J Behav Health 2013; 2(3):213-222 *ISSN: 2146-8346*

GESDAV

Journal of Behavioral Health

available at www.scopemed.org

Original Research

Beliefs in various smoking cessation interventions among Jordanian adult smokers

Susan Abughosh[1], Feras Hawari[2], Ekere James Essien[1], Ronald J Peters[3], I-Hsuan Wu[1].

[1]University of Houston, College of Pharmacy, 1441 Moursund Street, Houston
[2]King Hussein Cancer Center, Queen Rania Al Abdullah Street, P.O.Box 1269, Amman, Hashemite Kingdom of Jordan
[3]University of Texas Health Center at Houston, School of Public Health, 7000 Fannin, Suite UCT 2618, Houston

Received: January 28, 2013

Accepted: April 03, 2013

Published Online: June 25, 2013

DOI: 10.5455/jbh.20130403104936

Corresponding Author:
Susan Abughosh,
University of Houston, College of Pharmacy,
1441 Moursund Street, Houston, TX 77030
smabugho@Central.UH.EDU

Key words: Smoking Cessation, Waterpipe, Cigarettes, Jordan

Abstract

Background/Objectives: To examine smokers' beliefs in potential effectiveness of available smoking cessation interventions in Jordan.
Methods: A cross-sectional survey-based study in a convenient sample of willing adults in Amman, Jordan (n=600) from 07/2009 to 07/2010. Participants who reported using a cigarette or a waterpipe to smoke tobacco in the past 30 days were considered current smokers and included in further analysis. Cigarette and waterpipe smoking were being analyzed separately with two outcomes for each smoking behavior: 1) believing smoking cessation medications are helpful in quitting vs. not, and 2) believing educational programs/counseling by healthcare providers are helpful vs. not. Multivarite logistic regression was used to determine participant characteristics associated with the defined outcomes.
Results: More smokers believed in the effectiveness of educational program as compared to the medications. Cigarette smokers who find it hard to abstain from smoking where they are not allowed to were more likely to believe cessation medications are helpful (OR=1.79, 95%CI= 1.01–3.15). Cigarette smokers with a lower education level (OR=0.33, 95%CI= 0.14–0.78), with a father who smokes (OR=0.39, 95%CI= 0.21–0.75), or who tried cigar smoking in the past month (OR=0.39, 95%CI= 0.18–0.86) were less likely to think educational programs are helpful.
Waterpipe smokers who were older were less likely to believe cessation medications (OR=0.41, 95%CI= 0.17–0.99) and educational programs (OR=0.38, 95%CI= 0.18–0.80) are useful. Males (OR=6.07, 95%CI= 1.82–20.26) were more likely to believe cessation medications are helpful. Waterpipe smokers who have used cigar before (OR=0.16, 95%CI= 0.05–0.51) were less likes to perceive the effectiveness of medication. On the other hand, whose father is also a waterpipe smoker (OR=0.39, 95%CI= 0.17–0.89) was less likely to believe in educational programs.
Conclusions: Understanding these opinions from a smoker's perspective is important in designing culturally appropriate interventions to help smokers quit.

INTRODUCTION

Tobacco use remains the leading preventable cause of premature death worldwide [1, 2]. It is responsible for approximately 443,000 premature deaths annually in the United States [3] and 5.4 million worldwide [2]. Both cigarette and waterpipe smoking are on the rise [4].

Smoking causes many health problems, including myocardial infarction, stroke, peripheral vascular disease, and different kind of cancers [5]. It has been estimated that by 2030, there will be more than 10 million tobacco-related deaths a year worldwide [6]. The average smoker's lifespan is about 10 years less than that of nonsmokers [7].

While the health dangers of tobacco use are generally

known, smoking rates remain high in many countries [8]. There is still a great need in making a concerted effort to develop effective smoking cessation interventions and aid smokers in quitting [6]. Smokers who try to quit often find it difficult because of the addictive properties of nicotine [9]. According to a study conducted by Lenert et al. [10], the vast majority of smokers try to quit without professional help (80%); however, only about 10% of them succeed. The common reasons for failing to quit found in a previous study included stressful situations in normal daily life, not being able to handle withdrawal, and the belief that quitting has no value [11].

Several smoking intervention strategies are available for smokers. During the 1990s, a variety of pharmaceutical cessation aids became available, which include nicotine replacement therapy and the antidepressant Bupropion [12]. Even more recent, Varenicline was approved by both the U.S. Food and Drug Administration (FDA) and the European Medicines Agency of the EU in 2006 as an aid to smoking cessation [13]. In addition to pharmacologic methods in helping smokers quit, behavioral methods are also available, which mainly include consultations from healthcare programs or/and educational programs, and mass media interventions [14]. Previous literature has also shown that provision of advice and support to smokers by health care professionals, especially in primary care settings, would improve cessation rates [15].

Jordan is a small Middle-Eastern country with a 5,600,000 population where smoking is relatively a common practice [16]. The smoking rate in Jordan is the 4th highest (48%) among Arab countries [5]. Many Jordanian smokers have a desire to quit smoking. In a previous study, more than half of the current cigarette smokers were considering quitting in the next year (57%) among a convenience sample of Jordanian adults (n=260) [17]. The objectives of the study were to examine smokers' beliefs in potential effectiveness of available smoking cessation interventions among Jordanian adults. Suggested intervention programs included smoking cessation medications (prescriptions) and educational programs/counseling by healthcare professionals. Understanding these opinions from a smoker's perspective is crucial in designing and advocating culturally appropriate interventions to aid smokers in quitting.

METHOD

A cross-sectional study was conducted in a convenient sample of willing adults 18 years or older in Amman, Jordan from 07/2009 to 07/2010. The G-power 3.1 statistical software [18] was used for power analysis and determined that 152 participants were needed for a two-tail analysis using logistic regression with 0.05 α-level, 0.2 β-level (80% power), and 1.8 odds ratio. The sample was used in previous studies [8] and the survey was adapted from a previously used self-report survey [19, 20]. The survey included questions on socio-demographic characteristics, current and history of cigarette and waterpipe tobacco smoking, environmental and behavioral determinants of smoking such as peer influence, and perceived harm. The variable selection was guided by two significant theories in the field of behavioral sciences: the Theory of Reasoned Action (TRA) [21] and the Social Cognitive Theory (SCT) [22]. The constructs of TRA include the behavioral intention as a direct determinant of behavior, the attitude toward the behavior whether positive or negative, and subjective norm (social pressure to perform or not to perform a behavior). SCT [22] explains psychological functioning: behavioral, cognitive, and environmental factors operate as interacting determinants of the outcome and act bidirectionally with each other. The constructs of the SCT include the environment (stimuli from the physical or social environment), person (personality, characteristics, or cognitive behavior), and behavior (acquired behavior). The survey instrument is available from first author upon request.

Prior to distributing the survey, pilot testing with 20 random adults was carried out to assess validity and reliability of the survey. The 20 adults took the survey twice separated by a one week time period. All adults reported that the survey was understandable. Test retest correlation was evaluated and all coefficients were above 0.7. This indicated an acceptable face validity and reliability of the survey instrument. Survey distribution sites included a physician clinic, two academic institutions, three shopping centers, and a marketing company. These sites were purposefully used to include adult participants of various ages, socioeconomic status and professions. Adults entering the sites were asked if they were willing to participate for 15-20 minutes in an anonymous written survey regarding smoking habits and attitudes towards smoking. If they agreed, they were given a survey and asked to drop the completed survey in a sealed box that was available at each of these sites.

The analysis was conducted separately among cigarette and waterpipe smokers. Participants who reported using a cigarette or a waterpipe to smoke tobacco in the month prior to the survey were considered current cigarette or waterpipe smokers respectively and were included in further analysis. Respondents who did not report using a cigarette or a waterpipe in the past month were not included in further analyses. This was based on the survey questions: During the past 30 days, have

you tried smoking cigarettes/tobacco in a waterpipe (hookah, shisha, narghile, argeela)? A similar definition was used to define current waterpipe smokers in a recent pilot study by Lipkus et al [23] and previous 30-day cigarette use has been used in several studies to define current cigarette use [24-26].

For both cigarette and waterpipe smokers, the two primary outcome variables were chosen for this study: 1) believing smoking cessation medications (Bupropion and Varenicline) are useful for helping smokers quit vs. not useful, 2) believing educational programs/counseling by healthcare providers regarding quitting plans are useful for helping smokers quit vs. not useful.

Statistical analysis

Descriptive statistics and chi-square analyses were used to determine the frequencies and associations of sample characteristics with the two outcomes previously defined for both current cigarette and waterpipe smokers. Univariate logistic regression analyses of smoker characteristics with the two outcome variables were carried out and results were presented as unadjusted odds ratios (OR) with 95% confidence intervals (CI). Variables with a probability $p<0.2$ in the univariate analyses were included in multivariate logistic regression models to control for each of the two outcomes after assessing co-linearity between the independent variables. Backward elimination was used to arrive at the final models that included significant variables with $p<0.05$. Results were presented as adjusted ORs with 95% CIs. All statistical analyses were carried out using SAS statistical package version 9.2 [27].

RESULTS

The response rate was approximately 60% with 600 respondents returning the survey out of 1000 distributed. Among the 600 participants who answered the survey, a total of 260 of them smoked cigarette in the past 30 days and 169 of them smoked tobacco in a waterpipe in the past 30 days. Those participants were recognized as smokers in our study and were included in further analysis.

Current cigarette smokers

Current cigarette smoker characteristics are described in Table 1. Approximately three fourth of the current cigarette smokers were male (76.28%), and 55.00% were older than 25 years. Mean age was 28.67 with standard deviation = 7.9. Most of them had a college degree or more (82.24%) and were not in a medical related field major (71.36%). More than half of the current cigarette smokers believed smoking cessation medications are useful for helping smokers quit (53.22%), and 63.85% of the current cigarette smokers believed educational programs/discussing the plans with healthcare professionals is useful. Table 1 also summarizes the results of chi-square analysis of various cigarettes smoker characteristics with the 2 outcome variables: outcome 1: believing smoking cessation medications are useful vs. not, and outcome 2: believing educational programs/counseling by healthcare professionals are useful vs. not. Bivariate (unadjusted rates) and multivariate (adjusted rates) logistic regression results with the two outcome variables are presented in Table 2.

Participants who find it hard to abstain from smoking where they are not allowed to were more likely to think smoking cessation medications are useful (OR=1.79, 95% CI= 1.01 – 3.15). Participants with a high school degree or less (OR=0.33, 95% CI= 0.14 – 0.78), with a father who smokes (OR=0.39, 95% CI= 0.21 – 0.75), or, who tried cigar smoking in the past month (OR=0.39, 95% CI= 0.18 – 0.86) were less likely to think educational programs/counseling by healthcare professionals are useful.

Current waterpipe smokers

Current waterpipe smoker characteristics are described in Table 3. Slightly more than half of the current waterpipe smokers were male (56.02%) and 64.50% were younger than 25 years. Mean age was 25.35 with standard deviation = 5.2. Most of them had a college degree or more (88.76%) and were not in a medical related field major (69.23%). Forty percent of the current waterpipe smokers believed smoking cessations are useful for helping them quit, and 60.36% of the current waterpipe smokers believed educational programs/counseling by healthcare professionals are useful. Table 3 also summarizes the results of chi-square analysis of various waterpipe smoker characteristics with the 2 outcome variables: outcome 1: believing smoking cessation medications are useful vs. not, and outcome 2: believing educational programs/counseling by healthcare professionals are useful vs. not. Bivariate and multivariate logistic regression results with the two outcome variables are presented in Table 4.

Participants who were older than 25 years old were less likely to believe smoking cessation medications (OR=0.41, 95% CI= 0.17 – 0.99) and educational programs/counseling by healthcare professionals (OR=0.38, 95% CI= 0.18 – 0.80) are useful. Males (OR=6.07, 95% CI= 1.82 – 20.26) were more likely than females to believe cessation medications are useful. Waterpipe smokers who have used cigar before (OR=0.16, 95% CI= 0.05 – 0.51) were less likely to perceive the effectiveness of medication. On the other hand, participants with a father who smokes waterpipe

Table 1. Characteristics of participants who smoked cigarette in the past 30 days

		Think cessation medication is useful (53.22%)		Think educational program/counseling by healthcare provider is useful (63.85%)	
Characteristic	Total Frequency** (Percentage)	Percentage	p-value	Percentage	p-value
Demographics and health condition					
Gender					
Female	60 (23.72%)	45.28%	0.2067	71.67%	**0.1583***
Male	193 (76.28%)	55.17%		61.66%	
Age, (years)					
Less than 25 years old	117 (45.00%)	54.46%	0.7407	70.94%	**0.0313***
25 years old or older	143 (55.00%)	52.27%		58.04%	
Occupation / Major					
Medical Field	63 (28.64%)	52.73%	0.9718	69.84%	0.3402
Non Medical Field	157 (71.36%)	52.45%		63.06%	
Education level					
≥College degree or more	213 (82.24%)	55.03%	0.3123	68.54%	**0.0005***
≦High school degree	46 (17.76%)	46.51%		41.30%	
Grades					
Mostly As and Bs	110 (42.97%)	55.79%	0.4839	73.64%	**0.0040***
Mostly Bs, Cs, Ds, Fs	146 (57.03%)	51.11%		56.16%	
Cigar and Alcohol use and experience					
Used cigar in the last 30 days					
No	198 (77.65%)	54.64%	0.2764	68.69%	**0.0066***
Yes	57 (22.35%)	45.83%		49.12%	
Used alcohol in the last 30 days					
No	216 (85.71%)	52.50%	0.9321	66.67%	**0.1065***
Yes	36 (14.29%)	53.33%		52.78%	
Addiction Level					
Cigarette consumption					
Heavy smoker (>10/day)	139 (53.46%)	50.79%	0.4208	55.40%	**0.0024***
Light smoker (≦10/day)	121 (46.54%)	56.07%		73.55%	
Is it hard to keep from smoking where you are not allowed to?					
No	109 (48.88%)	45.54%	**0.0715***	66.06%	0.4703
Yes	114 (51.12%)	58.10 %		61.40%	
Relatives' and friends' tobacco use					
Father's tobacco use					
Non smoker	139 (54.94%)	51.97 %	0.7248	70.50%	**0.0366***
Smoker	114 (45.06%)	54.29 %		57.89%	
Mother's tobacco use					
Non smoker	207 (82.47%)	55.21 %	**0.0759***	66.18%	0.3706
Smoker	44 (17.53%)	39.47 %		59.09%	
Close friends' tobacco use					
Most of close friends are non smoker	142 (58.92%)	57.36 %	**0.1612***	69.72%	**0.0523***
Most of close friends are smoker	99 (41.08%)	47.83%		57.58%	

p≤0.2

****Total numbers do not add up to 260 because of missing values.

Some of the insignificant variables in the survey were not included in the table.

(OR=0.39, 95% CI= 0.17 – 0.89) were less likely to think educational programs/counseling by healthcare

professionals are helpful in quitting.

Table 2. Bivariate and multivariate logistic regression of cigarette smoking cessation strategies

	Think cessation medication is useful		Think educational program/ counseling by healthcare provider is useful	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographics				
Gender				
Female	Reference		Reference	
Male	1.49 (0.80 –2.76)		0.64 (0.34 –1.20)	
Age, (years)				
Less than 25 years old	Reference		**Reference**	
25 years old or older	0.92 (0.55 –1.54)		**0.57 (0.34 –0.95)***	
Education level				
≥College degree or more	Reference		**Reference**	**Reference**
≦High school degree	0.71 (0.37 –1.38)		**0.32 (0.17 –0.62)***	**0.33 (0.14 –0.78)***
Grades				
Mostly As and Bs	Reference		**Reference**	
Mostly Bs, Cs, Ds, Fs	0.83 (0.49 –1.40)		**0.46 (0.27 –0.78)***	
Cigar and Alcohol use and experience				
Used cigar last 30 days				
No	Reference		Reference	**Reference**
Yes	0.70 (0.37 –1.33)		0.56 (0.27 –1.14)	**0.39 (0.18 –0.86)***
Used alcohol last 30 days				
No	Reference		**Reference**	
Yes	1.03 (0.48 –2.23)		**0.44 (0.24 –0.80)***	
Addiction Level				
Cigarette consumption				
Heavy smoker (>10/day)	Reference		**Reference**	
Light smoker (≦10/day)	1.24 (0.74 –2.08)		**2.24 (1.33 –3.78)***	
Is it hard to keep from smoking where you are not allowed to?				
No	Reference	**Reference**	Reference	
Yes	1.66 (0.96 –2.88)	**1.79 (1.01 –3.15)***	0.82 (0.47 –1.41)	
Relatives' tobacco use				
Father's tobacco use				
Non smoker	Reference		**Reference**	**Reference**
Smoker	1.10 (0.65 –1.84)		**0.58 (0.34 –0.97)***	**0.39 (0.21 – 0.75)***

a. OR: Odds Ratio, 95% CI: 95% Confidence Interval

* ***p≤0.05, significant result***

Table 3. Characteristics of participants who smoked waterpipe in the past 30 days

		Think smoking cessation medication is useful (39.46%)		Think educational program/counseling by healthcare provider is useful (60.36%)	
Characteristic	Total Frequency** (Percentage)	Percentage	p-value	Percentage	p-value
Demographics and health condition					
Gender					
Female	73 (43.98%)	32.79%	**0.1308***	56.16%	0.2738
Male	93 (56.02%)	45.24%		64.52%	
Age, (years)					
Less than 25 years old	109 (64.50%)	44.21%	**0.1109***	64.22%	**0.1662***
25 years old or older	60 (35.50%)	30.77%		53.33%	
Occupation / Major					
Medical Field	44 (30.77%)	47.50%	**0.1151***	68.18%	**0.1558***
Non Medical Field	99 (69.23%)	32.95%		55.56%	
Education level					
≥College degree or more	150 (88.76%)	42.31%	**0.0504***	62.67%	**0.0843***
≦High school degree	19 (11.24%)	17.65%		42.11%	
Grades					
Mostly As and Bs	100 (59.88%)	40.91%	0.5687	64.00%	0.2555
Mostly Bs, Cs, Ds, Fs	67 (40.12%)	36.21%		55.22%	
High school type					
Public	95 (57.58%)	42.35%	0.4147	52.63%	**0.0393***
Private	70 (42.42%)	35.59%		68.57%	
Anti-smoking message					
Being exposed to anti-smoking message on media before	37 (21.89%)	39.51%	0.9890	48.65%	**0.0995***
No	132 (78.11%)	39.39%		63.64%	
Yes					
Tobacco use experience					
Have used cigar before					
No	72 (43.64%)	48.28%	**0.0711***	59.72%	0.6258
Yes	93 (56.36%)	33.33%		63.44%	
Relatives' and friends' tobacco use					
Dad's argeela use					
Non Smoker	117 (72.67%)	39.62%	0.8146	65.81%	**0.1876***
Smoker	44 (27.33%)	37.50%		54.55%	
Siblings' argeela use					
Non Smoker	62 (38.51%)	43.86%	0.3395	70.97%	**0.0872***
Smoker	99 (61.49%)	35.96%		57.58%	
Close friends' tobacco use					
Most of close friends are non smoker	17 (10.49%)	57.14%	**0.1546***	58.82%	0.7087
Most of close friends are smoker	145 (89.51%)	37.59%		63.45%	

p≤0.2

***Total numbers do not add up to 169 because of missing values.

Some of the insignificant variables in the survey were not included in the table.

Table 4. Bivariate and multivariate logistic regression of waterpipe smoking cessation strategies

	Think cessation medication is useful		Think educational program/ counseling by healthcare provider is useful	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographics and health condition				
Gender				
Female	Reference	**Reference**	Reference	
Male	1.69 (0.85 –3.36)	**6.07 (1.82 –20.26)***	1.42 (0.76 –2.66)	
Age, (years)				
Less than 25 years old	Reference	**Reference**	Reference	**Reference**
25 years old or older	0.56 (0.27 –1.15)	**0.41 (0.17 –0.99)***	0.64 (0.34 –1.21)	**0.38 (0.18 –0.80)***
Occupation / Major				
Medical Field	Reference		Reference	
Non Medical Field	0.54 (0.25 –1.17)		0.58 (0.28 –1.23)	
Education level				
≥College degree or more	Reference		Reference	
≦High school degree	0.29 (0.08 –1.07)		0.43 (0.16 –1.14)	
High school type				
Public	Reference		**Reference**	
Private	0.75 (0.38 –1.49)		**1.96 (1.03 –3.75)***	
Anti-smoking message				
Being exposed to anti-smoking message on media before				
No	Reference		Reference	
Yes	1.22 (0.52 –2.86)		1.85 (0.89 –3.86)	
Tobacco use experience				
Have used cigar before				
No	Reference	**Reference**	Reference	
Yes	0.54 (0.27 –1.06)	**0.16 (0.05 –0.51)***	1.17 (0.62 –2.20)	
Relatives' and friends' tobacco use				
Dad's argeela use				
Non Smoker	Reference		Reference	**Reference**
Smoker	0.91 (0.43 –1.93)		0.62 (0.31 –1.26)	**0.39 (0.17 –0.89)***

a. OR: Odds Ratio, 95% CI: 95% Confidence Interval

* ***p≤0.05, significant result***

DISCUSSION

This is the first study, to our knowledge, that examined beliefs of different quitting strategies among a sample of current cigarette and waterpipe smokers in Jordan. We found a high percentage believing in the effectiveness of educational programs and counseling by healthcare providers (63.85% for cigarette smokers and 60.36% in waterpipe smokers). On the other hand, smokers believed smoking cessation medications are slightly less helpful in helping them quit (53.22% for cigarette smokers and 39.46% in waterpipe smokers). Pharmaceutical companies currently spend millions of dollars annually to encourage smokers to use their medications, however, many smokers may still remain doubtful about their benefits or have concerns regarding safety [28]. Bupropion and Varenicline are the two options for smokers if they're willing to try the medication. Bupropion is the first non nicotine-containing agent approved by FDA for smoking cessation in 1997 [29], whereas Varenicline was more recently approved in 2006 [13]. In our study, a lower percentage of smokers believed in the effectiveness for the medication as compared to the educational

programs. Manufacturers of cessation medications might want to inform smokers about potential benefits of use through educational materials or advertising to increase utilization. A previous study conducted in Jordan showed that Varenicline and Bupropion were indeed effective in helping the cancer population achieve higher abstinence rates [11]. This finding may also be related to the relatively high cost of medication compared to the consultation. It would be great if the government could provide financial aid to use these medications to smokers willing to quit may increase use and aid smokers in quitting. This in turn can cause future cost savings with the prevented morbidity and mortality.

Male waterpipe smokers were more likely to perceive smoking cessation medications are helpful in helping them quit as compared to females (OR=6.07). Gender, however, was not a significant predictor in the educational program/counseling by healthcare provider's model. It is an interesting finding. A possible reason for this could be male smokers may not have the patience to listen to the harms of smoking or discuss the quitting plans with healthcare providers compared to females. They may view cessation medications as a quicker and easier way. In a clinical trial conducted by Dale et al, six hundred and fifteen healthy smokers were randomly assigned to either the placebo or the Bupropion SR group. At the end of study, they found that male smokers did have a higher successful smoking abstinence rates as compared to females [30]. Another possible reason among women against successful cessation is the fear of excessive weight gain or even the common post cessation weight gain of 2-3 kg [31].

Waterpipe smokers who were older than 25 years old were less likely to believe the effectiveness in both cessation medication (OR=0.41) and educational program (OR=0.38). Quitting smoking at any age can promise significant health benefits, but older smokers may have a skepticism, fatalism, and self-doubt attitudes toward their life [32], and thus, could be less likely to have the intention to quit smoking habits [33]. Smokers with no intention would be unwilling to try any intervention regardless of the available aids.

In our study, we found smokers who had experience using other forms of tobacco (cigar) were less likely to perceive the effectiveness of cessation medications (OR=0.16 for waterpipe smokers) and educational program/counseling by healthcare provider (OR=0.39 for cigarette smokers). It is not a surprising finding since smokers who use multiple tobacco products tend to become more addicted to nicotine and unwilling to quit. It is difficult for such smokers with high addiction level to believe in any intervention that can help them quit.

Smokers whose father is also a tobacco user were less likely to believe educational program/counseling by healthcare provider is helpful in helping them quit (OR=0.39 for both waterpipe and cigarette smoker). Other family members' smoking habits didn't come out significant in both interventions. This indicates that the father's attitude towards smoking has a great impact on their children in creating the perception that it is an acceptable behavior and an unwillingness to quit. Thus, educational programs or discussing the quitting strategy with healthcare providers may be less effective with a smoker with no intention to quit.

Smokers with a lower education level were less likely to believe educational program or discussing with healthcare provider is helpful in quitting (OR=0.33 for cigarette smokers). This is consistent with previous research; more educated patients were generally more active participants than less educated ones [34]. Overcoming barriers to participation may be particularly important in designing the future interventions [34]. Also, any intervention should be designed in a language that is easy to understand for all levels whether it combines smoking cessation medication use or not.

Cigarette addiction level was based on the Fagerstrom test [35]. Six questions were included in the survey to determine the addiction level, for example, "Do you smoke even if you are so sick?" or "Do you inhale when you smoke?" Another question was "Is it difficult for you to abstain from smoking in some places where smoking is not allowed to?" Smokers who thought it was difficult were more likely to believe cessation medications are helpful in quitting (OR=1.79 for cigarette smokers). Smokers with such a high addiction level may feel the need to use medications to get over the expected cravings when quitting as smoking is an integral part of their life. People usually perceive oral medications to work faster, which might explain why the predictor came out significant in the multivariate model.

Several limitations to this study can be described. This research was based on a convenience sample, thus we were unable to characterize nonparticipants. The generalizability of the result is also only limited to similar subpopulations in Middle East and may not be applicable to other populations in different areas or cultures. Information bias may also exist with the voluntary survey.

CONCLUSION

Despite the limitations listed above, this is the first study, to our knowledge, that examined beliefs of different quitting strategies among a sample of current cigarette and waterpipe smokers in Jordan. To increase

the utilization of the cessation interventions and achieve a successful cessation, smokers' beliefs should be considered. Our results show that smokers who thought oral cessation medications such as Bupropion and Varenicline were more likely to be beneficial for cigarette smokers with higher addiction level (find it hard to abstain from smoking) and waterpipe smokers who are a male gender, younger, and had no experience using other forms of tobacco before. The other intervention, educational program or discussions with healthcare provider can be directly beneficial to cigarette smokers with higher education level, with no experience using other forms of tobacco before, and with a father who doesn't smoke. As for waterpipe smoker, educational program can be helpful for smokers who are younger, with a father who doesn't smoke. Understanding these factors from a smoker's perspective is essential when designing and advocating culturally appropriate interventions to aid smokers with different characteristics and to achieve successful cessation.

DECLARATION

This manuscript has not been published elsewhere and that it has not been submitted simultaneously for publication elsewhere.

ETHICAL APPROVAL

The study was approved by the IRB at the University of Houston.

FUNDING

No funding available.

DECLARATION OF INTERESTS

None declared.

REFERENCES

1. WHO. World Health Organization 2009. WHO Report on the Global tobacco epidemic.Accessed 12/20/2010 from http://whqlibdoc.who.int/hq/2009/WHO_NMH_TFI_09.1_eng.pdffrom 2009.
2. Leung CM, Leung AK, Hon KL, Kong AY. Fighting tobacco smoking--a difficult but not impossible battle. *Int J Environ Res Public Health.* 2009;6:69-83.
3. CDC. Smoking-attributable mortality, years of potential life lost, and productivity losses--United States, 2000-2004. *MMWR Morb Mortal Wkly Rep. 2*008;57:1226-1228.
4. Noonan D, Kulbok PA. New tobacco trends: waterpipe (hookah) smoking and implications for healthcare providers. *J Am Acad Nurse Pract.* 2009;21:258-260.
5. Shishani K, Nawafleh H, Froelicher ES. Jordanian nurses' and physicians' learning needs for promoting smoking cessation. *Progress in cardiovascular nursing.* 2008;23:79-83.
6. Maziak W, Ward KD, Eissenberg T. Interventions for waterpipe smoking cessation. *Cochrane Database Syst Rev.* 2007;4.
7. Price JH, Jordan TR, Jeffrey JD, Stanley MS, Price JA. Tobacco intervention training in graduate psychiatric nursing education programs. *Journal of the American Psychiatric Nurses Association.* 2008;14:117-124.
8. Abughosh S, Wu IH, Hawari F, Peters RJ, Yang M, Crutchley R*, et al.* Cigarette Smoking Among Jordanian Adults. *Journal of Ethnicity in Substance Abuse.* 2012;11:101-112.
9. Abdullah ASM, Husten CG. Promotion of smoking cessation in developing countries: a framework for urgent public health interventions. *Thorax.* 2004;59:623-630.
10. Lenert L, Muñoz RF, Stoddard J, Delucchi K, Bansod A, Skoczen S*, et al.* Design and pilot evaluation of an internet smoking cessation program. *Journal of the American Medical Informatics Association.* 2003;10:16-20.
11. Hawari F, Obeidat N, Beano H, Dawahrah S, Al-Rimawi D, Ghonimat I. Smoking Abstinence Rates and Reasons for Failure to Quit Smoking in Cancer Patients in Jordan. *Respiration.* 2012;83:233-238.
12. Pierce JP, Gilpin EA. Impact of over-the-counter sales on effectiveness of pharmaceutical aids for smoking cessation. *JAMA: the journal of the American Medical Association.* 2002;288:1260-1264.
13. Jimenez-Ruiz C, Berlin I, Hering T. Varenicline: a novel pharmacotherapy for smoking cessation. *Drugs.* 2009;69:1319-1338.
14. Yu Y, Yang M, Sansgiry SS, Essien EJ, Abughosh S. Beliefs in Effectiveness of Various Smoking Cessation Interventions among Chinese Adult Smokers. *Epidemiol.* 2011;1:2161-1165.
15. Lancaster T, Silagy C, Fowler G. Training health professionals in smoking cessation. *Cochrane Database Syst Rev.* 2000;3.
16. Dar-Odeh NS, Bakri FG, Al-Omiri MK, Al-Mashni HM, Eimar HA, Khraisat AS*, et al.* Narghile (water pipe) smoking among university students in Jordan: prevalence, pattern and beliefs. *Harm Reduct J. 2010;*7:10.
17. Abughosh S, Wu IH, Hawari F, Peters RJ, Yang M. Predictors o f Intention to Quit Cigarette Smoking among Jordanian Adults. *Epidemiol.* 2011;1:2161-1165.
18. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods.* 2007;39(2), 175-191.
19. Peters RJ, Jr., Kelder SH, Prokhorov A, Amos C,

Yacoubian GS, Jr., Agurcia CA*, et al.* The relationship between perceived youth exposure to anti-smoking advertisements: how perceptions differ by race. *J Drug Educ.* 2005;35:47-58.

20. Peters RJ, Kelder SH, Prokhorov A, Springer AE, Yacoubian GS, Agurcia CA*, et al.* The relationship between perceived exposure to promotional smoking messages and smoking status among high school students. *Am J Addict.* 2006;15:387-391.
21. Fishbein M, Ajzen I. *Understanding* Attitudess and Predicting Social Behavior. NJ: Prentice-Hall: Englewood Cliffs; 1980.
22. Bandura A. *Social Foundation* of Thought and Action; A Social Cognitive Theory. NJ: Prentice Hall: Englewood Cliffs; 1986.
23. Lipkus IM, Eissenberg T, Schwartz-Bloom RD, Prokhorov AV, Levy J. Affecting Perceptions of Harm and Addiction among College Waterpipe Tobacco Smokers. *Nicotine Tob Res.* 2011.24.
24. Warren CW, Jones NR, Eriksen MP, Asma S. Global Tobacco Surveillance System collaborative Group. Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet.* 2006;367:749-753.
25. Mermelstein R, Colby SM, Patten C, Prokhorov A, Brown R, Myers M*, et al.* Methodological issues in measuring treatment outcome in adolescent smoking cessation studies. *Nicotine Tob Res.* 2002;4:395-403.
26. Maziak W, Hammal F, Rastam S, Asfar T, Eissenberg T, Bachir ME*, et al.* Characteristics of cigarette smoking and quitting among university students in Syria. *Prev Med.* 2004;39:330-336.
27. SAS Institute, Cary, NC, USA.
28. Bansal MA, Cummings KM, Hyland A, Giovino GA. Stop-smoking medications: Who uses them, who misuses them, and who is misinformed about them? *Nicotine & Tobacco Research.* 2004;6:S303-S310.
29. Einarson A, Riordan S. Smoking in pregnancy and lactation: a review of risks and cessation strategies. *European journal of clinical pharmacology* 2009,65:325-330.
30. Dale LC, Glover ED, Sachs DPL, Schroeder DR, Offord KP, Croghan IT*, et al.* Bupropion for Smoking Cessation*. *Chest.* 2001;119:1357-1364.
31. Sorensen G, Pechacek TF. Attitudes toward smoking cessation among men and women. *Journal of Behavioral Medicine*. 1987;10(2):129-137.
32. Appel DW, Aldrich TK. Smoking cessation in the elderly. *Clinics in geriatric medicine.* 2003;19:77.
33. Messer K, Trinidad DR, Al-Delaimy WK, Pierce JP. Smoking cessation rates in the United States: a comparison of young adult and older smokers. *American journal of public health.* 2008;98:317.
34. Street RL, Gordon HS, Ward MM, Krupat E, Kravitz RL. Patient participation in medical consultations. Why some patients are more involved than other? *Medical Care*. 2005; 43 (10): 960-969.
35. Stavem K, Røgeberg OJ, Olsen JA, Boe J. Properties of the Cigarette Dependence Scale and the Fagerström Test of Nicotine Dependence in a representative sample of smokers in Norway. *Addiction.* 2008;103:1441-1449.