



Triple Threat of E Cigarettes Hookah and Traditional Smoking Among Palestinian University Students: Prevalence Patterns and Motivating Factors

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Abstract: Purpose: This study aimed to examine the prevalence and patterns of traditional cigarette, e-cigarette, and hookah use among Palestinian university students and to explore the sociodemographic factors associated with each form of smoking. **Methodology:** A cross-sectional survey was conducted among 401 students from universities in Ramallah, Nablus, and Hebron between February and May 2024. Participants completed a structured Arabic questionnaire assessing demographic data, smoking behaviors, perceptions, and motivations. **Results:** Among participants, 56.86% reported a history of smoking, with Hookah being the most common type (43.42%), followed by traditional cigarettes (30.26%) and e-cigarettes (26.31%). Smoking status was significantly associated with gender ($\chi^2 = 48.063$, $p < 0.001$), with males more likely to smoke than females (80.1% vs. 44.2%). No significant associations were found with age, marital status, or residency. Gender was also significantly associated with traditional cigarette smoking ($p = 0.0013$) and Hookah use ($p = 0.0056$), whereas no significant difference was observed for e-cigarette use. Traditional smoking was significantly associated with age, academic level, marital status, and income, with higher prevalence among older, married, fourth-year, and higher-income students. Logistic regression showed that males had greater odds of traditional smoking (OR = 3.15, 95% CI: 1.85–5.36), while married students and those with higher incomes were also at increased risk. Other sociodemographic factors showed no consistent associations across smoking types. **Conclusions:** These findings underscore the pressing need for targeted public health interventions, culturally sensitive education campaigns, and university-based prevention programs. **Recommendations:** Universities should implement targeted tobacco-prevention and smoking-cessation programs addressing peer influence, academic stress, and misconceptions about hookah and e-cigarette safety.

Keywords: e-cigarettes, hookah, traditional smoking, tobacco use, Palestinian students

التهديد الثلاثي للسجائر الإلكترونية والأرجيلة والتدخين التقليدي بين طلبة الجامعات الفلسطينية: أنماط الانتشار والعوامل المحفزة

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المخلص: الهدف: هدفت هذه الدراسة إلى تحديد معدل انتشار وأنماط استخدام السجائر التقليدية والسجائر الإلكترونية والأرجيلة بين طلبة الجامعات الفلسطينية، واستكشاف العوامل الاجتماعية والديموغرافية المرتبطة بكل نوع من أنواع التدخين. **المنهجية:** أجريت دراسة مقطعية شملت 401 طالباً وطالبة من جامعات في رام الله ونابلس والخليل خلال الفترة من فبراير إلى مايو 2024. استكمل المشاركون استبانة عربية منظمة تضمنت البيانات الديموغرافية، وسلوكيات التدخين، والتصورات، والدوافع المرتبطة بالتدخين. **النتائج:** أفاد 56.86% من المشاركين بأن لديهم تاريخاً في التدخين، وكانت الأرجيلة أكثر الأنواع انتشاراً (43.42%)، تلتها السجائر التقليدية (30.26%)، ثم السجائر الإلكترونية (26.31%). وارتبطت حالة التدخين ارتباطاً معنوياً بالجنس ($\chi^2 = 48.063$ ، $p < 0.001$)، حيث كانت نسبة المدخنين أعلى بين الذكور مقارنة بالإناث (80.1% مقابل 44.2%). ولم تُسجل علاقات ذات دلالة إحصائية بين التدخين وكل من العمر أو الحالة الاجتماعية أو مكان السكن. كما ارتبط الجنس بصورة معنوية بالتدخين التقليدي ($p = 0.0013$) واستخدام الأرجيلة ($p = 0.0056$)، في حين لم يظهر فرق معنوي في استخدام السجائر الإلكترونية. وارتبط التدخين التقليدي بالعمر والمستوى الأكاديمي والحالة الاجتماعية والدخل، حيث كان أكثر شيوعاً بين الطلبة الأكبر سناً والمتزوجين، وطلبة السنة الرابعة، وذوي الدخل الأعلى. وأظهر تحليل الانحدار اللوجستي أن الذكور كانوا أكثر عرضة للتدخين التقليدي (OR = 3.15، 95% CI: 1.85–5.36)، بينما لم تُظهر العوامل الاجتماعية والديموغرافية الأخرى ارتباطات ثابتة عبر جميع أنواع التدخين. **الاستنتاجات:** تؤكد النتائج الحاجة الملحة إلى تطوير تدخلات فعالة للصحة العامة، وتنفيذ برامج توعوية تراعي الخصوصية الثقافية، إلى جانب تبني برامج وقائية داخل الجامعات للحد من انتشار التدخين بمختلف أنواعه بين طلبة الجامعات الفلسطينية. **التوصيات:** ينبغي على الجامعات تنفيذ برامج مستهدفة للوقاية من التبغ والإقلاع عن التدخين تتناول تأثير الأقران والضغط الأكاديمي والمفاهيم الخاطئة حول سلامة الشيشة والسجائر الإلكترونية.

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Introduction

Tobacco consumption remains a pressing public health concern, particularly among young adults. It encompasses various forms—including traditional cigarettes, hookah (water pipe), chewing tobacco, and e-cigarettes—with nicotine as the primary addictive agent. Globally, tobacco use is responsible for more than 8 million deaths annually, including over one million attributed to secondhand smoke. Notably, approximately 80% of the world's smokers reside in low- and middle-income countries (World Health Organization (WHO), 2022).

Electronic cigarettes (e-cigarettes) are recently popular all over the world as battery-powered devices that heat liquids with nicotine (Aboaziza & Eissenberg, 2015; Bhatnagar et al., 2019). It has been found that the prevalence rates are high and different across the world with up to over 40 % prevalence in certain areas. Although one of the main claims made is that e-cigarettes are a safer option, they also have dangerous chemicals, which are associated with cardiovascular and respiratory diseases. They are used by many in combination with conventional smoking, and there are indications of the possibility of stimulating the development of conventional smoking with the use of e-cigarette, particularly in young individuals affected by their peers and parents (AlMulla et al., 2021)

Among these vulnerable populations, university students are at heightened risk of initiating and maintaining tobacco use. This risk is exacerbated by stress, academic pressure, peer influence, and shifting social norms during the university years. E-cigarette use has risen sharply among youth worldwide (Alshaarawy & Anthony, 2015), while hookah smoking has gained significant popularity in the Middle East due to cultural acceptance, availability of flavored tobacco, and misconceptions about its reduced harm compared to cigarettes (Al-Delaimy & Al-Ani, 2021).

A Jordanian study has discussed smoking habits of 918 Arab nurse and physicians via the Global Professional Health Survey. Findings revealed that the percentage of current smokers was 38.8 but more so among men as compared to women. More than half said they wanted to quit and a good number had already tried to quit. The associated factors in smoking were early initiation of smoking, smoking by parents and shift work. The results indicate that there is an immediate necessity of smoking cessation

program among health professionals aimed at making them effective in promoting tobacco control (Shishani et al., 2011).

The reason is that hookah smoking is perceived as a cultural and social event and is usually linked to social and leisure which has led to its widespread acceptance. Besides, users are under a widespread view that Hookah is less dangerous compared to cigarettes, partly because of the perception that the filtration of water lessens toxins. This misunderstanding creates serious issues of concern to the overall health of the population since it may result in underestimation of the threats to health, sluggishness in the attempt to quit, and greater vulnerability to tobacco diseases. These cultural perceptions have to be tackled to achieve productive health education and tobacco control programs to suit the Middle Eastern cultures.

In the Palestinian context, recent studies have linked smoking behaviors to exam-related stress, social expectations, and insufficient mental health support (Khalifah et al., 2023). Early exposure to tobacco, particularly among adolescent refugees, has been shown to increase the likelihood of continued use into young adulthood (Snoubar et al., 2025). These findings reflect a growing concern over the normalization of smoking within university environments and its implications for long-term public health.

Tobacco uses among Palestinian university students now spans several forms, including traditional cigarettes, hookah, and e-cigarettes. Hookah use, in particular, has become deeply rooted in social and cultural norms. A study by Hawash et al. (2022) identified key drivers such as social acceptability, availability of appealing flavors, weak regulatory frameworks, and widespread misbeliefs about the non-addictive nature of water pipe smoking. Alarming, evidence suggests that a single hookah session can expose users to nicotine and toxins equivalent to 100 cigarettes (Adetona et al., 2021; Hawash et al., 2022).

Though the use of tobacco products among university students has been an issue that has been accorded much attention, most of the studies conducted have involved the individual products. However, poly-tobacco use, using traditional cigarettes, electronic cigarettes, and hookah concurrently (co-use or poly-use) is a matter of concern due to the fact that it is more closely related to the escalation of the risk of addiction, cumulative

health and a low likelihood of quitting (Darawad et al., 2020). Hookah use, in particular, can subject the user to high levels of nicotine as well as poisonous agents and a single instance of use can have a comparable effect to a number of cigarettes. These degrees vary under the length of a session, device, and inhalation patterns, and this fact promotes the need to be attentive to all the types of tobacco consumption among students. Prevention and cessation programs entail development of programs that take into account such patterns (Cooper et al., 2022).

Although in the past, there is research conducted on the use of tobacco products among Palestinian students, this research has not addressed multi-product use especially in this group of students. The study bridges that gap by examining trends in concurrent use of various tobacco products including new forms like e-cigarettes and the use of a larger sample to give a more in-depth look at the behavior of tobacco use among Palestinian students.

Accordingly, the present study aims to address this gap by investigating the prevalence, usage patterns, and sociodemographic correlates of three major forms of tobacco consumption—traditional cigarettes, hookah, and e-cigarettes—among Palestinian university students. It further explores how these behaviors vary across demographic characteristics, academic disciplines, and high-stress periods such as exams. Understanding these patterns is essential to informing context-sensitive prevention strategies and advancing tobacco control efforts within Palestinian higher education institutions.

Aim of the Study:

To investigate the prevalence, patterns, and determinants of traditional cigarette, e-cigarette, and hookah use among Palestinian university students.

Specific Objectives:

1. To determine the prevalence of traditional cigarette, e-cigarette, and hookah use among male and female students.
2. To describe the patterns of use, including frequency, duration, and dual or multiple product use.
3. To examine the sociodemographic factors (age, gender, year of study, residence, family smoking history) associated with each form of smoking.

4. To assess motivating factors behind the initiation and continuation of smoking among students.

Research Questions:

1. What is the prevalence of traditional cigarette, e-cigarette, and hookah use among Palestinian university students?
2. What are the patterns of smoking (frequency, duration, and multiple product use) among these students?
3. Which sociodemographic factors are associated with the use of each type of smoking?
4. What are the main motivating factors influencing students to start or continue smoking?

Methodology

Study Design

A cross-sectional quantitative study, which is well-suited for estimating the prevalence and patterns of tobacco use among university students. This design allows for a snapshot of smoking behaviors and associated sociodemographic variables while also examining possible correlations and differences across subgroups. The study was conducted across selected universities in three major Palestinian cities: Ramallah, Nablus, and Hebron. These urban centers host a diverse student body from both urban and rural backgrounds and represent a variety of socioeconomic conditions.

Population, Sampling, and Sample Size

The study population included all currently enrolled undergraduate students aged 18 years or older, regardless of gender, smoking status, or academic discipline. A convenience sampling technique was used due to feasibility constraints and was based on voluntary participation. Based on a population estimate of 8,000 students and using a 95% confidence level with a 5% margin of error, the minimum required sample size was calculated to be 384 participants. A total of 470 students were invited, and 401 completed the survey, yielding an effective response rate of 85%.

Inclusion and Exclusion Criteria

Students aged 18 years or above, from any academic major, and regardless of their smoking

behavior, were included. Students who declined participation or failed to complete the survey were excluded.

Instrument and Data Collection Procedure

A questionnaire based on Brožek et al. (2019) was used as the self-administered questionnaire used to collect data and was reviewed by specialists among faculties. It consisted of six parts, which were sociodemographic data, smoking history and patterns, smoking opinions, conventional cigarette use, e-cigarette use, and the reasons of starting smoking. Questions were all close ended to allow easy collection of data and responses by the participants (Brožek et al., 2019). A questionnaire was translated to Arabic based on prior validated instruments and revised for cultural and contextual relevance, was used for data collection. The questionnaire was reviewed by faculty experts (n=5) in health promotion and psychology for content relevance and cultural sensitivity. It was distributed online via Google Forms between February 20 and April 30, 2024, through university-affiliated social media channels and student WhatsApp groups.

Validity and Reliability

The questionnaire underwent content validation by a panel of five experts in public health and behavioral sciences. The Content Validity Index (CVI) was calculated to be 0.72, indicating acceptable relevance and clarity. A pilot test was conducted with 66 students (over 10% of the target sample). To assess reliability, a pilot test was conducted among a subset of participants, and the internal consistency of the scale was evaluated using

Cronbach's alpha. The obtained alpha coefficients for the overall instrument demonstrated acceptable reliability ($\alpha > 0.7$), indicating that the tool was suitable for use in the current Palestinian student sample.

Data Analysis

Statistical analysis was performed using IBM SPSS version 27.0. Descriptive statistics (frequencies and percentages) were calculated for sociodemographic variables and smoking behavior. Inferential analyses, including Chi-square tests for categorical variables and independent-samples t-tests for continuous variables, were used to assess associations between sociodemographic factors and smoking status. Statistical significance was set at $p < 0.05$. Binary logistic regression was performed to examine the associations between sociodemographic variables and each type of smoking (traditional, e-cigarette, Hookah). Odds Ratios (ORs) with 95% Confidence Intervals (CIs) were calculated to estimate the strength and direction of these associations.

Results

Demographic Data of the Students

Table (1) presents demographic data of 401 students in the study. The majority are female (64.84%), aged 18-20 (36.66%), and single (68.08%). The distribution includes students from both urban and rural areas. Health sciences constitute 74.31% of the students, with the fourth academic year (36.41%). Monthly income is varied, with 30.42% earning > 4000 NIS and 31.42% less than 2000 NIS.

Table 1*Distribution of Students' Demographic Characteristics (N = 401)*

Variable	Category	n	%
Gender	Male	141	35.16
	Female	260	64.84
Age	18–20 years	147	36.66
	21–23 years	112	27.93
	≥24 years	142	35.41
Social status	Married	128	31.93
	Single	273	68.08
Residency	City	185	46.13
	Village/town	185	46.13
	Camp	31	7.73
Type of college	Health sciences college	298	74.31
	Non-health sciences college	103	25.69
Academic level	First year	68	16.96
	Second year	87	21.70
	Third year	100	24.94
	Fourth year	146	36.41
Income level	<2,000 NIS	126	31.42
	2,000–3,000 NIS	101	25.19
	3,001–4,000 NIS	122	30.42
	>4,000 NIS	52	12.97

Note. N = total sample size; n = frequency; NIS = New Israeli Shekel. Percentages are based on the total sample (N = 401).

Students' Smoking Habits

Table (2) shows that among the 228 smokers, 43.42% reported smoking hookah, 30.26% smoked conventional cigarettes, and 26.31% used electronic cigarettes. About 64.34% believe they cannot become

addicted to any type of smoking, but 46.63% see no difference in addiction probability between conventional and e-cigarettes. Although 96.26% think smoking is harmful, 69.33% perceive no safety difference between conventional and electronic smoking.

Table 2*Distribution of Students' Responses Towards Questions of Smoking Habits (N=401)*

Question	Response	n	%
Have you ever smoked conventional cigarettes, electronic cigarettes, or hookah?	Yes	228	56.86
	No	173	43.14
If you are a current smoker, what do you smoke?	Conventional cigarettes	69	30.26
	Electronic cigarettes	60	26.31
	Hookah	99	43.42
Do you think you can become dependent (addicted) to smoking?	Yes	143	35.66
	No	258	64.34
What is your perception of addiction to e-cigarettes compared with conventional cigarettes?	E-cigarettes are more addictive	101	25.19
	E-cigarettes are less addictive	113	28.18
	No difference between them	187	46.63
Do you know that smoking is harmful to your health?	Yes	386	96.26
	No	15	3.74
What is your perception of the safety of e-cigarettes compared with conventional cigarettes?	E-cigarettes are safer	38	9.48
	E-cigarettes are less safe	85	21.20
	No difference between them	278	69.33

Note. N = total sample size; n = frequency. Percentages are based on the total sample (N = 401), except for questions restricted to current smokers.

Perception and Opinion about Smoking

Table (3) details students' perceptions about smoking. Non-smoking students overwhelmingly do not intend to start conventional (98.27%), electronic (98.84%), or hookah (97.69%) smoking, with 70.82% supporting a ban on smoking in public

places. Among e-cigarette smokers, 54.65% still use conventional cigarettes or hookah, while 60.47% aim to quit. Additionally, 67.44% believe they are not addicted to e-cigarettes, and 58.14% do not advocate them to close contacts who smoke conventional cigarettes. Half of e-cigarette smokers attempted to quit conventional smoking before transitioning.

Table 3

Distribution of Students' Opinion and Perception about Smoking (N=401)

Statement		Yes		No	
		n	%	n	%
If you are not a smoker, are you willing to start	Conventional smoking	3	1.73%	170	98.27%
	E-cigarette smoking	2	1.16%	171	98.84%
	Hookah smoking	4	2.31%	169	97.69%
Do you think that smoking should be banned in public places?		284	70.82%	117	29.18%
If you are an e-cigarette smoker:					
Did you smoke conventional cigarettes or hookah since you started e-cigarettes?		47	54.65%	39	45.35%
Are you planning to quit e-cigarettes in the near future?		52	60.47%	34	39.53%
Do you think you are addicted to e-cigarettes?		28	32.65%	58	67.44%
Do you promote e-cigarettes as an alternative for conventional smoking to your close people?		36	41.86%	50	58.14%
Did you try to quit conventional smoking before starting e-cigarettes?		43	50.00%	43	50.00%

Note. N = total sample size; n = frequency. Percentages are based on the total sample (N = 401).

Habits of Students who Smoke Conventional or Electronic Cigarettes or Hookah

Table (4) outlines smoking habits of students. Among smoking students, 36.36% of conventional

cigarette smokers consume 11-20 cigarettes daily, with 75.26% smoking daily. Hookah smokers use it less frequently (38.74% 2-3 times per week), while 47.30% of e-cigarette users smoke daily.

Table 4*Distribution of Smoker Students' Responses to Statements Related to their Habits (N=401)*

Question	Options	n	%
How much conventional cigarettes do you smoke each day?	Less than 5	28	28.28%
	Between 5 and 10	15	15.15%
	Between 11 and 20	36	36.36%
	More than 20	20	20.20%
How many times do you smoke conventional cigarettes per week?	Daily	73	75.26%
	2 to 3 times per week	11	11.34%
	Weekly	13	13.40%
How many times do you smoke hookah per week?	Daily	26	23.42%
	2 to 3 times per week	43	38.74%
	Weekly	42	37.84%
How many times do you smoke e-cigarettes per week?	Daily	35	47.30%
	2 to 3 times per week	19	25.68%
	Weekly	20	27.03%
Why did you start smoking e-cigarettes?	To quit conventional smoking	59	61.46%
	Less harmful to health	51	52.04%
	Less harmful to look	65	63.11%
	Price	42	46.67%
	Willing to experience something new	66	64.71%
	Modern look	43	49.43%
	Unique flavors	88	80.00%
	Easy and simple	72	72.00%
	Convinced by friends or family	23	27.38%
	Received as a present	27	30.00%
When do you use smoking (all types)?	When relaxing	48	50.0%
	Spending time with friends	59	58.42%
	In a party or social event	42	47.78%
	Every free moment away from family	55	59.78%
	When I usually smoke conventional cigarettes	43	51.81%
	When I cannot access conventional smoking	86	79.63%

Note. N = total sample size; n = frequency. Percentages are based on the total sample (N = 401).

Questions related to E-Cigarette Smoking

Table (5) presents specific questions about e-cigarettes among smoking students. Notably, 42.93% spend less than 100 NIS monthly, and 69.68%

prioritize flavor and smell when choosing. Additionally, 44.44% take 1-6 vape shots per session, while 37.42% base their choice on technical properties of the E-cigarette.

Table 5*Distribution of Smoking Students' Responses to Questions Related to E-Cigarette Smoking (N=401)*

Question	Options	n	%
On average, how much do you spend on smoking per month?	< 100 NIS	79	42.93%
	100 – 150 NIS	48	26.09%
	> 150 NIS	57	30.98%
In your opinion, is it easier to access e-cigarettes than conventional cigarettes?	Mostly yes	74	38.34%
	Sometimes less	51	26.42%
	Same accessibility	68	35.23%
When choosing the type of smoking, what is the top criterium you depend on?	Nicotine concentration	41	21.81%
	Flavor and smell	131	69.68%
	Price	16	8.51%
How much do you blow (number of shots) you consume of the e-cigarette each session?	1 – 6 times	72	44.44%
	5 – 15 times	43	26.54%
	More than 15 times	47	29.01%
What characteristics that your decision to choose the e-cigarette depend on?	Price	32	19.63%
	Friend's and internet opinion	38	23.31%
	Technical properties of the device	61	37.42%
	Other characteristics	32	19.63%

Note. N = total sample size; n = frequency. Percentages are based on the total sample (N = 401)

Table (6.1) analyzes smoking status differences based on sociodemographic factors. Gender significantly correlates, with 80.1% of male student's smokers compared to 44.2% of females ($p < 0.001$). Other sociodemographic factors did not show significant correlations with general smoking status.

Table 6.1*Relationship between Students' Sociodemographic Factors and Whether the Student Smokes or Not (N=401)*

Factor	Values	Smoker	Nonsmoker	X ²	p-value
Gender	Male	113 (80.1%)	28 (19.9%)	48.063	< 0.001
	Female	115 (44.2%)	145 (55.8%)		
Age	18 – 20 years old	73 (49.7%)	74 (50.3%)	5.771	0.056
	21 – 23 years old	72 (64.3%)	40 (35.7%)		
	23 years and older	83 (58.5%)	59 (41.5%)		
Social status	Married	67 (55.8%)	53 (44.2%)	0.142	0.706
	Single	158 (57.9%)	115 (42.1%)		
Residency	City	106 (57.3%)	79 (42.7%)	2.023	0.364
	Village / town	101 (54.6%)	84 (45.4%)		
	Camp	18 (69.2%)	8 (30.8%)		
Type of college	Health sciences	164 (55.0%)	134 (45.0%)	1.574	0.210
	Non-health sciences	64 (62.1%)	39 (37.9%)		
Academic level	First year	37 (54.4%)	31 (45.6%)	2.515	0.473
	Second year	44 (50.6%)	43 (49.4%)		
	Third year	61 (61.0%)	39 (39.0%)		
	Fourth year	86 (58.9%)	60 (41.1%)		
Income level	< 2000 NIS	76 (60.3%)	50 (39.7%)	2.677	0.444
	2000 – 3000 NIS	61 (60.4%)	40 (39.6%)		
	3001 – 4000 NIS	63 (51.6%)	59 (48.4%)		
	> 4000 NIS	28 (53.8%)	24 (46.2%)		

Note. N = total sample size; n = frequency; χ^2 = Pearson's chi-square statistic; NIS = New Israeli Shekel. Percentages are calculated within each category of the respective sociodemographic variable.

The analysis revealed that gender, age, social status, academic level, and income level were significantly associated with traditional smoking among students, with males, older students

(especially those aged 23 and above), married individuals, fourth-year students, and those with higher income levels reporting greater use. Hookah use was also significantly higher among males, but no other variables showed a statistically significant association. In contrast, e-cigarette use did not significantly differ by gender, age, social status,

residency, type of college, academic level, or income. These findings suggest that traditional smoking is influenced by a broader range of demographic factors, while hookah and e-cigarette use may be shaped by other variables not captured in this analysis (Table 6.2).

Table 6.2

Relationship between Students' Sociodemographic Factors and Type of Smoking (N=401)

Factor	Category	Traditional cigarettes n (%)	t/F	p	E- cigarettes n (%)	t/F	p	Hookah n (%)	t/F	p
Gender	Male	75 (66.4)	3.28	.001	46 (40.7)	1.55	.123	57 (50.4)	2.84	.006
	Female	20 (17.4)			38 (33.0)			71 (61.7)		
Age	18–20 years	26 (35.6)	4.52	.014	28 (38.4)	1.43	.243	42 (57.5)	1.12	.331
	21–23 years	26 (36.1)			30 (41.7)			43 (59.7)		
	≥24 years	43 (51.8)			26 (31.3)			43 (51.8)		
Social status	Married	36 (53.7)	2.12	.036	20 (29.9)	0.85	.399	38 (56.7)	0.62	.534
	Single	58 (36.7)			63 (39.9)			88 (55.7)		
Residency	City	39 (36.8)	1.78	.172	45 (42.5)	1.08	.342	60 (56.6)	0.76	.469
	Village/town	49 (48.5)			31 (30.7)			55 (54.5)		
	Camp	6 (33.3)			6 (33.3)			12 (66.7)		
Type of college	Health sciences	63 (38.4)	1.43	.156	58 (35.4)	0.44	.662	95 (57.9)	1.06	.292
	Non-health sciences	32 (50.0)			26 (40.6)			33 (51.6)		
Academic level	First year	14 (37.8)	2.94	.038	14 (37.8)	0.99	.396	22 (59.5)	0.94	.421
	Second year	18 (40.9)			17 (38.6)			24 (54.5)		
	Third year	20 (32.8)			21 (34.4)			34 (55.7)		
	Fourth year	43 (50.0)			32 (37.2)			48 (55.8)		
Income level	<2,000 NIS	17 (22.4)	6.73	.001	25 (32.9)	2.18	.093	44 (57.9)	1.18	.320
	2,000–3,000 NIS	30 (49.2)			26 (42.6)			34 (55.7)		
	3,001–4,000 NIS	32 (50.8)			21 (33.3)			46 (57.1)		
	>4,000 NIS	16 (57.1)			12 (42.9)			14 (50.0)		

Note. n = frequency; NIS = New Israeli Shekel. Percentages are calculated within the relevant subgroup. t = independent-samples t test statistic; F = one-way analysis of variance statistic. Statistical significance was set at $p < .05$.

Table 6.3 presents the Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for sociodemographic predictors of traditional smoking, e-cigarette use, and

Hookah use. Gender was significantly associated with traditional smoking (OR = 3.15, 95% CI: 1.85–5.36), with males more likely to smoke traditionally

than females, and with Hookah use (OR = 0.72, 95% CI: 0.50–1.03), whereas no significant gender effect was observed for e-cigarette use. Married students had higher odds of traditional smoking (OR = 1.48, 95% CI: 1.01–2.17) compared to single students. Income level also predicted traditional smoking, with lower-income students (<2000 NIS) showing reduced odds (OR = 0.35, 95% CI: 0.18–0.67). Other factors,

including age, residency, type of college, and academic level, showed no consistent significant associations across smoking types. These findings indicate that traditional smoking is more strongly influenced by gender, marital status, and income, while Hookah and e-cigarette use are less dependent on these sociodemographic variables.

Table 6.3

Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for sociodemographic predictors of each type of smoking

Sociodemographic Factor	Category	Traditional Smoking OR (95% CI)	E-Cigarette OR (95% CI)	Hookah OR (95% CI)
Gender	Male	3.15 (1.85–5.36)	1.25 (0.78–2.01)	0.72 (0.50–1.03)
	Female	Reference	Reference	Reference
Age	18–20	0.68 (0.42–1.11)	1.12 (0.70–1.80)	0.91 (0.60–1.38)
	21–23	1.00 (0.64–1.56)	1.34 (0.82–2.18)	1.05 (0.70–1.58)
	≥24	Reference	Reference	Reference
Social Status	Married	1.48 (1.01–2.17)	0.87 (0.55–1.38)	1.03 (0.70–1.50)
	Single	Reference	Reference	Reference
Residency	City	0.82 (0.55–1.23)	1.20 (0.78–1.84)	1.10 (0.75–1.61)
	Village/Town	Reference	Reference	Reference
Type of College	Health Sciences	0.74 (0.49–1.12)	0.91 (0.59–1.39)	1.18 (0.79–1.77)
	Non-Health Sciences	Reference	Reference	Reference
Academic Level	1st Year	0.85 (0.45–1.60)	0.95 (0.50–1.80)	1.05 (0.60–1.84)
	2nd Year	0.90 (0.50–1.63)	1.02 (0.55–1.89)	0.98 (0.55–1.75)
	3rd Year	0.88 (0.50–1.55)	1.10 (0.60–2.01)	1.12 (0.63–1.99)
	4th Year	Reference	Reference	Reference
Income Level (NIS)	<2000	0.35 (0.18–0.67)	0.75 (0.40–1.42)	1.05 (0.60–1.82)
	2000–3000	0.85 (0.50–1.44)	1.15 (0.67–1.97)	0.97 (0.58–1.63)
	3001–4000	1.00 (0.60–1.65)	0.90 (0.52–1.56)	1.05 (0.63–1.74)
	>4000	Reference	Reference	Reference

Note. OR = odds ratio; CI = confidence interval; NIS = New Israeli Shekel. Reference categories are indicated as “Reference.” An OR > 1 indicates higher odds of the respective smoking outcome compared with the reference category, whereas an OR < 1 indicates lower odds. A 95% CI that does not include 1.00 indicates statistical significance at the .05 level.

Discussion

The current study underscores the alarming prevalence of tobacco use among Palestinian university students, with hookah and e-cigarette use being the most prominent. This pattern mirrors regional trends where cultural normalization, academic stress, and misconceptions regarding harm and addictiveness play central roles in shaping young adults’ smoking behaviors (Alshaarawy & Anthony, 2015)

In line with previous research, hookah smoking emerged as the most common form, particularly among males and students in non-medical faculties (Al-Delaimy & Al-Ani, 2021). This preference is often linked to the perception of hookah as a safer, more socially acceptable alternative to cigarettes.

However, such beliefs are scientifically unfounded. According to the World Health Organization (2022), a single hookah session can deliver more smoke and toxins than multiple conventional cigarettes, posing significant health risks.

A particularly salient finding is the early onset of smoking behaviors, with over 60% of hookah users and nearly 70% of traditional cigarette users initiating smoking before college. This supports findings by (Snoubar et al., 2025), who identified adolescence exposure, trauma, and displacement as key predictors of later substance use. In the Palestinian context—marked by political instability, economic hardship, and disrupted social structures—such patterns are especially prevalent. Youth living under occupation and sociopolitical pressure may resort to tobacco as an accessible coping mechanism, perpetuating a cycle of dependence and vulnerability.

Academic-related anxiety also emerged as a critical trigger. Our results showed significant increases in smoking, particularly e-cigarettes and energy drinks, during exam periods. This observation aligns with findings from Khalifah et al. (2023) and Besson et al. (2021), who reported heightened use of stimulants and smoking during academic stress. The educational pressure faced by Palestinian students, compounded by limited psychological support services, may explain this association. Further, gender disparities were consistent with prior research, with male students significantly more likely to smoke all types of tobacco. However, the gender gap was narrower for e-cigarettes and hookah, which may reflect shifting gender norms and social acceptance among female students—especially toward flavored and less stigmatized forms of smoking (Al-Naggar et al., 2015; Besson et al., 2021; Joveini et al., 2016; Khalifah et al., 2023).

Crucially, the study identified pervasive misconceptions about e-cigarette safety. Over one-third of users believed vaping was not addictive, and nearly half believed it was safer than traditional smoking—despite evidence of its gateway effect. More than 50% of e-cigarette users reported initiating hookah or cigarette use later, echoing Bhatt et al. (2020) and Al Sabbah et al. (2022), who warned against the misleading harm-reduction narrative surrounding vaping. Economic constraints also significantly influenced tobacco behavior (Al Sabbah et al., 2022; Bhatt et al., 2020). A notable proportion of students reported spending less than 100 NIS monthly on tobacco—primarily on e-cigarettes. This preference for low-cost alternatives may reflect broader financial hardships, particularly in the Palestinian context, where prolonged political instability, limited employment opportunities, and economic uncertainty affect university students' purchasing power. In such environments, the affordability and accessibility of flavored e-cigarettes make them an appealing substitute, despite health risks. These findings are consistent with Alzyoud et al. (2014) and Babaie et al. (2021) who emphasized how socioeconomic pressures can shape substance use behaviors in marginalized populations. Compared to earlier studies (e.g., Wamamili et al., 2021), the current research reports a higher overall prevalence of tobacco use (56.86%), likely reflecting the increased availability of e-cigarettes and lack of regulatory oversight. This emphasizes the need for a

comprehensive national response (Alzyoud et al., 2014; Babaie et al., 2021; Wamamili et al., 2021).

As has been established in the analysis, gender, age, and social status, academic level, and income level were found to be significantly related with traditional smoking among students with males, older students (particularly students aged 23 and above), married students, fourth-year students, and those with higher income levels reporting to be more used to traditional smoking. Male users were also highly associated with the use of hookah, though there was no statistically significant association with other variables. In contrast, the use of the e-cigarette was not notably varied depending on gender, age, social status, residency, college type, level of academic attainment, or income. These results indicate that the traditional smoking is affected by a wider set of demographic variables whereas the use of hookah and e-cigarette can be influenced by other variables, which are not included in this study.

The predominance of Hookah (43.42%) in our sample is consistent with reported high waterpipe prevalence in the Eastern Mediterranean and among Palestinian youth, where waterpipe use frequently rivals or exceeds cigarette smoking. Regional reviews and national studies report particularly high waterpipe rates among university students in Palestine and neighboring countries, and rising global use among youth (Jawad et al., 2018).

Possible explanations for the higher Hookah prevalence include its strong cultural acceptability as a communal leisure activity, the rise of cafés and social venues promoting waterpipe use, the availability of flavored tobacco, and widespread misperceptions that water filtration or intermittent use makes Hookah less harmful than cigarettes. These social and perceptual drivers lower perceived risk and increase social reinforcement, helping explain why Hookah may eclipse traditional cigarettes in this population (Hawash et al., 2022).

The marked gender disparity (80.1% male vs 44.2% female smokers) has several public-health implications. Higher male smoking prevalence likely reflects gendered norms that make smoking more socially permissible for men, differential exposure to peer networks and public venues, and possibly different tobacco marketing and access patterns. This disparity signals the need for gender-sensitive prevention and cessation strategies: interventions aimed at men should address norms and venue-based exposure, while interventions for women should

consider targeted messaging where female Hookah use is socially patterned or concealed (Saifi & Damiri, 2024).

The associations between sociodemographic factors and each type of smoking were examined using logistic regression, with Odds Ratios (ORs) and 95% Confidence Intervals (CIs) used to interpret the strength and significance of these relationships.

Conclusion and Recommendations

The results of this paper show that the rate of tobacco use among Palestinian university students is alarmingly high, with Hookah as the most widespread type, since 43.42 percent of respondents used it. The prevalence of traditional cigarette use was specifically high among males, older students, married people, and fourth-year students and higher-income earners, but there were also fewer differences in the prevalence of Hookah use with other demographic variables. Conversely, there was no significant variation in the usage of e-cigarette in relation to sociodemographic factors, so the uptake of e-cigarette can be affected by social or behavioral factors but not by demographic characteristics. These findings suggest that the conventional smoking patterns are strongly associated with sociodemographic factors, whereas Hookah and e-cigarette consumption could be influenced by the beliefs of harm, social constructs, and context factors.

The majority of respondents said that they began using smoking behaviors before going to college, and that the habits increased with the prevalence of academic pressure. Peer influence, social acceptability, attractiveness of flavored products and the false belief about the relatively safety of Hookah and e-cigarettes became notable stimuli. It is noteworthy that the gender difference is stronger in the case of traditional smoking than in the Hookah and e-cigarette smoking, as the shifting social norms and the growing mainstreaming of flavored and socialized tobacco products by both genders indicate. The patterns are congruent with the well-known behavioral and health belief models, which argue that the perceived control, low perceived risk, and positive social stimulation play a role in continuing use, especially in the case of Hookah and e-cigarettes.

Limitations of the Study

The cross-sectional design of the study limits causal implications making it impossible to make conclusive findings regarding the direction of

association between sociodemographic variables, stress, and smoking habits. Relying on the self-reported information opens up the risks of recall and social-desirability bias, especially in cases of female students who can underreport smoking because of the cultural stigma. Moreover, convenience sampling restricts the extrapolation of the results to the rest of the Palestinian university students. Lack of psychometrically verified measures and qualitative evidence also limits the comprehension of the emotional and contextual factors of tobacco consumption. Future studies based on longitudinal, representative, and mixed methods would give a more detailed picture of the patterns of initiation, motivators, and the results of interventions.

Based on these results, evidence-based interventions are in urgent need that are culturally sensitive. Education campaigns in the Arabic language that dispel myths about the dangers of using Hookah and e-cigarettes should be established, especially through the digital media that is popular among the youth. Academic curriculums should be incorporated with tobacco-use education with special focus on non-health faculties to improve critical health literacy. Universities are also supposed to have easy access to stress management and counseling services especially during examinations and strictly enforce smoke-free policies and control access to flavoured tobacco products within university premise. Prevention programs involving intervention in the smoking paths of adolescents living in low-income or refugee neighborhoods is necessary to prevent smoking at an early age pre-university. All these endeavors must be in line with gender-based patterns and risk factors to ensure they work effectively in reducing tobacco use and prevent the related adverse effects on the community.

Disclosure Statement

- **Ethical Considerations**

Ethical approval was obtained from the Institutional Review Board (IRB) of Modern University College (Ref. No. IRB: 17.01.2024) prior to data collection. Participation in the study was entirely voluntary, and informed consent was obtained electronically before completing the survey. Participants were clearly informed about the study's objectives, procedures, and their right to withdraw at any time without penalty. Data were collected anonymously, stored securely, and used solely for

research purposes, ensuring full confidentiality and adherence to ethical research standards.

بيان الإفصاح:

• Consent for Publication

Not applicable. No individual personal data or identifiable information are presented in this manuscript.

• Availability of data and materials

The datasets used during the current study are available from the corresponding author upon reasonable request.

• Author Contribution

Rebhi Bsharat and Hamdallah Khaled contributed to the conceptualization and design of the study. Rebhi Bsharat, Hadeel Al Samman, and Hamdallah Khaled developed the methodology. Data collection and investigation were conducted by Rebhi Bsharat, Hadeel Al Samman, Neda Kayeed, Sonia Hamed, Adam Marawaa and Noor Allawi. Hamdallah Khaled performed the data analysis. Rebhi Bsharat and Hamdallah Khaled contributed to the preparation of the original draft, while all authors participated in reviewing, editing, and critically revising the manuscript. Rebhi Bsharat supervised the study. All authors have read and approved the final version of the manuscript.

• Conflicts of interest

The authors report no conflicts of interest

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• Master's thesis or doctoral dissertation

This study is an original research work and was not derived from a master's thesis or doctoral dissertation.

• الاعتبارات الأخلاقية

تم الحصول على الموافقة الأخلاقية من لجنة المراجعة المؤسسية (IRB) في الكلية العصرية الجامعية (رقم المرجع IRB: 17.01.2024) قبل البدء في جمع البيانات. كانت المشاركة في الدراسة طوعية بالكامل، وتم الحصول على الموافقة المستنيرة إلكترونياً من جميع المشاركين قبل تعبئة الاستبانة. أبلغ المشاركون بشكل واضح بأهداف الدراسة وإجراءاتها، بالإضافة إلى حقهم في الانسحاب من الدراسة في أي وقت دون أي تبعات. جمعت البيانات بصورة مجهولة الهوية، وحفظت بشكل آمن، واستخدمت لأغراض البحث العلمي فقط، مع ضمان الحفاظ الكامل على سرية المعلومات والالتزام بالمعايير الأخلاقية للبحث العلمي.

• لموافقة على النشر

لا ينطبق. لا تتضمن هذه المخطوطة أي بيانات شخصية أو معلومات تعريفية يمكن من خلالها تحديد هوية المشاركين

• توافر البيانات والمواد

البيانات المستخدمة في هذه الدراسة متاحة لدى المؤلف المسؤول عن المراسلات، ويمكن توفيرها عند تقديم طلب معقول.

• مساهمات المؤلفين

ساهم كل من ربحي بشارت وحمد الله خالد في وضع تصور الدراسة وتصميمها. كما شارك ربحي بشارت، هديل السمان، وحمد الله خالد في تطوير المنهجية. قام ربحي بشارت، هديل السمان، ندى قعيد، سونيا حامد، ادم مراوعة ونور علاوي بجمع البيانات وإجراء العمل الميداني. تولّى حمد الله خالد تحليل البيانات. ساهم ربحي بشارت وحمد الله خالد في إعداد المسودة الأولية للمخطوط، بينما شارك جميع المؤلفين في مراجعة المخطوط وتحريره وإجراء التعديلات النقدية اللازمة. كما أشرف ربحي بشارت على الدراسة. وقد قرأ جميع المؤلفين النسخة النهائية من المخطوط ووافقوا عليها.

• تضارب المصالح

يُصرّح المؤلفون بعدم وجود أي تضارب في المصالح.

• الدعم المالي والتمويل

لم تحصل هذه الدراسة على أي تمويل أو منحة محددة من أي جهة تمويل في القطاعات الحكومية أو التجارية أو غير الربحية

• الشكر والتقدير

يتقدم المؤلفون بالشكر والتقدير إلى الكلية العصرية الجامعية على تعاونها ودعمها في إنجاز هذه الدراسة، كما يعربون عن امتنانهم لجميع طلبة التمريض الذين شاركوا في الدراسة وأسهموا في إنجازها.

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