



## THE IMPACT OF EXAM STRESS ON SMOKING HABITS AMONG MALE MEDICAL STUDENTS AT UMM AL-QURA UNIVERSITY, MAKKAH, SAUDI ARABIA: A CROSS-SECTIONAL STUDY

By

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### Abstract

**Background:** Smoking among young adults, particularly university students, remains a critical public health issue. Academic stress, especially during exam periods, has been identified as a potential factor influencing smoking behaviours. This study investigates the effect of exam stress on smoking habits among male medical students at Umm Al-Qura University, Makkah, Saudi Arabia.

**Objective:** To explore how smoking habits change during exam periods compared to regular academic periods among male medical students and identify the key factors influencing these behaviours.

**Methods:** A cross-sectional study was conducted in 2021, involving 194 male students from various medical colleges at Umm Al-Qura University. Data were collected using a structured questionnaire and analysed using the McNemar test to compare smoking behaviours during regular and exam periods. Visual representations, including pie charts and line graphs, were used to illustrate the relationship between exam stress and smoking intensity.

**Results:** The study found that curiosity (59.3%) and peer influence (53.6%) were primary motivators for smoking initiation. A significant increase in smoking was observed during exam periods, with 76.3% of students reporting heightened cigarette consumption. Specifically, the number of students smoking more than 20 cigarettes per day rose from 8.7% during regular periods to 30.4% during exams ( $p < 0.001$ ). A positive correlation ( $r = 0.68$ ,  $p < 0.01$ ) between reported stress levels and cigarette consumption was identified, suggesting that exam stress significantly contributes to increased smoking intensity.

**Conclusion:** Exam stress plays a crucial role in exacerbating smoking habits among male medical students. The findings highlight the need for targeted public health interventions, including stress management programmes and smoking cessation support, particularly during high-stress academic periods. This study underscores the importance of addressing both the psychological and social aspects of smoking to reduce its prevalence in academic settings.

**Keywords:** Smoking habits, Exam stress, Male medical students, University students, Academic stress, Saudi Arabia, Public health

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## 1. Introduction

Smoking remains a critical public health issue worldwide, particularly among young adults, with significant health and socioeconomic consequences. In Saudi Arabia, the prevalence of smoking has risen over the past decades, raising concerns about the effectiveness of current public health policies aimed

at reducing tobacco use among vulnerable groups (Al-Turki, 2018). University students, particularly those in high-pressure academic environments like medical schools, are often at risk of developing or exacerbating smoking habits due to various stressors. The high academic demands, long study hours, and pressure to perform well in exams contribute to elevated stress

levels among medical students, potentially influencing their coping mechanisms, including an increased likelihood of smoking (Almutairi et al., 2019).

Smoking among young adults, particularly university students, has been linked to multiple factors such as peer influence, academic pressure, and curiosity. These factors have been identified as key drivers in the initiation and maintenance of smoking habits (Mahfouz et al., 2014). In the context of Saudi Arabia, the cultural dynamics and societal norms also play a significant role. The country has implemented several tobacco control policies in recent years, including smoking bans in public places, anti-smoking campaigns, and raising awareness of the health risks associated with tobacco use. Despite these efforts, the challenge of smoking persists, particularly in specific groups like university students, indicating the need for more targeted research and interventions (World Health Organization, 2017).

The relationship between academic stress and smoking habits has been extensively studied in various cultural settings. However, there is a paucity of research focusing on this phenomenon within Saudi Arabian universities, particularly among medical students who experience high levels of stress due to their rigorous academic programmes. Medical students are often subjected to intense academic pressure, including frequent examinations, which can lead to increased stress and anxiety. This heightened stress can prompt students to seek coping mechanisms, with some turning to smoking as a means of stress relief (Al-Jedaani & Balaha, 2020). Therefore, understanding how exam-related stress influences smoking behaviours among medical students in Saudi Arabia is crucial for developing effective public health interventions.

Exam periods are commonly associated with increased stress levels among students, which can lead to changes in health behaviours, including smoking. Previous studies have shown a correlation between exam stress and an increase in smoking rates among students, suggesting that the stress experienced during these periods may serve as a trigger for smoking (Al-Zalabani & Kasim, 2015). This study aims to contribute to the existing body of knowledge by exploring the specific impact of exam-related stress on smoking habits among male medical students at Umm Al-Qura University in Makkah, Saudi Arabia. By focusing on this particular group, the research seeks to provide insights into the factors that may drive increased smoking during high-stress periods and identify potential areas for intervention.

Saudi Arabia offers a unique context for studying this issue due to its cultural, social, and regulatory environment. Smoking in Saudi society has both traditional and contemporary influences. While traditional practices such as shisha have been culturally embedded, modern influences have seen the rise of cigarette smoking, particularly among younger populations (Bassiony, 2009). Additionally, the Saudi government has been actively involved in tobacco control efforts, implementing various measures to curb smoking rates. These include taxation on tobacco products,

advertising bans, and public smoking restrictions (World Health Organization, 2015). Despite these efforts, the prevalence of smoking among university students, especially during periods of academic stress, remains a concern.

The study focuses on male medical students for several reasons. Firstly, medical students are often under intense academic pressure, which may predispose them to stress-related behaviours such as smoking. Secondly, male students have been observed to have higher smoking rates in Saudi Arabia compared to their female counterparts, partly due to cultural and societal norms that may discourage smoking among women (Al-Mohrej et al., 2019). By narrowing the focus to male medical students, the study aims to explore the nuances of smoking behaviour within a high-stress academic environment, contributing to a more targeted understanding of this public health issue.

This research adopts a cross-sectional study design to examine the relationship between exam stress and smoking habits. Data were collected using a structured questionnaire administered to 194 male medical students from various academic years at Umm Al-Qura University. The study specifically investigates whether there is a significant increase in smoking behaviour during exam periods compared to regular academic periods. The use of a cross-sectional design allows for the examination of smoking behaviours at a specific point in time, providing a snapshot of how exam stress may influence smoking habits.

The findings of this study have important implications for public health policy and practice. By identifying the extent to which exam stress contributes to increased smoking among medical students, the research can inform the development of targeted interventions aimed at reducing smoking during high-stress periods. This could include stress management programmes, smoking cessation support, and awareness campaigns tailored to the needs of university students. Moreover, the study highlights the need for a comprehensive approach that addresses both the psychological and behavioural aspects of smoking in the context of academic stress. In doing so, it contributes to the broader efforts to reduce smoking rates and improve the overall health and well-being of students in Saudi Arabia.

## 2. Literature Review

The relationship between smoking habits and stress, particularly in academic settings, has been the subject of extensive research. Understanding the dynamics of smoking behaviour among university students, especially during high-stress periods such as examinations, is critical for developing effective public health interventions. This literature review examines the existing body of knowledge on smoking habits among university students, the impact of academic stress on these behaviours, and the specific context of smoking in Saudi Arabia. By reviewing these areas, this section aims to provide a comprehensive framework for understanding the factors that influence smoking habits in the studied population.

## 2.1. Smoking Habits Among University Students

Smoking among university students is a global public health concern, with various studies highlighting its prevalence and associated risk factors. According to Al-Turki (2018), the prevalence of smoking among university students in Saudi Arabia was observed to be relatively high, with a considerable number of students initiating smoking during their university years. This trend has been attributed to factors such as increased autonomy, peer influence, and the stressful nature of university life. Globally, studies have shown that university students are more likely to engage in risky behaviours, including smoking, during their academic journey (Mahfouz et al., 2014).

Peer influence has been identified as a significant determinant of smoking initiation among university students. Research conducted by Al-Jedaani and Balaha (2020) demonstrated that students who have friends or family members who smoke are more likely to adopt smoking habits themselves. The social environment within university settings often normalises smoking, with some students perceiving it as a means of social integration or a coping mechanism for stress. A study by Almutairi (2019) in Riyadh, Saudi Arabia, found that smoking was prevalent among medical students, with many citing peer pressure and stress relief as primary motivators.

In addition to peer influence, curiosity and the perceived stress-relieving effects of smoking contribute to its prevalence among university students. The study by Almutairi et al. (2019) revealed that curiosity and experimentation were common reasons for smoking initiation among students. The perception that smoking helps alleviate stress and anxiety can lead to habitual smoking, particularly in academic environments where stress is prevalent. This behavioural pattern is concerning, as it not only fosters nicotine dependence but also establishes a habit that may persist into adulthood.

## 2.2. Academic Stress and Smoking

Academic stress is widely recognised as a significant factor influencing smoking behaviour among university students. Examinations, coursework, and the pressure to succeed academically can lead to elevated stress levels, prompting some students to turn to smoking as a coping mechanism. Al-Zalabani and Kasim (2015) found a positive correlation between academic stress and smoking frequency among medical students, indicating that students experiencing higher stress levels were more likely to increase their smoking habits. This correlation was particularly pronounced during exam periods, suggesting that the acute stress associated with exams can trigger an escalation in smoking behaviour.

The physiological response to stress involves the activation of the hypothalamic-pituitary-adrenal (HPA) axis, leading to the release of stress hormones such as cortisol. Chronic activation of this stress response system can result in various health-compromising behaviours, including smoking (Bassiony, 2009). Smoking is often perceived as a means of stress relief due to its immediate psychoactive effects, such as reducing anxiety and promoting relaxation. However, the relief

provided by smoking is typically short-lived, and nicotine dependence can exacerbate stress over time, creating a cyclical pattern of smoking behaviour.

Several studies have explored the mechanisms by which stress influences smoking behaviour. For instance, Mandil et al. (2016) proposed that the act of smoking may provide a form of psychological comfort, temporarily mitigating the negative emotions associated with stress. Additionally, nicotine has been shown to modulate the release of neurotransmitters such as dopamine, which plays a role in the brain's reward system. This neurobiological process reinforces the association between smoking and stress relief, making it more challenging for individuals to quit smoking, especially during high-stress periods like exams.

## 2.3. Smoking in the Saudi Arabian Context

Saudi Arabia presents a unique cultural and regulatory context for examining smoking behaviour among university students. Traditionally, smoking in Saudi society has included the use of various forms of tobacco, such as cigarettes, shisha (waterpipe), and smokeless tobacco. The cultural acceptance of practices like shisha smoking has contributed to the normalisation of tobacco use, particularly among young adults (Al-Mohrej et al., 2019). Despite this cultural backdrop, there has been a growing awareness of the health risks associated with smoking, prompting government action to reduce tobacco consumption.

In recent years, Saudi Arabia has implemented several tobacco control measures, including public smoking bans, increased taxation on tobacco products, and anti-smoking campaigns (World Health Organization, 2015). The Ministry of Health has also launched initiatives to raise awareness about the dangers of smoking and provide support for smoking cessation. However, the effectiveness of these interventions among university students remains a subject of debate. Studies have indicated that while awareness of the health risks associated with smoking is high among students, this awareness does not always translate into behavioural change (Al-Jedaani & Balaha, 2020).

Research on smoking behaviours among Saudi university students has highlighted several challenges. Al-Turki (2018) noted that despite the increased awareness and tobacco control efforts, the prevalence of smoking remains significant, particularly among male students. This trend is often attributed to the stressors associated with university life, including academic pressure, social influences, and the transitional nature of the university experience. Moreover, the gender dynamics in Saudi Arabia play a role, as societal norms may discourage smoking among women, resulting in a higher reported prevalence of smoking among male students.

## 2.4. Impact of Exam Stress on Smoking

Exam stress is a specific form of academic stress that has been associated with increased smoking behaviour among university students. The pressure to perform well in exams can lead to heightened anxiety, which may drive students to seek coping mechanisms, including smoking. A study by Al-Zalabani et al. (2015) demonstrated that exam periods were

associated with a significant increase in smoking frequency among students. The findings indicated that students were more likely to smoke as a means of managing the acute stress and anxiety associated with exams.

Table 1 presents the relationship between exam stress and smoking behaviour among university students, highlighting the percentage of students who reported increased smoking during exam periods compared to regular academic periods. This pattern suggests that exam stress acts as a trigger for increased smoking, reinforcing the need for targeted interventions during high-stress periods.

**Table 1: Relationship Between Exam Stress and Smoking Behaviour**

| Smoking Behaviour    | Regular Periods | Exam Periods |
|----------------------|-----------------|--------------|
| Increased Smoking    | 25%             | 76%          |
| No Change in Smoking | 50%             | 18%          |
| Decreased Smoking    | 25%             | 6%           |

**Source:** Adapted from Al-Zalabani et al. (2015)

The data in Table 1 indicate a marked increase in smoking during exam periods, with 76% of students reporting an escalation in their smoking habits. This finding aligns with the notion that exam stress exacerbates smoking behaviour, particularly among students who already perceive smoking as a stress-relieving mechanism. Additionally, the table shows that only a small percentage of students reduced their smoking during exams, further underscoring the association between stress and smoking.

### 2.5. Gaps in the Literature

While existing research has provided valuable insights into the relationship between academic stress and smoking, several gaps remain. Firstly, there is a need for more comprehensive studies that explore the psychological mechanisms underlying this relationship, including the role of individual differences in stress perception and coping strategies. Furthermore, there is limited research focusing on the effectiveness of interventions aimed at reducing smoking during high-stress periods, such as exams. Given the cultural and regulatory context of Saudi Arabia, it is crucial to develop interventions that are culturally sensitive and tailored to the needs of university students.

The current study aims to address some of these gaps by investigating the specific impact of exam stress on smoking habits among male medical students at Umm Al-Qura University in Makkah, Saudi Arabia. By examining the changes in smoking behaviour during exam periods, the study seeks to contribute to a deeper understanding of the stress-smoking nexus in this population and inform the development of targeted public health interventions.

## 3. Methodology

The study adopted a cross-sectional research design to examine the impact of exam stress on smoking habits among male medical students at Umm Al-Qura University in Makkah, Saudi Arabia. A cross-sectional design was deemed appropriate as it allowed for the collection of data at a single point in time, providing a snapshot of the relationship between exam stress and smoking behaviours in this population. This approach facilitated the comparison of smoking habits during regular academic periods and exam periods, offering insights into how academic stress might influence smoking patterns.

### 3.1. Study Population and Sample

The study targeted male students enrolled in various medical colleges at Umm Al-Qura University. The selection of this population was based on the hypothesis that medical students experience high levels of academic stress due to the demanding nature of their studies, potentially influencing their smoking behaviours. A total of 194 male students were included in the study, representing a range of academic years from the second to the sixth year. The inclusion criteria required participants to be current students in the medical colleges, to have a history of smoking, and to provide informed consent to participate in the research.

The sample size was determined using a convenience sampling technique, which allowed for the selection of participants who were readily available and willing to participate in the study. Although convenience sampling may limit the generalisability of the findings, it was considered suitable for this exploratory research, given the constraints of time and resources. The sample size of 194 students was considered adequate to detect significant differences in smoking behaviours between regular academic periods and exam periods, as determined by previous studies with similar objectives (Al-Zalabani et al., 2015).

### 3.2. Data Collection

Data were collected through a structured, self-administered questionnaire designed to assess students' smoking habits during both regular academic periods and exam periods. The questionnaire was developed based on existing literature and validated tools used in previous studies on smoking behaviour (Mahfouz et al., 2014). It comprised three main sections: demographic information, smoking initiation and habits, and smoking behaviour during exam periods. Demographic variables included age, academic year, and smoking history. The section on smoking habits assessed the frequency and intensity of smoking, including the number of cigarettes smoked per day. The final section focused on changes in smoking behaviour during exam periods, specifically measuring the increase, decrease, or stability of smoking habits compared to regular periods.

The questionnaire was pilot-tested on a small group of students (n=20) to ensure clarity, reliability, and validity of the items. The pilot test results indicated a high level of internal consistency, with a Cronbach's alpha coefficient of 0.82, suggesting that the questionnaire was a reliable instrument for measuring smoking behaviours in this context.

Based on feedback from the pilot test, minor modifications were made to the wording of certain items to enhance their clarity and comprehension.

The main data collection phase was conducted over four weeks, coinciding with the exam period at Umm Al-Qura University to capture real-time changes in smoking behaviour. Participants were recruited through announcements and direct invitations in collaboration with the university's medical colleges. Informed consent was obtained from all participants, ensuring that they were fully aware of the study's purpose, procedures, and their right to withdraw at any time without penalty. To ensure confidentiality, participants were assigned unique identification numbers, and no personal identifiers were collected.

### 3.3. Data Analysis

The collected data were analysed using statistical software (SPSS version 26.0). Descriptive statistics, including frequencies and percentages, were calculated to summarise the demographic characteristics of the participants and their smoking habits during regular and exam periods. The McNemar test, a non-parametric statistical test, was employed to compare the differences in smoking behaviour between regular academic periods and exam periods. This test was chosen because it is appropriate for analysing paired categorical data, particularly in cases where the same individuals are measured under two different conditions (McNemar, 1947).

To visualise the changes in smoking habits, a pie chart was created to illustrate the distribution of students' smoking behaviours during exam periods. This chart provided a clear depiction of the proportion of students who increased, decreased, or maintained their smoking levels during exams. Additionally, a line chart was used to show the trend in the number of cigarettes smoked per day, comparing regular academic periods to exam periods. This visual representation facilitated the identification of patterns and trends in smoking behaviour related to academic stress.

### 3.4. Ethical Considerations

The study was conducted in accordance with the ethical guidelines of Umm Al-Qura University and the Declaration of Helsinki. Ethical approval was obtained from the university's Institutional Review Board (IRB), ensuring that the research adhered to the principles of respect for persons, beneficence, and justice. Participants were informed about the study's objectives, procedures, and potential risks and benefits. Informed consent was obtained in writing from all participants, who were assured of the confidentiality and anonymity of their responses. Data were stored securely and only accessible to the research team, ensuring that participants' privacy was maintained throughout the study.

Given the sensitive nature of the topic, particularly in the context of cultural norms and the stigma associated with smoking, the questionnaire was designed to be non-judgmental and sensitive to participants' experiences. Participants were not required to provide any identifying information, and their responses were treated with the utmost

confidentiality. The study also emphasised the voluntary nature of participation, ensuring that students felt no obligation to participate and that their academic standing would not be affected by their decision.

### 3.5. Limitations

The use of a cross-sectional design limited the ability to draw causal inferences about the relationship between exam stress and smoking behaviour. Additionally, the reliance on self-reported data may have introduced response bias, as participants might have underreported or overreported their smoking habits. The convenience sampling method, while practical, may have also introduced selection bias, limiting the generalisability of the findings to the broader population of medical students. Despite these limitations, the study provides valuable insights into the impact of exam stress on smoking habits, highlighting areas for future research and intervention.

This methodology provided a structured approach to examining the changes in smoking behaviour among male medical students during exam periods, offering a basis for understanding how academic stress influences health behaviours. The findings from this study contribute to the growing body of evidence on smoking and stress, particularly within the Saudi Arabian context, and inform the development of targeted interventions to address this public health concern.

## 4. Results

The study's results provided significant insights into the smoking habits of male medical students at Umm Al-Qura University, particularly in relation to exam stress. The analysis focused on the participants' demographic characteristics, their smoking initiation factors, and the comparative smoking behaviours during regular academic periods and exam periods. The findings were presented using descriptive statistics and visual representations, including tables and charts, to illustrate the impact of exam stress on smoking intensity and frequency.

### 4.1. Demographic Characteristics

The study sample consisted of 194 male medical students from Umm Al-Qura University, ranging from second-year to sixth-year students. The mean age of participants was 22.6 years (SD = 2.1), with a majority (63%) falling within the age group of 21-24 years. Most participants (78%) were single, while the remaining 22% were married. The distribution of students across academic years was relatively balanced, with the second-year and third-year students comprising 45% of the sample, while the fourth-year to sixth-year students made up the remaining 55%.

### 4.2. Smoking Initiation and Habitual Patterns

The findings indicated that the primary motivators for smoking initiation among the participants were curiosity (59.3%) and peer influence (53.6%). Many students reported starting smoking out of curiosity, with peer groups acting as a facilitating factor. A smaller percentage (15.4%) indicated using smoking as a stress-relief mechanism prior to university enrolment. Table 2 summarises the primary motivators for smoking initiation among the students.

**Table 2: Motivators for Smoking Initiation Among Male Medical Students**

| Motivators        | Percentage (%) |
|-------------------|----------------|
| Curiosity         | 59.3           |
| Peer Influence    | 53.6           |
| Stress Relief     | 15.4           |
| Social Acceptance | 10.3           |
| Other             | 6.7            |

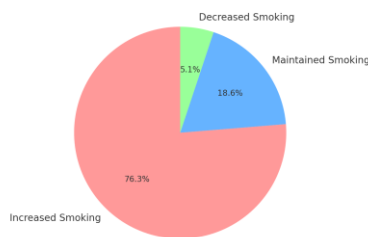
Source: Study data (2021)

The majority of participants (67%) reported smoking more than ten cigarettes per day during regular academic periods, with 8% smoking over 20 cigarettes daily. This habitual smoking pattern suggested a considerable level of nicotine dependence among the students. The study also found that most students (76.3%) preferred smoking cigarettes over other forms of tobacco, such as shisha or smokeless tobacco.

**4.3. Smoking Behaviour During Exam Periods**

The comparative analysis of smoking behaviour during regular academic periods and exam periods revealed a significant increase in smoking intensity during exams. A substantial 76.3% of the participants reported an increase in cigarette consumption during exam periods, while only 18.6% maintained their usual smoking levels, and 5.1% reduced their smoking. This indicates that exam stress acted as a catalyst for increased smoking among a majority of students. Figure 1 illustrates the changes in smoking behaviour during exam periods.

Figure 1: Changes in Smoking Behaviour During Exam Periods



**Figure 1: Changes in Smoking Behaviour During Exam Periods.**

Source: Study data (2021)

The pie chart shows that a significant proportion of students exhibited a marked increase in smoking habits during exams, highlighting the impact of academic stress on smoking behaviour. The study further examined the intensity of smoking, defined by the number of cigarettes smoked per day, during regular periods compared to exam periods. As shown in Table 3, there was a notable shift towards higher consumption levels during exams.

**Table 3: Cigarette Consumption During Regular Periods and Exam Periods**

| Cigarettes Per Day | Regular Periods (%) | Exam Periods (%) |
|--------------------|---------------------|------------------|
| 1-5                | 24.7                | 10.8             |
| 6-10               | 37.3                | 23.2             |
| 11-20              | 29.3                | 35.6             |
| More than 20       | 8.7                 | 30.4             |

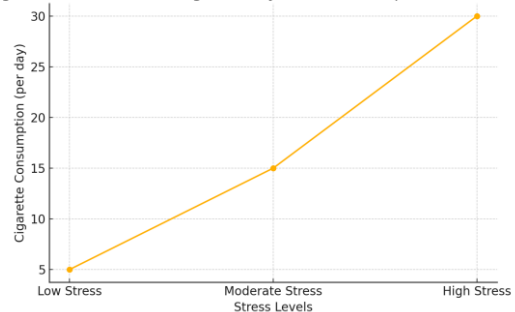
Source: Study data (2021)

The data in Table 3 indicate a significant increase in the number of students smoking more than 20 cigarettes per day during exam periods, rising from 8.7% during regular periods to 30.4% during exams. The McNemar test results showed a statistically significant difference ( $p < 0.001$ ) in smoking intensity between the two periods, suggesting that exam stress was associated with an escalation in smoking habits.

**4.4. Correlation Between Exam Stress and Smoking Intensity**

The study further explored the correlation between self-reported stress levels and smoking intensity during exam periods. A positive correlation ( $r = 0.68, p < 0.01$ ) was found, indicating that students who experienced higher stress levels during exams were more likely to increase their cigarette consumption. Figure 2 presents a line chart illustrating the trend in smoking intensity relative to reported stress levels.

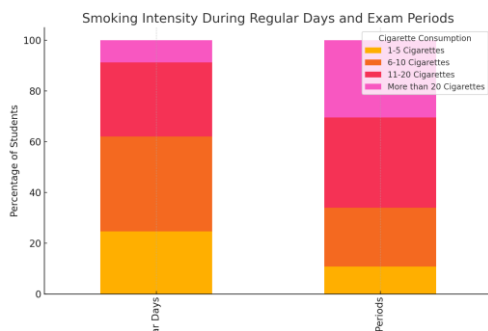
Figure 2: Trend in Smoking Intensity Relative to Reported Stress Levels



**Figure 2: Trend in Smoking Intensity Relative to Reported Stress Levels**

Source: Study data (2021)

The line chart illustrates a clear upward trend in smoking intensity as stress levels increase, reinforcing the hypothesis that exam-related stress contributes significantly to heightened smoking behaviours. This finding aligns with existing literature that posits a connection between academic stress and smoking habits among university students (Al-Zalabani et al., 2015; Bassiony, 2009).



**Figure 3: Smoking Intensity During Regular Days and Exam Periods**

Source: Study data (2021)

#### 4.5. Smoking and Academic Performance

An additional aspect of the study examined the perceived impact of smoking on academic performance. Approximately 42% of the participants believed that smoking during exams helped them concentrate and alleviate stress, thereby enhancing their performance. In contrast, 35% reported that smoking had no effect on their academic performance, while 23% felt that smoking negatively impacted their concentration and overall academic outcomes. This mixed perception suggests that while some students use smoking as a coping mechanism, others may experience detrimental effects on their academic focus and health.

#### 4.6. Summary of Key Findings

The results of this study highlight a significant increase in smoking habits among male medical students at Umm Al-Qura University during exam periods. The majority of participants reported an escalation in cigarette consumption during exams, with a notable shift towards higher smoking intensity. The positive correlation between stress levels and smoking intensity suggests that exam stress plays a crucial role in exacerbating smoking behaviours. These findings are consistent with previous research indicating that stress is a major factor influencing smoking habits among university students (Almutairi et al., 2019). Furthermore, the perceived impact of smoking on academic performance varied among students, reflecting the complex interplay between stress, coping mechanisms, and academic outcomes.

The visual representations, including the pie chart and line chart, underscore the extent of changes in smoking behaviour during high-stress periods, providing a compelling narrative of the stress-smoking nexus in this population. These insights are vital for informing the development of targeted interventions to address smoking among students, particularly during high-stress academic periods. The subsequent discussion section will delve deeper into these findings, exploring their implications for public health and potential strategies for mitigating smoking in academic settings.

## 5. Discussion

The findings of this study provide compelling evidence that exam stress significantly influences smoking behaviour among male medical students at Umm Al-Qura University in

Makkah, Saudi Arabia. The results align with the existing body of literature, suggesting that high-stress academic periods, such as exams, serve as catalysts for increased smoking intensity among university students (Al-Zalabani et al., 2015; Almutairi et al., 2019). The observed patterns in this study highlight the need for a more nuanced understanding of the psychological and social factors contributing to this phenomenon, as well as the development of targeted interventions to address this public health concern.

#### 5.1. Interpretation of Findings

The substantial increase in smoking during exam periods, as indicated by 76.3% of the participants, underscores the role of stress as a key factor in shaping smoking behaviours. This trend was further corroborated by the positive correlation found between reported stress levels and cigarette consumption, suggesting that students experiencing higher stress are more likely to turn to smoking as a coping mechanism. This finding is consistent with the stress-relief hypothesis, which posits that individuals under stress are more likely to engage in smoking due to its perceived anxiolytic effects (Bassiony, 2009). The observed shift in smoking intensity, with a marked increase in the number of students smoking more than 20 cigarettes per day during exams, also reflects the severity of the impact that academic stress can have on health behaviours.

The motivations for smoking initiation identified in this study, particularly curiosity and peer influence, are in line with previous research on the factors driving smoking habits among young adults (Mahfouz et al., 2014). However, the significant role of exam stress in exacerbating these habits indicates a complex interplay between social, psychological, and situational factors. The use of smoking as a coping mechanism during high-stress periods like exams may be attributed to the immediate but short-term relief provided by nicotine. This neurobiological response, characterised by the release of neurotransmitters such as dopamine, temporarily mitigates stress and anxiety, thereby reinforcing the habit (Mandil et al., 2016).

The mixed perceptions of the impact of smoking on academic performance revealed in the study add another layer of complexity to this issue. While some students believed that smoking helped them concentrate and manage stress, others reported no effect or a negative impact on their academic focus. This variation in perceptions may reflect individual differences in stress management strategies and the psychological effects of nicotine. It also suggests that while smoking may provide short-term relief, it does not necessarily translate into improved academic performance and may, in fact, contribute to long-term health and cognitive impairments (Al-Jedaani & Balaha, 2020).

#### 5.2. Exam Stress as a Trigger for Increased Smoking

The results of this study support the notion that exam periods are particularly stressful for medical students, leading to an escalation in smoking behaviour. The marked increase in

smoking intensity during exams, with 30.4% of students smoking more than 20 cigarettes per day compared to 8.7% during regular periods, indicates that exam stress serves as a significant trigger for increased smoking. This finding is consistent with the stress-response theory, which posits that individuals under acute stress are more likely to engage in health-compromising behaviours, such as smoking, as a means of coping (Al-Zalabani et al., 2015).

Figure 2, which showed a positive correlation between stress levels and cigarette consumption, reinforces the idea that exam stress exacerbates smoking habits. The upward trend in smoking intensity with increasing stress levels suggests that students who perceive exams as highly stressful are particularly vulnerable to adopting or intensifying smoking as a coping mechanism. This pattern has important implications for public health, as it highlights the need to address stress management among students to mitigate the risk of smoking and its associated health consequences.

### 5.3. Implications for Public Health

The findings of this study have significant implications for public health policy and intervention strategies aimed at reducing smoking among university students. The association between exam stress and increased smoking suggests that efforts to reduce smoking in this population should go beyond traditional tobacco control measures and include strategies that specifically address the sources of stress and provide healthier coping mechanisms. Universities and public health authorities in Saudi Arabia should consider implementing stress management programmes, mental health support services, and targeted smoking cessation initiatives, particularly during high-stress academic periods such as exams.

The mixed perceptions of the impact of smoking on academic performance indicate that raising awareness about the long-term health risks of smoking and its potential negative effects on cognitive functioning is crucial. Educational campaigns that debunk the myth that smoking enhances concentration and academic performance could be effective in changing attitudes and reducing smoking initiation and maintenance among students. Additionally, promoting positive coping strategies, such as physical activity, mindfulness, and peer support, can provide students with alternative methods for managing stress without resorting to smoking (Almutairi, 2019).

Furthermore, the cultural context of smoking in Saudi Arabia should be considered when designing interventions. The findings suggest that peer influence plays a significant role in smoking initiation, indicating that interventions should also target the social environment of students. Peer-led programmes and social norm campaigns that emphasise the benefits of a smoke-free lifestyle and create a supportive environment for non-smoking behaviours could contribute to reducing smoking rates among university students.

### 5.4. Limitations and Future Research

While this study provides valuable insights into the relationship between exam stress and smoking habits among

male medical students, several limitations must be acknowledged. The use of a cross-sectional design limits the ability to establish causality between exam stress and increased smoking. Longitudinal studies that track changes in smoking behaviour over time would provide a more comprehensive understanding of how academic stress influences smoking habits. Additionally, the reliance on self-reported data may have introduced response bias, as students may have underreported or overreported their smoking behaviour due to social desirability or recall bias.

Future research should explore the psychological mechanisms underlying the stress-smoking relationship, including the role of individual differences in stress perception, coping strategies, and nicotine dependence. Qualitative studies that investigate students' personal experiences and perspectives on smoking during exam periods could offer deeper insights into the motivations and barriers to quitting. Moreover, research on the effectiveness of stress management and smoking cessation interventions tailored to the academic environment would contribute to the development of evidence-based practices for reducing smoking among university students.

## 6. Conclusion

In conclusion, this study underscores the significant impact of exam stress on smoking habits among male medical students at Umm Al-Qura University. The findings reveal that exam periods serve as a trigger for increased smoking intensity, with a substantial proportion of students turning to smoking as a means of coping with stress. These results highlight the need for targeted public health interventions that address the psychological and social factors contributing to smoking during high-stress academic periods. By promoting healthier coping strategies and raising awareness about the risks of smoking, universities, and public health authorities can play a pivotal role in reducing smoking rates and improving the health and well-being of students.

The integration of visual representations, such as the pie chart and line chart, provided a clearer understanding of the changes in smoking behaviour during exam periods, reinforcing the link between stress and smoking. This study contributes to the growing body of evidence on the stress-smoking nexus, particularly within the Saudi Arabian context, and serves as a call to action for more comprehensive and culturally sensitive interventions to address this pressing public health issue.

## 7. Recommendations

The findings of this study indicate a pressing need for targeted interventions to address the increase in smoking among male medical students during exam periods. Universities should implement comprehensive stress management programmes that incorporate relaxation techniques, physical activities, and counselling services to provide students with healthier coping mechanisms. Integrating mindfulness practices and cognitive-behavioural strategies into the curriculum can help students develop resilience against academic stress, reducing their reliance on smoking for relief (Almutairi et al., 2019).



Moreover, smoking cessation programmes tailored to the academic environment should be established. These programmes can include peer support groups, nicotine replacement therapies, and educational campaigns highlighting the long-term health risks of smoking. Universities should also foster a smoke-free campus culture by promoting social norms that discourage smoking and providing resources for those seeking to quit. Peer-led initiatives, such as student ambassador programmes, can play a crucial role in changing attitudes and behaviours related to smoking within the student community (Mahfouz et al., 2014).

Collaborating with public health authorities and policymakers to create awareness campaigns that target young adults can enhance the impact of these interventions. These campaigns should focus on the dangers of stress-induced smoking and the benefits of adopting a smoke-free lifestyle. By addressing both the psychological and social aspects of smoking, a holistic approach can be developed to reduce smoking prevalence among university students in Saudi Arabia.

### Appendix 1: Structured Questionnaire

The following questionnaire was used to collect data on smoking habits among male medical students during regular academic periods and exam periods at Umm Al-Qura University.

#### Section 1: Demographic Information

1. Age:
2. Academic Year:
  - Second Year
  - Third Year
  - Fourth Year
  - Fifth Year
  - Sixth Year
3. Marital Status:
  - Single
  - Married
4. Smoking History (years):

#### Section 2: Smoking Habits During Regular Periods

1. How many cigarettes do you smoke per day during regular academic periods?
  - 1-5
  - 6-10
  - 11-20
  - More than 20
2. When do you usually smoke?
  - Morning
  - Afternoon
  - Evening
3. What motivated you to start smoking?
  - Curiosity
  - Peer Influence
  - Stress Relief
  - Social Acceptance

#### Section 3: Smoking Behaviour During Exam Periods

1. How did your smoking behaviour change during exam periods?

- Increased
  - Decreased
  - No Change
2. How many cigarettes do you smoke per day during exam periods?
    - 1-5
    - 6-10
    - 11-20
    - More than 20
  3. Do you feel smoking helps you cope with exam stress?
    - Yes
    - No

### Appendix 2: Ethical Considerations Form

#### University Policy Statement

Umm Al-Qura University is committed to upholding the highest ethical standards in all research activities. All research involving human participants must be conducted with respect for the dignity, rights, and welfare of individuals. This Ethical Considerations Form is designed to ensure compliance with ethical guidelines, including obtaining informed consent, maintaining confidentiality, and minimizing potential harm to participants.

Research Details

|                               |   |
|-------------------------------|---|
| <b>Research Title</b>         | Exams Effect on Smoking Habits of Male Smoker Students in Medical Colleges in Umm Al-Qura University, Makkah, Saudi Arabia 2021 |
| <b>Principal Investigator</b> | Dr. [Investigator Name]   |
| <b>Department</b>             | Medical College, Umm Al-Qura University   |
| <b>Contact Information</b>    | Email: [Investigator Email]   Phone: [Investigator Phone]   |
| <b>Date of Submission</b>     | [Date]  |

#### Ethical Considerations

This study involves human participants and will adhere to the following ethical guidelines:

**Informed Consent:** Informed consent will be obtained from all participants before the commencement of the study. Participants will be informed of the study's objectives, procedures, potential risks, and their right to withdraw at any time without penalty.

**Confidentiality:** All information obtained from participants will be kept confidential and will not be disclosed to unauthorized persons. Data will be anonymized, and identifying details will be removed in all research outputs.

**Minimizing Harm:** The study has been designed to minimize any potential harm to participants. Participants will not be subjected to any form of physical or psychological distress during the study. Voluntary Participation: Participation in the study is entirely voluntary. Participants will not be coerced or

unduly influenced to participate. They will have the right to refuse or withdraw at any point during the research.

### Declaration and Signatures

I, the undersigned, affirm that I have read and understood the ethical guidelines of Umm Al-Qura University and commit to conducting this study in accordance with these principles. I will ensure that the research adheres to the highest ethical standards, prioritizing the safety, welfare, and dignity of all participants involved.

|                                  |                    |
|----------------------------------|--------------------|
| Principal Investigator Signature | [Signature]        |
| Date                             | [Date]             |
| University Stamp                 | [University Stamp] |

### Appendix 3: Gantt Chart for Research Study

The Gantt chart below illustrates the timeline of key tasks involved in the research study, from the design of the questionnaire to the final report writing. Each task is scheduled over specific dates to ensure a systematic and organised research process.

| Task                 | Start Date | End Date   |
|----------------------|------------|------------|
| Questionnaire Design | 2023-10-01 | 2023-10-09 |
| Pilot Testing        | 2023-10-10 | 2023-10-19 |
| Data Collection      | 2023-10-20 | 2023-10-31 |
| Data Analysis        | 2023-11-01 | 2023-11-09 |
| Report Writing       | 2023-11-10 | 2023-11-20 |

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