Smoking Prevalence and Associated Factors Among Male Students at Misurata University, Libya: A Cross-Sectional Study

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Abstract:

Background: Tobacco smoking is a significant global public health issue, contributing to millions of deaths annually. University students are particularly vulnerable to smoking initiation due to sociocultural influences and the perception of smoking as a symbol of adulthood. This study aimed to assess the prevalence of smoking among male students at Misurata University and explore associated determinants such as socio-economic status, peer influence, and smoking-related attitudes.

Methods: A cross-sectional study was conducted at Misurata University between November and December 2024. A total of 400 male students aged 18 years and older were recruited using systematic random sampling, with 376 completing the questionnaire (94% response rate). Data were collected via a self-administered online questionnaire, adapted from validated instruments and translated into Arabic. Smoking status was defined according to WHO criteria. Descriptive statistics and Chi-square tests were used for data analysis.

Results: The prevalence of smoking among participants was 25% (n=94). Among smokers, 52% smoked cigarettes, 16% smoked waterpipes, 24% used both cigarettes and waterpipes, and 8% used electronic cigarettes. Smoking prevalence was higher among students aged 21–23 years (30.3%) compared to older students (27.8%). Peer influence was a significant factor, with 63.8% of smokers reporting that their first cigarette was offered by a friend. While 54.3% of smokers viewed smoking as a personal freedom, 80.9% supported smoking bans in universities for public health.

Conclusion: The study highlights a high prevalence of smoking among male university students in Misurata, Libya, with peer influence and early initiation being key determinants. Despite recognizing the health risks of smoking, many students continue to smoke, underscoring the need for targeted interventions.

Public health campaigns, stricter enforcement of tobacco control policies, and smoking cessation programs are essential to reduce smoking prevalence and its associated health and economic burdens.
***Keywords*:** University Students, Smoking, associated factors, Prevalence, Misurata.

انتشار التدخين والعوامل المرتبطة به بين الطلاب الذكور في جامعة مصراتة – ليبيا (دراسة مقطعية)

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الملخص:

يُعد تدخين التبغ قضية صحية عامة عالمية خطيرة، حيث يساهم في وفاة الملايين سنويًا، ويُعتبر طلاب الجامعات أكثر عرضة لبدء التدخين بسبب التأثيرات الاجتماعية والثقافية ونظرتهم للتدخين كرمز للبلوغ.

هدفت هذه الدراسة إلى تقييم انتشار التدخين بين الطلاب الذكور في جامعة مصراتة واستكشاف العوامل المرتبطة به مثل الوضع الاجتماعي والاقتصادي، تأثير الأقران، والمواقف المتعلقة بالتدخين.

الطريقة: دراسة وصفية مقطعية أُجريت في جامعة مصراتة بين نوفمبر وديسمبر 2024. تم استهداف مشاركة 400 طالب ذكر، تتراوح أعمارهم بين 18 عامًا فأكثر باستخدام أخذ العينات العشوائية المنهجية، حيث أكمل 376 طالبًا الاستبيان (معدل استجابة 94%). تم جمع البيانات عبر استبيان إلكتروني ذاتي، تم تكييفه من أدوات معتمدة وترجمته إلى العربية. تم تعريف حالة التدخين وفقًا لمعايير منظمة الصحة العالمية. تم استخدام الإحصاء الوصفي واختبارات كاي مربع لتحليل البيانات.

النتائج: بلغ معدل انتشار التدخين بين المشاركين 25% (94 مدخنًا)، منهم 52% يدخنون السجائر، 16% يدخنون الشيشة، 24% يستخدمون كلاً من السجائر والشيشة، و8% يستخدمون السجائر الإلكترونية. كان انتشار التدخين أعلى بين الطلاب الذين تتراوح أعمارهم بين 21–23 سنة (30.3%) مقارنة بالطلاب الأكبر سنًا (27.8%). كان تأثير الأقران عاملاً مهمًا، حيث أفاد 63.8%

من المدخنين أن أول سيجارة تم تقديمها لهم كانت من صديق. بينما رأى 54.3% من المدخنين أن التدخين هو حرية شخصية، أيد 80.9% حظر التدخين في الجامعات لأسباب صحية عامة.

الاستنتاج: تُظهر الدراسة ارتفاع معدل انتشار التدخين بين الطلاب الذكور في جامعة مصراتة بليبيا، مع اعتبار تأثير الأقران والبدء المبكر في التدخين عوامل رئيسية. على الرغم من إدراك المخاطر الصحية للتدخين، يستمر العديد من الطلاب في التدخين، مما يؤكد الحاجة إلى تدخلات مستهدفة. تُعد حملات الصحة العامة، وتطبيق صارم لسياسات مكافحة التبغ، وبرامج الإقلاع عن التدخين ضرورية للحد من انتشار التدخين والأعباء الصحية والاقتصادية المرتبطة به.

الكلمات المفتاحية: طلاب الجامعات، التدخين، العوامل المرتبطة، الانتشار، مصراتة.

1. Introduction:

Tobacco smoking represents a significant risk factor for health complications and mortality on a global scale (Mackay, et al., 2006). If the prevalence of tobacco use persists as a public health challenge, it is projected that 8 million individuals will succumb to tobacco-related causes each year by 2030(WHO, 2011).

Tobacco smoking affects different physiological systems and increases the risk of different forms of cancers (WHO, 2019). Research shows that it reduces the life expectancy of male smokers by about 12 years and that of females by 11 years (Dieteren, et al., 2021).

The ill health effects of smoking, particularly lung cancer, are most prevalent among people who start smoking at an early age and continue smoking into adulthood (WHO, 2021). Smoking causes many deaths among smokers, and also among non-smokers who frequently are exposed to smoke (WHO, 2019).

This habit is prevalent among diverse demographics, encompassing various ages and genders worldwide. Additionally, it has been observed that the initiation of smoking typically occurs at a young age for many smokers globally (Alasqah, et al., 2019). Research indicates an inverse relationship between the duration of smoking and the age at which individuals begin smoking (Althobaiti, et al., 2022). This behavior is classified as a pandemic, resulting in approximately 8 million fatalities annually, as reported by the World Health Organization (WHO, 2019).

Students may start to smoke as a way of expressing their transition into adulthood and, as a consequence, are more likely to smoke than the general population (La Torre, et al., 2012). Some students may smoke in order to fit in, as they are more likely to become involved with different kinds of sociocultural groups while on campus. If a student initiates smoking, it becomes difficult to stop and the student is likely to develop a regular smoking pattern for life.

According to (AlHumaid et al., 2022) among the original non-smokers who enter university, one-third become regular smokers by the end of their studies. (Mohammadi et al., 2020) also showed that the prevalence of smoking is significantly higher in students in their last year of study compared with those in their first year. The estimated cost of tobacco in low- and middle-income countries is 10% of the student's income (Eriksen, et al., 2012), so the money paid for tobacco is diverted from nutrition, education and medical care(Perera et al., 2017).

Recent studies in some Arab countries, gave different rates of smoking among university students, it still alarming rates, such as Saudi Arabia among applied medical sciences college's students 72% (AlQahtani, 2017), Yemen 33.1% (Nasser &Zhang, 2019), Egypt 46.7% (Khan et al., 2012), Kuwait 46% (Husain et al., 2016), and Lebanon 26% (Jradi et al., 2012).

In Libya, the percentage of smoking among university students was 28.3% (Abou-Faddan et al., 2013).

"Libya currently has several tobacco control policies in effect. Under Decree No. 206 of 2009, the Libyan Cabinet implemented a ban on smoking in public places and prohibited the advertising of tobacco products in the media. Additionally, the decree forbids the sale of cigarettes to or by individuals under the age of 18. The Cabinet also enacted restrictions on the production of sweets or other items designed to resemble cigarettes, as well as the import or marketing of products branded with tobacco-related names, such as clothing, footwear, or toys."

This study aims to assess the current prevalence of smoking among male students at Misurata University and explore associated determinants such as socio-economic status, peer influence, and smoking-related attitudes.

2. Methods:

Participants and study design:

This cross-sectional study was conducted at Misurata University between November and December 2024. The university comprises 19 faculties, and this study targeted male students from medical faculties, including the faculty of Medicine, Pharmacy, and Health Sciences, and non-medical faculties including the Faculty of Economics, Engineering, Sciences, Human Sciences, Information Technology, Preparatory Year, Education. At the time of the study, the total number of male students enrolled at Misurata University was 6,671.

Inclusion Criteria:

- Male students aged 18 years or older.
- Currently enrolled as full-time or part-time students at Misurata University.

- Willing to provide informed consent for participation.

Exclusion Criteria:

- Female students.
- Students under 18 years old.
- Non-students or students from other universities.
- Unwilling to participate or those who provided incomplete responses.

Sampling and sample size:

The sample size was calculated using Epi-Info Software version 7. Based on a 28.3% prevalence of smoking among university students (derived from a previous study conducted among male students at Al-Jabal Al-Gharbi University, Gharian–Libya (Abou-Faddan et al., 2013), a confidence limit of 5%, and a 95% confidence level, the minimum required sample size was 311 students. To account for potential non-responses and ensure robustness, the sample size was increased to 400 students.

A systematic random sampling method was used to select participants. The sample was drawn proportionally from the 10 selected faculties, ensuring that the number of participants from each faculty reflected the total number of male students attending that faculty. Specifically, the sample size for each faculty was calculated as follows:

$$\text{Sample size per faculty} = \frac{Number\ of\ male\ students\ in\ the\ faculty}{Total\ number\ of\ male\ students\ in\ the\ 10\ faculties} \times 400$$

Recruitment and Participation

A total of 400 students were invited to participate in the study. Of these, 376 students provided complete responses, resulting in a 94% response rate. Recruitment was conducted through announcements in lectures, university social media platforms, and posters placed in common areas. Participation was voluntary, and informed consent was obtained from all participants prior to data collection

Definitions:

Smokers were defined according to the criteria established by the World Health Organization (WHO, 2023) and (Maziak et al., 2019). A smoker was classified as any individual who, at the time of the survey, met one or more of the following criteria:

1. Regularly smoked one or more cigarettes per day.
2. Regularly smoked one or more waterpipes per week.
3. Smoked less than one cigarette per day and/or one or less waterpipe per week.

Ex-smokers, defined as individuals who had quit smoking prior to the survey, were categorized as non-smokers. This distinction ensures a clear separation between current smoking behavior and past smoking history

Data Collection:

Data were collected using a self-administered questionnaire distributed online via a Google Form. The questionnaire was accessible through a web link, which was shared with participants via email and public social media platforms. Participants could complete the electronic questionnaire at their convenience, and responses were automatically uploaded to the researcher's database for analysis.

Questionnaire Development:

The questionnaire was adapted from validated tools used in previous studies (Jarrar et al., 2019) and (Joveini et al., 2016). The final version was derived from similar instruments utilized in prior research, with adjustments made to suit the specific goals of this study. To ensure clarity and accessibility for the target audience, the questionnaire was translated into Arabic and validated for accuracy in both English and Arabic versions

Pilot Testing:

The questionnaire underwent a pilot study to assess its validity and reliability. The pilot study was conducted as a web-based test involving students from participating universities who were excluded from the main study. Feedback from the pilot study was used to refine the questionnaire, ensuring that the questions were clear, relevant, and easy to understand.

Questionnaire Content:

The final questionnaire collected data on the following:

1. Socio-demographic and Economic Characteristics: Age, faculty, year of study, and socioeconomic background.
2. University Affiliation: The participant's enrolled university and faculty.
3. Smoking Prevalence and Patterns: Frequency, duration, and types of tobacco products used (e.g., cigarettes, waterpipe).
4. Attitudes Toward Smoking: Perceptions, beliefs, and behaviors related to smoking.

Ethical consideration:

The study received ethical approval from the Ethics Committee of the Faculty of Medicine, Misurata University. The research adhered to the International Ethical Guidelines for Epidemiological Studies, ensuring the protection of participants' rights and well-being.

Before participation, verbal informed consent was obtained from all participants. The objectives, benefits, and procedures of the study were clearly explained to ensure participants fully understood the purpose of the research. Participation was entirely voluntary, and participants were free to withdraw at any time without consequences.

All data collected were treated with strict confidentiality. Personal identifiers were removed to ensure anonymity, and responses were securely stored in a password-protected database accessible only to the research team.

Data analysis:

Collected data were coded and analyzed using the Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows), Version 25. Descriptive statistics, including frequencies and percentages, were used to summarize the data.

To examine associations between variables, cross-tabulation and the Chi-square test of significance were performed. A p-value of ≤ 0.05 was considered statistically significant, indicating a meaningful relationship between the factors studied.

3. Results:

Participants' characteristics:

The study included a total of 400 students from first to final year of Misurata University, Misurata, Libya, of them 376 completed the questionnaire with a response rate of 94%.

Table (1) shows, almost of participants (80%) were between 18 and 23 years old with a mean student age of 21.52 ± 2.54 years. About 40% of participants from medical faculties, and 60% from non-medical faculties.

This study documented the prevalence of smokers among the participants were 94 (25%), and 288 (75%) were non-smokers (Figure 1).

We found no statistically significant differences between medical and non-medical students in terms of the prevalence of smoking, and we found that smoking prevalence was equal (25%) among both groups being smokers.

Smoking prevalence was highest among students aged 21-23 (30.3%), with a significant p-value (0.041) (Table 1)

Smoking prevalence increased with academic year, though the differences were not statistically significant ($p = 0.597$). The highest proportion of smokers was observed in the fourth year (30%), followed by the third year (28.4%), and the second year (23.7%). The lowest proportion of smokers was in the first year (18.9%), Smoking prevalence among interns and fifth-year students was identical (23.8%),

Table (1): Smoking status of the study sample based on some characteristics, Misurata University (2024)

Characteristics	Total	Smokers	Non-smokers	p-value
	No (%)	No (%)	No (%)	
Age				
18-20	149 (39.6)	27 (18.1)	122 (81.9)	0.041
21-23	155 (41.2)	47 (30.3)	108 (69.7)	
24-28	72 (19.1)	20 (27.8)	52 (72.2)	
Medical faculties	148 (39.3)	37 (25)	111 (75)	0.55
Non- medical faculties	228 (60.7)	57 (25)	171 (75)	
Academic year				
First year	90 (26)	17 (18.9)	73 (81.1)	
Second year	76 (20.2)	18 (23.7)	58 (76.3)	
Third year	67 (17.8)	19 (28.4)	48 (71.6)	0.597
Fourth year	100 (26.6)	30 (30)	70 (70)	
Fifth year	22 (5.8)	5 (23.8)	17 (77.3)	
Interns	21 (5.6)	5 (23.8)	16 (76.2)	
Total	**376 (100)**	**94 (25)**	**282 (75)**	

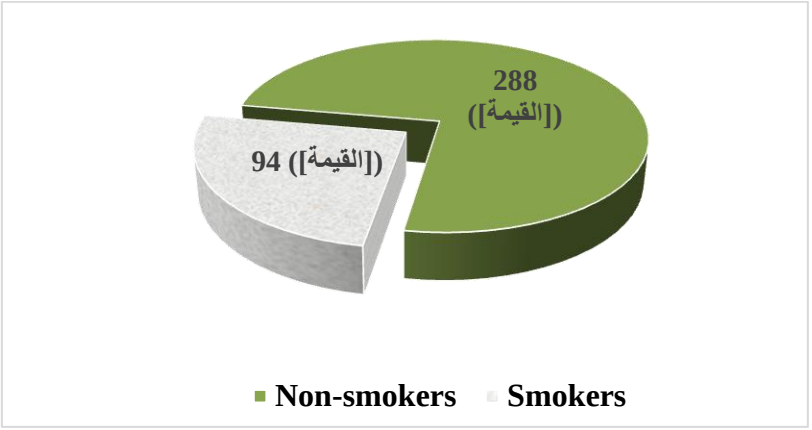

Figure (1): prevalence of smoking among male students at Misurata University

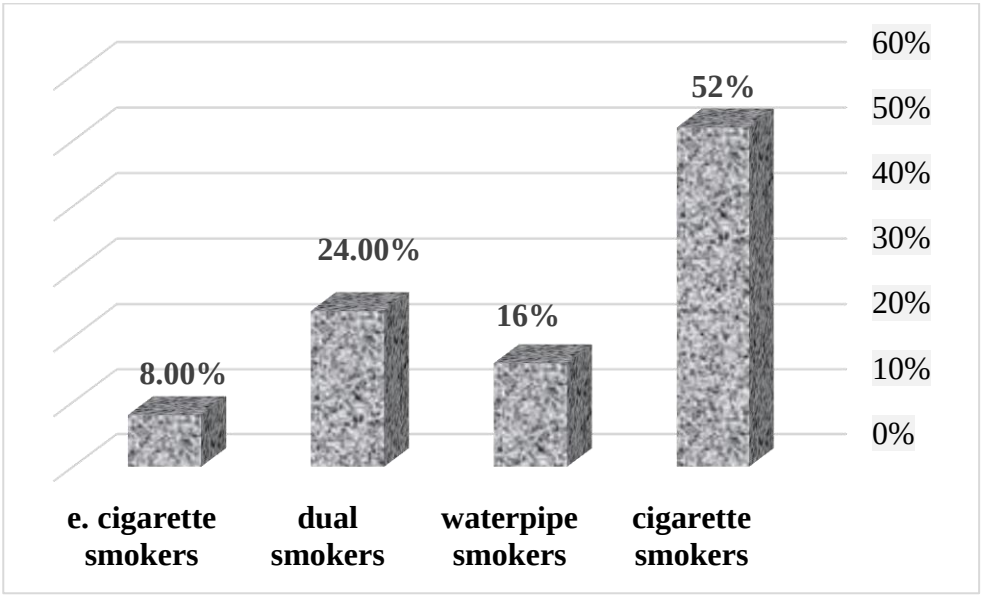

Figure (3): Types of tobacco products smoked by smokers

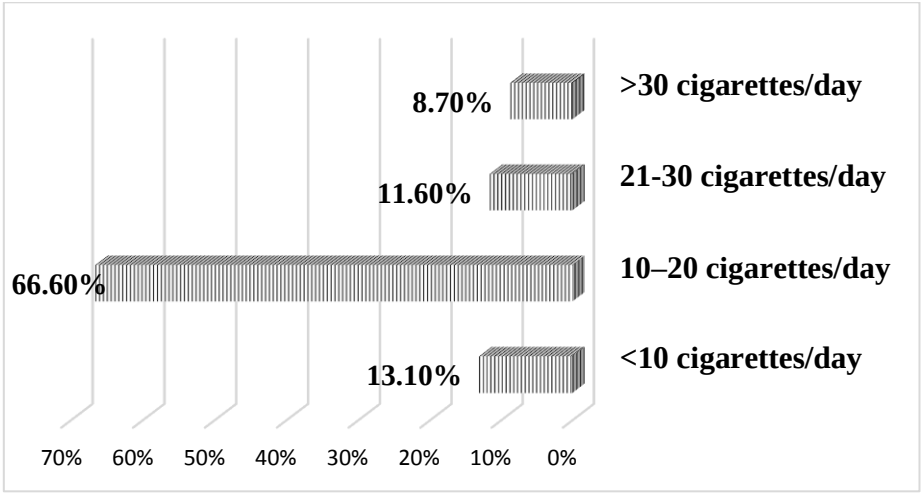

Figure (4): frequency of daily smoked cigarette among smoker's student

Table (2), shows Smoking Habits Among Smokers (n=94). More than half of smoker participants (52%) were cigarette smokers, 16% were waterpipe smokers, 24% were both cigarette and waterpipe smokers, and 8% were

electronic cigarette smokers (Figure2). Almost two thirds of cigarette smokers (66.6%) smoked 10–20 cigarettes/day (Figure 3).

More than two thirds of smokers (72.4%) started smoking between the ages of 16 and 20 years, while a small percentage started before 10 years (2.1%).

Majority of smokers (86.1%) regular smokers, while 13.9% are non-regular. Friends are the most common source (63.8%), followed by self-initiation (31.9%) and relatives (4.3%).

Table (2): Smoking habit among the smokers' students (n=94)

variable	No	(%)
Smoking status (n=94)		
Cigarette	49	52
Waterpipe	14	16
Daul (cigarette &waterpipe)	23	24
Electronic cigarette	8	8
Age of initiation (years)		
<10	2	(2.1)
11-15	11	(11.7)
16-20	68	(72.4)
>20	13	(13.8)
Regularity of smoking		
Regular	81	(86.1)
Non regular	13	(13.9)
Source of first cigarette		
By my self	30	(31.9)
My friend	60	(63.8)
Relative	4	(4.3)
Number of cigarettes smoked per day (n=69)		
<10 cigarettes/day	9	13.1
10-20 cigarettes/day	46	66.6
21-30 cigarettes/day	8	11.6
>30 cigarettes/day	6	8.7
Waterpipe frequency (n=37)		
Daily	17	45.9
Weekly	5	13.5
Occasionally	15	40.6

Table (3), shows Attitudes and Perceptions toward smoking among male students at Misurata University (2024).

Smokers were significantly more likely than non-smokers to view smoking as a personal freedom (54.3% vs. 14.6%, p-value: 0.000).

While both groups (smokers and non-smokers) supported the prohibition of smoking in universities, non-smokers were more likely to agree (94.7% vs. 80.9%, p-value: 0.000).

Very few students, regardless of smoking status, agreed with their brothers or children smoking, though smokers were slightly more likely to agree (4.3% vs. 0.7%, p-value: 0.01).

Both smokers and non-smokers overwhelmingly agreed that smoking is a major cause of diseases, though non-smokers showed slightly higher agreement (94% vs. 88.3%).

Both smokers and non-smokers recognized the dangers of passive smoking, with non-smokers showing slightly higher agreement (89.4% vs. 83%, p-value: 0.000).

Table (3): Attitudes and Perceptions toward smoking among male students at Misurata University (2024)

	Total	Smokers	Non-smokers	p-value
	No (%)	No (%)	No (%)	
Smoking is a personal freedom				
Agree	92 (24.6)	51(54.3)	41 (14.6)	0.000
Disagree	184 (48.9)	24 (25.5)	160 (56.7)	
Neutral	120 (26.7)	19 (20.2)	81 (28.7)	
Smoking should be strictly prohibited in universities for better public health				0.000
Agree	343 (5.1)	76 (80.9)	267 (94.7)	
Disagree	17 (4.5)	13 (13.8)	4 (1.4)	
Neutral	16 (4.3)	5 (5.3)	11 (3.9)	
Do you agree that your brothers or children smoke?				0.01
Agree	6 (1.6)	4 (4.3)	2 (0.7)	
Disagree	357 (94.9)	84 (89.4)	273 (96.8)	
Neutral	13 (3.5)	6 (6.4)	7 (2.5)	

Smoking is a major cause of many diseases				
Agree	384 (92.6)	83 (88.3)	265(94)	
Disagree	6 (1.6)	6 (6.4)	0 (0)	
Neutral	22 (5.9)	5 (5.3)	17 (6)	
Smoking is hazardous to the health of others (passive smokers)				0.000
Agree	330 (87.8)	78 (83)	252 (89.4)	
Disagree	10 (2.7)	8 (8.5)	2 (0.7)	
Neutral	36 (9.6)	8 (8.5)	28 (9.9)	

4. Discussion:

Smoking directly affects health, and studies have shown that smoking poses a risk for many diseases, particularly cardiovascular and lung cancer (Eriksen et al., 2012).

The results underscore the persistent challenge of tobacco use among university students, despite existing tobacco control policies and widespread awareness of the health risks associated with smoking. The findings provide valuable insights into the determinants of smoking behavior, including age of initiation, peer influence, socio-economic factors, and attitudes toward smoking, which can inform targeted interventions to reduce smoking prevalence in this population.

Smoking Prevalence and Patterns:

The prevalence of smoking among male students (25%) aligns with earlier studies in Libya, such as the 28.3% prevalence reported among male students at Al-Jabal Al-Gharbi University (Abou-Faddan et al., 2013). However, it is lower than rates observed in some Arab countries, such as Saudi Arabia 72% (AlQahtani, 2017), Egypt 46.7% (Khan et al., 2012), and Kuwait 46% (Husain et al., 2016), but higher than in Lebanon 26% (Jradi et al., 2012). This variation may reflect differences in cultural norms, enforcement of tobacco control policies, and the availability of tobacco products.

We found no statistically significant differences between medical and non-medical students in terms of the prevalence of smoking, which is equal (25%) among students in both medical and non-medical faculties at Misurata University.

The equal smoking prevalence (25%) among medical and non-medical students at Misurata University likely reflects a combination of shared cultural, social, and environmental factors, as well as similar levels of stress,

accessibility to tobacco, and exposure to health education. While medical students may have greater awareness of the health risks of smoking, this knowledge does not necessarily translate into lower smoking rates if other influencing factors (e.g., stress, peer pressure, or addiction) are strong. Further research could explore these factors in more depth to identify potential strategies for reducing smoking prevalence among university students.

The higher prevalence among students aged 21–23 years (30.3%) compared to older students (27.8%) suggests that smoking initiation often occurs during early adulthood, a critical period when students are exposed to new social environments and peer influences.

Cigarette smoking was the most common form of tobacco use (52%), followed by dual use of cigarettes and waterpipes (24%), waterpipe smoking alone (16%), and electronic cigarettes (8%). The high prevalence of cigarette smoking is consistent with global trends, while the significant use of waterpipes reflects the growing popularity of this method in the Middle East. The use of electronic cigarettes, though relatively low, indicates a shift toward newer tobacco products, which may pose additional public health challenges due to their perceived lower risk and appeal to younger populations.

Determinants of Smoking:

Peer Influence: Peer influence emerged as a significant factor in smoking initiation, with 63.8% of smokers reporting that their first cigarette was offered by a friend. This finding highlights the role of social networks in shaping smoking behavior, particularly in university settings where students seek to fit in and establish their identities. The influence of peers is further supported by the higher smoking prevalence among students in their final years of study, as observed in previous research. Peer pressure and the desire to conform to group norms can lead to experimentation with tobacco, which may develop into regular use over time.

Age of Initiation: The study found that 72.4% of smokers started smoking between the ages of 16 and 20 years, with a smaller percentage initiating before the age of 15 (11.7%). This finding is consistent with other studies reporting that the most common age for starting smoking was between 16 and 20 years among all ever-smokers (Haddad & Malak, 2002).

Early initiation is concerning because it increases the likelihood of developing a long-term smoking habit and experiencing severe health consequences later in life. Interventions targeting adolescents and young adults are crucial to prevent smoking initiation and reduce the burden of tobacco-related diseases.

Attitudes and Perceptions: Attitudes toward smoking varied significantly between smokers and non-smokers. While 54.3% of smokers viewed smoking as a personal freedom, only 14.6% of non-smokers shared this view. This suggests that smokers may rationalize their behavior as a matter of personal choice, despite being aware of the health risks. Interestingly, a majority of both smokers (80.9%) and non-smokers (94.7%) supported smoking bans in universities, indicating broad recognition of the need for smoke-free environments to protect public health. However, the persistence of smoking behavior despite this awareness highlights the complex interplay between knowledge, attitudes, and behavior.

Health Risks and Awareness:

The study revealed a high level of awareness about the health risks of smoking, with 88.3% of smokers and 94% of non-smokers agreeing that smoking is a major cause of diseases. Similarly, 83% of smokers and 89.4% of non-smokers acknowledged the hazards of secondhand smoke. Despite this awareness, the disconnect between knowledge and behavior suggests that educational campaigns alone are insufficient to deter smoking. This underscores the need for interventions that address the underlying social, psychological, and environmental factors driving tobacco use.

5. Conclusion:

The study highlights a high prevalence of smoking among male university students in Misurata, Libya, with peer influence and early initiation being key determinants. Despite recognizing the health risks of smoking, many students continue to smoke, underscoring the need for targeted interventions. Public health campaigns, stricter enforcement of tobacco control policies, and smoking cessation programs are essential to reduce smoking prevalence and its associated health and economic burdens.

6. Recommendations:

This study primarily assesses the prevalence of smoking among male student populations, highlighting the need for additional research to examine smoking behaviors and contributing factors within female student demographics. Such future studies are necessary to comprehensively understand gender-specific patterns and ensure targeted interventions address the unique social, psychological, and cultural influences affecting smoking initiation among all students.

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