

ORIGINAL RESEARCH

Characteristics and smoking patterns among adult Jordanian cigarette smokers with cardiovascular diseases

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ABSTRACT

Background: Cardiovascular disease is the leading cause of death, and smoking cessation is a key component of secondary cardiovascular disease risk prevention efforts. **Objectives:** To examine the relationships between demographic, clinical and health factors, history and patterns of smoking, nicotine dependence, withdrawal symptoms, and willingness (*i.e.*, readiness) to quit smoking after hospital discharge among adult Jordanian men who were cigarette smokers and were admitted to the hospital with a cardiovascular disease diagnosis.

Methods: This cross-sectional study recruited 118 adult men smokers from three hospitals in Jordan during 2011. Data were collected using structured interviews and medical record abstraction.

Results: The mean age of smokers was 50.7 (± 6.7) years and they smoked at least one cigarette per day for an average of 28.8 years (± 7.0). Currently they smoke an average of 28.9 (± 8.0) cigarettes a day. About a quarter (24.6%, $n = 29$) had previously made a quit attempt that lasted at least 24 hours. Smokers were considered highly nicotine dependent if they had scores of > 6 (out of 10) on the Fagerström Test for Nicotine Dependence scale. The average nicotine dependence score was significantly higher in the high versus low nicotine dependence group (6.9 vs. 4.1). The number of cigarettes smoked daily was significantly higher in the high compared to the low nicotine dependence group (30.7 cigarettes vs. 23.4). Logistic regression showed smokers who had someone available to encourage quitting smoking “at least sometimes” were more likely to quit smoking after hospital discharge, and smokers who had sufficient personal income to support self were less likely to quit smoking after hospital discharge, while controlling for all other variables.

Conclusions: The very high nicotine dependence of these men indicates that there is an urgent need for education, counseling and behavioral interventions, and pharmacological therapies, to achieve successful smoking cessation. Study findings lay the basis for development of appropriate smoking cessation programs in Jordan.

Key Words: Cardiovascular diseases, Nicotine dependence, Cigarette smoking, Jordan

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1. INTRODUCTION

1.1 Background

Tobacco use is a leading cause of cardiovascular disease (CVD) and in 2012 accounted for about 24% of the deaths in the United States (US).^[1,2] It is also a leading cause or contributor to many chronic medical conditions including lung disease and cancer.^[1]

Because smoking is a risk factor for cardiac morbidity and mortality, smoking cessation is a key component of secondary CVD risk prevention efforts.^[3] Despite the well documented health hazards and the public's awareness of the tragic consequences of smoking, cigarette smoking remains highly prevalent. The US Centers for Disease Control and Prevention^[4] estimated that, in 2012, approximately 18.1% (42.1 million) of adults in the US are smokers (20.5% of men and 15.8% of women). In comparison, Jordan has much higher rates of smoking than the US. Smoking is a widely accepted social activity and occurs in public, at workplace and at home. Cigarette smoking prevalence among Jordanians (15+ years of age) in the most recent statistics in 2009 was 47% in men and 6% in women.^[5]

Little is known about the history and pattern of smoking in patients with CVD in Jordan. Existing data include two studies by Elshatarat *et al.*,^[6,7] an unpublished dissertation,^[8] and the two studies^[9,10] that evaluated the smoking patterns and knowledge about smoking as an addiction to ascertain the reasons why physicians and nurses smoke at high rates and do not deliver smoking cessation intervention. While patients with existing CVD are at increased risk of a subsequent CVD event, little data exist about the relationships between nicotine withdrawal symptoms, nicotine dependence and willingness to quit smoking after hospital discharge in patients with CVD diagnosis in Jordan.

1.2 Research objective

The aims of this study were to examine the relationships between demographics, clinical, smoking history, smoking patterns and nicotine dependence, including willingness to quit smoking after hospital discharge, in adult Jordanian men who were cigarette smokers admitted to the hospital with a CVD diagnosis.

1.3 Literature review

According to the World Health Organization,^[11] tobacco kills up to half of its long-term users and if current trends continue, tobacco is estimated to result in more than 8 million deaths each year until the year 2030. Eighty percent of those deaths are estimated to occur in the developing world.

Some smokers seek available resources for treating smoking,

however about 60% of smokers in the US who are seen by clinicians each year receive minimal advice (*i.e.*, less than 3 minutes) about smoking cessation.^[12] Being hospitalized for a major cardiac event combined with required smoking abstinence during hospitalization spurs many smokers to quit smoking.^[13-15] However, with the rare exception of a program at one of the cancer centers, smoking cessation interventions appear to be absent in Jordanian hospitals.

Smoking cessation significantly reduces the risk of subsequent mortality after myocardial infarction by up to 61%.^[16] Also, a majority of smokers with a diagnosis of CVD resume smoking after being discharged from the hospital.^[15,17] A significant proportion (63% to 66%) of patients who had myocardial infarction relapsed to smoking within one year after hospital discharge.^[17,18]

Nicotine is considered to be the most abused psychoactive substance.^[19] Nicotine withdrawal symptoms ensue within 6-12 hours after an abrupt cessation in or reduction of nicotine use.^[20] Therefore, smokers use nicotine-containing products to avoid or relieve their withdrawal symptoms. The presence of withdrawal symptoms is a barrier to quitting smoking because the smoker loses autonomy over his/her use of tobacco.^[21] Examples of nicotine-seeking/craving situations are: during a cessation attempt, upon waking in the morning, and in response to situations in which smoking has been restricted.^[22]

Evidence of the benefits of smoking cessation is abundantly strong.^[23-25] Smoking cessation in patients with CVD diagnoses has been associated with a reduction in subsequent readmission and mortality rates.^[1,26] In a systematic review, Critchley and Capewell^[27] reported that quitting smoking was associated with a 36% reduction in risk of mortality among patients with congestive heart disease [with a pooled crude risk ratio of 0.64 (95% CI: 0.58, 0.71)].

The presence of a smoking cessation program in the hospital or outpatient clinics is superior to individual smoking cessation efforts. Smokers hospitalized with CVD need intensive smoking cessation counseling lasting at least 1 month after hospital discharge to decrease their likelihood of relapse to smoking since most had smoked for many years.^[15,28] Dawood *et al.*^[29] found that patients who quit smoking after myocardial infarction and were still abstinent at 6 months after discharge were more likely to sustain their non-smoking status if they were discharged from a hospital that provided a smoking cessation program ($p < .001$).

While a few cross-sectional studies like this one represent a good starting point and a foundation for smoking cessation programs in Jordan, no intervention studies have been re-

ported to determine which options for intervention work best in the Jordanian setting. This study describes cardiovascular patients' smoking related variables and behaviors and their intention to stay smoke-free after discharge home from the hospital. Predictors of willingness to quit smoking after the hospital discharge also are examined.

2. METHODS

2.1 Design

A cross-sectional design was used to achieve the study aims.

2.2 Settings

Subjects in this study were recruited from three hospitals in Amman (the capital of Jordan): a military hospital, a teaching hospital, and a private hospital. These hospitals provide a full range of cardiovascular medical and surgical services for patients admitted from different socioeconomic levels. The hospitals were selected as they represent the three major sectors of health care in Jordan. As they offer diagnosis, treatment and rehabilitative services, the choice of the hospitals offered an opportunity to recruit subjects with CVD diagnosis who were admitted to different departments in each of the participating hospitals (*e.g.*, medical and surgical wards, intensive care units, and coronary care units).

The military hospital (represented by a known heart institute) offers its services to military personnel and their families as well as civilian citizens and indigents' persons from Jordan and beyond. With over 6,500 annual admissions, the heart institute has a capacity of 170 beds, including an 8-bed coronary care unit, an 8-bed day care unit, and a 16-bed intensive care unit for post cardiac surgery patients. The teaching hospital was selected as it is one of the oldest and largest hospitals in Jordan. The hospital provides the highest quality medical services of general and specialized natures and is accredited by the Joint Commission International. Also, it provides different teaching and training programs, develops and promotes scientific research, and contributes to the prevention of diseases. In its heart center and post cardiac intensive care unit, 56 beds are dedicated for the cardiovascular cases. Likewise, the private hospital is known for its advanced medical expertise and multispecialty care, which is provided with advanced medical technology. It is recognized for post-graduate medical education and training, and is accredited by the Joint Commission International. It provides coronary care services for patients with angina, myocardial infarction and post cardiac catheterization and balloon or stent angioplasty.

2.3 Sample

The subjects were patients hospitalized with a CVD diagnosis who were admitted to any of the three participating

hospitals. Data collection occurred between September and December 2011. A total of 118 patients met the inclusion criteria and provided data for this study.

Subjects were considered for participation in the study if they: (1) were men; (2) were 18 years of age or older; (3) were admitted to the hospital with a primary diagnosis of CVD; (4) were oriented to time and place; (5) had smoked at least 100 cigarettes in their life and were current smokers of at least one cigarette/day during the month preceding hospital admission; (6) were able to read and speak Arabic language; and (7) gave informed consent.

Women were excluded for the following reasons: (1) low prevalence of smoking by Jordanian women (5.7%); and (2) having no women to serve as research assistants to collect the data limited the ability to include women because, culturally, some women may be uncomfortable and would consider a man investigator entering their rooms for an interview as a violation of their modesty.

Recruitment process

Convenience sampling was used in recruiting the subjects. The data collector and principal investigator (A.H.A.) spoke with the charge nurse on the shift to know which men patients meet the eligible CVD diagnoses in this study; the medical records and nursing notes were then screened to determine whether they meet these two primary eligibility criteria for participation: (1) had one of several CVD diagnoses, and (2) current smoker before admission to the hospital. The two criteria were confirmed through the medical review when available, and cued the investigator about which patients he should speak to about the study.

Eligible patients were approached to be recruited once their medical condition was deemed stable by their health care provider and at least 12 hours after their hospital admission to allow for nicotine withdrawal symptoms to be manifested. Further, the patients' nurses were consulted to determine whether or not the patient was hemodynamically stable. The patients who met the eligibility criteria were approached directly by the principal investigator to explain the purpose, nature and risks of the study, and to invite them to participate.

2.4 Measurements

The study data collection booklet consisted of several sections to elicit data about sociodemographic, clinical and health factors, knowledge questions, history and pattern of smoking, as well as the following standardized questionnaires were used: Fagerström Test for Nicotine Dependence, Wisconsin Smoking Withdrawal Scale, and Willingness to Quit Smoking Measures. All the questionnaires had strong psychometric properties.

2.4.1 Fagerström Test for Nicotine Dependence (FTND)

The FTND is a short and convenient self-report measure of dependency on nicotine in adults.^[30] The FTND consists of six items, with responses ranging from 0 to 1 or 0 to 3, accordingly. It asks questions like “How soon after you wake up do you smoke your first cigarette?”, “How many cigarettes per day do you smoke?”, and “Do you smoke more during the first hours after waking than during the rest of the day?” The responses are summed to compute a score ranging from 0 (least dependent) to 10 (most dependent). Heatherton *et al.*^[30] found the coefficient alpha to be 0.61. In this study, subjects were considered highly nicotine dependent if they had scores of > 6 on the FTND scale.^[31–33]

2.4.2 Wisconsin Smoking Withdrawal Scale (WSWS)

The WSWS, a 28-item scale, assesses nicotine withdrawal and contains seven subscales tapping the major symptom elements of the nicotine withdrawal syndrome (anger, anxiety, sadness, concentration, craving, sleepiness, and hunger), with coefficient alphas for the subscales ranging from 0.75 to 0.93. The WSWS items are rated on a 5-point Likert scale, ranging from “Strongly Disagree” (0) to “Strongly Agree” (4).^[34] This scale has predictive validity for smoking cessation outcomes, is sensitive to smoking withdrawal, and is appropriate for use in research.

2.4.3 Willingness to quit smoking

The subjects’ willingness to quit smoking was measured with a modified question, asking “After you are discharged from this hospital, how willing are you to stop smoking cigarettes?”.^[35–37] The subjects’ responses were based on an 11-point scale that ranges from 0 “not at all willing” to 10 “extremely willing”. A score of less than 7 denoted a low willingness for the subject to quit smoking.^[37,38]

2.5 Ethical considerations

Approvals from the Committee on Human Research at the University of California, San Francisco and the Institutional Review Boards at the three participating hospitals in Jordan were obtained. Smokers were given an explanation of the purpose, nature, risks of the study, as well as privacy and confidentiality considerations. Written informed consent was provided by all participants.

2.6 Data management and analysis

Data were analyzed using IBM SPSS 21 Statistics for Windows. The data were double entered and files were matched to verify the accuracy of the data. The data was systematically examined for missing data, out of range values and data inconsistencies. Statistical analyses (*t*-test, Chi square, and logistic regression yielding Odds ratios [OR] with 95%

confidence intervals [CI]) were conducted using two-tailed tests and $\alpha = 0.05$.

3. RESULTS

3.1 Sociodemographic characteristics

The men ages ranged from 35 to 69 years with a mean age of 50.7 (± 6.7) years. Most were married (91.5%) and reported living with someone (96.6%). The total number of persons living in the household ranged from 1 to 13 with a mean of 4.2 (± 1.8). Most were Muslims (84.7%) and the remainders were Christians. The level of education was quite high; 21.2% had a high school education or less; 41.5% had a diploma degree; and 37.3% had obtained a bachelor degree or higher.

The majority of the subjects reported being employed (72%). Among the employed, 38.8% were self-employed. They reported working an average of 43.1 (± 5.8) hours per week. Their reported personal monthly income ranged from 150 to 1500 Jordanian dinars (JD) (1 JD \approx 1.41 US dollars). Median income was 480 JD. Also, 40.7% reported a monthly personal income of less than 450 JD and 42.4% reported a monthly household income of less than 600 JD.

3.2 Health history, index diagnosis and risk factors

About 22% of subjects had previous CVD diagnoses, 11.5% had a history of myocardial infarction, 84.6% had angina and 3.8% had other CVD diseases. The reasons for the current hospital admissions were angina (67.8%), myocardial infarction (27.1%), and other cardiac diagnoses (5.1%). The following cardiac procedures were performed during the index admission: cardiac catheterization (78.8%), stent placement (42.4%), coronary artery bypass graft surgery (13.6%), and balloon angioplasty or other procedures (4.3%).

The reported CVD risk factors were: family history, 57.6%; sedentary life style, 76.8%; hypertension, 37.3%; hypercholesterolemia, 30.5%; obesity or overweight, 39%; and diabetes, 33.1%. When asked about daily caffeinated beverage consumption, the range was 1 to 20 cups with a mean of 4.0 (± 3.0), and a median of 3 cups. The subjects’ perception of their general health was ranked as “good, very good, or excellent” by 68.7% of the subjects and 69.5% reported having health insurance.

3.3 Knowledge and health beliefs

High proportions of the subjects had correct answers to the knowledge and belief questions: “Do you think that tobacco smoking is harmful to health?” (93.2%), “To what extent do you think the number of cigarettes a person smokes affects his future health?” (89.8%), “How likely do you think it is that the heart disease will worsen in a smoker who does not

quit smoking?" (92.4%), and "How likely do you think it is that you will avoid or decrease serious health problems if you quit smoking?" (91.5%). When asked "Do you believe that waterpipe smoking is less harmful to a smoker than cigarette smoking?" 33.9% responded "yes".

3.4 History, patterns, and customs of cigarette smoking

The cigarette smokers (n = 118) reported smoking their first puff on average at age 17.2 years (± 2.4), ranging from 6 to 22 years. The age at which they consumed their first cigarette was about the same (see Table 1).

Table 1. Description of Cigarette Smoking History, Pattern and Customs (n = 118)

Variable	Mean	S.D.*	Median	Min*	Max*
Age of first puff of a cigarette (Years)	17.2	2.4	17.0	6	22
Age of first whole cigarette (Years)	17.3	2.3	17.5	9	22
Number of years of smoking at least 1 cigarette a day	28.8	7.0	30.0	10	50
Total amount paid for cigarettes per month (JD)*	62.4	19.7	60.0	20	175
Percent of income spent on cigarettes per month	14.5	7.2	13.1	5.7	60
Days since last cigarette	2.5	1.3	2.5	0.0	7.7
Number of times that serious quit cigarette smoking attempt was Made and lasted at least 24 hours (n = 29)	3.2	1.7	3.0	1	10
Variable	%	n			
How soon after you wake up do you smoke your first cigarette?					
Within 30 minutes	88.1	104			
After 30 minutes	11.8	14			
Have you smoked cigarettes during this hospitalization?					
Yes	8.5	10			
Have you ever made a serious attempt to quit cigarette smoking that lasted at least 24 hours?					
Yes	24.6	29			
What motivated or led you to resume cigarette smoking? (n = 29)					
Stress	69.0	20			
Social/party situation	34.5	10			
Boredom	31.0	9			
Relief of nicotine withdrawal symptoms	27.6	8			
Crisis	10.3	3			
Other	10.3	3			

* JD: Jordanian Dinars (1 JD \approx 1.41 US Dollars); S.D.: Standard Deviation; Min: Minimum; Max: Maximum.

The cigarette smokers reported that they smoked at least one cigarette per day for an average of 28.8 years (± 7.0), with an average of 28.9 (± 8.0) cigarettes a day. The median was 30 cigarettes a day, with a range from 12 to 70. The total amount paid for cigarettes per month was reported as 62.4 JD (± 19.7) (range: 20 – 175 JD). On average, this represents 14.5% (± 7.2) of their monthly income. About a quarter (24.6%, n = 29) had made a previous quit attempt that lasted at least 24 hours. When asked "how many quit attempts have you made that lasted at least 24 hours?", the range was 1 to 10, with a mean of 3.2 (± 1.7) (see Figure 1).

Most (72.4%) of the cigarette smokers attempted to quit smoking on their own without any help. The methods they used in their past quit attempts were: gradually decreasing

the number of cigarettes smoked per day (37.9%), consuming snacks (such as gum or candy) as an alternative to cigarette smoking (27.6%), decision made with another smoker to mutually quit smoking (13.8%), using pamphlets (3.4%), private consultation from a healthcare provider (3.4%). None of them had used medications, or participated in a formal smoking cessation program. When asked what led them to resume smoking again, the four most common reasons were: stress (69%), social or party situation (34.5%), boredom (31%), and relief from nicotine withdrawal symptoms (27.6%).

Some (8.5%) reported having smoked cigarettes during the current hospitalization. The subjects reported that the cigarette smoking policy at their most recent work place was restricted to designated indoor areas for 52.5%, and

smoking was allowed anywhere for 27.1%. Only 20.3% of employers did not allow smoking in the workplace. Most (99.2%) smoked cigarettes inside their own homes, and

50.8% stated that they smoke in every room. When asked, “Does cigarette smoking occur while children are present?”, 90.7% responded “yes”.

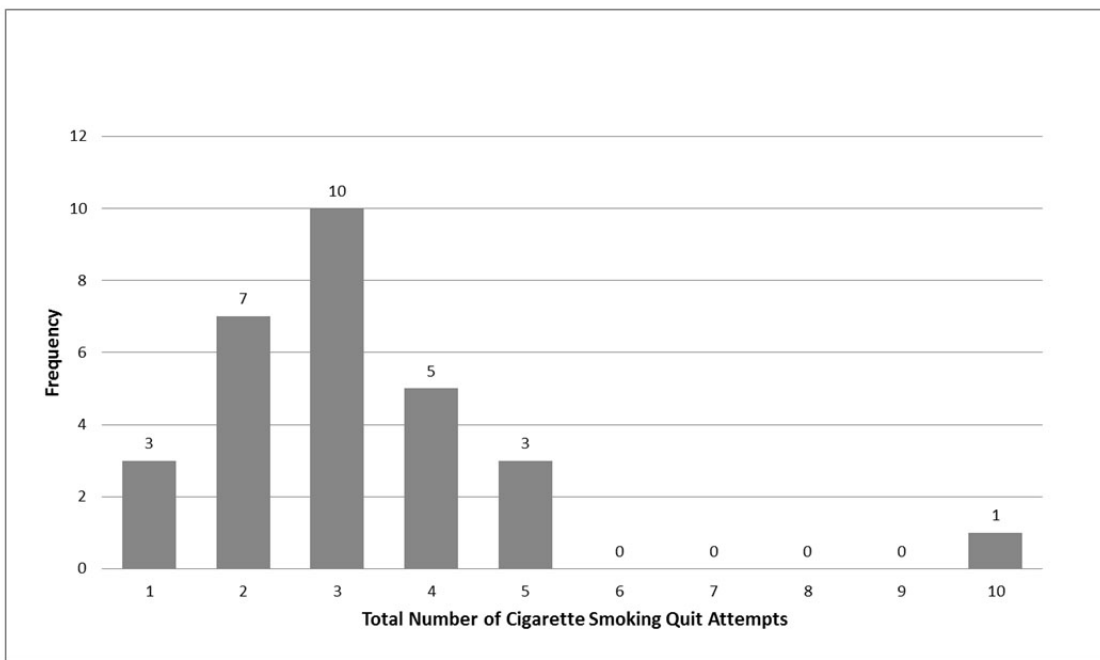


Figure 1. Previous cigarette smoking quit attempts

The average FTND score on a scale from 0 to 10 was 6.2 (± 1.6). The rank order of nicotine withdrawal symptoms reflected that craving was the most frequent symptom (70.9%) and sadness being the least frequent (40.2%) (see Figure 2).

The first and second most common consequences of smoking were health risks (99.1%) and craving addiction (97.4%), while social impression ranked lowest (29.9%) (see Figure 3).

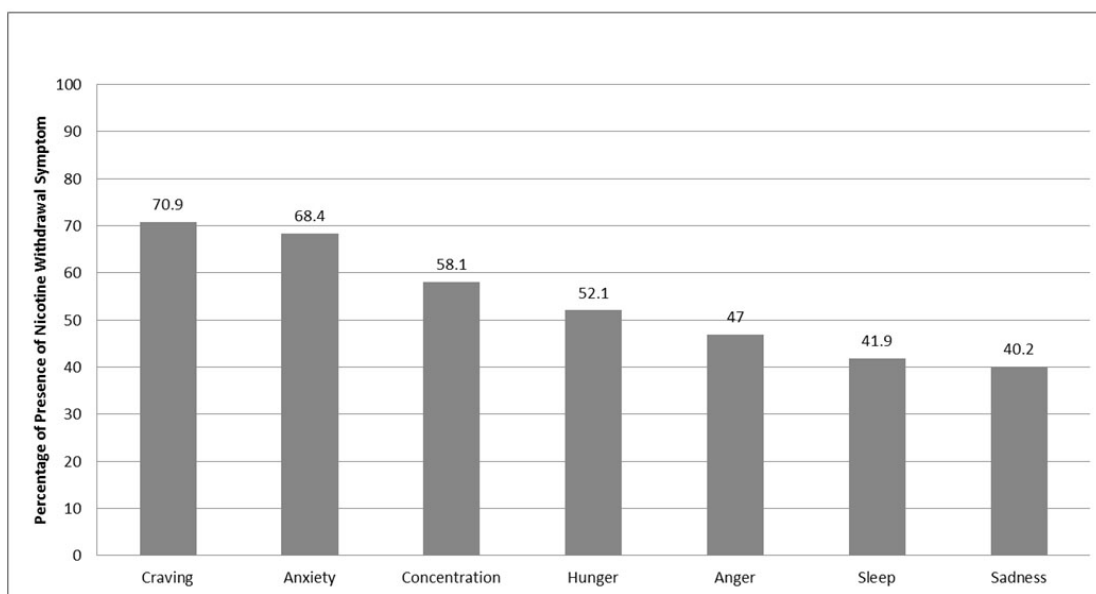


Figure 2. Nicotine withdrawal symptoms

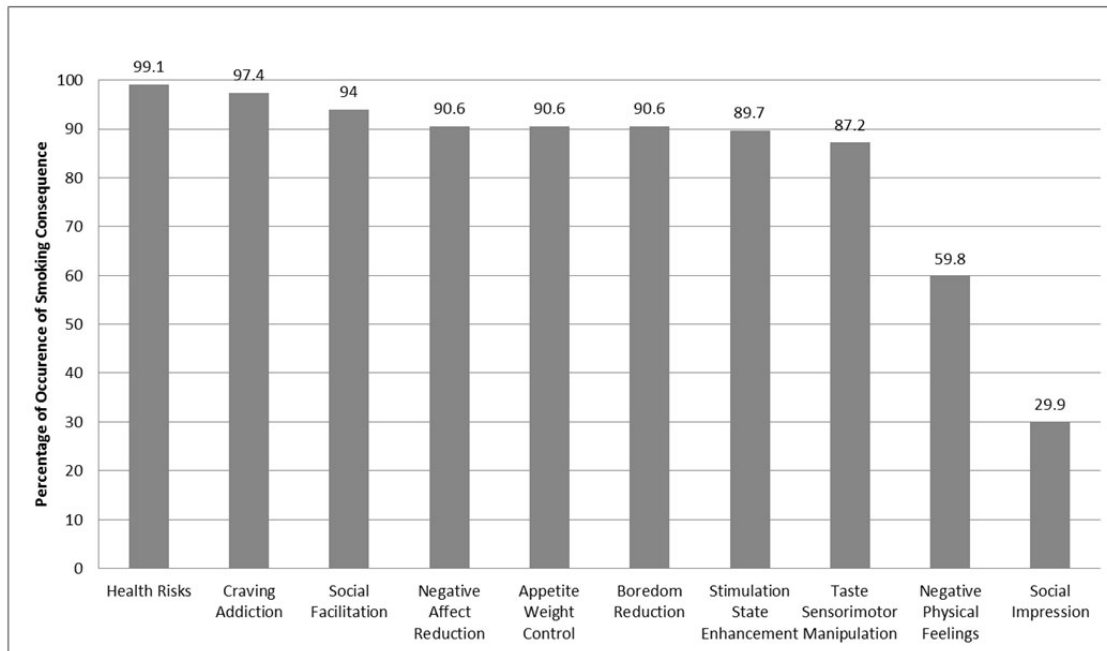


Figure 3. Consequences to smoking

3.5 Smoking status assessment while seeking healthcare

The subjects reported whether a nurse and a physician asked about their smoking status; 90.7% ($n = 107$) of the 118 subjects reported that they were asked about their smoking status while they were in the hospital; 99.1% ($n = 106$) were asked by physicians and 42.1% ($n = 45$) by nurses. Furthermore, 28.0% ($n = 33$) had been seen by a health care provider in the past 12 months. During those 33 subjects' index admissions, 72.7% ($n = 24$) reported being asked about their smoking status and also advised to quit smoking.

3.6 Comparison by nicotine dependency

Table 2 provides a comparison for cigarette smoking history by nicotine dependence status. The average age when the first whole cigarette was smoked was statistically significantly earlier for the high nicotine dependence group [17.1 years (± 2.0) vs. 17.9 years (± 2.9), $t = -1.98$, $p < .05$]. Although the total number of years of smoking at least 1 cigarette a day did not differ significantly between the high nicotine dependence and low nicotine dependence groups (29.2 vs. 28.7), the total amount paid for cigarettes per month was statistically significantly higher in the high nicotine dependence group [66.2 JD (± 19.1) vs. 51.3 JD (± 17.3), $t = 4.34$, $p < .01$].

Table 3 provides a comparison of smoking patterns and customs by nicotine dependence status. The number of cigarettes smoked daily was statistically significantly higher in the nicotine dependent group [30.7 cigarettes (± 7.9) vs.

23.4 cigarettes (± 5.6), $t = 5.30$, $p < .01$].

In addition, the high nicotine dependence group smoked their first cigarette more often within 30 minutes after waking up than the low nicotine dependence group (96.6% vs. 63.3%, $\chi^2 = 16.06$, $df = 1$, $p < .01$). They found it "more difficult to refrain from cigarette smoking in places where it is forbidden" (43.2% vs. 3.3%, $\chi^2 = 16.06$, $df = 1$, $p < .01$), and would hate to give up their first cigarette in the morning (88.6% vs. 40.0%, $\chi^2 = 29.24$, $df = 1$, $p < .01$).

The high nicotine dependence group smoked more cigarettes during the first hours after waking than during the rest of the day (78.4% vs. 56.7%, $\chi^2 = 5.35$, $df = 1$, $p < .05$), and they "smoked cigarettes even when they are ill enough to be in bed most of the day" (56.8% vs. 16.7%, $\chi^2 = 14.49$, $df = 1$, $p < .01$). Moreover, they tended to often smoke at home in every room (56.8% vs. 33.3%, $\chi^2 = 4.94$, $df = 1$, $p < .05$) and while children are present (94.3% vs. 80.0%, $\chi^2 = 5.43$, $df = 1$, $p < .05$).

3.7 The adverse effect of social support on smokers

Additional questions in relation to smoking revealed that 94% of the men responded that "some, most or all of the time" they had someone available they could count on to loan them cigarettes if they wanted them. Only 38.5% stated that they had someone available who encouraged them to quit smoking, and 92.3% had someone who, "some, most or all of the time" who was available to them with whom they could smoke while they are talking about their problems.

Table 2. Comparisons of Cigarette Smoking History by Level of Nicotine Dependence (n =118) #

Variable	Low Dependence (n = 30; 25.4%)		High Dependence (n = 88, 74.6%)	
	Mean (\pm S.D.)*		Mean (\pm S.D.)*	
Age of first puff of a cigarette (Years)	17.8 (\pm 3.2)		16.9 (\pm 2.0)	
Age of first whole cigarette (Years)	17.9 (\pm 2.9)		17.1 (\pm 2.0)	
Number of years of smoking at least 1 cigarette a day	29.2 (\pm 8.7)		28.7 (\pm 6.4)	
Total amount paid for cigarettes per month (JD) *	51.3 (\pm 17.3)		66.2 (\pm 19.1)	
Days since last cigarette	2.7 (\pm 1.3)		2.4 (\pm 1.3)	
Number of times that serious quit cigarette smoking attempt was made and lasted at least 24 hours (n = 29)	2.8 (\pm 1.4)		3.3 (\pm 1.9)	
Variable	%	n	%	n
Have you smoked cigarettes during this hospitalization?				
Yes	3.3	1	10.2	9
Have you ever made a serious attempt to quit cigarette smoking that lasted at least 24 hours?				
Yes	26.7	8	23.9	21
What motivated or led you to return to cigarette smoking? (n = 29)				
Stress	62.5	5	71.4	15
Social/party situation	37.5	3	33.3	7
Relief of nicotine withdrawal symptoms	25.0	2	28.6	6
Boredom	12.5	1	38.1	8
Crisis	12.5	1	9.5	2
Other	0.0	0	14.3	3

Note. #Significant differences are in bold. Subjects were considered nicotine dependent if they had scores of > 6 on the Fagerström Test for Nicotine Dependence (FTND) scale. * JD: Jordanian Dinars (1 JD \approx 1.41 US Dollars); S.D.: Standard Deviation.

3.8 Responses to willingness to quit smoking

In response to questions about the stage of readiness to stop smoking cigarettes, almost half (46.2%) responded “I am seriously planning to quit within the next 30 days.” 44.4% endorsed “I am seriously considering quitting within the next 6 months”; and 9.4% reported that they had no intention of quitting within the next 6 months.

When asked, “Does current willingness to quit smoking after discharged from the hospital differ from before this interview?”, 11.1% responded “yes”. When cigarette smokers were asked if they were willing to quit smoking after discharge from the hospital, the mean score was 7.6 (\pm 1.2) (range: 4-10) on a scale from 0 to 10. However, for the 13 subjects who expressed that their current willingness to quit smoking once discharged from the hospital differed from before the interview, their mean willingness to quit smoking score before this interview was significantly lower than after the interview [5.0 (\pm 1.7) vs. 8.3 (\pm 1.3), $t = -9.636$, $p < .01$].

The reasons given by the subjects for the greater willingness to quit smoking were linked to their knowledge and awareness of the effect of smoking on the body as they recognized

them from the questions asked during the interview. “I felt the effect of smoking on my health,” “The questions clarified aspects that I did not know before about smoking,” “I was not aware enough about the effect of smoking on me” are examples of the reasons the subjects gave for the differences in their willingness scores before and after the interview.

3.9 Predictors of willingness to quit smoking

Variables with a significant p value ($< .10$) in univariate logistic regression analysis were candidates for multivariate analysis. After performing the multivariate logistic regression analysis at a p -value cut-off point of 0.05, only two independent variables (sufficiency of personal income to support self, and availability of someone who encourages quitting smoking) were shown to be statistically significantly contributing to the likelihood of quitting smoking after hospital discharge. Table 4 shows the final multivariate logistic regression model. Three variables (health insurance, previous attempt to quit smoking, nicotine dependency) were not statistically significant but were retained in the final model as they were variables previously identified in the literature to be predictive.

Table 3. Comparisons of Cigarette Smoking Patterns and Customs by Level of Nicotine Dependence (n = 118)[#]

Variable	Low Dependent (n = 30)		High Dependence (n = 88)	
	%	n	%	n
Number of cigarettes smoked daily				
11-20	60.0	18	10.2	9
21-30	36.7	11	64.8	57
31 or more	3.3	1	25.0	22
How soon after you wake up do you smoke your first cigarette?				
Within 30 minutes	63.3	19	96.6	85
After 30 minutes	36.7	11	3.4	3
Do you find it difficult to refrain from cigarette smoking in places where it is forbidden?				
Yes	3.3	1	43.2	38
Which cigarette would you hate most to give up?				
The first one in the morning	40.0	12	88.6	78
All others	60.0	18	11.4	10
Do you smoke cigarettes more during the first hours after waking than during the rest of the day?				
Yes	56.7	17	78.4	69
Do you smoke cigarettes even when you are ill enough to be in bed most of the day?				
Yes	16.7	5	56.8	50
Is cigarette smoking allowed inside your home?				
Yes	100.0	30	98.9	87
Inside your home, is cigarette smoking allowed in every room?				
Yes	33.3	10	56.8	50
Inside your home, does cigarette smoking occur while children are present?				
Yes	80.0	24	94.3	83
Which of the following best describes the indoor cigarette smoking policy at your most recent place of employment?				
Allowed anywhere	26.7	8	27.3	24
Allowed only in designated indoor areas	46.7	14	54.5	48
Not allowed	26.7	8	18.2	16
Variable	Mean (±S.D.) [*]		Mean (±S.D.) [*]	
Number of Smoked Cigarettes Daily	23.4 (±5.6)		30.7 (±7.9)	
FTND Score	4.1 (±1.0)		6.9 (±1.0)	

Note. [#]Significant differences are in bold. Subjects were considered nicotine dependent if they had scores of > 6 on the Fagerström Test for Nicotine Dependence (FTND) scale ^{*}S.D.: Standard Deviation.

As shown in Table 4, the two variables sufficiency of personal income to support self and availability of someone who encourages quitting smoking had made a statistically significant unique contribution in the prediction of likelihood to quit smoking after hospital discharge. Smokers who have someone available to encourage quitting smoking “at least sometimes” [OR: 10.83 (95% CI: 1.95, 60.03), $p < .01$] were more likely to quit smoking after hospital discharge, while controlling for all other variables. Whereas, smokers who had sufficient personal income to support themselves [OR: 0.21 (95% CI: 0.06, 0.75), $p = .016$] were less likely to quit smoking after hospital discharge, while controlling for all

other variables.

4. DISCUSSION

In this cross-sectional study, the sample included 118 adult Jordanian men who were admitted to a hospital with a CVD diagnosis. Their mean age was 50.7 (±6.9) years, and most were married and living with someone. They lived in large households (range 1 to 13 members). Living with a family member is typical in Jordanian society.

This sample had a very high prevalence of other CVD risk factors, including: family history of CVD, sedentary life

style, overweight or obesity, hypertension, diabetes mellitus, and hypercholesterolemia. The prevalence of obesity (39%) in this sample was also higher compared to the prevalence of obesity in the general Jordanian population of middle-aged

men or older (27.3%).^[39] Being a smoker and having these additional risk factors greatly increases their risk of future CVD events.

Table 4. Multivariate logistic regression analysis of independent variables and willingness to quit smoking as a dependent variable

Variable	B	S.E.	Sig.	Odds Ratio	95% C.I. for Odds Ratio	
					Lower	Upper
Sufficiency of personal income to support self [Yes]	-1.548	0.643	0.016	0.213	0.06	0.75
Health insurance [Yes]	-0.815	0.603	0.177	0.443	0.14	1.44
Attempted quitting smoking [Yes]	1.153	0.603	0.056	3.169	0.97	10.34
Nicotine dependency group [Low dependence]	-0.213	0.693	0.759	0.808	0.21	3.14
Availability of someone who encourages quitting smoking ["Some of the time", "Most of the time", and "All of the time"]	2.382	0.874	0.006	10.826	1.95	60.03
Constant	-2.178	0.973	0.025	0.113		

* $\chi^2 = 17.445$, $df = 5$. Significant differences are in bold.

Most of the study subjects (78.8%) had completed a diploma degree or higher. This finding is contrary to the findings in the Western context where higher education is associated with higher smoking cessation rates.^[40] Although nearly more than 90% correctly answered the knowledge and belief questions about the harmful effects of smoking on health, they continued smoking. In the same light, only 24.6% (n = 29) of the subjects had unsuccessfully attempted quitting smoking in the past without the use of any medication or counseling during those quitting smoking attempts. This indicates that knowledge about the harmful effect of smoking alone is not enough to give up this addictive behavior. Continuing smoking despite the knowledge about the harmful effects of smoking on health might be because they do not have the knowledge on counseling and behavioral interventions, and pharmacological therapies that are directed to achieve successful smoking cessation. When asked about smoking status, education and advises on quitting smoking should be provided to decrease the likelihood of relapse to smoking. Furthermore, it is important for the health care facilities in Jordan to establish appropriate counseling and behavioral interventions, and pharmacological therapies to disseminate such services and increase the likelihood of smoking cessation. Appropriate information about such services and educational sessions should be provided to smokers whether they have been diagnosed with CVD diagnosis or not. Further studies about the relationships between the level of knowledge about the harmful effect of smoking and seeking smoking cessation support should be considered.

Subjects started smoking early in life and it appears that experimentation of "taking their first puff" was followed by

continued smoking as indicated by the identical responses. Most cigarette smokers began in their late teen years. Also, they smoked cigarettes for many years with very few quit attempts. This resulted in the development of a severe dependence on nicotine. Most of the cigarette smokers reported that they smoked more than a pack of cigarettes (*i.e.*, 20 cigarettes) every day, and most of them (88.1%) reported that they smoked their first cigarette within 30 minutes after waking, suggesting high levels of nicotine dependence.^[30] Their active, long term smoking increased their risk for CVD especially having myocardial infarction during their young age. Smoking is known to be a major contributor to accelerated atherosclerosis and development of cardiovascular diseases.^[41] Further, heavy smoking (>10 cigarettes per day) increases the odds of relapse to smoking.^[14] Light smokers quit more easily with counseling, but heavier smokers need pharmacologic treatment.^[26]

A large proportion of the subjects (55.3%) reported not being asked or advised by nurses about their smoking during their hospitalization. Among the 33 subjects (28% of the sample) who had seen a health care provider in the previous 12 months, 27.8% (n = 24) were not asked nor advised about their smoking status. Consequently, health education by health providers is necessary to correct erroneous beliefs about the dangers of tobacco use.^[9,10] Nurses as well as all other healthcare workers should be encouraged to ask their patients about their smoking status and to advise smokers to quit smoking.^[26] This apparently is not the standard of practice in the study sites we used.

According to evidence-based guidelines, smoking evaluation and education should occur during each health care visit.^[26]

A study addressing the knowledge of nurses and physicians in Jordan revealed that major knowledge deficits and lack of practice in smoking cessation counseling was evident in Jordan.^[9,10] This indicates a dual need for education of health professionals as well as patients about smoking cessation.

Approximately a quarter of the cigarette smokers (24%) had unsuccessfully attempted quitting smoking in the past. None of the subjects who had attempted to quit smoking in the past used any medications or counseling to assist in their quitting smoking. These results are similar to the findings from Jordan reported by Elshatarat and colleagues^[6] who found that 83% had attempted to quit smoking in the past without help from others. The use of a method combining pharmacotherapy and counseling to treat tobacco has been recommended.^[26] Encouraging healthcare providers to provide pharmacological treatments should increase the likelihood of smoking cessation. Quitting smoking behavior is a cornerstone of improved CVD health and it should be encouraged in all smokers.^[42,43]

Most (94%) of the subjects responded that they had someone available to them who they were able to count on to loan them cigarettes. Being in contact with smokers makes it more difficult for smokers to both quit and to remain abstinent from tobacco.^[14] Also, this finding raises many concerns about the adverse influence the social support and the risk these relationships may have on their health in the future after their hospital stay.

Some subjects in this study (n = 10) reported that they smoked cigarettes secretly in the hospital. It is important to note that these hospitals prohibit smoking. Although regulations have been instituted to protect the public from the dangers of smoking in public areas in Jordan, restrictions on tobacco use in public places has not been enforced, not even in hospitals. Banning of smoking, as a public health measure, has been emphasized in the European Guidelines on Cardiovascular Disease Prevention^[42] as well as in the American Heart Association/American College of Cardiology Guideline on Lifestyle Management to Reduce Cardiovascular Risk.^[43] To make progress in this domain of public policy, active monitoring and implementation of these regulations in public places is important and would be beneficial for both active smokers and others in the community.

Most (99.2%) of the subjects reported smoking cigarettes inside their own homes and 50.8% stated that they smoke in every room. Importantly, 90.7% reported smoking while children are present, which in Jordan can be a very large number since children play a prominent role in the Jordanian home. These data indicate smokers' ignorance or disregard

about the effect of second-hand smoke on others. Education about the harmful effects of second-hand smoking on their children could be used as a way to encourage parents who smoke to quit.

The expressed higher willingness to quit smoking after the study interview by some suggests that the very process of interviewing resulted in heightened motivation to consider quitting smoking. Possibly this is due to the information gained and heightened awareness related to tobacco gained from interviewing process. This is consistent with the findings that even brief counseling results in beneficial smoking cessation outcomes.^[26]

As indicated in the multiple logistic regression analysis, a lower likelihood of willingness to quit smoking is found in men who smoke cigarette and do not have someone available to encourage them to quit smoking. Further, men with sufficient personal income to support self were less likely to quit. The importance of being encouraged to quit smoking by the smoker's household members or friends is significant. Smoking cessation efforts are enhanced by the presence of others who support the smoker in quit attempts.^[26] The finding that Jordanian men smokers with higher socioeconomic status were less likely to quit is contrary to the results from Western populations where higher socioeconomic status is highly correlated with smoking cessation.^[26] The relationship between wanting to quit smoking and socioeconomic status should be explored in future studies. Healthcare professionals need to keep these findings in mind when developing smoking cessation interventions for men with CVD in Jordan.

5. CONCLUSION

This study showed that knowledge about harmful consequences of smoking alone is not enough to motivate smokers with cardiovascular disease to quit and smokers who have sufficient personal income to support themselves are less likely to quit smoking after hospital discharge, suggesting that special attention needs to be given to this group. Also the presence of others who support smoking cessation is important consideration in development of future smoking cessation programs in Jordan.

5.1 Limitations and strengths

This cross-sectional study was descriptive in nature and it provided a snapshot of the different aspects related to smoking. The convenience sample may limit the generalizability of the study findings. Future work on smoking in Jordanian women is also needed. The sample was obtained from three varied institutions, allowing for generalizability of the findings to adult men smokers who were hospitalized with CVD diagnosis.

5.2 Implications and recommendations

It is important that healthcare professionals to take every opportunity to initiate smoking cessation interventions during hospitalization. This is particularly important in Jordan where smoking rates are high. Patients are especially receptive to consider quitting during hospitalization for a major cardiac event and it has the advantage of providing care as they are experiencing in acute involuntary smoking abstinence.

Nursing programs should provide more emphasize on smoking and its cessation interventions during preparing future nurses. Provision of continuing education programs on smoking and cessation interventions for nurses in practice is recommended.

In future studies and smoking cessation programs, participants could be instructed to have a non-smoker with them during the smoking cessation sessions. This would foster encouragement for smoking cessation efforts by someone close to them.

Culturally appropriate and sensitive smoking cessation interventions for men hospitalized with CVD need to be tested. Also, recruiting women in future research will be important to gain an understanding of and insight into women's

characteristics, knowledge and patterns of smoking.

The Jordanian regulations that have been instituted should be enforced to protect the public from the dangers of second-hand smoking in public areas. For instance, the prohibition of smoking inside public places, including hospitals, should be enforced.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there are no conflicts of interest to declare.

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