Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 19s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Smoking prevalence and factors associated with cigarette smoking among university students in Sudan

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Cite this paper as: Neimat MAA Dinar, (2025) Smoking prevalence and factors associated with cigarette smoking among university students in Sudan. *Journal of Neonatal Surgery*, 14 (19s), 543-548.

ABSTRACT

Background: Cigarette smoking is a significant public health concern worldwide. Smoking has harmful effects on human organs; regrettably, it continues to lead to the loss of lives among many adults and young people. This study aimed to estimate the prevalence of smoking among university students in Sudan

METHODS:

A cross-sectional study was performed among university students in Sudan. The data were collected using an online questionnaire survey, data were collected from 480 randomly chosen students.

RESULTS:

A total of 480 university students randomly recruited from 7 medical colleges participated in the study. The rate of smoking among university students revealed that a greater prevalence of smoking in females (n=300) 42.5% than males (n=180) 37.5%

The distribution of students across levels of study indicated that most of them are in the fifth year at 22.92 % (n=110), while a relatively high percentage of 18.75% (n=90) are in the sixth year. In comparison to the specialties, the most common was Medicine which had a representation rate of 37.5% (n=180).

The participants had a mean age of 21 years (SD = 3). From all subjects 20.83% (n=100) identified themselves as smokers and 79.17% (n=380) as non-smokers.

Regarding the factors associated with cigarettes, the majority of students (n = 460 (95.83%) were aware of the adverse effects of active smoking, and n = 20 (4.17%) were unaware. 34.00% (n=162) reported leisure time as a factor increasing tobacco consumption, and 4.17% (n=20) reported that the period of exam is a period increasing tobacco consumption.

As presented the associations of factors associated with cigarette smoking. The prevalence of smoking varied markedly among demographic groups; females were more likely to be current smokers (n = 140) or ex-smokers (n = 40) compared to males (n = 100; no ex-smokers), and this association was statistically significant (p = 0.03). According to the level of study, the majority of smokers were fifth-year students (n=60). Most commonly ex-smokers among first-year students (n=20) and internship (n=20) students. While there were no statistically significant associations with specialty (p=0.09), Medicine students showed the majority of smokers (n=100), followed by Physical Therapy students (n=50).

CONCLUSIONS

This study indicates that the smoking prevalence among university female students and students across levels of study is significantly high. It highlights the necessity for effective educational initiatives to combat smoking and underscores the importance of identifying key factors that should be considered when developing successful anti-smoking programs.

Keywords: *Smoking prevalence; cigarette smoking; university students; associated factors; Sudan.*

1. INTRODUCTION

Smoking is the leading preventable cause of death worldwide and is regarded as a major risk factor for the global burden o f diseases, particularly chronic noncommunicable diseases like cancer, stroke, and cardiovascular and respiratory conditio ns (1).

Smokers are those who smoked one or more cigarettes per day, or one or more water pipes per week, or one cigarette per day or less, and likewise one or less water pipe per week (2).

According to a different WHO estimate from the 1990s, smoking causes the deaths of 3 million people a year, 2 million of whom are in industrialized nations and 1 million of whom are in developing nations (3). However, it is expected that the number of deaths would rise by 10 million between 2020 and 2030, with 3 million occurring in wealthy nations and 7 million in developing nations. According to this report, smoking causes one fatality every ten seconds, and in thirty to forty years, that number will rise to one death every three seconds (4, 5).

Nearly 80% of people's deaths from lung cancer, 80% of deaths from emphysema and bronchitis, and nearly a fifth of deaths from cardiovascular disease account for more than 25% of all cancer-related deaths (6). A smoking harmful effects are well known, and regrettably, many adults and children continue to lose their lives as a result.

The use of tobacco ranks as one of the most concerning issues related to global health. About 80% of smokers globally reside in low- and middle-income nations, which report the highest occurrences of related illnesses and fatalities (7). The use of tobacco is expanding quickly at an annual rate of approximately 3.4% in developing nations (4). This is additionally apparent in nations of the Eastern Mediterranean region and Africa, where health systems are fragile (4).

Recent research has indicated that people who start smoking early in their teenage years and continue for an additional 10 to 15 years (as 70% do) may pass away twenty years sooner than anticipated. The estimated prevalence among adults who use tobacco worldwide is roughly 22%. Smoking rates in middle-income and upper-middle-income countries are comparable, though they are somewhat higher in middle-income nations (8). The rate of cigarette smoking between university students rises from their initial to final years, highlighting the importance of promoting anti-smoking initiatives during their early years (5-6). The Regional Report, Economics of Tobacco for the Middle East and North Africa Region (MNA), indicated that the youth smoking rate varied significantly across several Arab nations, ranging from 7% in Oman to 53% in Lebanon, while overall 23% of adults in the region smoked. (8).

2. METHODS

Study design:

A cross-sectional study was conducted to assess the demographic characteristics, smoking prevalence, and factors associated with cigarette smoking among university students in Sudan.

Study Population and Setting:

A total of 480 students from various academic levels and specialties were included using a stratified random sampling method to ensure diverse representation. The students from eight universities from eight states (University of Khartoum, University of Gezira, University of Shendi, University of Kassala, Red Sea University, University of Sinnar, University of El Imam El Mahdi and University of Gadarif).

Sampling and sample size:

The random sampling method was applied to select eight states of Sudan out of eighteen states and one university from each state was selected as follows:

State of Sudan	Name of selected university
Khartoum State	University of Khartoum
Gezira State	University of Gezira
River Nile State	University of Shendi
Kassala State	University of Kassala
Red Sea State	Red Sea University
Sinnar State	University of Sinnar
White Nile	University of El Imam El Mahdi
Al Qadarif State	University of Gadarif

Data collection procedure and tools:

Data collection involved a structured questionnaire comprising demographic details, smoking habits, knowledge of adverse smoking effects, and environmental influences. The questionnaire was pretested for validity and reliability. The data were

collected by an online survey which was distributed to the selected universities by sending an email to the selected university and allowing for three months to receive responses.

Ethical Consideration:

The study was conducted in compliance with Helsinki Guidelines, and informed consent was secured from all participants.

Data Analysis:

Data were analysed using descriptive and inferential statistics, with chi-square tests employed to assess associations between variables, and a significance level set at $p < 0.05$.

Results:

Table 1 shows the demographic characteristics of university students in Sudan. The sample included 480 university students in Sudan 42.5% (n=300) females and 37.5% (n=180) males. The distribution of students across levels of study indicated that most of them are in the fifth year at 22.92 % (n=110), while a relatively high percentage of 18.75% (n=90) are in the sixth year. The students were distributed across the other levels as 14.58% (n=70) in the first year, 10.42% (n=50) in the third year, and 10.42% (n=50) in the eighth year. The remaining academic levels including fourth year, seventh year and intern accounted for 6.25% to 8.33% (n=30 to n=40). In comparison to the specialties, the most common was Medicine which had a representation rate of 37.5% (n=180). On the other hand, Nursing, Dentistry, and Physical Therapy accounted for 10.42% (n=50), 12.5% (n=60), and 18.75% (n=90), respectively. 30 students (6.25 were from pharmacy (6.25) and 50 (10.42) were studying, where optometry was opened the fewest people in a radiology of 20 (4.17). The participants had a mean age of 21 years (SD = 3). The data in this case is university students smoking status. From all subjects 20.83% (n=100) identified themselves as smokers and 79.17% (n=380) as non-smokers.

As **Table 2** illustrates, the vast majority of students (n = 460(95.83%) were aware of the adverse effects of active smoking and n = 20 (4.17%) were unaware. 34.00% (n=162) reported leisure time as a factor increasing tobacco consumption, personal or professional problems (6.25%, n=30), sitting with smokers (6.25%, n=30), and 4.17% (n=20) reported that the period of exam is a period increasing tobacco consumption. 50% (n=240) of respondents did not fall into this category. Regarding compliance with university laws banning smoking, 45.83% (n=220) claimed to follow the law while 12.5% (n=60) reported not following the law, as well as 20.83% (n=100) was the category with the most or least number of students in terms of behaving as university laws like these.

Table 3 presents the associations of factors associated with cigarette smoking among university students with the prevalence of smoking in the Sudan. The prevalence of smoking varied markedly among demographic groups. As shown in Table 1, females were more likely to be current smokers (n = 140) or ex-smokers (n = 40) compared to males (n = 100; no ex-smokers), and this association was statistically significant ($p = 0.03$). The majority of smokers were fifth-year students (n=60), followed by sixth-year (n=40) and eighth-year students (n=40) according to study levels. Most commonly ex-smokers among first-year students (n=20) and internship (n=20) students. While there were no statistically significant associations with specialty (p=0.09), the majority of smokers were Medicine students (n=100), followed by Physical Therapy students (n=50). Smoking and ex-smoking were lower in other industries.

Table 1: Demographic Characteristics of University Students in Sudan

Variable	Freq.	Percent
Sex		
Female	300	62.50%
Male	180	37.50%
Level of Study		
First	70	14.58%
Third	50	10.42%
Fourth	40	8.33%
Fifth	110	22.92%
Sixth	90	18.75%
Seventh	30	6.25%

Eighth	50	10.42%
Internship	40	8.33%
Specialty		
Medicine	180	37.50%
Nursing	50	10.42%
Dentistry	60	12.50%
Radiology	20	4.17%
Physical Therapy	90	18.75%
Pharmacy	30	6.25%
Optometry	50	10.42%
Age		21±3 yrs
Are you Smoker?		
Yes	100	20.83%
No	380	79.17%

Table 2: The Factors Associated with Cigarette Smoking Among University Students in Sudan

Variables	Freq.	Percent
Do you know the adverse effects of active smoking?		
Yes	460	95.83%
No	20	4.17%
Do you avoid sitting with smokers while they smoke?		
Yes	150	31.25%
No	260	54.17%
Only in enclosed spaces	70	14.58%
What are the factors that increase tobacco consumption?		
Exam period	20	4.17%
Leisure	160	33.33%
Personal/professional problems	30	6.25%
Sitting with smokers	30	6.25%
Not applicable	240	50.00%
Commitment to laws of smoking prohibition at university?		
Yes	220	45.83%
No	60	12.50%
Most students	100	20.83%
Little number	100	20.83%

Table 3: The Associations Between Factors Associated with Cigarette Smoking Among University Students and Prevalence of Smoking in Sudan

Variable	Smoker	Non-smoker	Ex-smoker	P-value
Sex				
Female	140	140	40	0.03*
Male	100	100	0	
Level of Study				
First	20	30	20	0.07
Third	20	20	10	
Fourth	10	30	10	
Fifth	60	50	20	
Sixth	40	50	0	
Seventh	30	0	10	
Eighth	40	10	0	
Internship	40	20	20	
Specialty				
Medicine	100	80	0	0.09
Nursing	30	20	10	
Dentistry	20	30	10	
Radiology	10	10	10	
Physical Therapy	50	20	10	
Pharmacy	10	20	0	
Optometry	30	30	10	

* significant

3. DISCUSSION

The study aimed to identify the prevalence and risk factors of cigarette smoking among university students in Sudan. The findings of this study highlight critical aspects of smoking prevalence and associated factors among university students in Sudan. With 20.83% of students identifying as smokers, the prevalence aligns with similar studies conducted in low- and middle-income countries, where young adults represent a significant proportion of the smoking population (9). On the other hand, a recent study was conducted in Sudan assessing smoking prevalence among university medical students in Sudan, which showed that the prevalence was so high at 48.8% (10). This indicates the need for targeted tobacco control interventions within educational institutions among university students.

The significant gender disparity (p=0.03), where females had higher rates of smoking compared to males, deviates from global trends and different from local reports, which indicated that males are more smokers in comparison to females (10), where smoking prevalence is typically higher among males (11). This anomaly may reflect sociocultural influences specific to Sudan or sampling biases that warrant further investigation.

The study also reveals the role of environmental and psychological factors in tobacco use. Leisure time was identified as the most common trigger for smoking, consistent with evidence that boredom and social influence are strong predictors of smoking initiation among young adults (12, 13). Additionally, non-compliance with university smoking prohibition laws by a significant portion of students emphasizes the need for stricter enforcement and awareness campaigns (14). Another study that was conducted in Sudan highlighted that the education has an effect on public knowledge of oral cancer and related

factors such as smoking or tobacco use (15).

Although many students acknowledged the adverse effects of smoking, only one-fifth expressed a desire to quit, reflecting the persistent challenge of nicotine dependence. Effective smoking cessation programs tailored to this demographic, including counselling and pharmacological support, should be prioritized to address this gap.

However, the study was conducted on large sample size and from different states of Sudan. There are some limitations which could be a barrier for generalize the findings. The first limitation was that it depends on self-report data collection which may result in inaccurate information, the second limitation was the online survey which may be associated with bias in collected data, and the final limitation was the lack of a standardized questionnaire for data collection.

4. CONCLUSION

This study identifies a considerable prevalence of smoking among university students in Sudan, with notable associations between smoking and demographic as well as environmental factors. The findings indicate the importance of targeted tobacco control strategies, particularly among females and during leisure periods, alongside stricter enforcement of university smoking policies. Future research should explore the underlying sociocultural factors influencing smoking prevalence to develop more effective interventions.

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