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A population-based survey on prevalence of cigarette smoking and its socio-demographic risk factors among women of reproductive age in Tehran-Iran

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ABSTRACT

BACKGROUND: The trend of smoking among women is rising in some developing countries. The objective of this study was to determine the socio-demographic risk factors of cigarette smoking among women of reproductive age in Tehran (capital of Iran) in 2010.
METHODS: This was a population-based study in which 1359 women, 15-49 years old, were selected by proportional random multistage cluster sampling. Multivariate logistic regression analysis was used to estimate the adjusted association between socio-demographic variables and cigarette smoking.
RESULTS: The prevalence of cigarette smoking was 3.1%. The odds of cigarette smoking were higher among divorced women compared with married and widowed women (OR [odds ratio]: 14.0; 95% CI [confidence interval]: 4.1–47.3) and higher in women with a university education compared with those with a high school diploma or less (OR: 2.6; 95% CI: 1.3–5.0).
CONCLUSIONS: This study highlights an association between marital status and education with cigarette smoking among Iranian women.

Key words: Cigarette smoking, Socio-demographic factors, Iranian women, Reproductive age

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INTRODUCTION

There are 2.5 billion women living in developing countries and this number will reach 3.5 billion by 2025; thus, the absolute numbers of female smokers will rise even if the prevalence stays low [1]. The rate of tobacco use has dramatically decreased during the past

30 years in most industrialized countries due to the increasing awareness of cigarette-associated risks and the implementation of effective policies to control tobacco use; consequently, tobacco companies are discovering new markets in developing countries [2]. Furthermore, the tobacco use is now shifting from men towards women. Even low levels of tobacco consumption among reproductive-age women are considered as a major health risk [3, 4]. Not many women are conscious of gender-specific health risks, including cervical cancer, osteoporosis, poor pregnancy outcomes and early menopause [5]. It is also the concealed cause of many fatal diseases worldwide, including cardiovascular disease, chronic obstructive lung disease, and lung cancer [6]. Tobacco related illnesses are climbing in women due to the fact that a greater number of women are now dying more from lung cancer than breast cancer [5]. Female smokers have fewer chances of successful conception due to lower fertility rates [7] and smoking has detrimental effects on both the mother and her unborn child [8]. Smoking may cause a decrease in breast milk volume [9] and it creates a greater chance of early weaning [10].

In Iran, like in many other countries, tobacco consumption is considered a major public health concern. Much effort has been put into tobacco control in Iran. Examples include a fatwa on the ban of smoking by the authoritative religious leaders, ratified by the parliament in 1992, and again by the government in 1994; a ban on the public sale and use of tobacco by the government in 1997; the Vice President's decree in 2002; a Comprehensive National Tobacco Control Law adopted in 2006 [11]. The most significant sanctions are found in Article 13 of this law; according to this article, "Smoking in public places or public transportation vehicles may be punished with fines of up to 150,000 Rials (~$15)" [12]. Additionally, Iran signed the Framework Convention on Tobacco Control (FCTC) in 2003, and ratified it in November 2005; and the aforementioned anti-tobacco laws have been extensively implemented in Iran. However, to reach the goals of this international treaty, the community-specific determinants should be taken into account [13]. In Iran, the price of a pack of Marlboro cigarettes is $3[14]. The World Health Organization (WHO) estimates that this is roughly equivalent to 6 kg of rice in Bangladesh, 1 kg of fish in France and Ghana or 12 eggs in Panama [15].

The prevalence of smoking in Iranian girls has been reported as 2% in Tehran [16] to 10.1% in Kerman [17]. In a systematic review, the lowest and highest prevalence of smoking among female students of Iran's universities was 0.7% and 25.5% respectively [18]. Unfortunately, the use of other types of tobacco, such as the water pipe, is increasing. It appears that the water pipe is more acceptable to women compared to cigarettes [19]. In other Iranian studies, 46% of the participants had used a water pipe (50% of men and 36.8% of women) [11]. In research conducted by the authors of this study, the prevalence of water pipe use in women of reproductive age was 6.3% [20].

Few studies have investigated factors associated with cigarette smoking among women in developing countries. There is no previous study in Iran in which the full spectrum of women of reproductive age has been exclusively considered. However, due to very rapid changes in fertility rates in recent decades, much of Iran's population comprises females of reproductive age. According to the Statistics Center of Iran, the population of women 15 to 49 years of age was about 21 million, 3.8 million of whom lived in Tehran [21]. Therefore, research on smoking in women of reproductive age is of great importance. This study aimed to examine associated socio-demographic factors of cigarette smoking among women of reproductive age in Tehran, Iran.

METHODS

This was a population-based cross-sectional survey in Tehran, the capital of Iran. The inclusion criteria required participants to be 1) of Iranian nationality, 2) 15–49 years of age, 3) a resident of Tehran, 4) neither pregnant nor in the postpartum period, and 5) absent of severe psychological disorders. Informed consent was obtained from all participants and the Ethics Committee of the Tehran University of Medical Sciences approved the study protocol.

Sampling and data collection

A multistage cluster sampling technique was used. A total of 1 359 women of reproductive

age (15–49 years) were selected for the study conducted in 2010. Data were collected using face-to-face interviews by female interviewers who were trained and briefed for this study. A structured questionnaire was used for the field survey, which included questions about cigarette smoking and socio-demographic characteristics. Information was collected from smokers relating to smoking behaviour, such as smoking duration, pattern of smoking, and the number of cigarettes consumed per day for participants who smoked regularly. The number of cigarettes smoked was categorized as light (≤10 cigarettes/day), moderate (11–20 cigarettes/day), and heavy (>20 cigarettes/day).

Socio-demographic characteristics included age, marital status, occupation, sufficiency of income for expenses, crowding index, wealth index, ethnicity, and body mass index (BMI), as well as the spouse's level of education and occupation for married participants. The crowding index was determined by dividing the number of family members by the number of rooms, not including the bathroom. The crowding index was categorized into three levels including low crowding (<2 people per room), average crowding (2–3 people per room), and high crowding (>3 people per room). For calculating the wealth index, the principal components were analyzed, and the participants were categorized as very poor, poor, average, rich and very rich. The BMI (kg/m²) was calculated using height and weight. Based on the classifications of the World Health Organization, the values of BMI were categorized as <18.5, 18.5–24.9, 25–29.9, and ≥30 [22].

Data analysis

Frequency, percentage, mean and standard deviation were used for descriptive statistics. The Pearson's chi-square test was used to identify the relationship between cigarette smoking and socio-demographic characteristics. Backward multiple logistic regression was employed to determine the influence of each socio-demographic factor on cigarette smoking. Independent variables of marital status and woman's education, with $p < 0.05$ on the chi-square test, were employed for the regression model. The spouse's education variable was

not included in the model due to its collinearity with the woman's education variable. SPSS version 16 was used to analyse the data.

RESULTS

Participants' characteristics

The mean age of the women was 31.9 (SD 9.5) years, and more than one-third (39.8%) were aged 35 years or older. Most of the participants (70.8%) were married and 64.1% were housewives. Almost one-third had a university education. Most of the women (69.3%) stated that their monthly income sufficed for their expenses. More than one-quarter (29.3%) were poor and 46.6% lived in families with low crowding. The mean BMI was 25.3 (SD 5) kg/m² and about half the women had normal BMI.

Prevalence of cigarette smoking

As shown in Table 1, the proportion of women who smoked cigarettes was 3.1%. More than one-third of the women (39%) smoked cigarettes regularly. Among the participants who smoked cigarettes, most (62.5%) were light smokers and 18.8% were heavy smokers with a mean number of 13.1 (SD 12.7) cigarettes/day. About two-thirds of the women (68.6%) had been smoking cigarettes for more than one year.

Relationship between socio-demographic data and cigarette smoking

Table 2 shows the frequency of cigarette smoking based on the participants' socio-demographic characteristics. According to the chi-square test results, there was a statistically significant relationship between cigarette smoking and marital status ($p < 0.001$), as well as the woman's education and the spouse's education ($p < 0.05$). Cigarette smoking was mostly observed in divorced women and in women with a university education and also in women whose spouses had a university education. The variables of marital status and education were employed for the logistic regression model. The spouse's level of education was not used in the model due to collinearity with the woman's level

TABLE 1

CIGARETTE-SMOKING STATUS IN WOMEN OF REPRODUCTIVE AGE.	
VARIABLE	N (%)
CIGARETTE USE* (N= 1359)	
Yes No	42 (3.1) 1308 (96.9)
DURATION OF CIGARETTE SMOKING* †(MONTH) (N= 35)	
≤12 12–24 ≥24	11 (31.4) 12 (34.3) 12 (34.3)
PATTERN OF CIGARETTE SMOKING* ‡ (N= 41)	
Regularly Sometimes Seldom	16 (39) 15 (36.6) 10 (24.4)
NUMBER OF CIGARETTES CONSUMED PER DAY (N= 16)	
≤10 11–20 >20	10 (62.5) 3 (18.8) 3 (18.8)

*There were nine non-respondents for the smoking variable, seven for duration of smoking and one for pattern of cigarette smoking.
†among those who were smoking   ‡among those who were smoking regularly

of education. Table 3 presents the logistic regression odds ratios (OR) for significant correlates of cigarette smoking after adjustment for other variables, which are presented in Table 2. Cigarette smoking was more likely in divorced women (OR: 14.0; 95% CI: 4.1–47.3) when compared with married women and women with a university education (OR: 2.6; 95% CI: 1.3–5.0) when compared with women who had a high school diploma or less.

DISCUSSION

Prevalence of smoking among women in this study was 3.1%. This is very low compared to the prevalence of developed countries like United States (22%) [23], and some developing countries such as Turkey (13% among female students, [24]) and China (7% in women [25]). However, it is higher compared with some other developing countries like Kuwait (2%) [26] and Ethiopia (0.2%) [27]. It is similar with what is reported in some other cities in Iran, such as Kerman (2.4%) [28], but it is higher compared to the average obtained in a national cross-sectional survey on Iranians aged 15–64 years, sampled from all of the provinces (1.4%) [29].

Although a low prevalence of smoking in women has been reported by this present study

and others in Iran [30], there could be some underreporting of smoking among women. In an earlier study, the prevalence of self-reported smoking among Iranian women aged 19 years or older was 1.3% compared to 6.7% based on serum cotinine level. The underreporting of smoking among women could be a result of the conservative Iranian society and the fact that smoking in women is often considered an adverse practice and perceived as a disgraceful behaviour. The varying trend of smoking among Iranian women of reproductive age remains unexplored due to the insufficiency of data [31]. A comparison of cigarette smoking prevalence in this study with previous studies indicates that cigarette smoking in Iranian women is increasing. This is to be expected considering that women and girls are the main target groups of tobacco company marketing at the present time. Therefore, there is a need for anti-smoking policies and interventions focusing on prevention and smoking cessation.

In the current study, smoking was more common among Iranian women who had a university education, which was consistent with a previous study in Iran [32]. An earlier study also indicated an amplified rate of smoking among Iranian female university students [33]. Similarly, Ukrainian women who live in large cities and have a university education are more likely to

TABLE 2

FREQUENCY OF CIGARETTE SMOKING BASED ON THE PARTICIPANTS' SOCIO-DEMOGRAPHIC CHARACTERISTICS.

CHARACTERISTICS	n (%)	FREQUENCY OF CIGARETTE SMOKING n (%)	CHARACTERISTICS	n (%)	FREQUENCY OF CIGARETTE SMOKING n (%)
AGE (YEAR)			**WEALTH INDEX**		
15–24	350 (25.8)	9 (2.6)	Very poor	141 (12.2)	7 (5.0)
25–34	468 (34.4)	13 (2.8)	Poor	338 (29.3)	7 (2.1)
35 or older	541 (39.8)	20 (3.7)	Average	216 (18.8)	5 (2.3)
MARITAL STATUS			Rich	227 (19.7)	7 (3.1)
Single	360 (26.6)	16 (4.5)*	Very rich	230 (20.0)	10 (4.4)
Married	957 (70.8)	22 (2.3)	**BODY MASS INDEX**		
Divorced	17 (1.3)	4 (23.5)	Less than 18.5	67 (5.2)	2 (3.0)
Widow	18 (1.3)	0	18.5–24.9	657 (50.9)	26 (4.0)
EDUCATION			25.0–29.9	366 (28.3)	10 (2.8)
Illiterate	23 (1.7)	0**	30.0 or higher	202 (15.6)	3 (1.5)
Elementary school	111 (8.2)	1 (0.9)	**ETHNICITY**		
Secondary school	170 (12.5)	4 (2.4)	Persian	851 (63.4)	28 (3.3)
High school	86 (6.3)	0	Azeri	380 (28.3)	11 (2.9)
Diploma	510 (37.6)	13 (2.6)	Other	111 (8.3)	3 (2.7)
University	455 (33.6)	24 (5.3)	**SPOUSE'S EDUCATION§**		
OCCUPATION			Illiterate	8 (0.8)	0 **
Housewife	866 (64.1)	23 (2.7)	Elementary	107 (10.9)	0
Employed	207 (15.3)	10 (4.9)	Secondary school	159 (16.1)	5 (3.1)
Student	247 (18.3)	8 (3.2)	High school	50 (5.1)	2 (4.0)
Unemployed	32 (2.4)	1 (3.1)	Diploma	380 (38.6)	5 (1.3)
SUFFICIENCY OF INCOME FOR EXPENSES			University	281 (28.5)	13 (4.7)
Absolutely not	199 (14.9)	8 (4.0)	**SPOUSE'S OCCUPATION§**		
To some extent	928 (69.3)	35 (2.7)	Unemployed	19 (2.0)	1 (5.3)
Completely	213 (15.9)	8 (3.8)	Worker	127 (13.2)	2 (1.6)
CROWDING INDEX			Clerk	363 (37.8)	7 (1.9)
Low	611 (46.6)	24 (3.9)	Private sector	417 (43.4)	13 (3.1)
Average	535 (40.8)	13 (2.4)	Experts/Managers	44 (3.5)	1 (2.9)
High	164 (12.5)	5 (3.0)			

a All variables except age include unanswered responses.
§ This variable applies to married participants.
∗ $p < 0.001$
∗∗ $p < 0.05$
Percentages for the overall population add up to 100% whereas those for smoking prevalence do not.

smoke [5]. However, a recent study in Iranian men [34], along with the majority of studies conducted in other countries, showed a higher smoking prevalence in populations with less education [35-38]. Some studies reported a strong association between higher educational level and

TABLE 3

MULTIVARIABLE LOGISTIC REGRESSION ANALYSIS FOR FACTORS ASSOCIATED WITH CIGARETTE SMOKING.	
VARIABLE	**CIGARETTE SMOKING** **OR (95% CI)**
MARITAL STATUS	
Married and widow Single Divorced	1 1.5 (0.7–2.9) 14.2 (4.2–48. 1)[a]
EDUCATION	
High school diploma or lower University	1 2.6 (1.3–5.0)[b]

[a]$* p < 0.001$

[b]$** p < 0.01$

Variables of marital status and education were included in the final logistic regression model.

higher socioeconomic status, which in turn, will lead to decreased smoking rates [39,40]. This discrepancy may be due to the fact that higher educational level does not necessarily lead to higher socioeconomic status in Iranian women. Furthermore, getting into social environments, such as universities and finding new friends, may contribute to smoking; a relationship between friends and smoking has been established in previous studies. [41-45]. Further research is required to explore the reasons for smoking among educated women in Iran.

In this study, the smoking rate was higher in divorced women than married women. The relationship between divorce and smoking has been reported in various countries [46, 47, 36, 37]. Currently, Iranian law allows those couples mutually agreeing to a divorce to go to an office of the notary public and register their divorce before two witnesses [48]. Divorce is strongly discouraged in Islam and is not acceptable in Iranian culture; however, in recent years, the divorce rate in Iran has increased. While the mean rate of divorce in Iran is 10.4 out of 100 marriages (max 27), compared to 25 divorces out of 100 marriages in Paris, in Tehran, the capital of Iran, there was a high rate of divorce in 2007 and 2009 with 22% and 27% respectively and all provinces experienced an increased rate over the period [49]. Considering the clear difference between smoking rates among married and divorced women, it seems likely that divorced women suffer more from financial and sociocultural pressures which may lead them to smoke. Thus, they might have chosen to start smoking due to false public opinion that smoking reduces discomfort and stress.

Recognizing and controlling tobacco use among women, especially at reproductive age, is an essential part of any tobacco control strategy. However, there is a current opportunity available to prevent the expansion of tobacco use and future premature deaths in developing countries, including Iran, where cigarette consumption is still relatively low among young women [4]. An inclusive ban on all forms of publicity, in addition to other tobacco control interventions, will protect people from industry marketing strategies and may reduce tobacco consumption [5].

The tobacco trade has promoted the idea that smoking is fashionable, keeps women and girls slim and is a symbol of vitality, advancement, freedom and independence [50]. As women and girls are the main targets of tobacco companies' trade today, this implies the necessity of formulating effective intervention programs that focus on smoking prevention and control. For example, one-quarter of all smoking-related deaths in the world could be avoided by a 70% increase in the price of tobacco. This in turn may also profit governments through amplified revenues, which can then be used for tobacco cessation strategies [5].

It should be noted that due to the nature of cross-sectional studies, the relationships shown in the present study between the relevant factors and the prevalence of smoking do not necessarily indicate causality. It is recommended that the reasons for smoking be examined among high-risk groups (divorced and women with a university education). Additionally, qualitative studies are also helpful to understand the viewpoints

of educated and divorced female smokers regarding tobacco smoking.

CONCLUSIONS

This study highlights an association between marital status and education with cigarette smoking among Iranian women.

The findings of this study about associated factors may contribute to the development of efficient health promotion interventions for the prevention and cessation of cigarette smoking.

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