

# Prevalence of Cigarette Smoking and Related Factors in Birjand, Iran During Year 2014

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## Abstract

**Background:** Smoking is amongst unhealthy behaviors that endangers public health and can impose significant costs on the society. We aimed to investigate the prevalence of cigarette smoking and related factors in Birjand city, Eastern Iran, during year 2014.

**Methods:** This cross-sectional study was conducted on 5235 participants in Birjand city, east of Iran, during year 2014. We analyzed comprehensive data from Birjand study. Researchers asked participants to complete a check-list, which contained demographic questions and infectious disease risk factors. Binary logistic regression model was performed and  $P < 0.05$  was considered significant.

**Results:** Prevalence of smoking was 7.0% (2.0% in females and 12.7% in males). No history of cigarette smoking ( $OR = 0.02, P < 0.001$ ), no experience of IV drug abuse ( $OR = 0.08, P < 0.001$ ) and non-IV drug abuse ( $OR = 0.08, P < 0.001$ ) had protective effects on cigarette smoking, similar to high school education, but with different odd ratios. Other variables had no significant effect.

**Conclusions:** The prevalence of cigarette smoking was lower than similar studies in Iran. This study showed that males smoked cigarettes more than females. The results showed that it is better to plan for the future to control cigarette smoking and its related factors.

**Keywords:** Cigarette, Smoking, Factors, Iran

## 1. Background

Smoking is amongst unhealthy behaviors that endanger public health and can impose significant costs on the society (1). Smoking is the most important cause of death in 35-69 year-old individuals in developing countries (2). The world health organization (WHO) has estimated that tobacco use (smoking and smokeless) is currently responsible for the death of about six million people across the world each year, this total includes about 600 000 people that are estimated to die from the effects of second-hand smoke (3). In Iran, the majority of smokers (66.7%) had their first cigarette at age 14 (4). According to national reports, the prevalence of smoking ranged between 3.8% and 30.1% in different cities and had a total prevalence of 14.3% in Iran, which was significantly higher in males than females (5). Based on WHO reports, 30129 thousand males and 30207 thousand females (60335 thousand in total) of the population aged 15 years and over were smoking cigarette in Iran, during year 2015, and estimated that the number of smokers will increase to 31883 thousand males and 31903 thousand females (63786 thousand in total) by

2020 (3). Zarrabik et al. (6) reported that cigarette smoking prevalence was 36.26% during a life time and 9.6% in one month among university students of Rasht, north of Iran. Also, Ansari-Moghaddam et al. (7) reported that risk of smoking is greater for males than females. Additionally, Fotouhi et al. (8), reported that prevalence of smoking in residents of Tehran, capital of Iran, was 12%, which was 20.6% in males and 2.9% in females; smokers used 209 cigarette packages on average, annually.

Non-communicable diseases like cardiovascular diseases, cancers, chronic respiratory diseases, mental illness and diabetes are common causes of death (9). These diseases were the causes for approximately 35 million deaths out of 58 million deaths that occurred in 2005; also it is predicted that in 2020 the cause of death in every seven cases out of ten, in the developing countries, will be non-communicable diseases (10). Smoking, alcohol consumption, hypertension, hyperglycemia, dyslipidemia and obesity are the most significant risk factors for most non-communicable diseases (9). Regular consumption of cigarettes is known as a risk factor for non-communicable disease. As an example, some studies have shown that

cigarette smoking has a significant effect on hypertension (11).

## 2. Objectives

However, there may be many other reasons such as social or family culture that may increase tendency of cigarette smoking and due to the importance and necessity of a comprehensive study of cigarette smoking prevalence in any society, we aimed to investigate the prevalence of cigarette smoking and related factors such as demographic or social risk factors on cigarette smoking tendency.

## 3. Methods

This cross-sectional study was conducted on 5235 participants (over 15 years old) in Birjand city, east of Iran, during year 2014. We analyzed data from a comprehensive cluster sampling study performed in Birjand. The sample size was estimated by considering the overall national prevalence of hepatitis B, which was equal to 3% with 0.05 as a type I error and 0.80 as the power value. In this study, 250 heads were selected randomly according to city's postal area, and then 20 subjects were collected from each head. The inclusion criteria were having the ability to respond to the interviewer, Iranian national identification card and age of 15 to 100 years. Further sampling details are presented by previous studies (12, 13). After determination of the samples, study aims were explained and informed consent was obtained. Then, researchers asked participants to complete a check list, which included demographic questions and infectious disease risk factors such as gender, marital status, education level, cigarette smoking, history of hypertension, injection drugs and non-injection drugs. After ensuring the accuracy of the collected information, data was analyzed by SPSS software (version 22). To obtain odds ratios and confidence intervals, a binary logistic regression model was performed. Crude odds ratios were obtained by univariate logistic regression then a multiple logistic regression model was fitted to the data. In all the statistical tests,  $P < 0.05$  was considered significant.

## 4. Results

Of the 3890 participants, 2020 (51.9%) were female, 3156 (81.1%) were married, 646 (16.6%) were single, 16 (0.4%) were divorced and 72 (1.9%) were widowed. Mean ( $\pm$  SE) age of participants was  $41.66 \pm 0.19$  (range between 17 and 72); mean ( $\pm$  SE) age of smokers was  $41.25 \pm 0.74$  and  $41.68$

$\pm 0.20$  for non-smokers. About 91% of participants did not smoke cigarettes, while others (9%) smoked cigarettes. Some related factors with cigarette smoking were assessed in this study such as gender, marital status, education, history of illegal drug injection and non-injection. Of 288 participants, who smoked cigarettes, 242 (84%) were male and 224 (77.8%) were married, 85 (29.5%) had high school education and 77 (26.7%) were university students, 101 (35.3%) were IV drug abusers and 44 (15.4%) were non-IV drug abusers. Among participants, who smoked cigarettes, 32 (13.4%) were 15 to 24 years old, 109 (45.8%) were 25 to 39 years old, 30 (12.6%) were 40.45 years old and 67 (28.2%) were 55 to 69 years old (Table 1).

Table 1 shows the univariate logistic regression model. Based on the results, risk of cigarette smoking was 4.15 (95% CI: 4.63 - 8.82,  $P < 0.001$ ) for males in comparison with females. In addition, high school level of education had a protective effect (OR = 0.46, 95% CI: 0.31 - 0.66,  $P < 0.001$ ) on cigarette smoking compared with illiterates. Moreover, no history of cigarette smoking (OR = 0.02, 95% CI: 0.01 - 0.02,  $P < 0.001$ ), no history of hypertension (OR = 0.67, 95% CI: 0.52 - 0.86,  $P = 0.002$ ), lack of IV drug abuse (OR = 0.08, 95% CI: 0.02 - 0.32,  $P < 0.001$ ) or non-IV drug abuse (OR = 0.08, 95% CI: 0.05 - 0.13,  $P < 0.001$ ) had protective effects on cigarette smoking like high school education but with different odds. Other variables had no significant effect.

Table 2 shows multiple logistic regression model results with a stepwise approach. In the presence of other variables, cigarette smoking risk was 3.45 for males compared with females (95% CI: 2.83 - 6.10,  $P < 0.001$ ). In addition, risk of smoking cigarette was 0.46 in high school participants compared to illiterates (95% CI: 0.28-0.74,  $P = 0.001$ ). In other words, illiterate participants smoked cigarette about two times more than high school students. Risk of smoking in participants, who did not have history of cigarette smoking, was 0.53 times more compared to those who did so (95% CI: 0.38 - 0.73,  $P < 0.001$ ). Moreover, risk of smoking in participants, who did not have IV drug abuse, was 0.28 times more in comparison with those, who did so (95% CI: 0.15 - 0.52,  $P < 0.001$ ). The last three variables i.e. high school education, hypertension, smoking history and drug injection had a protective effect on cigarette smoking.

## 5. Discussion

In this study we aimed to investigate the prevalence of cigarette smoking and related factors such as the role of demographic and social risk factors, due to the importance and necessity of a comprehensive study of cigarette smoking prevalence in any society.

**Table 1.** The Odds Ratio (OR) Estimates of Cigarette Smoking Among People in Birjand Using Logistic Regression Model<sup>a</sup>

| Variables                           | Group       | Adjusted Odds Ratio (95% CI) | P                    | Adjusted for  |
|-------------------------------------|-------------|------------------------------|----------------------|---|
| <b>Gender</b>                       | Male        | 4.15 (2.83 - 6.10)           | < 0.001 <sup>c</sup> | Education level, smoking history, hypertension history, non-injection drugs |
|                                     | Female      | Ref <sup>b</sup>             | Ref                  |   |
| <b>Education level</b>              | Illiterate  | Ref                          | Ref                  | Gender, smoking history, hypertension history, non-injection drugs          |
|                                     | Elementary  | 1.37 (0.70 - 2.70)           | 0.548                |   |
|                                     | Guidance    | 0.78 (0.48 - 1.27)           | 0.328                |   |
|                                     | High school | 0.46 (0.28 - 0.74)           | 0.001 <sup>c</sup>   |   |
|                                     | University  | 0.86 (0.58 - 1.27)           | 0.456                |   |
| <b>History of cigarette smoking</b> | Yes         | Ref                          | Ref                  | Gender, education level, hypertension history, non-injection drugs          |
|                                     | No          | 0.03 (0.02 - 0.04)           | < 0.001 <sup>c</sup> |   |
| <b>IV drug abuse</b>                | Yes         | Ref                          | Ref                  | Gender, education level, smoking history, hypertension history              |
|                                     | No          | 0.28 (0.15 - 0.52)           | < 0.001 <sup>c</sup> |   |

<sup>a</sup>Stepwise regression model was used to exclude unnecessary variables and fit the data.

<sup>b</sup>REF: Reference category for comparison with other categories.

<sup>c</sup>Statistically significant at 0.05.

The prevalence of cigarette smoking is a useful indicator for the estimation of the following harmful outcomes. The result of our study showed that the prevalence of cigarette smoking was about 9% in Birjand, Iran. The prevalence of cigarette smoking was lower than similar studies from Iran (8, 14, 15). Although, Kazemi et al. indicated that smoking prevalence was 3.9% between nurses in Birjand, east of Iran (16). A meta-analysis study by Ansari-Moghaddam et al. (7) reported that the prevalence of cigarette smoking was 16.8% (16.4 - 17.2) among Iranian adolescents. However, smoking prevalence in north of Iran was close to that found by our study (16). Based on the results, 84% of smokers were male and 16% were female, which means that males smoke more than females. This finding is similar to the result of previous studies (2, 5, 14, 17, 18). The study of Choi et al. showed that cigarette smoking prevalence was 42.1% in males and 6.2% in females (19). Also, Hashemi et al. (8) indicated that 20.6% of males and 2.9% of females smoked cigarettes in Tehran, capital of Iran. Higher prevalence of smoking in males is because of the freedom males have in the cultural context of cities like Birjand. However, prevalence of 16% of cigarette smoking amongst females is also a danger. Among participants, who smoke cigarettes, 13.4% were 15 to 24 years old, 45.8% were 25 to 39 years old, 12.6% were 40 to 45 years old and 28.2% were 55 to 69 years old. Based on WHO reports, age-specific rates of tobacco smoking in Iran were lower than Birjand city, except for one category. Cigarette smoking prevalence was 12.6% in 40 to 45 year-olds in Birjand, but at the same age category was 16.6% in Iran (based on 2010 statistics) (3).

According to univariate logistic regression, risk of smoking was 4.15 times more in males than females; similar to the study of Kelishadi et al. (5), which indicated that males smoke cigarette 2.02 times more than females in Iran, moreover, Moghimbeigi et al. (17, 18) showed that males smoke 2.98 times more than females. No history of cigarette smoking, lack of IV drug abuse and non-IV drug abuse had protective effects on cigarette smoking. Unfortunately, the authors could not find a similar study, which investigated the association between IV drug abuse and cigarette smoking. Gac et al. (11) also showed that systolic and diastolic blood pressure had a significant difference in adolescents, who smoked cigarettes in comparison with others. Our study also showed that participants without any history of hypertension smoked less than others, however it is not possible to determine priority of occurrence due to the cross-sectional design of the study, which means that in this kind of study, it is hard to say that history of hypertension is the cause of more smoking or vice versa. Another limitation of this study was cultural beliefs about smoking in small cities like Birjand that cause an underestimation.

Multiple logistic regression model showed that gender, education level, cigarette smoking, hypertension history and lack of IV drug abuse were the most important variables, which had a significant effect on cigarette smoking in the presence of other variables. Risk of cigarette smoking was higher in males than females. After adjusting for other variables, lack of hypertension, smoking history and drug injection, and having high school education had a protective effect on cigarette smoking.

**Table 2.** The Odds Ratio (OR) Estimates of Cigarette Smoking Among People in Birjand Using Logistic Regression Model<sup>a</sup>

| Variables                    | Group       | Smoke Cigarette |              | Crude Odds Ratio (95% CI) | P                    |
|------------------------------|-------------|-----------------|--------------|---------------------------|----------------------|
|                              |             | Yes, n = 288    | No, n = 3553 |                           |                      |
| Gender                       | Male        | 242 (13.1)      | 1604 (86.9)  | 6.39 (4.63 - 8.82)        | < 0.001 <sup>b</sup> |
|                              | Female      | 46 (2.3)        | 1949 (97.7)  | REF <sup>c</sup>          | -                    |
| Age y                        | 15 - 24     | 32 (6.7)        | 445 (93.3)   | REF                       | -                    |
|                              | 25 - 39     | 109 (7.8)       | 1297 (92.2)  | 0.85 (0.56 - 1.28)        | 0.455                |
|                              | 40 - 45     | 30 (7.2)        | 385 (92.8)   | 0.92 (0.55 - 1.54)        | 0.761                |
|                              | 55 - 69     | 67 (7.6)        | 820 (92.4)   | 0.88 (0.56 - 1.36)        | 0.566                |
| Marital status               | Single      | 59 (9.2)        | 583 (90.8)   | REF                       | -                    |
|                              | Married     | 224 (7.2)       | 2887 (92.8)  | 0.58 (0.20 - 1.65)        | 0.308                |
|                              | Divorced    | 1 (6.3)         | 15 (93.8)    | 0.75 (0.27 - 2.09)        | 0.594                |
|                              | Widow       | 4 (5.6)         | 68 (94.4)    | 0.88 (0.09 - 8.46)        | 0.914                |
| Education level              | Illiterate  | 21 (4.9)        | 405 (95.1)   | REF                       | -                    |
|                              | Elementary  | 50 (7.1)        | 655 (92.9)   | 1.38 (0.84 - 2.27)        | 0.199                |
|                              | Guidance    | 55 (13.5)       | 352 (86.5)   | 0.94 (0.65 - 1.36)        | 0.734                |
|                              | High school | 85 (7.4)        | 1068 (92.6)  | 0.46 (0.31 - 0.66)        | < 0.001 <sup>b</sup> |
|                              | University  | 77 (7.5)        | 1073 (93.3)  | 0.90 (0.65 - 1.24)        | 0.526                |
| History of cigarette smoking | Yes         | 133 (67.5)      | 64 (32.5)    | REF                       | -                    |
|                              | No          | 147 (4.1)       | 3480 (95.9)  | 0.02 (0.01 - 0.02)        | < 0.001 <sup>b</sup> |
| IV drug abuse                | Yes         | 4 (50)          | 4 (50)       | REF                       | -                    |
|                              | No          | 280 (7.4)       | 3493 (92.6)  | 0.08 (0.02 - 0.32)        | < 0.001 <sup>b</sup> |
| Non IV drug abuse            | Yes         | 44 (44.9)       | 54 (55.1)    | REF                       | -                    |
|                              | No          | 241 (6.5)       | 3448 (93.5)  | 0.08 (0.05 - 0.13)        | < 0.001 <sup>b</sup> |

<sup>a</sup>Values are expressed as No. (%).

<sup>b</sup>Statistically significant at 0.05.

<sup>c</sup>REF: Reference category for compare with other categories

Lack of cooperation from some of the participants was a limitation of this study. This limitation was solved by tracking and visiting other houses in each cluster, to achieve a full sample size.

### 5.1. Conclusion

The prevalence of cigarette smoking was lower than similar studies in Iran. This study showed that males smoke cigarettes more than females. Results showed that it is better to plan for the future to control cigarette smoking and its related factors.

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