

Quit smoking intention (Among) Adults attending primary health care services in Bahrain: A Descriptive cross sectional study

Dr. Ruwaina J. Mohamed¹, Dr. Meaad Hujair¹, Dr. Afaf Al Zayer¹, Dr. Maryam Hameed^{1*}, Dr. Fatima Hubail², Dr. Ameerah AL-Nooh³, Dr. Adel Salman AlSayyad⁴

¹Family Physician, Ministry of Health, Bahrain

²Consultant Family Physician, Ministry of Health, Bahrain

³Consultant Family Medicine & Public Health, MOH, Bahrain

⁴Associate Professor of Family & community Medicine, Arabian Gulf University, Bahrain

DOI: [10.36348/sjm.2019.v04i08.010](https://doi.org/10.36348/sjm.2019.v04i08.010)

| Received: 11.08.2019 | Accepted: 17.08.2019 | Published: 29.08.2019

*Corresponding author: Maryam Hameed

Abstract

Background: The tobacco epidemic is one of the biggest public health threats the world has ever faced, killing more than 8 million people a year. An intention to quit is an important preliminary step for the behavioral change and it is highly associated with attempting to quit and with quitting. Therefore, this study examines the predictors of intention to quit and previous quitting attempts in Bahrain. **Aim:** To improve the overall quality of smoking cessation services in Bahrain. **Objectives:** 1) To study the prevalence of intention to quit smoking among adult smokers attending primary health care in Bahrain. 2) To explore predictors of an intention to quit and predictors of previous quitting attempts among adult smokers in Bahrain. **Study design:** Cross-sectional study. **Settings:** Data was collected from two primary care health centers in each health region in Kingdom of Bahrain using validated questionnaire. Participants 502 adult smokers aged ≥ 18 years, who were attending primary care within 10 days period in February 2018 (1st – 14th February), were included. Data was analyzed by using SPSS version 23.0. **Results:** We found that more than half of the smoker population (51.4%) are seriously thinking of quitting smoking in the next 12 months., while (70.9%) of them had previous quitting smoking attempts. Predictors noted to be significant in this study, include being a male, married, lower level of education, having shortness of breath and gastrointestinal symptoms. **Conclusion:** Results indicate high intention to quit smoking rate and along with the significant predictors found in this study, there is a great need to develop preventive and therapeutic interventions addressing these predictors to ensure higher rate of success and support the current tobacco smoking cessation services according to what predictors showed.

Keywords: Cessation, Intention, Quit smoking, Smoking.

Copyright © 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (Non-Commercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

The tobacco epidemic is one of the biggest public health threats the world has ever faced, killing more than 8 million people a year. More than 7 million of those deaths are the result of direct tobacco use while around 1.2 million are the result of non-smokers being exposed to second-hand smoke [1].

Smoking causes more deaths each year than the following causes combined: Human immunodeficiency virus (HIV) illegal drug use alcohol use motor vehicle injuries and firearm-related incidents [2].

Globally the prevalence of tobacco smokers is 35.8% of males and 6.6% of females [4]. Based on a morbidity and mortality weekly report conducted by the

centers for disease control and prevention (CDC); the intention to quit in the United States is 68%⁷ while in a study done in Switzerland 72% of smokers intended to quit [8]. In another study done in China, more than half of smokers (53.1%) had previous quitting attempts and almost one-quarter (23.6%) planned to quit [5]. On the other hand, lower rates were seen in Bangladesh as 36% of smokers intended to quit [9].

Prevalence of tobacco smoking in the Eastern Mediterranean Region is 36.8% in males and 2.8% in females which corresponds to the global numbers [4].

In Bahrain, the overall prevalence of smoking was found to be 19.9%. The prevalence rate of tobacco smoking among males was 33.4% compared to 7.01% among females. Current daily smoking rates among

them were 30.6% and 5.7% respectively. The combined Ex-smoking rate was 9.6% and it was markedly higher among males 15.3% compared to females 4.1% [15].

In a study done in six cities of China, the past quit attempts, the duration of these attempts, heaviness of smoking index, outcome expectancy of quitting, worries about future health and overall opinion of smoking were found to be independently associated with intentions to quit smoking but the interest to quit smoking is considerably low among the Chinese smokers. Identifying the determinants and factors of intentions to quit smoking will provide possibilities for shaping effective policies and programs for increasing quitting smoking rates among smokers [5].

In a study conducted in Jordan, 53% has intention to quit smoking and 60.6% had previous quitting attempts [10]. In another study, 57% of Jordanian smokers were considering quitting smoking. Significant predictors that were related to intention to quit smoking were identified such as: heaviness of smoking, exposure to media antismoking message, health education, and previous attempts to quit smoking and smoker's health. These predictors were recommended to be considered in designing tools for an effective intervention to quit smoking in the Middle Eastern Country [11].

Higher rates of intention to quit were seen in two studies held in Syria 74% and 75%, while the previous quitting attempts were 58% and 78% respectively [12, 13].

In a survey done in Kingdom of Saudi Arabia, the intention to quit rate was 64 %. According to the survey, the addiction level, previous attempts to quit smoking and presence of a smoker family member were the main factors determining the intention to quit smoking [14].

Quit Tobacco Services in Bahrain

The history of tobacco control in Bahrain dates back to 1978. A number of control measures were implemented for the first time, including raising custom duties on cigarettes to 70%, regulating the permissible level of tar and nicotine per cigarette and restricting cigarette advertising. In 1994 a tobacco control decree was issued to reinforce the antismoking measures [16].

In 2007, Bahrain ratified World Health Organization's Framework Convention on Tobacco Control (FCTC). Based on Article 14, which states that parties shall endeavor to design and implement effective programs aimed at promoting the cessation of tobacco use, and facilitate the accessibility and affordability of drugs to recover from tobacco dependence [4, 17].

Based on that, Bahrain developed guidelines for the implementation of Article 14 of the convention and incorporated these guidelines in all primary care services, thus quit tobacco clinics started in the primary care health centers in the Ministry of Health.¹⁶

The first quit tobacco clinic was established since 2004 in Hooraa health center followed by Hamad Kanoo health center in 2012 and Bank of Bahrain and Kuwait health center in 2014 [4].

Bahrain policies facilitated easy accessibility to these clinics either by self-referral through the 24-hour hotline number to fix an appointment or by the official referral form from the physician [18]. The two main interventions for smoking cessation in these clinics are behavioral therapy and pharmacotherapy which are provided free of charges [18].

The tobacco quit rate (56.5%) in these clinics was calculated as total abstinence from tobacco for at least 6 months after the first visit to these clinics [17].

According to the latest non-communicable disease bulletin issued in 2018, Bahrain has almost fully achieved the tobacco demand reduction measures: increased excise taxes and prices, smoke-free policies, large graphic health warnings/plain packaging, bans on advertising, promotion and sponsorship and the last mass media campaigns [17].

Quitting smoking at any age confers substantial and immediate health benefits and quitting smoking by the age of 30 reduces the risk of dying from tobacco-related disease by almost 90% [5].

According to Treating Tobacco Use and Dependence Guidelines, smoking cessation intervention starts with assessing the smoker's intention to quit [14] and based on the Theory of Reasoned Action/planned behavior (TRA), behavior is influenced by the intention to perform the behavior which is influenced by the subjective norms, attitudes, as well as self-efficacy or confidence of the ability to successfully perform the behavior [19].

Changes in addictive behavior involve progression through several stages as described by stage-based models of behavior change [20]. Starting at no desire to quit, progression is made toward forming an intention to stop. The intention is followed by preparing for the behavior change, then implementing the behavior change and finally maintaining it [5, 20].

An intention to quit is an important preliminary step for the behavioral change even though having an intention to quit is not the sole predictor of a smoking cessation, intention is highly associated with attempting to quit and with smoking cessation [5, 20, 21].

Although there are studies about quitting rate in Bahrain, there is a need for more information about the intention to quit. So our objective is to study the intention to quit smoking and describe its related factors.

Aim

Our aim is to improve the overall quality of smoking cessation services in Bahrain.

OBJECTIVES

- To study the prevalence of intention to quit smoking among adult smokers attending primary health care in Bahrain.
- To explore predictors of an intention to quit and predictors of previous quitting attempts among adult smokers in Bahrain.

METHODS

Study Variables

- **Smokers:** Current smoker who smokes any tobacco products occasionally or daily in the last thirty days - Defined by WHO [3, 1].
- **Cessation:** To quit smoking any tobacco product for at least six months [4].
- **Intention:** Aim or plan to quit smoking.
- **Adults:** Males and Females, ≥ 18 years old living in Bahrain.
- **Quit smoking:** Is the process of discontinuing tobacco smoking.
- **Nicotine dependence:** Maladaptive pattern of nicotine use, leading to clinically significant impairment or distress, as manifested by three or more of the following (tolerance, withdrawal, taking, large amount of nicotine or over long period, unsuccessful effort to cut down, spend most of the time in places related to nicotine intake and reduction of important social activities), occurring at any time in the same 12-month period [24].

Study Design: Cross sectional study.

Sample Size and Sampling Technique

A sample size of 384 participants was estimated by the sample size formula: $(ss = Z^2 * (p) * (1-p) / c^2)$ (based on $Z = 1.96$, $c = 0.05$, $p = 0.5$), but a larger sample size of 500 participants aged 18 years or older attending ten randomly selected local health centers from five health regions in Bahrain was recruited.

The estimated sample size ($n = 500$) was divided almost equally on ten health centers and from each health center the participants was selected conveniently.

Sampling Technique

There are five health regions in Bahrain with twenty-six primary healthcare centers distributed within these health regions.

In this study, we randomly selected two health centers from each health region to include a total of ten health centers representing the Kingdom of Bahrain population. The health centers are listed below:

- BBK Hidd HC and NBB Arad from health region one
- Ibn Sina HC and Hoorah HC from health region two
- Yousif engineer HC and Aali HC from health region three
- East Riffa HC and Hamad Kanoo HC from health region four
- Budaiya HC and Hamad Town HC from health region five

Inclusion and Exclusion Criteria

- Adult aged 18 years and above living in Bahrain.
- Current smoker who smokes any tobacco products occasionally or daily - Defined by WHO)
- Speak Arabic or English or both.

Any participant who doesn't meet the above mentioned criteria was excluded from the study.

Study Procedure and Measures

Study Tool

A validated questionnaire was used with permission from the authors [11].

The questionnaire contains seven sections covering:

- Socio-demographic characteristics which includes: (gender, age, marital status, educational level, occupation and monthly income).
- Tobacco use history: age of first time trying smoking, number of smoked cigarettes in the last 30 days, quitting attempts and number of quitting trials.
- Characteristics, attitudes and intentions of tobacco use: (intention to quit in one month, six months and one year, history of cutting down number of smoking in the last year).
- Nicotine withdrawal symptoms.
- Fagerstrom scale for nicotine dependence [23].
- Factors influencing intentions to quit: (concern about fitness and health, family and friends influence).
- Factors associated with tobacco use: (family and friends smoking status, smoking related health problems, social media influence).

Two outcome variables were identified. First variable is the intention to quit smoking in the next year vs. not, based on the question: Are you seriously thinking of quitting smoking in the next year? The second variable is having a previous quitting attempt vs. not based on the question: Have you ever tried to quit smoking?

The data was collected through face to face interview. The questionnaire was translated to Arabic from an English version and was reviewed by two independent experts. Both versions of the questionnaire were piloted on 10% of the health centers attendees who were excluded from the study. Participants who fit the inclusion criteria were approached in the waiting area and verbal consent was taken to participate in a survey regarding smoking habits and attitudes.

The interviewing team had a standardized approach to the participants to minimize the bias that might occur from having different technique.

Plan of Analysis

Data were analyzed using SPSS version 23 program and results were presented through descriptive statistics such as frequencies, means, and standard deviations for quantitative variables and percentages and proportions for categorical variables. Inferential statistics and appropriate statistical tests were used. In addition, we calculated adjusted OR with CI 95%, univariate logistic regression model to determine predictors of intention to quit.

Confidentiality and ethical considerations:

- Verbal consent was obtained from all participants.
- The questionnaire has no identity verification and strict confidentiality of the participants was ensured.

RESULTS

A total of 602 smokers were approached, 502 respondents completed the interview to yield a response rate of 83.6%.

Table-1 summarizes the results of Socio-demographic characteristics of the participants. The majority of participants were males 90.6% and younger than 40 years of age (72.9%). Mean age was 35.75 ± 12.32 years old.

Most of the participants were married (65.3%). Majority (85.4%) were high school graduates or higher, and 88.8% of them were non-healthcare workers.

Table-1 also represents the tobacco use history among participants, which showed that 65.9% tried their first cigarettes in the first 18 years of life. Most of the participated smokers (79.7%) used less than 600 cigarettes per month which equates 1 pack-year.

In addition, Table-1 represents the social predictors associated with tobacco use. It shows that 62.7% of the participants have family members who smoke and 92% have close friends who smoke.

More than half (51.4%) of the participants are seriously thinking of quitting smoking, while 70.9% of

them had previous quitting smoking attempts (Figure 1 and 2).

Table-2 presents the health related problems associated with smoking. Around 23.1% of the participants reported having shortness of breath, 19.7% were complaining of dyspepsia. About 9.8%, 8% and 3.2% were having symptoms of irritable bowel syndrome, heart disease and inflammatory bowel disease, respectively.

The nicotine dependence was assessed using Fagerstrom scale and is presented in Figure-3. Among the smokers who answered the questionnaire, 44.2% had high dependence and 43% had low nicotine dependence.

Table-3 shows the relation between nicotine dependence and each of previous quitting attempts and intention to quit smoking in one year, as there is a significant relation between nicotine dependence and previous quitting attempts ($P < 0.010$). In addition, there is a significant relation between nicotine dependence and intention to quit smoking in one year ($P < 0.024$).

Among the low nicotine dependence smokers, 65.3% had previous quitting attempts (95% CI=58.9-71.6) and 70.9% were seriously thinking of quitting smoking in the next year (95% CI=64.0-77.8). While in the medium nicotine dependence smokers, 84.4% had previous quitting attempts (95% CI=73.1-92.2) and 83.3% were seriously thinking of quitting smoking in the next year (95% CI=69.8-92.5). Moreover, among smokers with high nicotine dependence 72.5% had previous quitting attempts (95% CI=66.7-78.4) and 63.1% were seriously thinking of quitting smoking in the next year (95% CI=55.6-70.6).

Table 4 and 5 summarize the result of univariate logistic regression of the relationship between smoking predictors and two outcome variables (previous quitting attempts and intentions to quit smoking in 12 months respectively).

Male participants (74.3%) were 4.65 more likely to have previous quitting attempts compared to females with 95% CI of (2.49, 8.69). Married smokers (74.1%) are 1.54 more likely to have previous quitting attempts compared to those who are single with 95% CI of (1.04, 2.30). Those who have shortness of breath (84.5%) are 2.70 more likely to have previous quitting attempts compared to those who don't have it with 95% CI of (1.57, 4.66).

Table-5 illustrate that smokers with lower degree of education (61.7%) are 1.69 more likely to have intention to quit within 1 year with 95% CI (1.03, 2.76) than those who have higher degree of education. Smokers who complained of gastrointestinal problem (77.9%) are 1.8 more likely to have intention to quit

smoking within 1 year than those who didn't have it with 95% CI of (1.044, 3.103)

Table-1: Socio-demographic characteristics, tobacco use history and factors associated with tobacco use

		N	%
Gender	Male	455	90.6%
	Female	47	9.4%
	Total	502	100.0%
Age	<30	189	37.6%
	30-40	177	35.3%
	>40	136	27.1%
	Total	502	100.0%
Marital Status	Single	142	28.3%
	Married	328	65.3%
	Widowed	14	2.8%
	Divorced	18	3.6%
	Total	502	100.0%
Educational Level	Illiterate	6	1.2%
	Less than high school	67	13.3%
	High School	200	39.8%
	Diploma / Bachelor	197	39.2%
	Master / PhD	32	6.4%
	Total	502	100.0%
Occupation	Healthcare	56	11.2%
	Non-Healthcare	446	88.8%
	Total	502	100.0%
Age of first time trying smoking	≤18 Years	331	65.9%
	19-24 Years	115	22.9%
	>24 Years	56	11.2%
	Total	502	100.0%
Number of smoked cigarettes in the last 30 days	≤300	228	45.4%
	301-600	172	34.3%
	>600	102	20.3%
	Total	502	100.0%
Family members who smoke	Yes	315	62.7%
	No	187	37.3%
	Total	502	100.0%
Close friends who smoke	Yes	462	92.0%
	No	40	8.0%
	Total	502	100.0%

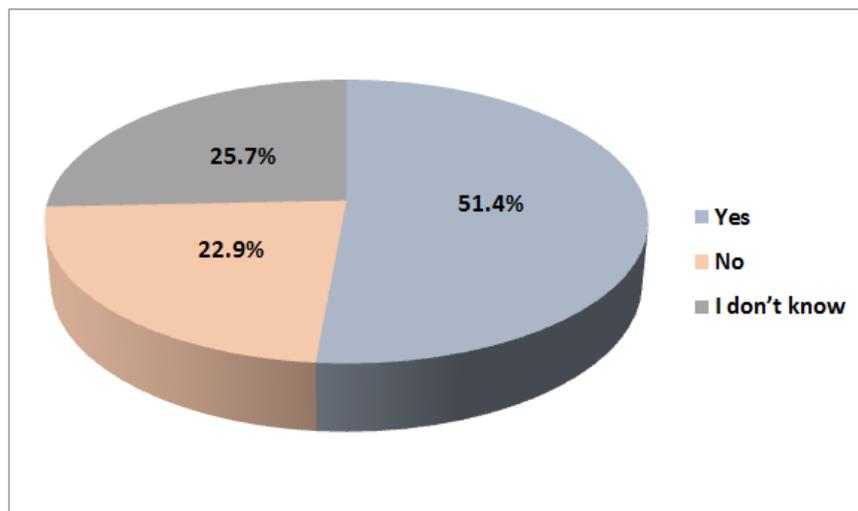


Fig-1: Seriously thinking of quitting smoking in the next year

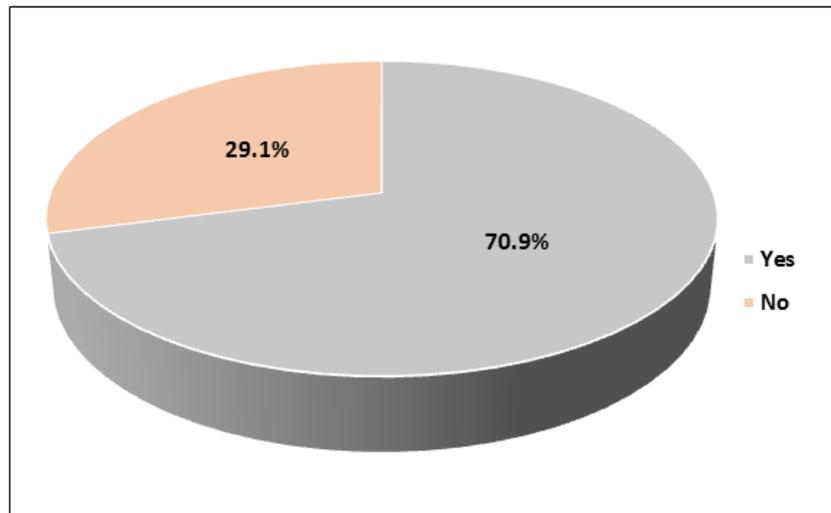


Fig-2: Smoking quitting attempts

Table-2: Factors (Health related problems) associated with tobacco use

	Yes		No		Total	
	N	%	n	%	N	%
Dyspepsia	99	19.7%	403	80.3%	502	100%
Irritable bowel syndrome	49	9.8%	453	90.2%	502	100%
Inflammatory bowel disease	16	3.2%	486	96.8%	502	100%
Shortness of breath	116	23.1%	386	76.9%	502	100%
Heart Diseases	40	8.0%	462	92.0%	502	100%

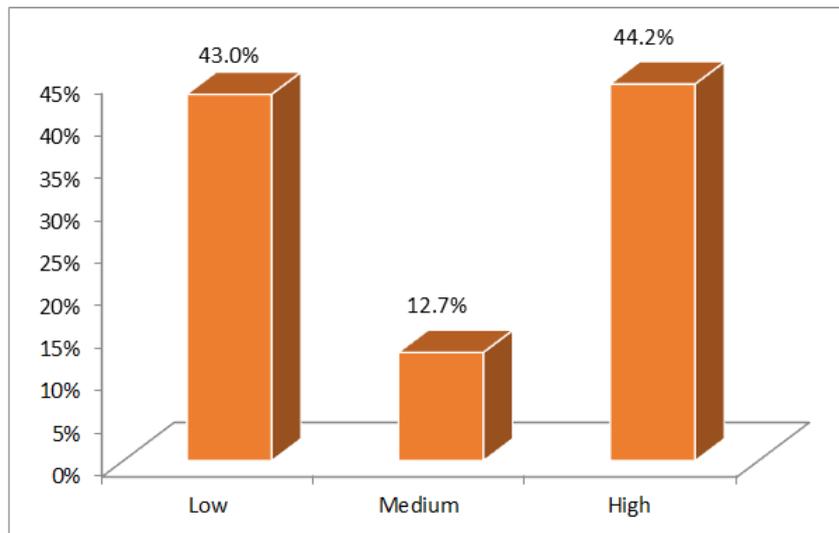


Fig-3: Fagerstrom Test of Nicotine Dependence

Table-3: Relationship between Nicotine dependence and each of previous quitting attempts and intention to quit smoking in one year

		quitting smoking attempts				Seriously thinking of quitting smoking in the next year			
		No		Yes		No		Yes	
		N(%)	95%CI	N(%)	95%CI	N(%)	95%CI	N(%)	95%CI
Fagerstrom Test of nicotine Dependence	Low	75(34.7)	28.4-41.4	141(65.3)	58.9-71.6	48(29.1)	22.2-36.0	117(70.9)	64.0-77.8
	Medium	10(15.6)	7.8-26.9	54(84.4)	73.1-92.2	8(16.7)	7.5-30.2	40(83.3)	69.8-92.5
	High	61(27.5)	21.6-33.3	161(72.5)	66.7-78.4	59(36.9)	29.4-44.1	101(63.1)	55.6-70.6
Chi-Squared P-value		0.010				0.024			

Table 4: Relationship between smoking predictors and previous quitting attempts

		Quitting smoking attempts		Chi-Squared P-value	OR	95% CI for OR	
		N	%			Lower	Upper
Gender	Male	338	74.3%	<0.001	4.654	2.492	8.692
	Female	18	38.3%				
Age	<30 Years	128	67.7%	0.473	0.784	0.483	1.274
	30-40 Years	129	72.9%				
	>40 Years	99	72.8%				
Marital Status	Married	243	74.1%	0.032	1.543	1.037	2.296
	Unmarried	113	64.9%				
Educational Level	Lower than high school	51	69.9%	0.168	1.129	0.638	1.998
	High School	151	75.5%				
	Higher than high school	154	67.2%				
Number of smoked cigarettes in the last 30 days	≤300	155	68.0%	0.418	0.764	0.454	1.286
	301-600	126	73.3%				
	>600	75	73.5%				
Family members who smoke	Yes	218	69.2%	0.211	0.767	0.505	1.164
	No	129	74.6%				
Close friends who smoke	Yes	330	71.4%	0.282	1.477	0.723	3.019
	No	22	62.9%				
Gastrointestinal problems	Yes	97	74.0%	0.359	1.234	0.787	1.933
	No	259	69.8%				
Shortness of breath	Yes	98	84.5%	<0.001	2.701	1.566	4.660
	No	258	66.8%				
Heart Diseases	Yes	30	75.0%	0.553	1.252	0.595	2.631
	No	326	70.6%				

Table-5: Relationships between predictors and intentions to quit smoking in 12 months

		Seriously thinking of quitting smoking in the next year		Chi-Squared P-value	OR	95% CI for the OR	
		N	%			Lower	Upper
Gender	Male	245	70.4%	0.054	2.196	0.969	4.974
	Female	13	52.0%				
Age	<30 Years	92	67.2%	0.811	0.852	0.489	1.485
	30-40 Years	94	70.1%				
	>40 Years	72	70.6%				
Marital Status	Married	174	70.4%	0.455	1.192	0.752	1.888
	Unmarried	84	66.7%				
Educational Level	Lower than high school	37	61.7%	0.046	0.509	0.270	0.962
	High School	101	65.2%				
	Higher than high school	120	75.9%				
Number of smoked cigarettes in the last 30 days	≤300	120	71.0%	0.152	1.652	0.928	2.939
	301-600	95	72.0%				
	>600	43	59.7%				
Family members who smoke	Yes	156	67.5%	0.281	0.772	0.482	1.237
	No	97	72.9%				
Close friends who smoke	Yes	238	68.8%	0.403	0.648	0.233	1.802
	No	17	77.3%				
Gastrointestinal problems	Yes	74	77.9%	0.033	1.800	1.044	3.103
	No	184	66.2%				
Shortness of breath	Yes	62	72.1%	0.503	1.199	0.704	2.043
	No	196	68.3%				
Heart Diseases	Yes	20	66.7%	0.757	0.882	0.399	1.950
	No	238	69.4%				

DISCUSSION

This study is the first to examine intention to quit smoking and having a quitting attempt among a sample of adults in Bahrain. We found that more than half of the population was considering quitting in the next year (51.4%). Higher rates were seen in United States⁷ and Switzerland [8]. Another studies in China⁵ and Bangladesh showed lower rates of intention to quit [9].

Higher rates were observed also in two studies in Syria [12, 13] with similar rates seen in another two studies conducted in Jordan and KSA [11, 10, 14].

In this study Bahrain showed a higher rate (70.9%) of previous quitting attempts compared to studies done in China, Jordan and Syria [5, 10, 12].

In this study participants had many reasons for previous quit attempts. Number of predictors was examined in relation to quitting attempts such as gender, age, educational level, marital status, number of smoked cigarettes in the last 30 days, finding difficulty to avoid smoking in nonsmoking areas, having a relative or friend who smokes and having a health-related problem.

Study results showed many factors contributed to quitting attempts. The most common noted factor was having shortness of breath (84.5%). This comes in agreement with a study done in Switzerland [8] which showed that personal history of lung disease was also positively related. Nevertheless, this finding was inconsistent with other study done in Jordan [11]. This symptom can be used as a focus when advocating for quitting smoking.

The male gender was another predictor of significance as the majority of quitting attempts were among males (74.3%). The effect of gender was not significantly associated with quitting attempts in the literature. No association was found in studies from Switzerland, China, Jordan and USA [8, 5, 11, 24, 25].

The marital status was the third predictor from this study as we found that 74.1% of married smokers had previous quitting attempts. In another study in China there was a similar association between marriage and intention to quit smoking [5].

We studied the relationship between the same studied predictors and intention to quit smoking in 12 months. We found that having a higher level of education and having gastrointestinal symptoms are the two most significant factors for the smokers to quit smoking specifically in the next 12 months. Studies conducted in Canada, UK and Australia revealed similar results [26].

Nicotine dependence as per Fager Strom scale is affecting the quitting attempts and the actual attempts among participants. In comparison to low level dependence and high level dependence, the medium level of nicotine dependence showed this effect the most.

Nicotine dependence has been reported to significantly decrease quit attempts and smoking cessation, so high dependence smoker should be targeted to lower their dependence level prior to their quitting attempts trials [11].

There are quitting attempts among the low nicotine dependence but they showed lower rates than those with medium nicotine dependence smokers.

Based on what the participants answered during the interview, this might be due to their believes that they are not heavy smokers and because of the absence of health related issues.

Although we were interested to find a positive effect of the social media on tobacco use, our results were not conclusive in showing obvious effect. In contrast, similar studies in the United States suggested that smoking populations were more responsive to publicity in the electronic media than print media [27].

Strengths and limitations

The strength of this study is that it's the first study to our knowledge that examines intention to quit and predictors of intention to quit or previous quitting attempts among a population of smoking adults in Bahrain with a good response rate. In addition, this is a study about a very important behavioral risk factor for many non-communicable diseases of high prevalence and of a public health concern. It can be a first step for further analytical future studies to be conducted in Bahrain.

In this study, the results were similar to other studies with new significant predictors that can be useful in improving the cessation rate and supporting the cessation services in Bahrain.

Several limitations may be considered in this study. Firstly, it's not easy to assess the reasons for association shown in cross sectional studies. Secondly, strong association and causality cannot be inferred. Another limitation could be that the generalizability of the results is limited to similar subpopulations in the Middle East and may not be applicable to other populations in different geographical areas or cultures. Furthermore, results may be susceptible to selection, volunteer or recall bias.

RECOMMENDATION

As there are significant predictors found in this study, there is a great need to develop preventive and therapeutic interventions addressing these predictors to ensure higher rate of success and support the current tobacco smoking cessation services.

Due to the fact that smoking associated with high morbidity and mortality worldwide we recommend enhancing the tobacco control and smoking cessation services that are incorporated in primary health care centers. Moreover, emphasizing the continuity of implemented plans by follow up done through the tobacco control committee and the national multi sector committee for prevention and control of NCDs.

In addition, we recommend the enforcement of anti-smoking campaigns and public health programs for the community to raise awareness about smoking risks and health related problems in the active and passive smokers.

Despite the success of Quit Tobacco Clinics and the good quitting rates, there are limited QTC numbers which are not accessed by the whole population, so we recommend increasing the number of these clinics.

Some of the participants reported that the reason for their quitting attempts was the recent increase in the cigarette's prices due to taxation on tobacco. It was not included as a study variable in our study which might be considered in future studies.

Implementation of these changes might improve the overall quality of smoking cessation services in Bahrain and increase the quitting rates.

CONCLUSIONS

This is the first study in Bahrain to assess the predictors of intention to quit. It is interview based with no missing values. The previous quitting attempts among study population were 70.9%, and the intention to quit smoking was 51.4%.

In this study, multiple predictors were associated with tobacco use. The male gender, being married and the high education level were the most three significant sociodemographic predictors associated with smoking cessation.

Among the health related problems, we found that shortness of breath and gastrointestinal symptoms were the main contributing predictors.

Medium nicotine dependence smokers showed the highest rate of quitting attempts and intention to quit.

Most of the results in this study were similar to many studies conducted globally and regionally.

REFERENCES

1. WHO. (2019). Report on the Global tobacco epidemic. [Cited 2019 July 26]; [14 screens]. Available from https://www.who.int/tobacco/global_report/en/
2. Centers for Disease Control and Prevention. (2014). Health Effects of Cigarette Smoking Fact Sheet. [Cited 2018 Jan 17]. Available from https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/index.htm
3. American Lung Association. (2019). Health effect of smoking. [Cited 2019 Mar 6]. Available from <https://www.lung.org/stop-smoking/smoking-facts/health-effects-of-smoking.html>
4. Hamadeh, R. R., Ahmed, J., Al-Kawari, M., & Bucheeri, S. (2017). Quit tobacco clinics in Bahrain: smoking cessation rates and patient satisfaction. *Tobacco induced diseases*, 15(1), 7.
5. Feng, G., Jiang, Y., Li, Q., Yong, H. H., Elton-Marshall, T., Yang, J., ... & Fong, G. T. (2010). Individual-level factors associated with intentions to quit smoking among adult smokers in six cities of China: findings from the ITC China Survey. *Tobacco control*, 19(Suppl 2), i6-i11.
6. World Health Organization. (2013). Framework Convention on Tobacco Control. [Cited 2019]; [42 pages]. Available from https://www.who.int/fctc/text_download/en/
7. Babb, S. (2017). Quitting smoking among adults—United States, 2000–2015. *MMWR. Morbidity and mortality weekly report*, 65:1457-1464.
8. Marques-Vidal, P., Melich-Cerveira, J., Paccaud, F., Waeber, G., Vollenweider, P., & Cornuz, J. (2011). Prevalence and factors associated with difficulty and intention to quit smoking in Switzerland. *BMC public health*, 11(1), 227.
9. Driezen, P., Abdullah, A. S., Quah, A. C., Nargis, N., & Fong, G. T. (2016). Determinants of intentions to quit smoking among adult smokers in Bangladesh: findings from the International Tobacco Control (ITC) Bangladesh wave 2 survey. *Global health research and policy*, 1(1), 11.
10. Shishani, K., Nawafleh, H., Jarrah, S., & Froelicher, E. S. (2011). Smoking patterns among Jordanian health professionals: a study about the impediments to tobacco control in Jordan. *European Journal of Cardiovascular Nursing*, 10(4), 221-227.
11. Abughosh, S., Wu, I. H., Hawari, F., Peters, R. J., Yang, M., & Crutchley, R. (2011). Predictors of intention to quit cigarette smoking among Jordanian adults. *Epidemiology*, 1(2), 1-7.
12. Ward, K. D., Eissenberg, T., Rastam, S., Asfar, T., Mzayek, F., Fouad, M. F., ... & Maziak, W. (2006).

- The tobacco epidemic in Syria. *Tobacco control*, 15(suppl 1), i24-i29.
13. Maziak, W., Hammal, F., Rastam, S., Asfar, T., Eissenberg, T., Bachir, M. E., ... & Ward, K. D. (2004). Characteristics of cigarette smoking and quitting among university students in Syria. *Preventive medicine*, 39(2), 330-336.
 14. Almogbel, Y. S., Abughosh, S. M., Almeman, A. A., & Sansgiry, S. S. (2016). Factors associated with the willingness to quit smoking among a cohort of university students in the KSA. *Journal of Taibah University Medical Sciences*, 11(2), 128-133.
 15. National Non-Communicable Diseases Risk Factors Survey. (2007). Kingdom of Bahrain.
 16. Fadhil, I. (2007). Tobacco control in Bahrain: an overview. *EMHJ-Eastern Mediterranean Health Journal*, 13 (3), 719-726, 2007.
 17. Non-Communicable Diseases Unit Bulletin. (2018). ISUUE NO.8.
 18. Assistant Undersecretary of Primary Care and Public Health. (2010). Smoking Cessation Counseling, Departmental Policy and Processes. Version 2.0. Health Policy Network, Ministry of Health, Kingdom of Bahrain. DPP/PMED/09/0038.
 19. Prochaska, J. O., Redding, C. A., Rossi, J. S., Rossi, S. R., & Velicer, W. F. (2000). Health behavior models. *The International Electronic Journal of Health Education*, 3, 180-193.
 20. Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: applications to addictive behaviors. *American psychologist*, 47(9), 1102-1114.
 21. DiClemente, C. C., Prochaska, J. O., Fairhurst, S. K., Velicer, W. F., Velasquez, M. M., & Rossi, J. S. (1991). The process of smoking cessation: an analysis of precontemplation, contemplation, and preparation stages of change. *Journal of consulting and clinical psychology*, 59(2), 295-304.
 22. World Health Organization. (2010). Gender, Women, and the tobacco epidemic. Available from :https://www.who.int/tobacco/publications/gender/women_tob_epidemic/en/
 23. Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., & FAGERSTROM, K. O. (1991). The Fagerström test for nicotine dependence: a revision of the Fagerstrom Tolerance Questionnaire. *British journal of addiction*, 86(9), 1119-1127.
 24. Haddad, L. G., & Petro-Nustas, W. (2006). Predictors of intention to quit smoking among Jordanian university students. *Canadian Journal of Public Health*, 97(1), 9-13.
 25. Fagan, P., Augustson, E., Backinger, C. L., O'Connell, M. E., Vollinger Jr, R. E., Kaufman, A., & Gibson, J. T. (2007). Quit attempts and intention to quit cigarette smoking among young adults in the United States. *American journal of public health*, 97(8), 1412-1420.
 26. Hyland, A., Borland, R., Li, Q., Yong, H. H., McNeill, A., Fong, G. T., ... & Cummings, K. M. (2006). Individual-level predictors of cessation behaviours among participants in the International Tobacco Control (ITC) Four Country Survey. *Tobacco control*, 15(suppl 3), iii83-iii94.
 27. Man-Kit Leung, C., Leung, A., Ellis Hon, K. L., & Yim-Fai Kong, A. (2009). Fighting tobacco smoking-a difficult but not impossible battle. *International journal of environmental research and public health*, 6(1), 69-83.