

## Smoking Pattern and Associated Sociodemographic Factors: Findings from a Nationwide STEPS Survey in Iran

### Abstract

**Background:** Smoking is a modifiable risk factor for noncommunicable diseases with a wide range of harmful health outcomes. Identification of sociodemographic characteristics of smokers can be a guideline to development of effective intervention proportional to target population. This study aimed to determine smoking pattern and its associated sociodemographic factors in Iran. **Methods:** This cross-sectional study was conducted based on data from the sixth round of nationwide STEPwise approach to Surveillance (STEPS) survey in the 31 provinces of Iran. A total of 10,834 participants aged  $\geq 15$  years were selected through a multistage cluster sampling method. Collecting data was performed via three-step questionnaire (ecological, behavioral risk factors, and physical and biochemical measurements). Data analysis was performed via Epi Info and then SPSS version 21 softwares using descriptive methods and analytical tests. **Results:** Of all participants, 9.6% were current cigarette smokers, which was significantly more frequent among men than women (21.5% vs. 1.1%, respectively,  $P < 0.001$ ). Smoking was significantly associated with being self-employed and having under diploma education level ( $P < 0.05$ ). Of all current cigarette smokers, 8.7% were daily smokers. The mean  $\pm$  standard deviation of systolic blood pressure and history of cardiovascular symptoms in current smokers were higher than nonsmokers ( $P = 0.005$  and  $P < 0.001$ , respectively). Coughing for  $>4$  weeks, frequent wheezing, and shortness of breath were significantly more frequent in current smokers than nonsmokers ( $P < 0.001$ ,  $P < 0.001$ , and  $P = 0.02$ , respectively). **Conclusions:** Our results draw a picture of sociodemographic distribution of smoking pattern to determine the specific characteristics of the target population affecting cigarette smoking and identified specific demographic strategies for preventive and control action plan.

**Keywords:** Cigarette smoking, noncommunicable diseases, risk factors, tobacco smoking

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### Introduction

Tobacco smoking is responsible for  $>7$  million deaths per year, nearly 80% of which occur in low- and middle-income countries.<sup>[1]</sup> According to the World Health Organization's (WHO) global report on trends in the prevalence of tobacco smoking, about 12% of Iranian people were smokers in 2010. If tobacco control efforts continue at the same intensity, the WHO projected that this rate reaches approximately 9% of the population by 2025 (about 22% for men and about 1% for women).<sup>[2]</sup> The total costs of the three most common smoking-related diseases (lung cancer, chronic obstructive pulmonary disease, and ischemic heart disease) in Iran were US\$1.46 billion in 2014.<sup>[3]</sup>

Despite the slow decline of smoking in recent years, cigarette smoking has been

established as one of the leading risk factors of noncommunicable diseases (NCDs).<sup>[4]</sup> Due to the global burden and the threat of NCDs as major public health challenges throughout the world,<sup>[5]</sup> identification of the risk factors for these diseases and design and implementation of appropriate interventions for prevention and control of NCDs is essential. Effectiveness of these interventions is strongly associated with drawing a picture of the socioeconomic and demographic status of target population to achieve a pattern of risk factors distribution and their determinants.<sup>[6]</sup> On the other hand, determining the pattern of smoking and its prevalence rate in a target population could lead to predicting the future trend of smoking prevalence and identifying high-risk subgroups.<sup>[7]</sup>

The stepwise technique is WHO recommended tool for surveillance

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of NCDs and their risk factors and is effective in surveillance activities, especially in low- and middle-income countries. By means of this technique, we could be able to provide consistent data about NCDs and their risk factors and their determinants, compare the result across the countries, and eventually determine the priorities for development and implementation appropriate intervention in target population.<sup>[8]</sup> This cross-sectional study was conducted to determine smoking pattern and its sociodemographic factors in Iran.

## Methods

### Design and population

In this cross-sectional study, we analyzed findings from the sixth round of a population-based nationwide survey in Iran. This survey was conducted in the 31 provinces of Iran based on WHO STEPS approach, and all Iranian people aged 6–70 years were considered as the target population. In this cross-sectional study, we only assessed the characteristics of people aged 15 years and older. We selected the minimum number of samples in each province proportionate to the population of the province. Considering the goal, the total sample size was estimated 12,000, and a multistage cluster random sampling design was used for this survey with proportional to size. At first, each big city or a combination of several small cities was considered as primary sampling unit (PSU). Then, a systematic random sample was selected from PSU list. Being urban/rural was considered as secondary sampling unit (SSU). Based on a systematic random method, we selected 12 SSUs from each PSU. In the next stage, 20 households in each SSU which close to each other based on the geographical location were considered as executive clusters. The number of samples in each executive cluster was 20. We randomly selected households based on postal code, and from each selected household, eligible person (Iranian people aged 6–70-year-old) was randomly selected in each age group by KISH method. Sampling continued until 20 people in each executive cluster were selected.

### Implementation and data collection

For surveillance of NCDs risk factors, three levels of assessment were conducted including step 1: ecological and behavioral risk factors measurement (dietary pattern, physical activity, smoking, and alcohol consumption patterns and status of NCDs); step 2: physical measurements (measuring height, weight, waist circumference, and BP); and step 3: biochemical measurements (measuring blood sugar, lipid, and A1C hemoglobin).

Before the survey, executive teams of data gathering were trained in terms of technical principles of interview and physical and biochemical measurements.

At first, the goals of the study were explained to each household by trained interviewers, and verbal informed consent was obtained before their participation in the study. Then, the questionnaires were completed through face-to-face interviews with selected participants. In the final step, physical and biochemical measurements were conducted on that day or on another day that selected people had measurement conditions. All measurements were controlled through periodic monitoring by city and province observers and reported to higher-level officials.

The focus of this study was on the smoking pattern as a behavioral risk factor for NCDs and determining the sociodemographic factors associated with cigarette smoking. In this regard, the pattern of cigarette smoking and other tobacco products among current smokers and nonsmokers was assessed.

### Statistical analysis

All analyses were performed using Epi Info version-7 software (CDC, Atlanta, USA) at first and then SPSS version 21 (IBM Corp., Chicago, IL, USA). Descriptive methods such as mean (standard deviation [SD]) and frequency (%) and analytical tests including Chi-square, ANOVA, and independent *t*-test were used for data analysis.  $P < 0.05$  was considered statistically significant.

### Ethical consideration

The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki, and it was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences. In this survey, the consent of the participants, the confidentiality of personal data, and free measurements as the principles of medical ethics were considered.

## Results

### Sociodemographic characteristics

A total of 10,834 participants aged  $\geq 15$  years (58.5% women and 41.4% men) were included in this study. Of all participants, 9.6% (1035 people) were current cigarette smokers, and the majority of them (11.4%) were 45–70 years old. Current cigarette smoking was significantly more frequent among men than among women (21.5% vs. 1.1%, respectively,  $P < 0.001$ ). The majority of current cigarette smokers (12.4%) had Turk ethnicity and most of them (26.4%) were self-employed. In terms of education, the majority of current cigarette smokers (14.2%) had under diploma education level. Sociodemographic characteristics associated with cigarette smoking status are presented in Table 1.

### Smoking behaviors

Of all current cigarette smokers, 8.7% were daily smokers, of them men were significantly more likely to smoke

**Table 1: Sociodemographic characteristics associated with cigarette status in population study**

Characteristics	Current smoking, n (%)	Not smoking now, n (%)	P*	
Gender				
Male	963 (21.5)	3525 (78.5)	<0.001	
Female	72 (1.1)	6271 (98.9)		
Age groups (years)				
15-24	76 (3.2)	2291 (96.8)	<0.001	
25-44	444 (11.3)	3490 (88.7)		
45-70	515 (11.4)	4018 (88.6)		
Residency				
Urban	743 (9.9)	6797 (90.1)	0.1	
Rural	292 (8.9)	3002 (91.1)		
Ethnicity				
Baloch	22 (7)	293 (93)	<0.001	
Turk	297 (12.4)	2096 (87.6)		
Turkoman	9 (5.7)	149 (94.3)		
Sistani	9 (7.9)	105 (92.1)		
Arab	27 (11.1)	216 (88.9)		
Fars	442 (8.3)	4908 (91.7)		
Kurd	85 (10.4)	731 (89.6)		
Gilak	51 (11.8)	381 (88.2)		
Lor	81 (9.2)	797 (90.8)		
Multiethnic	3 (6.1)	46 (93.9)		
Education				
Illiterate	174 (6.7)	2423 (93.3)	<0.001	
Under diploma	582 (14.2)	3521 (85.8)		
Diploma	202 (7.7)	2424 (92.3)		
Academically	77 (5.2)	1418 (94.8)		
Family size				
1	27 (7.9)	314 (92.1)	0.4	
2-4	670 (9.4)	6423 (90.4)		
5 and above	334 (10)	3017 (90)		
Job				
Homemaker	49 (1)	4792 (99)	<0.001	
Retried	140 (19.5)	577 (80.5)		
Unemployed	112 (16.9)	550 (83.1)		
Worker and employee	198 (15.3)	110 (84.7)		
Self-employed	517 (26.4)	144 (73.6)		
Student and soldier and unpaid work	18 (1.5)	1223 (98.5)		
House area (m)				
50 and below	67 (12.1)	488 (87.9)		0.1
51-75	166 (9.5)	1589 (90.5)		
76-100	268 (10.3)	2336 (89.7)		
101-150	290 (9.7)	2712 (90.3)		
151-200	139 (9.5)	1322 (90.5)		
>200	89 (8)	1024 (92)		

\*P values are from Chi-square test

cigarette daily than women (93% vs. 75%, respectively,  $P < 0.001$ ). The mean number of cigarettes smoked per day was  $13.7 \pm 9.4$ . 3.4% of respondents stated that they were daily cigarette smokers in the past and the mean age to start daily cigarette smoking was  $21.9 \pm 7.9$ .

Participants were also asked about the use of other smoked products such as pipe, chopogh, and hookah. Overall smoking pipe and chopogh was more prevalent than hookah ( $3.5 \pm 4.1$  vs.  $2.2 \pm 2.3$ ). The age of onset of daily smoking hookah was higher than daily smoking cigarette ( $23.4 \pm 10.2$  vs.  $21.9 \pm 7.9$ ). Smoking behaviors by gender among the population study is presented in Table 2.

### Health-related characteristics associated with cigarette smoking status

In terms of cardiovascular illnesses, history of pain or discomfort in the chest or below sternum in current smokers was significantly higher than nonsmokers (19.8% vs. 15.5%, respectively,  $P < 0.001$ ). Diagnosis of cardiovascular diseases (CVDs) is also more prevalent among current smokers than nonsmokers although this difference was not statistically significant ( $P = 0.1$ ). The mean (SD) systolic blood pressure in current smokers was significantly higher than nonsmokers ( $125.7 \pm 19.2$  vs.  $123.8 \pm 19.3$ , respectively,  $P = 0.005$ , 95% CI: 0.5–3.06). However, there was no significant difference in diastolic blood pressure between two groups ( $P = 0.9$ ). Elevated blood pressure in the past year was more prevalent among current smokers than nonsmokers although this difference was not statistically significant ( $P = 0.2$ ).

In terms of breathing difficulties, symptoms such as coughing >4 weeks, frequent wheezing, and shortness of breath were significantly more frequent among current smokers than nonsmokers ( $P < 0.001$ ,  $P < 0.001$ , and  $P = 0.02$ , respectively). History of diabetes in the past year was more reported among current smokers than nonsmokers, but the difference was not statistically significant ( $P = 0.8$ ) [Table 3].

### Discussion

The present study aimed to determine the smoking pattern and sociodemographic factors associated with cigarette smoking in Iran. It is noteworthy that available data from population-based nationwide survey in Iran is mostly on all tobacco products use, and few studies have been conducted on cigarette smoking exclusively. The results of the present study revealed that 9.6% of respondents were current cigarette smokers and 8.7% were daily smokers, of them men were significantly more likely to smoke cigarette daily than women. The findings from a burden of disease study in Iran showed that between 1990 and 2010, the overall prevalence of tobacco smoking in the general population was unchanged (12%), but the prevalence at all ages increased by 1% in men and declined by 2% in women.<sup>[9]</sup> Therefore, the overall prevalence of smoking in this survey was lower than the trend mentioned. In addition, a meta-analysis of smoking prevalence in Iran by Moosazadeh *et al.* for the years 2004 and 2006–2009 showed that one-fifth of Iranian men and 2%–3% of women

**Table 2: Smoking behaviors among the population study**

Smoking pattern	Mean±SD			t, P, 95% CI
	Male	Female	Total	
Mean age to start daily cigarette smoking	21.6±7.6	26.6±10.9	21.9±7.9	3.165, 0.003, -8.12-1.81
Mean number of cigarettes smoked per day now	14.1±9.4	9.5±7.1	13.7±9.4	4.315, <0.001, 2.38-6.5
Mean frequency pipe and chopogh smoking per day	2.2±2.5	5.3±5.8	3.5±4.1	0.965, 0.37, -11.29-5.12
Mean frequency hookah smoking per day	1.8±1.7	2.6±2.8	2.2±2.3	3.238, 0.001, -1.38-0.33
Mean age to start daily hookah smoking	23±9.9	23.8±10.5	23.4±10.2	0.664, 0.5, -2.91-1.44

CI=Confidence interval, SD=Standard deviation

**Table 3: Health-related characteristics associated with cigarette smoking status in the population study**

Health-related characteristics	Current smoking, n (%)	Not smoking now, n (%)	P
History of hypertension in the past year (yes)	87 (71.3)	1051 (66)	0.2
History of diabetes in the past year (yes)	52 (71.2)	658 (69.9)	0.8
History of cardiovascular disease (yes)	82 (7.9)	648 (6.6)	0.1
History of pain or discomfort in the chest or below sternum (yes)	205 (19.8)	1520 (15.5)	<0.001
Chest pain relief with change of position and pill (yes)	100 (81.3)	818 (77)	0.005
Asthma (yes)	32 (3.1)	329 (3.4)	0.6
Coughing >4 weeks (yes)	71 (6.9)	412 (4.2)	<0.001
Frequent wheezing (yes)	98 (9.5)	449 (4.6)	<0.001
Shortness of breath (yes)	94 (9.1)	702 (7.2)	0.02

have daily smoking habits.<sup>[10]</sup> Ninety three percentage of male smokers and 75% of female smokers were daily smokers in this study, which is considered high. However, daily smoking is directly associated with the risk of some adverse health outcomes, including CVDs.<sup>[11]</sup> The high prevalence of daily smoking in this study requires discover the causal association between the some characteristics of target population with high daily smoking pattern.

Controlling and management of NCDs and their risk factors require action on social determinants of health and development and implementation of effective interventions with regard to these determinants.<sup>[12]</sup> In this study, the majority of current smokers had under diploma education level and were 45–70 years old and self-employed. The association between smoking and demographic factors have been reported in a previous study.<sup>[13-16]</sup> In most studies, smoking was associated with lower education, older age, and unemployment.<sup>[6,10,14,17]</sup> Particularly, education level is considered as a key demographic factor in predicting smoking,<sup>[6,18,19]</sup> so that smoking rate significantly decreased with higher education level. Therefore, the role of education, which somehow leads to the promotion of health literacy, will be given further consideration.

Studies on smoking are important because tobacco smoking is the main underlying cause of NCDs,<sup>[20]</sup> and the rate of NCDs is increasing among both genders and various socioeconomic groups in the world.<sup>[21]</sup> It is estimated that by the year 2030, the mortality rate associated with tobacco smoking will reach to 8 million.<sup>[22]</sup> All tobacco products have a negative effect on health.<sup>[23]</sup> Smoking could lead to metabolic changes which are predisposing factors for NCDs.<sup>[24]</sup> The results of the present study showed that some signs attributed to CVDs such as history of pain or discomfort in the chest or below sternum in current smokers were significantly higher than nonsmokers. The situation was the same in the field of the mean of systolic blood pressure in current smokers compared to nonsmokers.

In the terms of the relationship between ethnicity and smoking, in this study, the majority of current cigarette smokers had Turk ethnicity. This finding highlights the importance of the study on causes of a higher incidence of smoking in some ethnic groups such as Turk ethnicity. In a study on the prevalence of smoking in northwest Iran, it was also found that the prevalence of tobacco smoking in this region that most of them had Turk ethnicity was greater than it is in other regions of Iran.<sup>[4]</sup> Thus, there is a need to clarify associations between smoking and ethnicity. In terms of the relationship between hypertension and smoking, different results have been reported in various studies. In some studies, there was no association between smoking and raised blood pressure<sup>[25,26]</sup> while results in some other studies demonstrated that cigarette smoking increased the blood pressure, especially systolic blood pressure.<sup>[27,28]</sup> However, in some similar studies, there was no strong relationship between smoking and high blood pressure among smokers population.<sup>[29,30]</sup> The association between smoking and CVDs and diabetes has been proven to be well established.<sup>[31]</sup>

Some symptoms of breathing difficulties were significantly more frequent among current smokers than nonsmokers. Diagnosis of CVDs and history of diabetes were also more reported among current smokers although not significant. The results of the surveys showed that the risk of respiratory disease significantly increased with tobacco smoking.<sup>[32]</sup>

### Strengths and limitations of the study

This study is important because in addition to determining the prevalence of smoking as a key risk factor for NCDs, it explores the demographic factors involved and measured the effect of these factors on the smoking pattern. Identifying these factors plays an important role in the design and implementation of comprehensive smoking prevention and prevention programs.

The limitation of our study was probably related to the design of the study which may lead to underestimating actual prevalence rates. On the other hand, in-depth study of the causes of this trend and associated demographic factors with cross-sectional study is not possible, and further studies are needed to explore the logical causality these associations.

### Conclusions

This study assessed the sociodemographic distribution of cigarette smoking as a key risk factor for NCDs. Smoking is an unhealthy behavior, which is influenced by various factors such as individual characteristics, family, friends, peers, and community environment. Thus, identifying these factors and their implications plays an important role in the effectiveness of control and prevention programs of smoking. Since the same preventive and controlling strategies cannot be considered for different populations, such studies can determine the specific characteristics of the target population, so that specific demographic strategies can be identified. After identifying these factors, we can design and implement appropriate interventions to empower identified high-risk population groups to take informed preventive and control actions.

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### Conflicts of interest

There are no conflicts of interest.

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