



Prevalence of Tobacco Use and the Factors Affecting It: A Cross-sectional Analysis of Baseline Data From the Bandare Kong Cohort Study in Southern Iran

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Abstract

Background: Tobacco use (TU) has been increasing in Iran and turned into a major national healthcare concern. Therefore, the present research aimed to explore the prevalence of TU and its predictors in Bandar Kong in the south of Iran.

Materials and Methods: The baseline data from the Bandare Kong Cohort Study were used in a prospective study of 4,035 subjects (40-70 years old) in Hormozgan province from 2016 to 2018. Adjusted and crude odds ratios (OR) were used at 95% confidence interval (CI) to determine the predictors of TU.

Results: Hookah smoking (HS) was found to be the most prevalent type of smoking (17.60%, 95% CI: 16.41-18.78%), followed by second-hand smoking (17%, 95% CI: 15.81-18.14%) and cigarette smoking (9%, 95% CI: 8.11-9.89%), respectively. Age, gender, education, alcohol consumption, and environmental tobacco smoke (ETS) were the main predictors of cigarette and HS. Marital status, place of residence, and psychological problems were the predictors of HS (OR=0.1.65, 95% CI: 1.11, 2.45, $P=0.01$), and body mass index (BMI) (OR=0.95, 95% CI: .93, 0.98, $P=0.002$) and drug abuse (OR=4.52, 95% CI: 3.11, 6.55, $P<0.001$) were the predictors of cigarette smoking.

Conclusion: Male gender, higher age, rural residence, low education, alcohol consumption, drugs, second-hand smoking, and history of depression were among the main risk factors of smoking behavior. The results indicated a considerable need for more educational and preventive programs for each risk factor involved in smoking behavior especially for HS, exposure to ETS, and its consequences in the population of Bandar Kong.

Keywords: Prospective Epidemiological Research Studies in IRAN (PERSIAN), Cigarette, Second-hand smoke, Hookah, Smoking, Predictors

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Introduction

Tobacco use (TU) is a key general health issue globally and a key risk factor involved in increasing the burden of diseases in the world especially in the case of chronic and non-contagious diseases such as cardiovascular diseases, respiratory diseases, cancer, and stroke (1). Annually, TU accounts for more than 8 million deaths worldwide (2). About 80% of these deaths occur in low and middle-income countries (3).

In Iran, TU behaviors are growing among adults (4). Despite preventive measures, the trend of cigarette smoking has not reduced among adult population in Iran

in the past two decades (5). According to the CASPAIN study (2011-2012), 5.9% of Iranian adults used tobacco in their lifetime, and this rate is higher compared to western countries and other middle-eastern countries (6). Hookah smoking (HS) is another traditional form of TU of an unknown origin. It involves the passage of smoke above water before inhaling. It is termed differently in different countries, including hookah, water-pipe, hubble-bubble, goza, and narghile (7, 8). It has been shown that the adverse effects of HS are significantly more pronounced than those of cigarette smoking (9, 10). Iran has also witnessed an increase in the trend of HS for the past two

decades especially in the south of the country (11). In fact, Hormozgan Province ranks third in terms of the rate of HS (12).

In Iran, TU is considered a major healthcare issue which requires major planning with the aim of controlling its use (13, 14). There is a considerable need for lowering the burden of HS-related diseases (15), as the current prevalence rate of the behavior is significantly high in Iran (4). An effective measure before any intervention is the prevention and management of TS by identifying and concentrating on the prevalence of the issue and its correlates. This can help better know the risk factors involved in TS.

Before developing an effective intervention, there is a need for epidemiological investigations aiming to identify the risky behaviors associated with TU (16). Moreover, there are certain intra- and inter-geographical differences in terms of the prevalence of TU (17). It is essential to conduct an independent study in each geographical area marked by idiosyncratic cultural features. In Iran, geographical diversity should be considered carefully in policy-making and designing preventive measures against TU (12).

The present research used baseline data from the Bandare Kong Cohort Study with the aim of determining the predictors of TU in the target area in Hormozgan province, Iran. In this study, local health staff and policy-makers were provided with the required information to prevent and cut down on TU. Lowering the costs of TU-related chronic diseases and promoting the level of public health and quality of life in the target population were among the long-term goals of the present study.

Research Questions

RQ1: What is the prevalence of TU in Bandar Kong in Southern Iran?

RQ2: Is there any association between the variables and TU?

Materials and Methods

Design and Setting

The present cross-sectional study used baseline data from the Bandare Kong Cohort Study in the south of Iran to explore the prevalence of TU and its associated risk factors. The Bandar Kong district is located in 53 °54-57 ° to the east and 35 °26-37° to the north at the altitude of 5 meters above Persian Gulf. The design and protocol of the Bandare Kong Cohort Study will be described later (18).

In short, the Bandare Kong Cohort Study is a prospective cohort study already conducted in 2016 with the aim of an epidemiological exploration and identification of the risk factors of noncontagious diseases in Bandar Kong in southern Iran.

The present study was conducted on 4063 adults, aged 40-70 years, who had entered the Bandare Kong Cohort

Study during 2016-2018. The participants were urban residents selected through a multi-stratified sampling method (cluster and systematic samplings) from 14 different regions in Bandar Kong. The sampling scope was participants' home. The first building on the right side of the nearest street to the center of cohort was selected as the first cluster. Then, from each cluster, one region, one street, and an alley were selected respectively, and the participants were selected from each cluster through systematic randomization (list of families). In rural regions, the sampling was done in two stages, the first being a public announcement to invite influential well-reputed neighbors to familiarize them with the benefits and procedures of research. This was done by lecturing in public places such as mosques, distributing pamphlets to introduce the research, and putting up posters and banners in villages. The second stage was done by visiting the eligible participants at their houses one by one for the interview.

Each interview was held using a questionnaire presented by a well-trained interviewer enquiring about demographic information, socio-economic indices, history of TU, drug abuse, and medical history. The inclusion criteria were explained completely. The participants were supposed to provide written informed consent to take part in the study.

Inclusion and Exclusion Criteria

The primary inclusion criterion was being 40-70 years of age. Only those residing in the target region were included in the study. Immigrants or foreigners could only participate if they had lived in the region for at least a year. For non-immigrants, it was necessary that they resided in the region for at least 9 months. Those who were unwilling to participate despite being told about the research design and benefits as well as those unable to respond to interview questions were excluded.

Instrumentation

The data collection instrument was a questionnaire developed in the light of the related literature, existing instrument, and experiences gained from the Bandar Kong Cohort Study or foreign similar works. The reliability and validity of the questionnaire were already approved (18). The dependent variables in this study were as follows:

Hookah Smoking

To find out if the participants had experienced HS, the following question was asked:

“Have you ever smoked hookahs in your life?”

The response was supposed to be either yes or no.

Cigarette Smoking

Whether the participants smoked cigarettes or not was checked using the National Health Interview Survey

(NHIS). Smokers were defined as those who had smoked more than 100 cigarettes during their life. Those who had already quit smoking were taken as ex-smokers. The covariates in this study were as follows:

Alcohol Consumption

The following question was asked to see whether the participants experienced alcohol consumption or not: "Have you drunk alcohol more than once in your life?" This question was to be answered with either yes or no.

Drug Abuse

The following question was asked in order to see whether the participants ever experienced drug abuse (e.g., heroin, amphetamine, barbiturates, cannabis, cocaine, hallucinogen, and opioid):

"Have you ever consumed illicit drugs more than once in life?"

This question was to be answered with either yes or no.

Exposure to environmental tobacco smoke (ETS)

This variable was investigated with 2 questions:

"Have you been exposed to ETS at home or at work?"

How many hours a day have you been exposed to ETS?"

History of Depression

Participants were asked whether they had ever been told by a specialist that they suffered from depression, which had to be answered with yes or no.

Demographic Variables

These variables included gender, age, body mass index (BMI), place of residence, education, occupation, marital status, socio-economic status (possession of accommodation, area of accommodation, number of rooms in accommodation), family size, and cigarette smoking by other family members. These data were obtained using a questionnaire.

Statistical Analysis

A complete range of information on participants' age, gender, marital status, education, socio-economic status (SES), BMI, place of residence (rural/urban), occupation, spouse's occupation, alcohol consumption, drug abuse, family members' smoking, exposure to ETS at home or work, physical activity, history of depression, and psychiatric disorder was collected. Concerning the low frequency of some levels of independent variables and the high collinearity between the history of depression and other psychiatric disorders, 15 variables were finally included: age, gender, marital status, education, SES, family size, BMI, place of residence, occupation, alcohol consumption, drug abuse, exposure to ETS at home/work, family members' smoking, and a history of psychiatric disorders correlating with cigarette smoking and HS. Chi-square test was run to investigate the correlation

between two nominal variables. Simple logistic regression was used to estimate crude odds ratio (OR) and analyze independent variables. The significance level was set at 0.25 in the final model (multiple logistic regression) to calculate ORs.

Results

A total number of 4035 people residing in Bandar Kong participated in this study. Their mean age was 48.2 years; the majority of the sample was female (n=2315, 57.4%). Moreover, 60% of the sample were illiterate or of a low level of literacy. The majority of female participants were housewives (n=1925, 83.2%) and their husbands were mostly drivers (n=210, 9.1%), sailors (n=178, 7.7%), and unemployed (n=186, 8%). The majority of men in this study were drivers (n=189, 11%), fishermen (n=175, 10.2%), and sailors (n=157, 9.2%). In this sample, 1,092 (27.1%) used at least one type of tobacco product. HS was the most prevalent (17.60%) (95% CI: 16.41-18.78%), followed by cigarette smoking (9% of the sample) (95% CI: 8.11-9.89%). Table 1 presents a summary of the participants' baseline demographic information.

Though more than 75% of the sample did not report any experience of smoking cigarettes or hookahs, 6.9%

Table 1. Participants' Demographic Information (n=4035)

Continuous Variables	Mean	SD
Age (year)	48.24	9.40
Education (year)	5.81	4.80
BMI	26.91	5.11
Nominal variables	No.	%
SES		
Very Low	768	19.00
Low	769	19.10
Medium	836	20.70
High	864	21.40
Very high	767	19.00
Age (at the time of participation)		
35-39	931	23.1
40-44	740	18.4
45-49	688	17.1
50-54	549	13.6
55-59	508	12.6
60-64	368	9.1
65-70	242	6.0
Education		
<6	2418	60.1
6-12	1271	31.6
>12	337	8.4
Gender (females)	2315	57.4
Marital status		
Single	93	2.3
Married	3605	89.5
Widowed or divorced	328	8.1

and 15.5% reported smoking cigarettes and hookahs, respectively (Table 2). Table 3 indicates the distribution of smoking behaviors across genders. On average, the results showed that men began smoking earlier than women (19.02 years vs. 27.13 years). The rate of cigarette and HS among men was 20.80% (95% CI: 18.90-22.80%) and 23% (95% CI: 20.99-25.03%), respectively. Besides, the rate of drug abuse and alcohol consumption among men was 9.60% (95% CI: 8.28-11.14%) and 12.40% (95% CI: 10.6-14.04%), respectively. Among women, the rate of cigarette and HS was 0.30% (95% CI: .09-0.56%) and 13.7% (95% CI: 12.17-14.99%), respectively. Furthermore, the rate of drug abuse and alcohol consumption among women was 0.40% (95% CI: 0.20-0.78%) and 0.20% (95% CI: 0.04-0.44%), respectively. According to Table 4, when other factors are controlled, in the 45-54 age group, the odds ratio of cigarette smoking is three times as high as the >65 age group (OR=3.05, 95% CI: 1.44-6.44, $P=0.003$). Moreover, the odds ratio of cigarette smoking in the 55-64 years age group is 2.72 times as high as the >65 years age group (OR=2.72, 95% CI: 1.32-5.61, $P=0.007$). When the effect of other variables is adjusted, the odds ratio of cigarette smoking among men is nearly 87 times as high as women (OR=87.67, 95% CI: 34.87-120.37, $P<0.001$). The odds ratio of cigarette smoking for those with less than 6 years of education and those with 6-12 years of education is 2.27 and 1.90 times higher compared to those with an academic degree, respectively.

Furthermore, when the other factors are controlled, a 1 unit increase in BMI is followed by a 0.05 unit decrease in the odds ratio of cigarette smoking (OR=0.95, 95% CI: 0.93-0.98, $P=0.002$). When the effect of other variables is adjusted, the odds ratio of smoking cigarettes is 2.56 times higher in alcohol consumers than in non-consumers

Table 2. Distribution of Cigarette and Hookah Smoking

Variables	No. (%)
Neither cigarette nor hookah	3048 (75.5)
Cigarette only	278 (6.9)
Hookah only	625 (15.5)
Both cigarette and hookah	84 (2.1)

Table 3. Distribution of Smoking Types Across Genders

Variables	Male No. (%)	Female No. (%)	Statistical Test	P Value
Cigarette	356 (20.80)	6 (0.30)	Chi-square	<0.0001
Hookah	393 (23.00)	316 (13.70)	Chi-square	<0.001
Drug abuse	165 (9.60)	10 (0.40)	Chi-square	<0.001
Alcohol	212 (12.40)	4 (0.20)	Chi-square	<0.001
ETS (at home)	141 (8.20)	346 (15.00)	Chi-square	<0.001
ETS (at work)	199 (11.60)	30 (1.0)	Chi-square	<0.001
Mean age at first smoking*	19.02 (6.58)	27.13 (8.25)	Simple regression	0.001

* The age of beginning to smoke

(OR=2.56, 95% CI: 1.79-3.65, $P<0.001$). Moreover, the odds ratio of smoking cigarettes among those exposed to ETS at work is 1.79 times higher compared to others (OR=1.79, 95% CI: 1.21-2.63, $P=0.003$).

According to Table 5, if the other factors are controlled, the odds ratio of HS is 1.57 times as high in the 45-54 age group as those above 65 years of age (OR=1.57, 95% CI: 1.23, 2.01, $P<0.001$). Moreover, the odds ratio of HS is 1.98 times as high for the age group 55-64 years as those above 65 (OR=1.98, 95% CI: 1.39, 2.82, $P<0.001$). When the effect of other variables is adjusted, the odds ratio of HS for men is 0.83 times as high as that for women (OR=1.83, 95% CI: 1.33, 2.53, $P<0.001$). The odds ratios of HS for those with less than six years of education and those with 6-12 years of education are 5.57 and 3.92 times, respectively, as high as those with an academic degree. The odds ratio of HS is 2.86 times as high for widowed or divorced individuals as singles (OR=2.86, 95% CI: 1.29, 6.34, $P=.001$). Among urban residents, the odds ratio of HS is 24% lower compared to the rural (OR=0.76, 95% CI: 0.60, 0.96, $P=0.02$). The odds ratio of HS is 2.43 times as high for alcohol consumers as non-consumers (OR=2.43, 95% CI: 1.73, 3.42, $P<0.001$). Moreover, the odds ratio of HS for people exposed to ETS at work is 2.27 times as high as others (OR=2.27, 95% CI: 1.49, 3.44, $P<0.001$). The findings presented in Table 5 indicate that the odds ratio of hookah intake is 1.65 times as high for participants with psychiatric disorders as others (OR=1.65, 95% CI: 1.11, 2.45, $P=0.01$).

Discussion

The Bandar Kong Cohort Study helped to conclude that HS was the most prevalent form of TU (17.6%) compared to cigarettes (9%). Based on our findings, there has been a significant association between hookah and cigarette smoking and the variables of age, gender, education, alcohol consumption, and ETS. Marital status, place of residence, and psychiatric disorders have an association with HS only and BMI and drug abuse have an association with only cigarette smoking.

In the present study, the prevalence of cigarette smoking was 0.30% and 20.80% among women and men, respectively. The overall prevalence was 9%. In their study, Abdollahpour et al reported the rate of cigarette smoking to be 41.07% and 32.68% among women and men, respectively (4). This reported rate was higher than the present findings. Drope et al found that 14.2% of men and 4% of women were cigarette smokers. This rate among men showed to be lower compared to the present study; however, considering women, it was consistent with the present findings (19). The prevalence of HS in the present study was found to be 13.70% and 23% among women and men, respectively. The overall rate of HS was found to be 17%. It seems that in the south of Iran, HS is more prevalent than cigarettes, which is consistent with their

Table 4. Univariate and Multivariate Analysis of Variables Affecting Cigarette Smoking

Variables	Cigarette Smoking			
	Crude OR (95% CI)	P-value	Adjusted OR (95% CI)	P Value
Age (year) Ref: >65	-	-	-	-
35-44	1.83 (0.94, 3.53)	0.073	1.84 (0.86, 3.96)	0.11
45-54	2.98 (1.54, 5.75)	0.001	3.05 (1.44, 6.44)	0.003
55-64	2.62 (1.34, 5.12)	0.005	2.72 (1.32, 5.61)	0.007
Gender Ref: females	-	-	-	-
Males	101.11 (44.99, 227.20)	<0.001	87.67 (34.87, 120.37)	<0.001
Education (year) (Ref: collegiate)	-	-	-	-
<6	1.32 (0.82, 2.13)	0.24	2.27 (1.30, 3.95)	0.004
6-12	2.20 (1.36, 3.56)	0.001	1.90 (1.12, 3.21)	0.016
Marital status (Ref: single)	-	-	-	-
Married	3.27 (1.032, 10.41)	0.044	1.62 (0.45, 5.82)	0.45
Widowed or divorced	0.37 (0.081, 1.68)	0.19	1.36 (.25, 7.39)	0.72
SES (Ref: high)	-	-	-	-
Low	0.97 (0.76, 1.23)	0.25	1.03 (0.71, 1.50)	0.86
Moderate	1.05 (0.77, 1.41)	0.25	0.89 (0.63, 1.26)	0.54
Residence (Ref: rural)	-	-	-	-
Urban	1.70 (1.19, 2.42)	0.003	1.40 (0.92, 2.14)	0.11
Family size	0.98 (.93, 1.04)	0.25	0.95 (0.88, 1.02)	0.13
Family members' smoking	1.50 (1.09, 2.06)	0.013	1.21 (0.74, 1.96)	0.44
BMI	0.91 (0.88, 0.93)	<0.001	0.95 (0.93, 0.98)	0.002
Occupation (Ref: employed)	-	-	-	-
Unemployed	0.16 (0.12, .21)	<0.001	1.07 (0.73, 1.57)	0.69
Alcohol consumption (Ref: non-smoker)	9.89 (7.36, 13.30)	<0.001	2.56 (1.79, 3.65)	<0.001
Drug abuse (Ref: non-smoker)	16.87 (12.21, 23.30)	<0.001	4.52 (3.11, 6.55)	<0.001
HS (Ref: non-smoker)	1.47 (1.13, 1.90)	0.003	1.33 (0.97, 1.85)	0.07
ETS (at home)	0.76 (0.52, 1.09)	0.13	0.88 (0.50, 1.53)	0.65
ETS (at work)	2.37 (1.70, 3.29)	<0.001	1.79 (1.21, 2.63)	0.003
Psychiatric disorders	1.04 (0.57, 1.90)	0.25	1.13 (0.55, 2.31)	0.73

local culture. Therefore, hookah was found to be the most common form of TU in this region. It is socially accepted especially among women (20). In a cross-sectional study conducted in Tehran, the prevalence of HS was found to be 17.6% among 1830 participants, which is consistent with the present findings (21). This rate is higher than that of adults in the United States (0.6%) (22) and lower compared to a similar study conducted in Kuwait which reported that the prevalence of HS was 79.9% and 21.1% among women and men, respectively (23). Different geographical contexts and demographic information make the comparison of information difficult. However,

the prevalence of hookah and cigarette smoking in the present study was higher compared to the Iranian national report by Nemati et al (5.6% vs .3%). The prevalence of exposure to ETS in the present study was found to be 15.1% and 19.8% among women and men, respectively. This rate is lower than that reported by Abdollahpour et al (4) and Zeng et al (24). These discrepancies can be explained partly by the different national rules and regulations in different countries and demographic features.

The logistic regression analysis in the present study showed that the male gender increased the risk of HS by 1.83 times. These findings are similar to the results of

Table 5. Univariate and Multivariate Analysis of Variables Affecting HS

Variables	Hookah Smoking			
	Crude OR (95% CI)	P Value	Adjusted OR (95% CI)	P Value
Age (year)	-	-	-	-
Ref: >65				
35-44	1.17 (0.96, 1.44)	0.12	1.07 (0.86, 1.34)	0.53
45-54	1.91 (1.54, 2.35)	<0.001	1.57 (1.23, 2.01)	<0.001
55-64	2.73 (2.01, 3.71)	<0.001	1.98 (1.39, 2.82)	<0.001
Gender (Ref: females)	-	-	-	-
Males	1.88 (1.60, 2.22)	<0.001	1.83 (1.33, 2.53)	<0.001
Education (year) (Ref: collegiate)	-	-	-	-
<6	5.48 (3.23, 9.28)	<0.001	5.57 (3.18, 9.75)	<0.001
6-12	4.05 (2.36, 6.95)	<0.001	3.92 (2.25, 6.80)	<0.001
Marital status (Ref: single)	-	-	-	-
Married	2.15 (1.03, 4.47)	0.039	1.39 (0.65, 2.97)	0.38
Widowed or divorced	4.20 (1.96, 9.02)	<0.001	2.86 (1.29, 6.34)	0.01
SES (Ref: high)	-	-	-	-
Low	1.51 (1.19, 1.89)	<0.001	1.23 (0.96, 1.60)	0.10
Moderate	0.92 (0.72, 1.16)	0.49	0.83 (0.64, 1.06)	0.14
Residence (Ref: rural)	-	-	-	-
Urban	0.76 (0.61, 0.94)	0.013	0.76 (0.60, 0.96)	0.024
Family size	0.96 (0.91, 0.99)	0.03	0.96 (0.92, 1.01)	0.07
Smoking by family members	1.03 (.78, 1.34)	0.25	1.08 (0.78, 1.50)	0.63
BMI	0.97 (0.96, 0.99)	0.012	1.01 (0.98, 1.02)	0.51
Occupation (Ref: employed)	-	-	-	-
Unemployed	0.79 (0.67, 0.93)	0.005	1.05 (0.82, 1.35)	0.66
Alcohol consumption (Ref: non-smoker)	2.90 (2.16, 3.89)	<0.001	2.43 (1.73, 3.42)	<0.001
Drug abuse (Ref: non-smoker)	2.18 (1.56, 3.04)	<0.001	1.19 (0.80, 1.76)	0.37
Cigarette smoking (Ref: non-smoker)	1.47 (1.13, 1.91)	0.003	1.35 (0.98, 1.85)	0.06
ETS at home	1.07 (0.83, 1.36)	0.24	1.19 (0.89, 1.60)	0.22
ETS at work	1.72 (1.25, 2.37)	0.001	2.27 (1.49, 3.44)	<0.001
Psychiatric disorders	1.52 (1.04, 2.21)	0.028	1.65 (1.11, 2.45)	0.013

other studies conducted in Iran and foreign countries (25-27). Contrary to the present findings, a body of research showed that the prevalence of HS was higher among women than among men (28, 29). Another study showed gender-based differences in the prevalence of HS (30). These divergent findings can be partly attributed to the idiosyncratic cultural context, geographical differences, gender distribution, features of the target population, and sample size. It is noteworthy that though in the present study, the prevalence of HS is higher among men than among women, and HS is significantly more prevalent than consuming cigarettes, alcohol, and drugs among

women. The difference was found to be statistically significant. This would point to the fact that HS is more socially acceptable in the population of Bandar Kong. The results of an extensive survey in 2007 in Iran showed that more than half of tobacco smoking women (i.e., 1.9% of overall 3.2%) smoke hookah employing water-pipe (31). It seems that HS has roots in public culture in the south of Iran, especially in Hormozgan, and has turned into a local cultural value. It is a socially accepted behavior (19). Therefore, it is essential to raise public awareness of the adverse effects of HS through the mass media. HS needs to be considered as a detrimental social behavior as

cigarettes and other addictive drugs are.

The present findings showed that TU, alcohol consumption, and drug abuse are more prevalent among men than women and this divergence was found to be statistically significant. A body of research also reported a higher prevalence among men (4, 32-34). Internalization of gender roles in participants and socio-cultural acceptance of cigarettes and drugs among men can be part of the reason for the higher prevalence of smoking among the male population (35). Contrary to the present findings, in another study, no difference was found across genders in terms of alcohol consumption and drug abuse (36). This difference can be partly due to the age range and other idiosyncrasies of the target population and cultural and ethnic differences even within the country. It is further noteworthy that overall, men are more prone to detrimental habits than women at a global scale. The former tend to underestimate the detriments of drug abuse more than the latter (37). Particularly in more conservative communities, where women are more controlled than men, access to cigarettes, alcohol, and drugs is harder for women, and consuming such stuff is deemed culturally unacceptable for women in Islamic countries (38).

The present study showed that women are more exposed to ETS at home than men. In another study conducted in Palestine, Al Zabadi et al observed that more than half of the participants admitted that a family member or a spouse also consumed tobacco and thus were exposed to ETS (39). Contrary to the present findings, Skorge et al (40) and Kabir et al (41) showed that men are more exposed to ETS than women. This discrepancy can be explained by the fact that Skorge et al and Kabir explored ETS at work and public places. Women are mostly housewives and thus are less exposed to ETS. Besides, different social and cultural features of different countries can account for such discrepancies. These findings can be explained by the fact that the socio-cultural idiosyncrasies of Iran have led to the higher prevalence of cigarette smoking in men compared to women (4). Consequently, those in the vicinity of smokers, primarily women and children, are more exposed to ETS. Raising smokers' and non-smokers' awareness of the adverse effects of ETS at home can be an effective strategy.

In the present study, men are significantly more exposed to ETS at work than women. This finding is consistent with studies conducted by Skorge et al (40), Kabir et al (41), and Akansha Singh (42). This would point to the gender-related differences in occupation. Probably a higher percentage of men are employed than women. Therefore, it is not beyond expectation that men are more exposed to ETS at work. It seems that there is a strong need for enforcement of smoke-free rules and regulations at work, as it is essential to optimally protect smokers and non-smokers by providing a smoke-free environment

(42).

The present research revealed that the beginning age of smoking cigarettes was lower among men than women. Some previous studies also reported the same finding (4, 43). This finding can be explained by men's more freedom of action in family and society and their more active social role. During adolescence and adulthood, men enjoy more social presence under less supervision. However, women are more controlled in the family, which can be part of the reason for this gender-based difference. A relevant study showed that parental control is less effective in men than in women in stopping alcohol or tobacco consumption and other illicit drugs (44).

Furthermore, the present findings revealed that an increase in age is followed by a decrease in tendency to smoke cigarettes and hookahs. In other words, the young showed a stronger tendency to smoke (25, 45, 46). Contrary to the present study, some studies reported higher rates of TU at higher ages (4, 47, 48). This difference might be explained by different features of the target populations and the age ranges. Moreover, probably the emergence of diseases following an increase in age and prohibited use and a better understanding of risks associated with drug abuse or other forms of TU lowered the rate of consumption.

As the present findings showed, HS was found to be more prevalent among widowed and divorced individuals than in singles. Some other studies reported similar findings too (49, 50). As reported in a study, perceived family norms among the married can be effective in quitting TU (51). Similarly, in another study, married women were found to be more motivated to stop TU than singles (20). This finding can be explained by the fact that widowed and divorced individuals might suffer more emotional and social problems due to their loss compared to others. Therefore, they might have resorted to smoking to relieve their mind.

Another finding was that a higher level of education was associated with less cigarette or HS. In a similar vein, some studies showed that a lower level of education was a major reason for the tendency to use illicit drugs (49, 50). Contrary to this finding, in some other studies, higher education showed no protective effect on the rate of TU (26, 51). These differences can be partly explained by the quality of items within the questionnaire, participants' education level, and different sociocultural features. In addition, a lower level of education can lower health literacy and then result in unawareness of consequences and actual risks of drug abuse which pave the way for the occurrence and continuation of addictive behaviors (52).

The results also showed that rural residence was a predictor of HS. Another study reported that more than half of rural residents accepted TU at home (53). Moreover, some other research reported that rural residence was associated with a two-fold increase in the

rate of cigarette smoking (54). This higher prevalence can be partly attributed to the existing gap of knowledge in rural areas in comparison to urban counterparts. Another reason might be that tobacco control and regulatory efforts are not strictly implemented in rural areas (55). This finding points to the need for greater attention to rural communities as a vulnerable population while exploring effective and fair tobacco control and other health-related policies.

The present findings showed that alcohol consumption was a predictor of cigarette and HS. Other investigations also reported higher chances of hookah and cigarette smoking among alcohol consumers (4, 56). Occasionally, alcohol consumption and cigarette smoking develop simultaneously. In other words, it seems that alcohol consumption exposes people to cigarette and hookah consumption. As it was expected, lifetime drug abuse correlated with cigarette smoking (4). Concerning this, a number of studies pointed to the strong association of the history of cigarette smoking and illicit drugs (57, 58). Moreover, exposure to ETS was reported to be correlated with hookah or cigarette smoking. Probably, those exposed to ETS showed a strong tendency to TU. In a similar vein, some investigations found exposure to ETS as a factor involved in TU (18, 56). Another explanation might be that those exposed to ETS might become more curious to try smoking (59). Additionally, another finding was that psychiatric disorders could predict HS among the participants. Similarly, some other researchers reported the prevalence of HS among people with psychiatric disorders such as depression and stress (4, 60). Furthermore, an increase in BMI was followed by a decrease in the rate of cigarette smoking. Similarly, previous studies showed that cigarette smokers had a lower BMI than non-smokers. In other words, BMI and cigarette smoking were reported to be negatively correlated and this correlation was statistically significant (61, 62). Contrary to the present findings, another study indicated that a higher BMI was associated with more chances of beginning to smoke earlier and more frequently (63). However, the cross-sectional nature of the study rejects the claim of a causal relationship between hookah and cigarette smoking and drug abuse, alcohol consumption, ETS, psychiatric disorders, and BMI. These interrelations still need more longitudinal and in-depth investigations.

Limitations and Strengths

One limitation of the present study was the self-reporting nature of data collection. Therefore, the validity of the data depended to a great extent on the accuracy of participants' responses. However, interviewers tried to emphasize the confidentiality of the information and reduce bias as far as possible. Moreover, this study was conducted on the population of Bandar Kong, which further limits the generalizability of the results. Another

key limitation lies in the information about alcohol consumption, drug abuse, and TU. In information retrieval, revealing such information might be faced with the feeling of embarrassment, undervaluation, and crime consideration due to the cultural context. Moreover, the present study was population-based. No similar study was found to explore the prevalence of TU and its correlates in the target region. The results can provide useful practical information to evaluate and reform tobacco control planning and policy-making in Iran and more specifically in the target region.

Conclusion

The prevalence of HS and exposure to ETS was found to be above average in the present study. Male gender, older age, rural residence, low education, alcohol consumption, drug abuse, ETS, and history of depression were among the risk factors of smoking behavior. The present findings revealed a great need for more systematic education and preventive measures for each risk factor, especially HS, exposure to ETS, and its consequences in Bandar Kong. Considering the present contradictions in these findings and the related literature, it seems that more specialized investigations are required to reveal whether any other similar factor accounts for smoking behavior in Iran.

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Authors' Contributions

TA designed the study, analyzed the data, and reviewed the manuscript. SD designed the study, analyzed the data, drafted the manuscript, and critically reviewed the manuscript. AN designed the study and reviewed the manuscript. HF, AG, and MS reviewed the manuscript. SR analyzed the data and reviewed the manuscript. All authors read and approved the final manuscript.

Conflict of Interest Disclosures

None to disclose.

Ethical Statement

Ethical approval was received for this study from the Ethics Committee of Hormozgan University of Medicine Sciences (1399.159.IR.HUMS.REC). Subjects provided written consent to participate in the study.

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Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

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