

## Cigarette Smoking among Kassala University Students: Prevalence and Associated Factors

Osman B Osman <sup>(1)</sup>

(1) Assistant Professor of Public Health, Public Health Department, Faculty of Applied Medical Sciences, Al-Baha University, Saudi Arabia, [obabikerosman@gmail.com](mailto:obabikerosman@gmail.com)

### Abstract

**Background:** Smoking remains a global public health issue. Like other tobacco products, cigarette smoking poses risk on children and adults both males and females. This study aimed to assess prevalence of cigarette smoking and associated factors among students of Kassala University, Sudan. **Methods:** A cross-sectional descriptive study was conducted on 580 male and female students who were studied at Kassala University in the year 2021/2022. They were studied at different academic programs and at different levels. A multistage sampling strategy was used, where each faculty represents a cluster. The data was collected by online questionnaire distributed to the students WhatsApp groups. The data was then analyzed by SPSS version 24. **Results:** The study findings showed that smoking prevalence is relatively low among Kassala University students, with 30.00% identified as smokers. Notably, smoking rates differ significantly between male and female students, with 61.5% of male students being smokers, compared to only 4.4% of female students. However, no significant variations in smoking prevalence are observed based on the level of study or faculty. Factors influencing tobacco consumption include settings with smokers (40.00%), exam periods (37.24%), leisure (13.10%), and personal/professional problems (9.66%). **Conclusion:** The study concluded that low prevalence of cigarette smoking among students at Kassala University in Sudan. They were mainly males and they reported that they used cigarette smoking because they sit with peers' smokers or due to stress of university exams. The findings highlight the need for targeted interventions to reduce smoking among male students and foster a healthier campus environment.

**Keywords:** University students, cigarette smoking, Prevalence, associated factors, Sudan

### Introduction:

Tobacco smoking is one of the most significant worldwide health issues, causing over 7 million deaths each year (**World Health Organization, 2019**). Among university students, smoking habits exhibit considerable variation across different countries and between male and female students within the same regions, with prevalence rates showing diverse patterns in different countries (**Nazzal et al., 2020, Alzahrani et al., 2021, Al Omari et al., 2021, Jamshed et al., 2017, Taheri et al., 2015, Elegbede et al., 2012, Kumar et al., 2011**). In the Eastern Mediterranean Region, 18.6% of people are reported to smoke by 2020, with male and female rates being 33.3 and 3.9 percent, respectively (**World Health Organization, 2019**).

Before 1940, cigarette smoking in Sudan was extremely uncommon but started to gain

popularity in the 1990s (**Idris et al., 1998b**). The world's greatest airlift of cigarettes occurs in Britain, and between the middle of the 1960s and the middle of the 1970s, consumption grew in Sudan and Somalia, both of which are African nations (**Taha and Ball, 1980**). Tobacco is consumed by Sudanese in a variety of ways, including cigarettes, water pipes (Shisha), and Toombak, a smokeless tobacco product that is the most widely used tobacco product in Sudan (**Idris et al., 1998a**).

The impact of cigarette smoking on human health cannot be exaggerated (**Perez-Warnisher et al., 2019, Perez-Warnisher et al., 2018**). It is approved that smoking contributes significantly to mortality and morbidity, making it a major public health problem (**Bousquet et al., 2005, Campbell et al., 2008, US Department of Health Human Services, 2004**). In order to determine the factors influencing smoking habits in Sudan, context-

specific analyses are necessary given the observed variances in smoking prevalence between nations and within areas. This study, which focuses on Kassala University students, aims to shed light on the specific variables that may be affecting smoking behaviours and investigate any links between smoking and depressive symptoms in college students.

The significance of this study lies in its potential to inform evidence-based policies and interventions tailored to the unique context of Kassala University in Sudan. By identifying the factors that drive smoking among university students. Furthermore, by filling the research gap specific to Sudan situation, this study can contribute to the broader body of knowledge on smoking patterns among university students in different socio-cultural contexts. Ultimately, the findings from this study have the potential to contribute to the formulation of effective public health strategies that address tobacco smoking leading to healthier and more resilient university populations.

Several risk factors contribute to the cigarette smoking among university students. The transition to higher education often brings about newfound independence and exposure to a diverse range of experiences, moreover, peer influence and the desire to belong to a certain social group can further propel cigarette smoking among university students, stress, a common companion of academic pursuits, can drive individuals to seek coping mechanisms, with smoking being a readily accessible option. Additionally, the presence of designated smoking areas on campus or within close proximity can normalize and facilitate smoking behaviours (Jane Ling et al., 2023, Khader and Alsadi, 2008, Kumar et al., 2011, Mandil et al., 2007, Nazzal et al., 2020, Pazdro-Zastawny et al., 2022, Von Ah et al., 2005).

### **Significance of study:**

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While cigarette smoking varies among university students in different countries, limited number of studies have investigated its prevalence in Sudan. This study aims to bridge this gap by exploring the prevalence and associated factors of cigarette smoking among Kassala University students in Sudan. The study's findings will

contribute valuable insights into the smoking behaviours of students in this state of Sudan, potentially guiding the development of targeted interventions to promote healthier lifestyles among the university population.

**WHO 2003**, report, smoking is the leading cause of death and smoking initiation rarely occurs after adolescence and tobacco use is predicted to cause 10 million deaths annually by the year 2030. Since smoking has a serious impact on public health, adolescent smoking has not declined, and remains a major public health (**World Health Organization, 2023**).

### **Aim of the study:**

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This study aimed to assess prevalence of cigarette smoking and associated factors among students of Kassala University, Sudan. The study hypothesises that the students at Kassala University have low level of smoking and the researcher will answer the question whether students have low cigarette smoking?

### **Materials and methods:**

#### **Study design:**

The study's descriptive cross-sectional approach made use of a variety of dependent and independent variables. The study sought to understand the scope of the issue and the contributing elements that contribute to the phenomena of alcohol use among university students.

#### **Study area:**

One of Sudan's state universities, University of Kassala is situated in the country's eastern Kassala town. The university was founded to offer higher education to students from Eastern countries, particularly Sudan. Six academic fields are represented at the university: engineering, medical, education, computer science, business, accounting, and management.

#### **Study Population:**

Students of both sexes are represented among the study population in all the university's faculties. For the academic year 2021–2022, there were around (8500) students registered for

bachelor's programs.

### Sampling:

The study utilized a multistage sampling strategy across the six faculties, where each faculty represents a cluster. This sampling was considered by the study to produce a decent result in order to ensure probability design. The multiphase sampling design was used to facilitate gathering students' perceptions belonging to various colleges in the university. Each faculty in the university represent a cluster, the whole students in all faculties in the university represents the sample frame which considered as population of interest.

**Sample size :** The study uses the following statistical formula to determine the minimum necessary sample size for sampling.  $(n = N/(1+N(e)^2)$ .

Where:  $n$  = Minimum required sample size.

$N$  = total population and  $e$  = margin of error (5%). The calculated number was found to be (38). The actual included in the study is (580) participants.

### Data collection:

An online survey that was created based on a modified WHO survey was used to gather the information needed to complete the study's stated purpose.

### Tool of data collection:

The questionnaire includes three categories, demographics, prevalence of cigarette smoking, reasons for smoking. It was initially developed by researcher, and it was tested on small proportions of the other participants before being administered on a large scale. The filling of questionnaire extended for one semester (four months) and checked for completeness before being entered for analysis. through (data cleaning process).

The questionnaire had a pre-test to make sure the questions were clear and comprehensive for the participants (pilot).

The results would only be used for the

specified research reasons, and the students' involvement was voluntary, they were told. After being provided to all faculties' participants via popular electronic channels mostly accessible to students (WhatsApp).

### Data Analysis:

The data was analysed by SPSS program version 24. A descriptive analysis was applied for frequency and percentages while inferential analysis was used for identification of any significant relationships between demographic characteristics and smoking status of students as Chi square test was used with 95% confidence.

### Ethical consideration:

The study was conducted with respect to participants rights, as they were informed that the result of this study is for the research purposes only, and their participation is voluntary, and they could provide agreement before filling the online survey.

### Results:

#### Results summary:

Table 1 presents the demographic characteristics of students at Kassala University, Sudan. The study includes data on sex, level of study, faculty, and age distribution among the students. The results show that the student population is balanced in terms of gender, with 260 (44.83%) male students and 320 (55.17%) female students. In terms of the level of study, there is a spread across different academic years, with the highest representation in the first year (104 students, 17.93%) and a relatively even distribution in subsequent years. The faculties also have varying numbers of students, with the Faculty of Medicine and Health Sciences having the largest representation (143 students, 24.66%), followed by the faculties of Agriculture and Natural Resources (96 students, 16.55%) and Computer Science and Information Technology (86 students, 14.83%). The average age of students is reported to be 21 years, with a standard deviation of 3 years, indicating that many students fall within the age range of 18 to 24 years.

Table 2 presents the characteristics of

Kassala University students concerning cigarette smoking. The data reveals that a significant majority of students, 65.17%, are bothered by the smell of cigarette smoke, while 34.83% reported not being bothered. Among the students, 30.00% identified themselves as smokers, while a larger proportion, 61.72%, reported not smoking. Additionally, 8.28% of students classified themselves as ex-smokers.

The data presented in table 3 offers factors influencing tobacco consumption include exam periods (37.24%), settings with smokers (40.00%), leisure (13.10%), and personal/professional problems (9.66%). Importantly, none consider the question not applicable. In terms of compliance with smoking prohibition laws at the university, a minority believes in its commitment (24.66%), while the majority perceives otherwise (75.34%).

Table 4 shows valuable insights into students' knowledge and attitudes towards smoking at Kassala University. It reveals that while many students are aware of the adverse effects of active

smoking (71.72%), a significant portion remains unaware (28.28%). Concerning behaviour, a substantial number of students avoid sitting with smokers while they smoke (45.69%), but a similar percentage does not (42.59%), with some limiting avoidance to enclosed spaces only (11.72%). Among smokers, a notable proportion expresses a desire to quit (13.79%), but a significant percentage does not wish to quit (16.21%), and many find the question not applicable (70.00%).

Table 5 provides insights into the relationship between demographic characteristics and cigarette smoking among Kassala University students in Sudan. The data reveals a significant association between smoking and sex ( $p < 0.01^*$ ), with a higher proportion of male students being smokers compared to females. However, no significant relationships are found between smoking and the level of study or faculty ( $p > 0.05$ ). The percentages of smokers, non-smokers, and ex-smokers do not vary significantly across different academic years or faculties.

**Table 1: Demographic characteristics of students at Kassala University, Sudan**

Variable		Freq.	Percent
Sex	Male	260	44.83
	Female	320	55.17
Level of study	First	104	17.93
	Third	98	16.90
	Fourth	84	14.48
	Fifth	76	13.10
	Sixth	79	13.62
	Seventh	65	11.21
	Eighth	74	12.76
Faculty	Agriculture and Natural Resources	96	16.55
	Computer Science and Information Technology	86	14.83
	Medicine and Health Sciences	143	24.66
	Sciences	94	16.21
	Engineering	58	10.00
	Law	45	7.76
	Education	58	10.00
Age		21±3 years	

**Table 2: Characteristics of Kassala University students in relation to cigarette smoking**

Variable		Frequency (n)	Percentage (%)
Are you bothered by the smell of cigarette smoke?	Yes	378	65.17
	No	202	34.83
Are you smoking a cigarette?	Smoker	174	30.00
	Not smoker	358	61.72
	Ex- smoker	48	8.28

Table 3: Factors associated with cigarette smoking among Kassala University students.

Variables		Freq.	Percent
What are the factors that increase tobacco consumption?	Exam period	216	37.24
	Leisure	76	13.10
	personal/professional problems	56	9.66
	sitting with smokers	232	40.00

Table 4: Students' knowledge and attitudes towards smoking at Kassala University

Variables		Freq.	Percent
Do you know the adverse effects of active smoking?	Yes	416	71.72
	No	164	28.28
Do you avoid sitting with smokers while they smoke?	Yes	265	45.69
	No	247	42.59
	Only in enclosed spaces	68	11.72
If you smoke do you want to stop smoking?	Yes	80	13.79
	No	94	16.21
	Not applicable	406	70.00
In your opinion, is there a commitment to laws of smoking prohibition at the university?	Yes	143	24.66
	No	437	75.34

**Table 5: The relationship between demographic characteristics and cigarette smoking among Kassala University students, Sudan.**

Variable		Smoker	Not smoker	Ex-smoker	P-value
<b>Sex</b>	Male	61.5	33.8	4.6	< 0.01*
	Female	4.4	84.4	11.3	
<b>Level of study</b>	First	29.8	62.5	7.7	> 0.05
	Third	31.6	63.3	5.1	
	Fourth	35.7	54.8	9.5	
	Fifth	38.2	52.6	9.2	
	Sixth	29.1	60.8	10.1	
	Seventh	18.5	72.3	9.2	
	Eighth	24.3	67.6	8.1	
	<b>Faculty</b>	Agriculture and Natural Resources	21.9	72.9	
Computer Science and Information Technology		36.0	51.2	12.8	
Medicine and Health Sciences		23.8	70.6	5.6	
Sciences		23.4	69.1	7.4	
Engineering		43.1	46.6	10.3	
Law		42.2	46.7	11.1	
Education		37.9	51.7	10.3	
Male		21.9	72.9	5.2	

(\*) significant

## Discussion:

The study aimed to measure the proportion of smoking behavior and determine possible associated factors behind the phenomenon among a total of 580 participants in Kassala University, Sudan.

The overall rate of smoking was found to be 30.00%, this figure represents really a significant social and health problem among both male and female target students. Males scored higher rates than female students as of male students mentioned smokers, compared to only few numbers of female students.

The gender differences in smoking behavior was reported by various studies conducted in Sudan, Egypt and Similarly, in Saudi Arabia. These studies suggested that gender differences in smoking behavior could largely be attributed to the social stigma associated with smoking of females (Ahmed, 2013).

Regarding factors associated with cigarette smoking, the study elicited many possible predisposing and enabling factors as majority of the participants ignored the adverse effects of active smoking and most of them expressed negative attitudes towards the desire to quit smoking. Enabling determinants including, exam period, leisure, personal/professional problems and the influence of peer smokers.

The association between socio-demographic characteristics and cigarette smoking behavior was statistically interpreted as insignificant with all of them (p-value > 0.05), except with the age where strong relationship was found between the age of participants and their smoking behavior (p-value < 0.01).

In comparison the overall rate of smoking reported by this study, it is clearly noticed as high when compared to the findings of the study conducted by Hala, Elnazeer, E. et al., 2021, among the students of College of Pharmacy in Yarmouk and Ribat National University – Sudan,

in which the rate of smokers were found to be low (Mohammedb, 2021).

Another relatively low proportion of smoking was reported by **Animut Takele Telayneh, et. al., 2021** in their a study conducted amongst the Amhara, Ethiopia Teachers' Education students, the prevalence of cigarette smoking is found to be also low (**Telayneh et al., 2021**).

Low rates of smoking was also demonstrated in a study conducted by **Omar Al Omari,etal, 2021**, among university students in Oman in which the rate of smoking among the participants was found to be (9.0%) (**Al Omari et al., 2021**).

The closer study to the current is that conducted by Karim M, et. al., 2016. in Bangladesh, in which the overall prevalence of cigarette smoking was found to be high (**Zaman et al., 2016**).

In contrast, the prevalence rate of smoking reported by this study may not considered surprising when compared to many other studies conducted in different countries among the same study participants. **Al-Naggar, et. al., 2013**, in Malaysia reported near half as a rate of smokers university students (**Al-Naggar et al., 2013**).

The overall prevalence of cigarette smoking among students at University of Azad Jammu and Kashmir in Muzaffarabad in Pakistan was to be about half (**Jamshed et al., 2017**).

The smoking rate of medical students was found to be about one third for males, and less among females in a study conducted by **Frusan Fakili, et. al., 2023 in Turkey (Fakili et al., 2023)**. **Again, Abdulaziz, F, et. al., 2011**, also reported more than third as an overall prevalence of cigarette smoking among medical students at King Fahad Medical City in Riyadh of Saudi Arabia (**Al-Kaabba et al., 2011**).

Finally, the study and the other comparative ones mentioned in the discussion shared almost common independent factors associated with the phenomenon of cigarette smoking, notably having smoking friends and/or smoking colleagues, leisure, and means of

relieving psychological pressure.

The cross-sectional design studies, in general does not expect to generate causes and or valid determinants of any social phenomena. The phenomenon of smoking amongst university students is largely expected for bias due the effects of gender variations and social stigma and increases or decreases the false negative or positive responses of participants and this off course the reliability and validity of the obtained data.

This study was designed as a cross-sectional descriptive, measuring the smoking rate of the students at one point of time. researchers stress that smoking behavior is time-dependent, and thus one-time measures of smoking is difficult to identify in exact the whole smoking behavior routes and or predictors, this can be overcome through conducting a longitudinal study design to generate causality as well as assessing associations.

### Conclusion:

The study concluded that the problem of cigarette smoking among the target participants involved in the study represent a significant health problem. The overall rate of smoking was high. The factors associated with smoking reported from participants were setting with smokers, followed by exam period, leisure, and personal/professional problems.

### Recommendations:

These findings indicates that the urgent need for effective university-based health promotion polices and interventions that focused on smoking-free university environment. Further studies should be conducted with more sample and all over the country and with different study design.

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