site also shows marginal difference in the prevalence of smoking but without statistical significance (p=0.097).

**Table 6.** Comparison of students’ demographics according to smoking status.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | | **Tobacco Smoke or Use** | | |
| **Yes** | **No** | **P-Value** |
| **Age** | Under 18  18-20  21-23  24-26  Over 26 | 0  3  14  14  45 | 2  1  6  5  25 | 0.321 |
| **Gender** | Male  Female | 55  22 | 23  15 | 0.120 |
| **Year of Study** | Freshman  Junior  Senior  Graduate Student  Master’s degree  Employee | 2  5  6  49  11  3 | 3  4  3  21  3  5 | 0.275 |
| **Study Field** | Health Sciences  Business  Accounting  Engineering  Sciences  Arts and Humanity  English Language  Social Sciences  Education | 24  16  0  6  11  4  1  8  6 | 6  4  2  6  9  3  1  7  1 | .097 |

Moreover, Table 7 illustrates a significant relationship between the awareness of smoking risks among participants and the study year (p=0.006), indicating that master's and graduate students have greater awareness regarding the risks associated with smoking. Conversely, no significant differences were observed in relation to age (p=0.359), or gender (p=0.466).

**Table 7.** Comparison of students’ demographics and smoking risk knowledge

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variables** | | **Smoking Risk Knowledge** | | | | |
| **Very knowledgeable** | **Somewhat knowledgeable** | **Not very knowledgeable** | **Not knowledgeable at all** | **P-Value** |
| **Age** | Under 18  18-20  21-23  24-26  Over 26 | 2  3  11  14  57 | 0  1  9  4  12 | 0  0  0  0  1 | 0  0  0  1  0 | **0.359** |
| **Gender** | Male  Female | 58  28 | 18  8 | 0  1 | 2  0 | **0.366** |
| **Study Year** | Freshman  Junior  Senior  Graduate Student  Master’s degree  Employee | 2  6  8  53  11  7 | 3  2  1  17  3  0 | 0  0  0  0  0  1 | 0  1  0  0  0  0 | **0.006** |

**4. Discussion**

The present study provides ample evidence regarding the smoking behavior, attitude, and beliefs of the university students towards the hazards of smoking in Jeddah, Saudi Arabia. The demographic facts reveal that over half of the sample (17.4%) belong to the age group of 21 to 23 years, whereas a great majority of the respondents (60.9%) belong to the age group of above 26 years. This agrees with other scholarly work showing that the prevalence of smoking is considerably high among young adults, particularly in late adolescence and early adulthood (6,17). Most of the subjects of the present study being male (67.8%) agrees with gender variations in the prevalence of smoking that are widely documented in various countries, including Saudi Arabia, where smoking/tobacco use tends to be higher in males (18,19). The observed gender disparity raises urgent questions regarding the social and cultural determinants of high prevalence in men, which require in-depth research to identify the underlying causes.

The research also analyzed the connection between the students' academic major and their attitudes toward smoking. Although no association was found to be statistically significant, trends indicated that students of health science (median 26.1%) were more aware of the dangers associated with smoking compared to other students. This finding agrees with previous research that shows health science students are provided with more comprehensive information about the health effects of smoking and its medical effects in the long term (20,21). Yet, despite this heightened awareness, the comparatively high level of smoking among students of health sciences indicates that knowledge by itself can be inadequate to inhibit the initiation or persistence of smoking behavior. This shortfall underscores the necessity for interventions that do not merely supply information but also actively engage students at a fundamental behavioral level, where they are compelled to confront the social and psychological determinants of smoking.

The very high rate of tobacco uses among Jeddah university students, at 66.1%, suggests that tobacco use continues to be a widespread problem among this population. The rate is far above the international average for university students and suggests that specific public health measures must be taken to address the problem in the context of Saudi Arabia (5,6). The early onset of smoking, especially in the youth population between 18-20 years (30.4%), is worrisome because enormous studies have established time and time again that early onset is a predictive factor in the establishment of chronic smoking disease in adult life. Furthermore, that 40% of individuals who smoke now smoke daily indicates a high nicotine dependence. This refers to the necessity of smoking cessation programs, which have been effective in addressing the university students' needs.

A further important result of this research concerns the risks of exposure to secondhand smoke, which also entail other health threats. Almost half of the students (49.6%) indicated that they lived with a smoker, and 90.4% confirmed that either family members or close friends smoked. This ongoing involuntary exposure to tobacco smoke in both the domestic and social spheres is striking, considering the known health threats of secondhand smoke (22). Moreover, that 31.3% of students are occasionally exposed to tobacco smoke indoors in their setting highlights the difficulty in maintaining smoke-free areas in the campus. Interestingly, even while a vast majority of students are exposed to secondhand smoke, 45.2% claimed that their schools have smoke-free policies enforced strictly (23). This indicates that institutional policy to curtail smoking exposure can have beneficial impacts; however, the persistence of exposure among students mandates that the policies be enforced, and education campaigns initiated to curtail tobacco exposure in universities.

A considerable proportion of students have a history of smoking, but an overwhelming majority (75.7%) indicated knowledge of the ensuing health risks. This is attributable to the success of enhanced awareness campaigns and global public health campaigns that have emphasized the dangers of smoking (24). Nonetheless, the knowledge-practice gap remains wide, as few students abstain from smoking despite knowing its dangers. This inequality indicates the challenges of quitting smoking, such that awareness alone does not suffice to alter habits (25). That 52.2% of the students expressed interest in enrolling in a program dedicated to quitting smoking indicates that students are open to quitting if the right resources and support groups are available. Given the high rates of tobacco usage and the expressed interest in quitting, it is essential that colleges and universities give top priority to creating broadly accessible smoking cessation programs that treat both the physiological addiction to nicotine and the behavioral components of smoking.

The present research has several limitations. A major limitation of the present research is the use of self-reported information, which might lead to underreporting or social desirability bias. In addition, the cross-sectional nature of the research restricts the extent to which causal explanations of the relationship between smoking behavior and demographic characteristics can be made. A future study using a longitudinal design would be useful in tracing the trajectory of change of smoking behavior and attitudes of university students over an extended period. Despite these limitations, the findings of the current study highlight the need to create comprehensive public health responses encompassing both awareness and the social-psychological determinants of smoking among Jeddah university students, with the universities playing a significant part in facilitating healthier lifestyles and quitting.

**5. Conclusion**

The results show high rates of tobacco use among Jeddah university students in Saudi Arabia, especially among male students and those aged over 26 years. Despite high awareness among most participants regarding the health hazards of smoking, the continuously high rates of smoking indicate that awareness is not enough to ensure behavior change. Large groups of students reported secondhand smoke exposure and interest in cessation services, yet few have quit. These findings highlight the need for implementation of more than awareness campaigns. The universities need to adopt smoking cessation programs and strict smoke-free policies to safeguard the health and well-being of students.

**Ethical Approval And Consent**

Ethical approval (IRRB-ER-2-17082025) was obtained from Ibn Sina National College (ISNC) Institutional Research Review Board (IRRB). The study was carried out in compliance with the 1975 Declaration of Helsinki, written informed consent was obtained from all participants electronically prior to their involvement. The survey did not collect any personally identifying data on the participants. Anonymity of responses was maintained by coding to keep the participants' responses confidential. The participants were also alerted to their right to withdraw from participation in the study at any time without any penalty.

**Disclaimer (Artificial intelligence)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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