

# Prevalence of tobacco use among young adults in Palestine

Rania Abu Seir,<sup>1</sup> Akram Kharroubi<sup>2</sup> and Ibrahim Ghannam<sup>1</sup>

<sup>1</sup>Department of Medical Laboratory Sciences, Al-Quds University, Abu Dis, Palestine. <sup>2</sup>Faculty of Health Professions, Al-Quds University, Abu Dis, Palestine. (Correspondence to: Rania Abu Seir: abusear@staff.alquds.edu).

## Abstract

**Background:** Smoking tobacco is a worldwide public health issue. Over the last few decades, smoking patterns have been changing, reflected by increasing rates among young people and females in particular.

**Aims:** This study aimed to determine the prevalence and modalities of smoking and to assess the factors, habits and beliefs that might encourage or discourage smoking among young adults in Palestine.

**Methods:** A cross-sectional study was conducted in the West Bank in 2014 among Palestinians aged 18–25 years old. Subjects were recruited from six Palestinian universities (n=1997). Participants were asked to complete a questionnaire focusing on sociodemographics, knowledge and beliefs towards tobacco smoking, and the reasons that motivate or hinder smokers to quit.

**Results:** The prevalence of tobacco smoking was found to be 47.7%. Males had higher smoking rates, consumption levels, and initiated smoking at younger ages (74.4% started at ≤18 years old). Smoking cigarettes and waterpipe were the most common forms among both sexes. Smokers were also found to consume higher amounts of caffeinated drinks and fast food, showed lower scores towards anti-smoking beliefs, and reported significantly higher prevalence of smoking-related symptoms and diseases, primarily shortness of breath (20.5%) and cough (16.6%). The majority of smokers reported attempting and willingness to quit smoking. Health and financial costs were the strongest factors encouraging quitting while mood changes and lack of self-control were the most reported discouraging factors. Moreover, smoking among family members and peers increased the odds of smoking.

**Conclusions:** Increasing rates of smoking among young Palestinians and a growing popularity of waterpipe use should alert stakeholders to the necessity for the implementation of smoking prevention and awareness policies and programmes.

Keywords: tobacco, smoking, waterpipe, public health, substance use

Citation: Abu Seir R; Kharroubi A; Ghannam I. Prevalence of tobacco use among young adults in Palestine. *East Mediterr Health J.* 2020;26(1):75–84. <https://doi.org/10.26719/2020.26.1.75>

Received: 11/06/19; accepted: 28/10/19

Copyright © World Health Organization (WHO) 2020. Open Access. Some rights reserved. This work is available under the CC BY-NC-SA 3.0 IGO license (<https://creativecommons.org/licenses/by-nc-sa/3.0/igo>)

## Introduction

Tobacco use is one of the major public health concerns worldwide. Annually, more than 7 million people die (12% of all deaths) as a result of tobacco use. Despite all the efforts to control the spread of tobacco use, it continues to adversely influence global health patterns, especially in low- and middle-income countries, where 80% of tobacco users live (1,2). Interventions to control tobacco smoking require an understanding of the knowledge and beliefs of the targeted population and tobacco control legislation (3,4).

The patterns and modalities of tobacco use have undergone several changes over the past few decades. Smoking rates are globally higher among males, but studies have shown that the gap has been narrowing with increasing tobacco use among females. In addition, the prevalence of smoking has been growing rapidly in the age group 15–24 years (2). Furthermore, waterpipe use is an emerging trend that until recently was associated with adults in the Eastern Mediterranean Region (5,6). Since the 1990s, waterpipe use has been spreading to younger populations (7–10).

Studies have reported varying smoking rates in

Palestine and rates have differed depending on the methodology and the target population. The prevalence of smoking ranged between 19.6–26.3% in the general population (11,12), and between 35–56% among university students (13,14). Few studies have focused on tobacco smoking among Palestinians in the context of beliefs and knowledge (11,14). These studies recruited mainly college or school students, but none of them addressed the factors and beliefs towards tobacco use outside of these demographics. Thus, the current study aimed to characterize the prevalence of tobacco smoking and smoking modalities (cigarette and waterpipe smoking) among young Palestinian males and females and to examine the factors and beliefs that might encourage or discourage smoking. This study's results could be utilized to draw strategic plans and policies to reduce tobacco use.

## Methods

A cross-sectional study was conducted in the West Bank, Palestine, between January and May 2014. Study subjects were young Palestinians aged 18–25 years. The study included students recruited from six Palestinian universities and non-students of the same age group recruited from university campuses (total=1997). Students were

recruited from 11 different faculties that included both medical and non-medical specialties. Non-students were chosen from the university campuses to minimize the confounding effect of occupational and environmental factors. This group included young administrative staff, cleaners, teaching assistants and other service providers on the university campuses.

Using a convenience sampling approach, subjects received a self-administered questionnaire. The purpose of the survey was explained to the participants verbally along with distribution of an explanatory sheet. Subjects completed the questionnaire anonymously.

The questionnaire was developed in English by intensively reviewing the literature, translated into Arabic, and validated by forward and backward translation. The questionnaire consisted of nine parts including socio-demographic characteristics including sex, age, study major (for students), marital status, parental educational level, place of residence, type of locality (urban or city, rural or village, refugee camp), and family income (very low: <LE 1500; low: LE 1500-<3000; moderate: LE 3000-<6000; above average: LE 6000-10 000; and high:> LE 10 000).

Smoking modalities included the following: type of tobacco consumed, consumption level of cigarettes and waterpipe, age at smoking initiation, attempting to stop smoking, longest period without smoking, dietary habits, self-reported morbidities, knowledge towards harmful effects of smoking, attitude and beliefs towards smoking, willingness of smokers to quit smoking and the reasons for their willingness or fear to quit smoking, factors that might be associated with smoking behaviour, and smoking among family and friends.

The beliefs part was taken from a previously validated questionnaire (The Smoking Consequences Questionnaire for Adults “SCQ-A”) (15), which is a 30-item self-reported scale that measures the expected utility of cigarette smoking. A 5-point Likert scale ranging from 0 (do not agree) to 4 (strongly agree) was used to assess their agreement to each statement. Nine subscales were derived via principal components analysis: negative affect reduction, social facilitation, taste-sensorimotor manipulation, negative physical feelings, weight control, health risk, stimulation-state enhancement, negative social impression, and boredom reduction. The smokers’ group included current tobacco smokers and those who smoked regularly in the past six months. Experimental smokers and ex-smokers (quit smoking for at least the previous six months) were excluded from the study in order to minimize their confounding effect.

Data were coded and entered into IBM SPSS version 23.0 for analysis. For categorical data, frequencies and percentages were used for descriptive analysis, and Pearson Chi-square ( $\chi^2$ ) was used to assess the significance of the differences between proportions. For the belief scores, averages were calculated for each subscale and Mann-Whitney U test was used to evaluate the statistical significance of differences between smokers and non-

smokers. Finally, binary logistic regression was used to calculate the odds ratios (ORs) and 95% confidence intervals (CIs) for the associations. Possible confounders were identified through the related literature. The final model was adjusted for sex, age, and family income.

### **Ethical considerations**

The study was approved by the Institutional Review Board (IRB) of Al-Quds University, Palestine. Each subject provided written informed consent before recruitment.

### **Results**

A total of 1997 subjects participated in this study. The majority were males and aged 18–22 years. The study population consisted mainly of university students, of which 33.3% were medical students. Approximately 50% of the participants reported being current smokers. Among males, the prevalence of tobacco smoking was higher compared to females by a factor of 2.5. After adjusting for possible confounding variables (sex, age, and family income), we found that males were five-times more likely to smoke (CI: 4.3–6.5) (Table 1).

The prevalence of tobacco smoking increased with age. University students reported relatively similar rates of smoking compared to non-students of the same age group, but medical students had a lower prevalence compared to non-medical students. Moreover, income level showed a positive relationship with the prevalence of smoking while paternal educational level showed an inverse association. However, maternal educational level, marital status, and place of residence had no significant effect on the prevalence of smoking. As for the type of locality, the lowest prevalence of smoking was found among subjects living in villages and the highest was among those living in refugee camps. Moreover, non-smokers perceived smoking to be costly financially (Table 1).

When examining smoking modalities among young Palestinian adults, the majority of smokers reported smoking both cigarettes and waterpipe. However, although approximately 25% of males and females were exclusively cigarette smokers, a higher proportion of females were exclusively waterpipe smokers (19.7% compared to 4.1% in males). Consumption levels of cigarettes were significantly higher among males while consumption levels of waterpipe did not differ between males and females. Males initiated smoking at an earlier age; 70% before the age of 19 years compared to 58% of females. In addition, more males reported attempting to quit smoking compared to females, but the length of the period spent without smoking did not differ between the two sexes (Table 2).

Dietary habits of smokers and non-smokers were compared among healthy and unhealthy participants (participants who suffer from smoking-related symptoms) (Table 3). It was found that consumption of most types of drinks was higher among unhealthy smokers, especially energy drinks. In addition, no

**Table 1 Characteristics of the study population by smoking status.**

Variable	Category	Smokers (n=953) N (%)	Non-smokers (n=1044) N (%)	Overall (n=1997) N (%)	OR (95% CI) <sup>a</sup>	P-value
<b>Sex</b>	Female	173 (23.5)	562 (76.5)	735 (36.8)	1	<0.001
	Male	780 (61.8)	482 (38.2)	1262 (63.2)	5.3 (4.3–6.5)	
<b>Age groups (years)</b>	18–<20	238 (34.2)	457 (65.8)	695 (34.8)	1	<0.001
	20–<22	408 (51.6)	383 (48.4)	791 (39.6)	2.0 (1.7–2.5)	
	22–<24	232 (57.3)	173 (42.7)	405 (20.3)	2.6 (2.0–3.3)	
	24–25	75 (70.8)	31 (29.2)	106 (5.3)	4.6 (3.0–7.3)	
<b>Study group</b>	Student	759 (47.1)	853 (52.9)	1612 (80.8)	1	0.279
	Non-student	192 (50.3)	190 (49.7)	382 (19.2)	1.1 (0.9–1.4)	
<b>Study major</b>	Medical	225 (42.5)	304 (57.5)	529 (33.3)	1	0.006
	Non-medical	528 (49.9)	530 (50.1)	1058 (66.7)	1.3 (1.1–1.7)	
<b>Income</b>	Very low	200 (40.6)	293 (59.4)	493 (26.9)	1	<0.001
	Low	190 (50.7)	185 (49.3)	375 (20.5)	1.5 (1.1–2.0)	
	Moderate	273 (54.2)	231 (45.8)	504 (27.5)	1.7 (1.3–2.2)	
	Above the average	182 (57.1)	137 (42.9)	319 (17.4)	1.9 (1.5–2.6)	
	High	93 (65.5)	49 (34.5)	142 (7.7)	2.8 (1.9–4.1)	
<b>Marital status</b>	Single	833 (46.9)	943 (53.1)	1776 (89.4)	1	0.086
	Married	34 (43.0)	45 (57.0)	79 (4.0)	0.8 (0.5–1.3)	
	Engaged	78 (59.5)	53 (40.5)	131 (6.6)	1.4 (0.9–2.0)	
<b>Paternal educational level</b>	Illiterate	61 (55.5)	49 (44.5)	110 (5.6)	1	<0.001
	Primary	142 (55.3)	115 (44.7)	257 (13.1)	0.9 (0.6–1.5)	
	Secondary	175 (40.7)	255 (59.3)	430 (21.9)	0.5 (0.3–0.8)	
	University level	548 (47.1)	616 (52.9)	1164 (59.4)	0.7 (0.5–1.0)	
<b>Maternal educational level</b>	Illiterate	72 (54.1)	61 (45.9)	133 (6.9)	1	0.303
	Primary	157 (49.4)	161 (50.6)	318 (16.5)	0.8 (0.6–1.2)	
	Secondary	328 (47.5)	363 (52.5)	691 (35.9)	0.7 (0.5–1.1)	
	University level	359 (45.8)	424 (54.2)	783 (40.7)	0.7 (0.5–1.0)	
<b>Place of residence</b>	With the family	729 (46.7)	833 (53.3)	1562 (78.4)	1	0.114
	Housing	220 (51.0)	211 (49.0)	431 (21.6)	1.2 (0.9–1.4)	
<b>Type of locality</b>	Village	458 (43.7)	591 (56.3)	1049 (52.6)	1	<0.001
	City	448 (51.9)	415 (48.1)	863 (43.2)	1.6 (1.3–2.0)	
	Camp	46 (54.8)	38 (45.2)	84 (4.2)	1.5 (1.0–2.5)	
<b>Perceived financial cost</b>	Extremely	595 (63.1)	921 (88.6)	1516 (76.5)	1	<0.001
	Partly	284 (30.1)	103 (9.9)	387 (19.5)	4.3 (3.3–5.5)	
	Not at all	64 (6.8)	15 (1.4)	79 (4.0)	6.6 (3.7–11.7)	

<sup>a</sup>Odds Ratios were age, sex and family income adjusted

significant differences in fast food consumption was observed; however, healthy smokers reported a higher consumption of dairy products compared to unhealthy smokers, but the consumption of dairy products in non-smokers was similar in both groups (Table 3).

Examining the mean of the scores obtained on perceived positive and negative beliefs towards smoking, the average scores of smokers who believed that smoking constitutes a health risk (mean=3.57/4) and that smoking gives negative social impressions (2.52/4) were significantly lower than those of non-smokers (3.81/4 and 2.82, respectively). In contrast, smokers held stronger

beliefs that tobacco smoking increased confidence in social contexts (2.77/4 compared to 1.95 among non-smokers), helped alleviate boredom (2.83/4 compared to 2.24), reduced stress (3.04/4 compared to 2.27), helped to control weight (2.96/4 compared to 2.77), improved social acceptance (2.53/4 compared to 1.91), and helped increase concentration (3.04/4 compared to 1.95). Furthermore, the risk perception of adverse health outcomes including heart diseases, lung cancer, bronchitis and lung infections, and hypertension was significantly higher among smokers compared to non-smokers (data not shown).

Table 2 Smoking modalities in both genders.

Variable	Category	Females N (%)	Males N (%)	Overall N (%)	P-value
<b>Smoker</b>		173 (23.5)	780 (61.8)	953 (47.7)	<0.001
<b>Smoking modalities</b>	Cigarettes only	40 (23.1)	195 (25.6)	235 (25.1)	0.001
	Waterpipe only	34 (19.7)	31 (4.1)	65 (7.0)	
	Cigarettes & waterpipe	97 (56.1)	536 (70.3)	633 (67.7)	
	Other types alone (cigar, pipe, etc.)	2 (1.2)	0 (0.0)	2 (0.2)	
<b>Cigarette consumption (cigarettes/day)</b>	<10	75 (55.1)	212 (28.5)	287 (32.6)	<0.001
	10–20	35 (25.7)	368 (49.4)	403 (45.7)	
	21–30	8 (5.9)	114 (15.3)	122 (13.8)	
	31–40	9 (6.6)	20 (2.7)	29 (3.3)	
	>40	9 (6.6)	31 (4.2)	40 (4.5)	
<b>Waterpipe consumption (times/week)</b>	Once	39 (34.2)	163 (30.2)	202 (30.9)	0.151
	2–3	31 (27.2)	179 (33.2)	210 (32.2)	
	4–6	26 (22.8)	82 (15.2)	108 (16.5)	
	7–10	11 (9.6)	59 (10.9)	70 (10.7)	
	>10	7 (6.1)	56 (10.4)	63 (9.6)	
<b>Age at smoking initiation (years)</b>	<12	2 (1.8)	28 (3.9)	30 (3.6)	0.008
	12–14	13 (11.6)	138 (19.4)	151 (18.3)	
	15–18	52 (46.4)	363 (51.1)	415 (50.4)	
	19–22	45 (40.2)	178 (25.0)	223 (27.1)	
	>22	0 (0.0)	4 (0.6)	4 (0.5)	
<b>Attempting to stop smoking</b>	Yes	53 (40.8)	447 (62.0)	500 (58.8)	<0.001
	No	77 (59.2)	274 (38.0)	351 (41.2)	
<b>Longest period without smoking</b>	<1 week	72 (50.7)	360 (49.8)	432 (49.9)	0.165
	1–2 weeks	17 (12.0)	132 (18.3)	149 (17.2)	
	2–4 weeks	24 (16.9)	86 (11.9)	110 (12.7)	
	>1 month	29 (20.4)	145 (20.1)	174 (20.1)	

The factors that mainly influenced smokers to quit were health (80.9%), followed by financial factors (50.4%), and family (46.8), while social factors were the least considered (29.6%). Furthermore, mood changes and loss of self-control were reported among 76.8% and 51.4% of smokers, respectively, as the most discouraging factors for quitting smoking, followed by fear of gaining weight (42.1%) and loss of self-confidence (24.5%). In this study, it was found that a significantly higher proportion of smokers reported their willingness to advise others not to smoke ( $P < 0.001$ ), and the proportion of non-smokers who were made aware through programmes at school about the risks of smoking was significantly higher in comparison to smokers ( $P < 0.001$ ) (data not shown).

Upon examining the health effects of smoking, we found that several symptoms were more prevalent among smokers when compared to non-smokers, including shortness of breath, cough, chest pains, inflammation of the chest, tightness of the chest, heart disease and hypertension ( $P < 0.001$ ) (Table 4).

Regarding the factors that encouraged smoking initiation, it was found that both paternal and maternal tobacco smoking were higher among smokers compared to non-smokers with ORs of 1.8 (CI: 1.5–2.3) and 3.3 (CI: 2.4–4.9), respectively. In addition, more smokers reported having at least a brother who smoked tobacco (OR=1.7; CI: 1.4–2.1) or sister (OR=6.5; CI: 3.9–11.1). Moreover, as the number of friends who smoked increased, the smoking prevalence also expanded, with an OR of 8.7 (CI: 6.7–11.3) for those who have more than 10 friends who smoked tobacco.

When comparing high school leaving certificate grade averages between smokers and non-smokers, it was found that a higher proportion of non-smokers reported grades of 90% or more while most smokers reported an average ranging 70–90%. The OR indicated an increased prevalence of smoking as the grade decreased. The prevalence of smoking was two times higher among students with a university cumulative average less than 70% compared to those with 90% or more (OR=1.9; CI: 1.1–3.5) (Table 5).

**Table 3 Dietary habits by smoking status in both healthy and those who suffer from smoking-related symptoms.**

Variable	Category	Suffer from smoking-related symptoms			Healthy		P-value
		Smokers	Non-smokers	P-value	Smokers	Non-smokers	
		N (%)	N (%)		N (%)	N (%)	
<b>Cold drinks</b>	< Once a month	78 (25.4)	55 (33.3)	<0.001	111 (17.2)	185 (21.4)	<0.001
	< Once a week	73 (23.8)	58 (35.2)		241 (37.4)	382 (44.2)	
	2–6 times a week	112 (36.5)	42 (25.5)		157 (24.4)	180 (20.8)	
	Daily	44 (14.3)	10 (6.1)		135 (21.0)	117 (13.5)	
	Total	307 (100)	165 (100)		644 (100)	864 (100)	
<b>Coffee</b>	< Once a month	42 (13.7)	64 (37.9)	<0.001	89 (13.9)	374 (43.6)	<0.001
	< Once a week	53 (17.3)	62 (36.7)		101 (15.8)	224 (26.1)	
	2–6 times a week	79 (25.7)	20 (11.8)		168 (26.2)	103 (12.0)	
	Daily	133 (43.3)	23 (13.6)		283 (44.1)	156 (18.2)	
	Total	307 (100)	169 (100)		641 (100)	857 (100)	
<b>Tea</b>	< Once a month	46 (15.1)	37 (22.2)	0.026	95 (14.9)	127 (14.6)	0.026
	< Once a week	68 (22.3)	49 (29.3)		154 (24.1)	258 (29.7)	
	2–6 times a week	94 (30.8)	37 (22.2)		149 (23.4)	214 (24.7)	
	Daily	97 (31.8)	44 (26.3)		240 (37.6)	269 (31.0)	
	Total	305 (100)	167 (100)		638 (100)	868 (100)	
<b>Energy drinks</b>	< Once a month	76 (24.8)	86 (52.1)	<0.001	211 (33.0)	567 (66.5)	<0.001
	< Once a week	72 (23.5)	38 (23.0)		178 (27.8)	161 (18.9)	
	2–6 times a week	98 (31.9)	32 (19.4)		117 (18.3)	59 (6.9)	
	Daily	61 (19.9)	9 (5.5)		134 (20.9)	65 (7.6)	
	Total	307 (100)	165 (100)		640 (100)	852 (100)	
<b>Dairy products</b>	< Once a month	163 (54.0)	75 (44.9)	0.09	332 (51.7)	342 (39.6)	<0.001
	< Once a week	75 (24.8)	40 (24.0)		151 (23.5)	251 (29.1)	
	2–6 times a week	32 (10.6)	23 (13.8)		88 (13.7)	156 (18.1)	
	Daily	32 (10.6)	29 (17.4)		71 (11.1)	114 (13.2)	
	Total	302 (100)	167 (100)		642 (100)	863 (100)	
Fast food	< Once a month	60 (19.7)	41 (24.3)	0.54	120 (18.9)	188 (21.7)	<0.001
	< Once a week	55 (18.0)	34 (20.1)		131 (20.6)	296 (34.2)	
	2–6 times a week	85 (27.9)	43 (25.4)		200 (31.4)	251 (29.0)	
	Daily	105 (34.4)	51 (30.2)		185 (29.1)	130 (15.0)	
	Total	305 (100)	169 (100)		636 (100)	865 (100)	

## Discussion

The prevalence of smoking among sample participants appeared to be high (47.7%), pointing to a continuously growing problem in need of urgent intervention. These results showed significant rates of tobacco smoking among males and females, with increasing popularity for waterpipe smoking, especially among females. The study showed a smoking prevalence higher than that reported among young Palestinians in general aged 15–29 years old (22%) (16,17), among An-Najah Palestinian University students in the West Bank (34.7%) (14), and Jordanian university students (28.6%) (18), but lower than the prevalence of smoking among university students in Gaza (55.7%) (13). Furthermore, Khattab et al. found the rates of smoking among Palestinians to be high compared to neighbouring Middle Eastern countries (19).

The prevalence of smoking is evidently lower among females globally (20), which could be attributed to cultural and social factors (5), but could also be an underestimation as a result of under-reporting due to social conditioning (5,14,18). Several studies reported a higher prevalence of smoking among Palestinian males but with varying estimates (12,14,16,17). In this study, 23.5% of females were found to be tobacco smokers compared to 61.8% of males. Studies have reported higher rates of smoking among young females (university students, young adults and school-aged students) compared to the general population (11–14,16,17). The increase in the prevalence of tobacco smoking among females has been attributed to the influence of urbanization on social life in the Region, in addition to the role of the media and marketing strategies that target women (19).

**Table 4 Prevalence of smoking-related symptoms and diseases by smoking status.**

Symptom / Disease	Frequency	Smokers N (%)	Non-smokers N (%)	P-value
<b>Shortness of breath</b>	I feel it so much	191 (20.5)	89 (8.7)	<0.001
	Sometimes I feel it	327 (35.0)	295 (28.8)	
	I don't feel it	415 (44.5)	639 (62.5)	
<b>Cough</b>	I feel it so much	155 (16.6)	55 (5.3)	<0.001
	Sometimes I feel it	380 (40.6)	320 (31.0)	
	I don't feel it	401 (42.8)	656 (63.6)	
<b>Chest pain</b>	I feel it so much	131 (14.0)	49 (4.8)	<0.001
	Sometimes I feel it	295 (31.6)	217 (21.0)	
	I don't feel it	508 (54.4)	765 (74.2)	
<b>Frequent inflammations of chest</b>	I feel it so much	84 (9.0)	23 (2.2)	<0.001
	Sometimes I feel it	171 (18.3)	86 (8.4)	
	I don't feel it	678 (72.7)	918 (89.4)	
<b>Squeeze (chest pressure)</b>	I feel it so much	67 (7.2)	31 (3.0)	<0.001
	Sometimes I feel it	146 (15.7)	83 (8.1)	
	I don't feel it	719 (77.1)	907 (88.8)	
<b>Heart diseases</b>	I feel it so much	63 (6.8)	18 (1.8)	<0.001
	Sometimes I feel it	90 (9.6)	51 (5.0)	
	I don't feel it	780 (83.6)	954 (93.3)	
<b>Hypertension</b>	I feel it so much	72 (7.7)	27 (2.6)	<0.001
	Sometimes I feel it	133 (14.3)	60 (5.8)	
	I don't feel it	725 (78.0)	940 (91.5)	

Differences in smoking modalities by sex showed that smoking waterpipe tobacco, in particular, was significant among males and females. Waterpipe smoking is an old practice in the Middle East but has recently become fashionable and gained popularity in both sexes worldwide, especially among young and affluent socioeconomic groups (21,22). This trend appears to be encouraged by the assumption that it is safer than smoking cigarettes, as well as the attraction of flavoured tobacco, and the social nature of the activity. In fact, some studies showed that waterpipe smoking has become more prevalent than tobacco smoking (5,9).

The prevalence of waterpipe smoking among Palestinian university students was found to be 24% (23) while 61.1% of Jordanian university students reported ever smoking from waterpipe (24). Additionally, it was found that males, in general, initiated smoking at younger ages compared to females (mainly between 15–18 years of age). Studies show that most adults initiate smoking during adolescence (25). Higher smoking rates were observed among residents of refugee camps and rural areas, as well as with increasing age and income, and lower parental educational level.

Parental socioeconomic level was found in some studies to be related to smoking initiation in young people; for example, in low-income countries adolescents coming from high-income families and residing in rural areas had higher rates of smoking (26), with several studies from Palestine and Jordan reported similar

findings (14,18,23,27). However, Jawad et al. reported that Palestinian refugees had nearly twice the rates of current tobacco smoking compared to non-refugees (28).

It was also found that smoking among Palestinian young adults was associated with unhealthy nutritional patterns and increased consumption of caffeinated drinks (29), which was consistent with other recent studies (30,31). The significant increase in the consumption of caffeinated energy drinks, especially among children and young adults, has raised concerns regarding their effects on health among susceptible populations (32,33).

Investigation of factors that could encourage smoking initiation among young Palestinian adults indicated that having friends and family members who used tobacco increased the risk of smoking. However, better academic performance, measured by high school leaving certificate grades and university cumulative averages, was associated with a reduction in the prevalence of smoking. Consistent with this study, personal, behavioural and environmental factors had been shown to influence smoking initiation in young people (3). Social peer pressure on smoking initiation had been previously found to predict not only smoking behaviour but also the level of tobacco consumption (34), and is consistent with recent studies in the Gaza Strip and the United Arab Emirates where peer pressure had the strongest influence on smoking initiation (11,35). Furthermore, the higher academic performance of non-smokers reported in this study could be related to personality traits associated

Table 5 Factors encouraging smoking initiation.

Factor	Category	Smokers (n=953) N (%)	Non-smokers (n=1,044) N (%)	OR <sup>a</sup> (95%CI)	P-value
<b>Smoker father</b>	No	417 (43.9)	593 (57.4)	1	<0.001
	Yes	532 (56.1)	440 (42.6)	1.8 (1.5–2.3)	
<b>Smoker mother</b>	No	851 (89.9)	949 (92.5)	1	0.039
	Yes	96 (10.1)	77 (7.5)	3.3 (2.4–4.9)	
<b>Smoker brother</b>	No	493 (52.3)	666 (56.6)	1	<0.001
	Yes	450 (47.7)	349 (34.4)	1.7 (1.4–2.1)	
<b>Smoker sister</b>	No	848 (92.1)	966 (97.1)	1	<0.001
	Yes	73 (7.9)	29 (2.9)	6.5 (3.9–11.1)	
<b>Number of smoker friends</b>	< 3	112 (12.0)	373 (48.0)	1	<0.001
	3–6	120 (12.8)	113 (14.5)	3.5 (2.5–4.9)	
	7–10	145 (15.5)	76 (9.8)	6.4 (4.5–9.0)	
	> 10	559 (59.7)	215 (27.7)	8.7 (6.7–11.3)	
<b>High school certificate grade average (%)</b>	>95	91 (11.9)	194 (27.3)	1	<0.001
	90–95	136 (17.8)	167 (23.5)	1.8 (1.3–2.6)	
	80–89	257 (33.6)	192 (27.0)	2.6 (1.8–3.7)	
	70–79	215 (28.1)	100 (14.1)	3.1 (2.1–4.6)	
	< 70	65 (8.5)	57 (8.0)	1.6 (0.9–2.5)	
<b>University cumulative average (%)</b>	≥90	32 (4.2)	55 (7.8)	1	<0.001
	80–89	178 (23.5)	260 (36.8)	1.0 (0.6–1.8)	
	70–79	398 (52.6)	315 (44.6)	1.5 (0.9–2.4)	
	< 70	148 (19.6)	76 (10.8)	1.9 (1.1–3.5)	

<sup>a</sup>Odds Ratios were age, sex and family income adjusted

with commitment and aspiration as reported by Tyas and Pederson (36). Similar findings had been reported by Tucktuck et al. among Palestinian university students (23).

The adverse health effects of smoking are already well known. Those found in this study were consistent with recent research assessing the prevalence of chronic obstructive pulmonary disease (COPD) in 11 Middle Eastern countries. The study reported a higher prevalence of COPD among smokers of both cigarettes and waterpipe with a dose–response relationship (37). Regardless of the high rates of smoking-related symptoms, lower belief scores for the perceived health risks of smoking were also found (38).

Belief patterns of smokers in this study were similar to those reported in the Gaza Strip (11). In addition, the reported effects of smoking on perceived reduction of stress and negative emotions were consistent with other studies (36,39). Overall, the findings in this study showed that smokers were less knowledgeable of the harmful effects of smoking compared to non-smokers.

### Limitations

This study consisted of a large sample recruited to represent different geographic and socio-economic classes. However, the study lacked randomization in the process of selection, thereby limiting the generalizability of the findings. In addition, the sample consisted mainly of stu-

dents, although the analysis showed no significant difference in the patterns, factors and beliefs towards smoking between students and non-students.

### Conclusion

In summary, the prevalence of tobacco use among young Palestinian adults is significant, with waterpipe and tobacco smoking rising. These findings highlight the need for gender and age appropriate tobacco cessation programmes and educational campaigns targeting the health risks of tobacco use. In addition, counseling should be extended to parents who use tobacco in order to support smoking cessation programmes aimed at young people. Adapted interventions should also be accompanied by cognitive-behavioural and motivational strategies that take into account social influences with regard to smoking initiation. Moreover, targeting school-aged students through awareness and peer-led interventions could be effective in reducing long-term smoking rates in young adults and encouraging smoking cessation.

Importantly, for an effective and sustainable tobacco-control programme, a comprehensive nation-wide policy that decreases accessibility to tobacco products among young adults should be adopted. This control could be achieved through prohibiting the purchase of tobacco products by minors, increased taxation and prices, restricting advertising campaigns, and banning smoking in public places.

## Acknowledgements

The authors thank the 1st year medical students at Al-Quds University, Palestine.

**Funding:** None.

**Competing interests:** None declared.

## Prévalence du tabagisme chez les jeunes adultes en Palestine

### Résumé

**Contexte :** Le tabagisme est problème de santé publique mondial. Ces dernières décennies, les habitudes tabagiques ont évolué, comme le montre l'augmentation des taux de consommation chez les jeunes et chez les femmes en particulier.

**Objectifs :** La présente étude avait pour objectif de déterminer la prévalence et les modalités de la consommation de tabac et d'évaluer les facteurs, les habitudes et les croyances susceptibles d'encourager cette pratique chez les jeunes adultes en Palestine ou de les en dissuader.

**Méthodes :** En 2014, une étude transversale a été menée en Cisjordanie auprès de jeunes Palestiniens âgés entre 18 et 25 ans. Les sujets ont été recrutés dans six universités palestiniennes ( $n=1997$ ). Il a été demandé aux participants de compléter un questionnaire portant sur les aspects sociodémographiques, les connaissances et les croyances vis-à-vis de la consommation de tabac ainsi que sur les raisons qui favorisent ou empêchent l'arrêt du tabac.

**Résultats :** La prévalence du tabagisme était de 47,7 %. Les hommes présentaient des taux et des niveaux de consommation supérieurs aux femmes et commençaient à fumer à un plus jeune âge (74,4 % avaient commencé à un âge inférieur ou égal à 18 ans). Les cigarettes et la pipe à eau constituaient les formes les plus répandues chez les deux sexes. Il a également été observé que les fumeurs consommaient davantage de boissons caféinées et de fast-food. Ils affichaient aussi des scores plus faibles s'agissant des croyances antitabac et faisaient état d'une prévalence significativement plus élevée de symptômes et de maladies liés au tabac, principalement les difficultés respiratoires (20,5 %) et la toux (16,6 %). La majorité des fumeurs ont déclaré avoir essayé d'arrêter de fumer et vouloir y parvenir. Les conséquences sur la santé et le coût financier constituaient les facteurs les plus importants en faveur de l'arrêt du tabac, tandis que les changements d'humeur et le manque de maîtrise de soi étaient les facteurs de démotivation les plus cités. Par ailleurs, le tabagisme parmi les membres de la famille et les collègues augmentait la probabilité de devenir fumeur.

**Conclusions :** L'augmentation des taux de tabagisme chez les jeunes Palestiniens et la popularité croissante de l'usage de la pipe à eau devraient alerter les parties prenantes et les inciter à mettre en œuvre des politiques et des programmes de prévention et de sensibilisation à cet égard.

### معدل انتشار تعاطي التبغ بين الشباب في فلسطين

رانيا أبو سير، أكرم خروبي، إبراهيم غنام  
الخلاصة

**الخلفية:** التدخين ولاء عالمي. وعلى مدى العقود القليلة الماضية، تغيرت أنماط التدخين بمعدلات متزايدة بين الشباب، وبين الإناث تحديداً. **الأهداف:** هدفت هذه الدراسة إلى تحديد معدل انتشار التدخين وكيفياته، وتقييم العوامل والعادات والعقائد التي ربما تشجع الشباب على التدخين أو تثنيهم عنه.

**طرق البحث:** أجريت دراسة شاملة لعدة قطاعات في الضفة الغربية عام ٢٠١٤ بين الفلسطينيين في عمر ١٨-٢٥ عاماً. وأُتي بالمشاركين في الدراسة من ست جامعات فلسطينية (عددهم ١٩٩٧). وطلب من المشاركين الإجابة عن استبيان يُركز على الخصائص السكانية الاجتماعية، والمعرفة بالتدخين والمعتقدات الخاصة به، والأسباب التي تدفع المدخنين نحو الإقلاع أو تمنعهم منه.

**النتائج:** تبين أن معدل انتشار التدخين ٤٧,٧ %. وكانت معدلات التدخين أكبر بين الذكور، وكذلك معدلات الاستهلاك، وبيدأ الذكور في التدخين بأعمار صغيرة (بداً ٤,٧٤ % منهم التدخين بعمر ١٨ عاماً أو أقل). وكان تدخين السجائر والرجيلة أكثر أنواع التدخين شيوعاً بين كلا الجنسين. وأظهرت الدراسة أيضاً أن المدخنين يستهلكون كميات أكبر من المشروبات التي تحتوي على الكافيين ومن الأكلات السريعة، وأبدوا درجات أقل فيما يخص المعتقدات المناهضة للتدخين، وأبلغوا عن معدلات انتشار أكبر من الأعراض والأمراض المصاحبة للتدخين وخاصة ضيق النفس (٥,٢٠ %) والسعال (٦,١٦ %). وأعرب غالبية المدخنين عن محاولتهم الإقلاع عن التدخين ورغبتهم في ذلك. وكانت أكبر العوامل الدافعة للإقلاع عن التدخين هي الحفاظ على الصحة والتكاليف المادية، بينما كانت أكبر العوامل التي تثنيهم عن الإقلاع هي التغييرات في المزاج وانعدام ضبط النفس. وإضافة إلى ذلك، زاد تدخين أفراد الأسرة والأقران من احتمالات التدخين.

**الاستنتاجات:** ينبغي أن تكون المعدلات المتزايدة للتدخين بين الشباب الفلسطينيين وزيادة شعبية الرجيلة تنبهاً للأطراف المعنية بشأن ضرورة تطبيق سياسات وبرامج مكافحة التدخين والتوعية بأضراره.

## References

1. World Health Organization. Tobacco: key facts. Geneva: World Health Organization; 2017 (<http://www.who.int/mediacentre/factsheets/fs339/en/>, accessed 28 December 2018).
2. Ng M, Freeman MK, Fleming TD, Robinson M, Dwyer-Lindgren L, Thomson B, et al. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA*. 2014;311(2):183-92. DOI: 10.1001/jama.2013.284692.
3. Buller D, Borland R, Woodall W, Hall J, Burris-Woodall P, Voeks J. Understanding factors that influence smoking uptake. *Tob Control*. 2003;12(suppl 4):iv16. DOI: 10.1136/tc.12.suppl\_4.iv16.
4. Botello-Harbaum MT, Haynie DL, Iannotti RJ, Wang J, Gase L, Simons-Morton B. Tobacco control policy and adolescent cigarette smoking status in the United States. *Nicotine Tob Res*. 2009;11(7):875-85. DOI: 10.1093/ntr/ntp081.
5. Maziak W, Nakkash R, Bahelah R, Hussein A, Fanous N, Eissenberg T. Tobacco in the Arab world: old and new epidemics amidst policy paralysis. *Health Policy Plan*. 2014;29(6):784-94. DOI: 10.1093/heapol/czt055.
6. Neergaard J, Singh P, Job J, Montgomery S. Waterpipe smoking and nicotine exposure: a review of the current evidence. *Nicotine Tob Res*. 2007;9(10):987-94. DOI: 10.1080/14622200701591591.
7. Knishkowsky B, Amitai Y. Water-pipe (narghile) smoking: an emerging health risk behavior. *Pediatrics*. 2005;116(1):e113-9. DOI: 10.1542/peds.2004-2173.
8. Maziak W, Ward KD, Afifi Soweid RA, Eissenberg T. Tobacco smoking using a waterpipe: a re-emerging strain in a global epidemic. *Tob Control*. 2004;13(4):327-33. DOI: 10.1136/tc.2004.008169.
9. World Health Organization. Waterpipe tobacco smoking: health effects, research needs and recommended actions by regulators. Geneva: World Health Organization; 2005 ([http://www.who.int/tobacco/global\\_interaction/tobreg/Waterpipe%20recommendation\\_Final.pdf](http://www.who.int/tobacco/global_interaction/tobreg/Waterpipe%20recommendation_Final.pdf), accessed 28 December 2018).
10. Aboaziza E, Eissenberg T. Waterpipe tobacco smoking: what is the evidence that it supports nicotine/tobacco dependence? *Tob Control*. 2015;24 Suppl 1:i44-i53. DOI: 10.1136/tobaccocontrol-2014-051910.
11. Eldalo AS. Prevalence and perception of smoking habits among the Palestinian population in the Gaza Strip. *J Multidiscip Healthc*. 2016;9:297-301. DOI: 10.2147/JMDH.S107346.
12. Absi M. Smoking emerging epidemic in Palestine. *Al Ranteesy Specialist Pediatric Hospital*; August 2015. DOI: 10.13140/RG.2.1.3477.4886.
13. Abu Shomar RT, Lubbad IK, El Ansari W, Al-Khatib IA, Alharazin HJ. Smoking, awareness of smoking-associated health risks, and knowledge of national tobacco legislation in Gaza, Palestine. *Cent Eur J Public Health* 2014;22(2):80-9. DOI: 10.21101/cejph.a4005.
14. Musmar SG. Smoking habits and attitudes among university students in Palestine: a cross-sectional study. *East Mediterr Health J*. 2012;18(5):454-60.
15. Copeland AL, Brandon TH, Quinn EP. The Smoking Consequences Questionnaire-Adult: Measurement of smoking outcome expectancies of experienced smokers. *Psychological Assessment*. 1995;7(4):484.
16. World Health Organization. WHO Report on the Global Tobacco Epidemic, 2015, country profile West Bank and Gaza Strip. Geneva: World Health Organization; 2015 ([http://www.who.int/tobacco/surveillance/policy/country\\_profile/pse.pdf](http://www.who.int/tobacco/surveillance/policy/country_profile/pse.pdf), accessed 28 December 2018).
17. Palestinian Central Bureau of Statistics (PCBS). Palestinian youth survey, 2015 - main findings. Ramallah: PCBS; 2016 (<http://www.pcbs.gov.ps/Downloads/book2179.pdf>, accessed 28 December 2018).
18. Haddad LG, Malak MZ. Smoking habits and attitudes towards smoking among university students in Jordan. *Int J Nurs Stud*. 2002;39(8):793-802.
19. Khattab A, Javaid A, Iraqi G, Alzaabi A, Ben Kheder A, Koniski ML, et al. Smoking habits in the Middle East and North Africa: results of the BREATHE study. *Respir Med*. 2012;106 Suppl 2:S16-24. DOI: 10.1016/S0954-6111(12)70011-2.
20. Global Youth Tobacco Survey Collaborating Group. Differences in worldwide tobacco use by gender: findings from the Global Youth Tobacco Survey. *J Sch Health*. 2003;73(6):207-15.
21. Singh PN, Neergaard J, Job JS, El Setouhy M, Israel E, Mohammed MK, et al. Differences in health and religious beliefs about tobacco use among waterpipe users in the rural male population of Egypt. *J Relig Health*. 2012;51(4):1216-25. DOI: 10.1007/s10943-010-9431-y.
22. Maziak W, Taleb ZB, Bahelah R, Islam F, Jaber R, Auf R, et al. The global epidemiology of waterpipe smoking. *Tob Control*. 2015;24 Suppl 1:i3-i12. DOI: 10.1136/tobaccocontrol-2014-051903.
23. Tucktuck M, Ghandour R, Abu-Rmeileh NME. Waterpipe and cigarette tobacco smoking among Palestinian university students: a cross-sectional study. *BMC Public Health*. 2017;18(1):1. DOI: 10.1186/s12889-017-4524-0.
24. Azab M, Khabour OF, Alkaraki AK, Eissenberg T, Alzoubi KH, Primack BA. Water pipe tobacco smoking among university students in Jordan. *Nicotine Tob Res* 2010;12(6):606-12. DOI: 10.1093/ntr/ntp055.
25. Townsend L, Flisher AJ, Gilreath T, King G. A systematic review of tobacco use among sub-Saharan African youth. *J Substance Use*. 2006;11(4):245-269. DOI: 10.1080/14659890500420004.
26. Hiscock R, Bauld L, Amos A, Fidler JA, Munafo M. Socioeconomic status and smoking: a review. *Ann N Y Acad Sci*. 2012;1248:107-23. DOI: 10.1111/j.1749-6632.2011.06202.x.

27. Abdulrahim S, Jawad M. Socioeconomic differences in smoking in Jordan, Lebanon, Syria, and Palestine: A cross-sectional analysis of national surveys. *PLOS ONE*. 2018;13(1):e0189829. DOI: 10.1371/journal.pone.0189829.
28. Jawad M, Khader A, Millett C. Differences in tobacco smoking prevalence and frequency between adolescent Palestine refugee and non-refugee populations in Jordan, Lebanon, Syria, and the West Bank: cross-sectional analysis of the Global Youth Tobacco Survey. *Confl Health*. 2016;10:20. DOI: 10.1186/s13031-016-0087-4.
29. Morabia A, Curtin F, Bernstein MS. Effects of smoking and smoking cessation on dietary habits of a Swiss urban population. *Eur J Clin Nutr*. 1999;53(3):239-43.
30. Davison G, Shoben A, pasch KE, Klein EG. Energy Drink Use Among Ohio Appalachian Smokers. *J Community Health*. 2016;41(5):897-902. DOI: 10.1007/s10900-016-0167-9.
31. Treur JL, Taylor AE, Ware JJ, McMahan G, Hottenqa JJ, Baseelmans BM, et al. Associations between smoking and caffeine consumption in two European cohorts. *Addiction*. 2016;111(6):1059-68. DOI: 10.1111/add.13298.
32. Seifert SM, Schaechter JL, Hershorin ER, Lipshultz SE. Health Effects of Energy Drinks on Children, Adolescents, and Young Adults. *Pediatrics*. 2011;127(3):511-528. DOI: 10.1542/peds.2009-3592.
33. MacDonald N, Stanbrook M, Hébert PC. "Caffeinating" children and youth. *Can Med Assoc J*. 2010;182(15):1597-1597. DOI: 10.1503/cmaj.100953.
34. Harakeh Z, Vollebergh WA. The impact of active and passive peer influence on young adult smoking: an experimental study. *Drug Alcohol Depend*. 2012;121(3):220-3. DOI: 10.1016/j.drugalcdep.2011.08.029.
35. Resen HM. Impact of parents and peers smoking on tobacco consumption behavior of university students. *Asian Pac J Cancer Prev*. 2018;19(3):677-681. DOI: 10.22034/APJCP.2018.19.3.677.
36. Tyas SL, Pederson LL. Psychosocial factors related to adolescent smoking: a critical review of the literature. *Tob Control*. 1998;7(4):409-20.
37. Tageldin MA, Nafti S, Khan JA, Nejjari C, Beji M, Mahboub B, et al. Distribution of COPD-related symptoms in the Middle East and North Africa: results of the BREATHE study. *Respir Med*. 2012;106 Suppl 2:S25-32. DOI: 10.1016/S0954-6111(12)70012-4.
38. Oncken C, McKee S, Krishnan-Sarin S, O'Malley S, Mazure CM. Knowledge and perceived risk of smoking-related conditions: a survey of cigarette smokers. *Prev Med*. 2005;40(6):779-84. DOI: 10.1016/j.ypmed.2004.09.024.
39. Stubbs B, Veronese N, Vancampfort D, Prina AM, Lin P-Y, Tseng P-T, et al. Perceived stress and smoking across 41 countries: A global perspective across Europe, Africa, Asia and the Americas. *Sci Rep*. 2017;7(1):7597. DOI: 10.1038/s41598-017-07579-w.