



# A COMPARATIVE STUDY ON THE PREVALENCE AND RELATED FACTORS OF CIGARETTE SMOKING IN IRAN AND OTHER ASIAN COUNTRIES: RESULTS OF ISFAHAN COHORT STUDY (ICS)

M. MOHAMMADIAN<sup>1</sup>, N. SARRAFZADEGAN<sup>2</sup>, H. REZA ROOHAFZA<sup>3</sup>,  
M. SADEGHI<sup>4</sup>, A. HASANZADEH<sup>5</sup>, M. REJALI<sup>6</sup>

<sup>1</sup>MSC in Epidemiology, Department of Biostatistics and Epidemiology, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>2</sup>Isfahan Cardiovascular Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>3</sup>Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>4</sup>Cardiac Rehabilitation Research Center, Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>5</sup>Department of Biostatistics and Epidemiology, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>6</sup>Epidemiologists, Department of Biostatistics and Epidemiology, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

**Abstract – Introduction:** Cigarette smoking is one of the most well-known risk factors for cardiovascular diseases, cancers and pulmonary diseases. The present study aimed to investigate the prevalence of cigarette smoking and its related factors in central parts of Iran and compare the results with other Asian countries.

**Materials and Methods:** The prevalence and related factors of cigarette smoking in central parts of Iran were determined using a population-based cohort study in Iran. Also, the prevalence of cigarette smoking was extracted for all Asian countries and compared with the prevalence of smoking in Iran.

**Results:** The overall prevalence of cigarette smoking in central parts of Iran was equal to 20.75% (38.4% in men and 3.1% in women). The odds ratio of cigarette smoking was 19.59 (95% Confidence interval (CI) = 12.97-30.60) in men compared to women, 2.07 (95% CI = 1.26-3.49) in the 45-54 age group, 1.79 (95% CI = 1.09- 3.03) in the 55-64 age group, and 1.61 (95% CI= 0.93-2.84) in the 65-74 age group compared to the 75-years-and-older age group. In 2012, in Asian countries, the highest prevalence of cigarette smoking was observed in Russia (32.7%), but the lowest prevalence was in Oman (8.5%). It seems that the prevalence of cigarette smoking was medium in Iranian population.

**Conclusions:** The higher prevalence of cigarette smoking was observed in people in the 45-54 age group, people with a good economic status, married people, unemployed people, those with low BMI, people who are very dissatisfied with their health status, those with secondary school education levels, and people who had the higher consumption of tea and coffee. Compared to other Asian countries, the prevalence of cigarette smoking was medium in Iran.

**KEYWORDS:** Prevalence, Related factors, Cigarette smoking, Asian countries.

**LIST OF ABBREVIATIONS:** BMI: Body Mass Index, OR: Odds Ratio, CI: Confidence interval.



## INTRODUCTION

The health has a vast meaning and its definition is affected by different factors<sup>1-5</sup>. Several studies<sup>6,7</sup> have found that unhealthy lifestyles, cigarette smoking, poor *nutrition* and inactivity are the most important risk factors threatening public health. Controlling these risk factors reduces a half of early mortalities in human societies<sup>8-11</sup>. In today's societies, cigarette smoking is one of the most well-known risk factors for cardiovascular diseases, cancers and pulmonary diseases<sup>9,12-15</sup>. Nicotine is an addictive substance in cigarettes leading to the addiction to cigarettes in smokers. The addiction to this substance makes it difficult for smokers to quit smoking<sup>16</sup>. Cigarette smoking is considered to be the most common psychiatric disorder due to the high prevalence of nicotine addiction in smokers<sup>17</sup>. Unfortunately, cigarette smoking is a common phenomenon with high prevalence in many societies despite the fact that risks of cigarette smoking have been well proved<sup>18-20</sup>. Some socioeconomic factors related to the cigarette smoking are as follows: the level of education, type of occupation, and monthly earnings<sup>21-23</sup>. Based on results of various studies, the prevalence of cigarette smoking in people with lower education is higher than those with higher education levels<sup>24,25</sup>. The prevalence of cigarette smoking in people with more stressful jobs is higher than other people<sup>26,27</sup>. Some lifestyle factors such as the mobility, type of nutrition, and body mass index (BMI) are also related to the state of cigarette smoking<sup>28,29</sup>. Cigarette smoking is a major public health problem and one of the most important causes of preventable mortality worldwide<sup>30,31</sup>. Based on the current model of smoking in the world, about 10% of women and 50% of young men smoke cigarettes. More than five million deaths attributable to cigarette smoking were diagnosed and recorded in 2010; however, predictions indicate that the number of deaths attributable to smoking will increase to 10 million cases per year due to the increase in the mean age of societies in the next few decades<sup>32-34</sup>. During the twentieth century, around one hundred million mortalities from cigarette smoking occurred globally, especially in developing countries<sup>34,35</sup>. If the current smoking model continues, it is expected that the cigarette smoking will cause deaths for one billion people during this century, and most of them will occur in low and middle-income countries<sup>36,37</sup>. Cigarette smoking habit is different in Asian countries than the rest of world, for instance, the cigarette smoking is not an acceptable behavior in the Asian women, and thus, the prevalence of cigarette smoking is much lower in Asian women than men; nevertheless, it should be noted that Asian women's self-report of cigarette smoking may be unreliable due to the social prohibition, and in fact, the estimated prevalence of

cigarette smoking may be less than actual in women of this region<sup>36</sup>. Therefore, it is very important to conduct appropriate studies at the individual level to determine the prevalence of cigarette smoking among Asian men and women, because the epidemiological appearance and factors related to this behavior should be properly investigated in order to carry out any program for the prevention and control of high-risk behavior in human societies. The present study aimed to investigate the prevalence of cigarette smoking and its related factors in central parts of Iran and compare the results with other Asian countries.

## MATERIALS AND METHODS

The present study was conducted using data from a population-based cohort study in three counties (Isfahan, Arak, and Najafabad) in central parts of Iran. Details of research method, including the sample size, procedure, patients' inclusion and exclusion criteria, and their follow-up in the Isfahan Cohort Study (ICS) were fully described in a paper by Sarrafzadegan et al<sup>37</sup>. The present study was conducted on 1726 people over 35 years of age living in urban and rural areas in three central counties of Iran as participants in ICS. After obtaining informed consent from subjects, a structured interview was conducted by trained interviewers with associate degrees in the health for at least half-hour using a questionnaire, including the demographic information, socioeconomic status, knowledge level, attitude and performance regarding non-communicable and chronic diseases, lifestyle-related behavior (including cigarette smoking, physical activity and dietary habits). The status of cigarette smoking was a studied index in the present study. Therefore, individuals were put in two groups of smokers or non-smokers. A person with a current consumption or history of smoking a cigarette per day was put in the smokers group, and a person who had no history of smoking was put in the non-smokers group<sup>38</sup>. The present study examined the prevalence of cigarette smoking and its relation with gender, age, education level, economic status, marital status, physical activity, occupation, BMI, health status and tea and coffee consumption. Qualitative variables were studied as the frequency and its percentages. The logistic regression was applied to investigate and determine smoking-related factors. To calculate odds ratios of smoking, a group with the lowest prevalence of cigarette smoking was considered as the reference group; and odds ratios for other components of that variable were calculated based on the reference group and reported with a 95% confidence interval (CI). The significance level was considered to be 0.05 in all analyses. SPSS18 (SPSS Inc., Chicago, IL, USA) software was used to analyze data.

## RESULTS

A total of 1726 people were included in the study, of which 851 (49.30%) were male and 875 (50.70%) were female. The overall prevalence of cigarette smoking was equal to 20.75% in all subjects and it was equal to 38.4% in men and 3.1% in women. The prevalence of cigarette smoking was 22.3% in married people, 7.16% in single people, 23.3% in the 45-54 age group, 20.8% in the 55-64 age group, 19.2% in the 65-74 age group, 12.8% in people in the 75-years-and-older age group, 18.8% in people with a low economic status, 22.5% in people with a medium economic status, and 26.8% in people with a good economic status. The odds ratio of cigarette

smoking was 19.59 (95% confidence interval (CI)= 12.97-30.60) in men compared to women. Compared to the 75-years-and-older age group, odds ratio of cigarette smoking was equal to 2.07 (95% CI = 1.26-3.49) in the 45-54 age group, and 1.79 (CI = 1.09- 3.03) in the 55-64 age group, and 1.61 (95% CI = 0.93-2.84) in the 65-74 age group. The odds ratio of cigarette smoking in married people was equal to 3.71 (95% CI = 2.15-6.86) compared to single ones. Compared with obese people, odds ratio of cigarette smoking was equal to 1.77 (95% CI = 1.27-2.47) in overweight people, and 2.85 (CI= 2.01- 4.05) in people with normal body mass index, and 8.2 (95% CI = 3.33- 20.23) in people with low weights (Table 1 presents the prevalence and

**TABLE 1.** Related factors of cigarette smoking in Iran.

Variable		Smoker or quit smoking	Non-smokers	Odds Ratio (95% Confidence interval)
<b>Gender</b>	Female	27 (3.1%)	848 (96.91%)	Reference
	Male	327 (38.4%)	524 (61.57%)	19.59 (12.97-30.60)
<b>Age groups</b>	45-54	138 (23.3%)	455 (76.7%)	2.07 (1.26- 3.49)
	55-64	132 (20.8%)	502 (79.2%)	1.79 (1.09-3.03)
	65-74	61 (19.2%)	258 (80.9%)	1.61 (0.93-2.84)
	75 and over	23 (12.8%)	157 (87.2%)	Reference
<b>Education level</b>	Illiterate	53 (14.1%)	322 (85.9%)	Reference
	Elementary school	118 (18.3%)	526 (81.7%)	1.36 (0.94-1.97)
	Secondary school	58 (26.8%)	158 (73.1%)	2.23 (1.43- 3.46)
	High school	77 (26.1%)	217 (73.8%)	2.15 (1.43- 3.25)
	University	45 (24.85%)	136 (75.13%)	2.01 (1.25- 3.2)
<b>Economic status</b>	Poor	215 (18.8%)	927 (81.2%)	Reference
	Medium	84 (22.5%)	289 (77.5%)	1.25 (0.93- 1.67)
	Rich	52 (26.8%)	142 (73.2%)	1.59 (1.09-2.28)
<b>Marital status</b>	Married	333 (22.3%)	1159 (77.7%)	3.71 (2.15-6.86)
	Single (divorced, widowed etc.)	15 (7.16%)	194 (92.82%)	Reference
<b>Sport activity</b>	Never	207 (19.3%)	869 (80.8%)	Reference
	Seldom	51 (23.1%)	170 (76.9%)	1.25 (0.87-1.8)
	Often	45 (21.4%)	188 (78.6%)	(0.68-1.45)
	Always	49 (27.3%)	130 (72.6%)	1.58 (1.07-2.29)
<b>Occupation</b>	Governmental	164 (41.41%)	232 (58.58%)	31.76 (18.69-56.85)
	Self employed	17 (2.2%)	764 (97.8%)	Reference
	Housewife	22 (25.3%)	65 (74.7%)	15.21 (7.25-31.89)
	Unemployed	19 (45.2%)	23 (54.8%)	37.12 (15.81-86.19)
	Retired	129 (31.9%)	285 (68.1%)	21.08 (12.35-37.9)
<b>BMI</b>	Low weight	14 (53.84%)	12 (46.16%)	8.2 (3.33-20.23)
	Normal	125 (28.8%)	308 (71.1%)	2.85 (2.01-4.05)
	Overweight	146 (20.2%)	579 (79.9%)	1.77 (1.27-2.47)
	Obesity	64 (12.44%)	450 (87.54%)	Reference
<b>Health status (personal opinion)</b>	Totally satisfied	84 (26.7%)	231 (73.3%)	1.96 (1.15-3.42)
	Satisfied	124 (20.8%)	473 (79.2%)	1.41 (0.85-3.41)
	Almost satisfied	114 (18%)	520 (82%)	1.18 (0.71-2.02)
	Dissatisfied	23 (15.6%)	124 (84.4%)	Reference
	Extremely dissatisfied	9 (29.1%)	22 (71%)	2.2 (0.8-5.76)
<b>Tea and coffee consumption</b>	Less than 14 cups per week	74 (12.8%)	502 (87.2%)	Reference
	14 to 28 cups per week	109 (20.3%)	429 (79.7%)	1.72 (1.23-2.41)
	More than 28 cups per week	126 (38.3%)	203 (61.7%)	4.21 (2.98-5.94)

\*Groups with the lowest prevalence of cigarette smoking are considered as the reference groups.



adjusted odds ratios of cigarette smoking for other variables). In 2012, in Asian countries, the highest prevalence of cigarette smoking was observed in Russia (32.7%), but the lowest prevalence was in Oman (8.5%). The prevalence of cigarette smoking was higher in Armenia, Azerbaijan, Bangladesh, Cambodia, China, Georgia, Indonesia, Japan, Jordan, Kazakhstan, Kuwait, Maldives, Mongolia, Nepal, Palestine, the Philippines, Russia, and Turkey than Iran, but lower in other countries; hence, it seems that the prevalence of cigarette smoking was medium in Iran compared to other Asian countries (Table 2 presents the prevalence of cigarette smoking in Asian countries).

## DISCUSSION

We aimed to study the prevalence of cigarette smoking and its related factors in Iran and compare the results with other Asian countries. The overall prevalence of cigarette smoking in the studied population was 20.75%. It was equal to 38.4% in men and 3.1% in women. People in the 45-54 age group showed the highest prevalence of cigarette smoking, but those in the 75-years-and-older age group showed the lowest prevalence. The odds ratios of cigarette smoking were higher in subjects with richer economic status compared to poor people, married subjects compared to single people, un-

**TABLE 2.** Prevalence of cigarette smoking in Asian countries in 2012.

Country	Prevalence (%) Male	Prevalence (%) Female	Prevalence (%) Both
Afghanistan	22.9 (18.9-27.4)	2.9 (2.1-3.8)	12.9 (10.9-15.1)
Armenia	51.7 (48.2-54.8)	1.7 (1.4-2.2)	26.8 (25.0-28.5)
Azerbaijan	44.9 (39.8-49.9)	0.9 (0.6-1.2)	22.1 (19.6-24.5)
Bahrain	23.9 (20.6-27.3)	5.9 (4.6-7.5)	17.5 (15.3-19.8)
Bangladesh	44.4 (41.4-47.9)	1.8 (1.5-2.3)	23.4 (21.9-25.1)
Bhutan	16.5 (13.4-20.1)	3.5 (2.4-4.9)	10.8 (9.0-12.8)
Brunei	14.0 (11.3-17.1)	8.4 (6.3-10.9)	11.2 (9.4-13.3)
Cambodia	42.1 (39.0-45.0)	4.0 (3.3-4.8)	21.5 (20.0-22.8)
China	45.1 (42.0-48.0)	2.1 (1.8-2.4)	24.2 (22.6-25.7)
Egypt	36.1 (33.4-38.7)	1.1 (0.9-1.4)	18.5 (17.2-19.9)
Georgia	45.4 (41.9-48.8)	4.4 (3.7-5.3)	23.8 (22.1-25.4)
India	23.0 (20.5-25.9)	3.2 (2.6-3.9)	13.3 (12.0-14.9)
Indonesia	57.0 (54.5-59.4)	3.6 (3.2-4.1)	30.1 (28.9-31.4)
Iraq	33.0 (29.0-37.6)	3.0 (2.3-3.8)	17.8 (15.8-20.0)
Japan	35.3 (32.4-38.5)	11.2 (9.6-13.0)	23.3 (21.5-25.1)
Jordan	43.4 (38.2-48.2)	8.5 (6.7-10.2)	26.3 (23.5-29.0)
Kazakhstan	43.1 (39.9-46.4)	6.3 (5.1-7.7)	23.7 (22.0-25.3)
Kuwait	31.3 (26.8-36.3)	3.5 (2.6-4.6)	20.9 (18.1-24.0)
Kyrgyzstan	35.8 (32.3-39.4)	3.4 (2.6-4.2)	18.8 (17.0-20.6)
Malaysia	37.9 (34.3-41.7)	1.3 (1.1-1.7)	19.0 (17.3-20.9)
Maldives	34.6 (30.8-38.6)	7.6 (6.0-9.6)	21.0 (18.8-23.0)
Mongolia	45.0 (41.0-48.8)	6.3 (5.0-7.8)	25.2 (23.1-27.2)
Myanmar	30.6 (27.3-34.0)	6.6 (5.2-8.1)	18.0 (16.3-19.8)
Nepal	37.4 (34.4-40.4)	16.9 (14.1-19.7)	26.4 (24.4-28.5)
Oman	12.9 (10.4-16.0)	0.9 (0.7-1.2)	8.5 (6.9-10.5)
Pakistan	28.0 (25.0-31.4)	5.4 (4.2-7.0)	17.0 (15.3-18.8)
Palestine	41.3 (37.6-45.1)	3.1 (2.4-3.9)	22.2 (20.3-24.1)
Philippines	39.8 (36.2-43.7)	8.1 (6.7-9.7)	23.7 (21.7-25.8)
Qatar	19.3 (16.1-23.0)	1.4 (1.0-1.9)	15.5 (12.8-18.4)
Russia	51.0 (47.5-54.5)	16.9 (14.3-19.8)	32.7 (30.4-35.1)
Saudi Arabia	22.1 (18.6-25.7)	2.2 (1.7-2.8)	13.9 (11.8-16.1)
Singapore	22.5 (19.2-26.2)	4.3 (3.1-5.9)	13.3 (11.4-15.2)
Sri Lanka	23.4 (20.2-27.0)	1.0 (0.7-1.3)	11.7 (10.1-13.5)
Syria	28.4 (23.9-33.0)	6.3 (4.6-8.3)	17.5 (15.0-19.9)
Tajikistan	30.0 (25.3-34.8)	2.6 (1.8-3.6)	16.1 (13.8-18.6)
Thailand	37.2 (34.3-39.9)	2.2 (1.8-2.5)	19.2 (17.8-20.6)
Turkey	39.0 (36.0-42.1)	13.6 (11.6-15.7)	26.0 (24.2-27.9)
Turkmenistan	36.8 (32.0-41.9)	3.1 (2.3-4.2)	19.3 (17.0-21.9)
United Arab Emirates	18.2 (15.2-21.4)	2.5 (2.0-3.2)	13.7 (11.6-16.0)
Vietnam	40.9 (37.9-44.0)	1.5 (1.2-1.9)	20.6 (19.1-22.2)
Yemen	26.1 (22.3-30.2)	6.7 (5.1-8.6)	16.2 (14.2-18.4)

\*Extracted from the article of Ng et al<sup>39</sup>.

employed people compared to self-employed ones, and those with lower BMI than obese subjects. The overall prevalence of cigarette smoking was 20.75% in people over 35 years of age living in urban and rural areas in central parts of Iran. In a study by Ng et al<sup>39</sup> the prevalence of cigarette smoking was 18.7% in the world in 2012, 23.5% in developed countries and 17.9% in developing countries. While the prevalence of cigarette smoking was 3.1% in women in Iran, this ratio was 6.2% globally, 3.7% in developing countries and 17.2% in developed countries. These results indicate that not only the prevalence of cigarette smoking was higher in developed regions than other regions of the world, but also it is 4.6 times higher in women in these regions than women in developing countries. Among the Asian countries, the highest prevalence of cigarette smoking was seen in Russia and the lowest in Oman. The highest prevalence of cigarette smoking among women of Asian countries was seen in Russia, so that the highest prevalence of cigarette smoking in the Asian women was equal to 16.9 % belonging to Russia and Nepal<sup>39</sup>. In the present study, the lowest prevalence of cigarette smoking was seen in illiterate people, but the highest rate in those with secondary school education. Except for the group of people with academic education, an increase in the education enhanced odds ratios of smoking. According to Mehrabi et al<sup>40</sup>, an increase in the education level reduced the prevalence of cigarette smoking. In the present study, people with university education had lower odds ratios than those with secondary and high school education. In the current study, the prevalence of cigarette smoking was 26.8% in people with a good economic status and 18.8% in those with a poor economic status, indicating that the improved economic status increased the prevalence of smoking. Probably, the higher prevalence of cigarette smoking in people with a good economic status than those with poor economic status can be attributed to the easier access to and better provision of cigarette, more individual willingness to high-risk behavior, and friendship with smokers as well as extreme leisure activities<sup>39, 41</sup>. In a variety of countries, attempts have been made to reduce the prevalence of cigarette smoking with regard to complications of its consumption, and in this way, there have been some successes and their experiences can solve or reduce this problem in Iran and other Asian countries. The International Agency for Research on Cancer has conducted more than 100 econometric studies on the impact of tobacco tax increases on final prices of tobacco and has finally concluded that the rise in tobacco prices (tax increase) is highly related to the tobacco consumption reduction<sup>42</sup>, so that an increase of 50% in tobacco prices leads to the reduction of 20% in tobacco consumption in

low, middle and high-income countries. A doubled price of cigarettes reduces smoking to one-third of the current situation<sup>35,42-44</sup>. Therefore, using experiences of successful countries in programs for reducing the prevalence of smoking, other countries can also take effective and successful measures in reducing this social problem by adopting policies such as rising cigarette prices, reducing the public access to cigarettes and conducting counseling programs for quitting smoking. In the current study, the prevalence of smoking was lower in women than men, it should be noted that smoking is considered to be an unacceptable behavior, particularly for women, in Iran and other Asian countries; hence, women are not likely to provide real answers to tobacco use, namely cigarette smoking. Therefore, results of the present study were in agreement with the underestimate for prevalence of smoking in women, but this bias does not exist in men, or is much less than women.

## CONCLUSIONS

The higher prevalence of cigarette smoking was seen in people in the 45-54 age group with a good economic status, married people, unemployed people, those with low BMI, people who were very dissatisfied with their health status, those with secondary school education levels, and people who had the higher consumption of tea and coffee. Compared to other Asian countries, the prevalence of cigarette smoking was medium in Iran.

### ETHICS APPROVAL AND CONSENT TO PARTICIPATE:

Isfahan University of Medical Sciences ethics committee.

### FUNDING:

The present study was financially supported by Isfahan University of Medical Sciences (Isfahan, Iran).

### AUTHORS' CONTRIBUTIONS:

All authors contributed to the design of the research, MM, AH, MR, NS, MRR, MS extracted the data and summarized it. MM, MR and AH analyzed the data. All authors drafted the first version. NS, and MS edited the first draft. Awwll authors reviewed, commented and approved the final version.

### ACKNOWLEDGMENTS:

The present study was financially supported by Isfahan University of Medical Sciences, Isfahan, Iran.

### CONFLICT OF INTEREST:

The Authors declare that they have no conflict of interests.



## REFERENCES

1. BRAVEMAN P. What are health disparities and health equity? We need to be clear. *Public Health Rep* 2014; 129: 5-8.
2. RAFIEMANESH H, MOHAMMADIAN-HAFSHEJANI A, GHONCHEH M, SEPEHRI Z, SHAMLOU R, SALEHINIYA H, TOWHIDI F, MAKHSOSI BR. Incidence and mortality of colorectal cancer and relationships with the human development index across the world. *Asian Pac J Cancer Prev* 2016; 17: 2465-2473.
3. RAZI S, ENAYATRAD M, MOHAMMADIAN-HAFSHEJANI A, SALEHINIYA H. The epidemiology of skin cancer and its trend in Iran. *Int J Prev Med* 2015; 16: 64-70.
4. RAZI S, GHONCHEH M, MOHAMMADIAN-HAFSHEJANI A, AZIZNEJHAD H, MOHAMMADIAN M, SALEHINIYA H. The incidence and mortality of ovarian cancer and their relationship with the Human Development Index in Asia. *Ecancermedicalscience* 2016; 10: 628-635.
5. SALEHINIYA H, GHOBADI DASHDEBI S, RAFIEMANESH H, MOHAMMADIAN-HAFSHEJANI A, ENAYATRAD M. Time trend analysis of cancer incidence in caspian sea, 2004-2009: a population-based cancer registries study (Northern Iran). *Caspian J Intern Med* 2016; 7: 25-30.
6. ALMASI Z, MOHAMMADIAN-HAFSHEJANI A, SALEHINIYA H. Incidence, mortality, and epidemiological aspects of cancers in Iran; differences with the world data. *J BUON* 2016; 21: 994-1004.
7. ARABSALMANI M, MOHAMMADIAN-HAFSHEJANI A, GHONCHEH M, HADADIAN F, TOWHIDI F, VAFAAE K, SALEHINIYA H. Incidence and mortality of kidney cancers, and human development index in Asia; a matter of concern. *J Nephrothol* 2017; 6: 30-42.
8. HASSANIPOUR-AZGOMI S, MOHAMMADIAN-HAFSHEJANI A, GHONCHEH M, TOWHIDI F, JAMEHSHORANI S, SALEHINIYA H. Incidence and mortality of prostate cancer and their relationship with the human development index worldwide. *Prostate Int* 2016; 4: 118-124.
9. PAKZAD R, MOHAMMADIAN-HAFSHEJANI A, KHOSRAVI B, SOLTANI S, PAKZAD I, MOHAMMADIAN M, SALEHINIYA H1, MOMENIMOVAHED Z. The incidence and mortality of esophageal cancer and their relationship to development in Asia. *Ann Transl Med* 2016; 4: 29-36.
10. RAFIEMANESH H, MALEKI F, MOHAMMADIAN-HAFSHEJANI A, SALEMI M, SALEHINIYA H. The trend in histological changes and the incidence of esophagus cancer in Iran (2003-2008). *Int J Prev Med* 2016; 7: 31-38.
11. RAFIEMANESH H, MEHTARPOOR M, MOHAMMADIAN-HAFSHEJANI A, SALEHINIYA H, ENAYATRAD M, KHAZAEI S. Cancer epidemiology and trends in Sistan and Baluchestan province, Iran. *Med J Islam Repub Iran* 2015; 29: 254.
12. HAFSHEJANI AM, SARRAFZADEGAN N, MOGHADDAM A, BARADARAN HR, HOSSEINI S, ASADI LARI M. Gender difference in determinants of short-term survival of patients with acute myocardial infarction in Isfahan, Iran. *J Isfahan Med Sch* 2012; 30: 24-33.
13. MOHAMMADIAN HAFSHEJANI A, BARADARAN H, SARRAFZADEGAN N, ASADI LARI M, RAMEZANI A, HOSSEINI S, ALLAHBAKHSI HAFSHEJANI F. Predicting factors of short-term survival in patients with acute myocardial infarction in Isfahan using a cox regression model. *Iran J Epidemiol* 2012; 8: 39-47.
14. MOHAMMADIAN M, SOROUSH A, MOHAMMADIAN-HAFSHEJANI A, TOWHIDI F, HADADIAN F, SALEHINIYA H. Incidence and mortality of liver cancer and their relationship with development in Asia. *Asian Pac J Cancer Prev* 2016; 17: 2041-2047.
15. MOHAMMADIAN-HAFSHEJANI A, SARRAFZADEGAN N, HOSSEINI S, BARADARAN HR, ROOHAFZA H, SADEGHI M, ASADI-LARI M. Seasonal pattern in admissions and mortality from acute myocardial infarction in elderly patients in Isfahan, Iran. *ARYA Atheroscler* 2014; 10: 46-54.
16. BANDIERA FC, ROSS KC, TAGHAVI S, DELUCCHI K, TYNDALE RF, BENOWITZ NL. Nicotine dependence, nicotine metabolism, and the extent of compensation in response to reduced nicotine content cigarettes. *Nicotine Tob Res* 2015; 17: 1167-1172.
17. HUNG AM, ROUMIE CL, GREEVY RA, GRIJALVA CG, LIU X, MURFF HJ, IKIZLER TA, GRIFFIN MR. Comparative effectiveness of second-line agents for the treatment of diabetes type 2 in preventing kidney function decline. *Clin J Am Soc Nephrol* 2016; 11: 2177-2185.
18. NASH SH, LIAO LM, HARRIS TB, FREEDMAN ND. Cigarette smoking and mortality in adults aged 70 years and older: results from the NIH-AARP Cohort. *Am J Prev Med* 2017; 52: 276-283.
19. KUMMET CM, MORENO LM, WILCOX AJ, ROMITTI PA, DEROO LA, MUNGER RG, LIE RT, WEHBY GL. Passive smoke exposure as a risk factor for oral clefts-a large international population-based study. *Am J Epidemiol* 2016; 183: 834-841.
20. VSEVOLOZHSKAYA OA, ANTHONY JC. Inter-relationships linking probability of becoming a case of nicotine dependence with frequency of tobacco cigarette smoking. *Nicotine Tob Res* 2016; 18: 2278-2282.
21. SIAHPUSH M, BORLAND R. Socio-demographic variations in smoking status among Australians aged  $\geq 18$ : multivariate results from the 1995 National Health Survey. *Aust N Z J Public Health* 2001; 25: 438-442.
22. BARBEAU EM, LEAVY-SPEROUNIS A, BALBACH E. Smoking, social class, and gender: what can public health learn from the tobacco industry about disparities in smoking? *Tob Control* 2004; 13: 115-120.
23. LAAKSONEN M, RAHKONEN O, KARVONEN S, LAHELMA E. Socioeconomic status and smoking: analysing inequalities with multiple indicators. *Eur J Public Health* 2005; 15: 262-269.
24. CAVELAARS AE, KUNST AE, GEURTS JJ, CRIALESI R, GRÖTVEDT L, HELMERT U, LAHELMA E, LUNDBERG O, MATHESON J, MIELCK A, RASMUSSEN NK, REGIDOR E, DO ROSÁRIO-GIRALDES M, SPUHLER T, MACKENBACH JP. Educational differences in smoking: international comparison. *BMJ* 2000; 320: 1102-1107.
25. GISKE K, KUNST AE, BENACH J, BORRELL C, COSTA G, DAHL E, DALSTRA JA, FEDERICO B, HELMERT U, JUDGE K, LAHELMA E, MOUSSA K, OSTERGREN PO, PLATT S, PRATTALA R, RASMUSSEN NK, MACKENBACH JP. Trends in smoking behaviour between 1985 and 2000 in nine European countries by education. *J Epidemiol Community Health* 2005; 59: 395-401.
26. KENNEDY SM, SHARAPOVA SR, BEASLEY DD, HSIA J. Cigarette smoking among inmates by race/ethnicity: impact of excluding African American young adult men from national prevalence estimates. *Nicotine Tob Res* 2016; 18: S73-78.
27. HOWARD J. Smoking is an occupational hazard. *Am J Ind Med* 2004; 46: 161-169.
28. SMITH PM, FRANK JW, MUSTARD CA. Trends in educational inequalities in smoking and physical activity in Canada: 1974 to 2005. *J Epidemiol Community Health* 2009; 208: 82-89.
29. STEA TH, WANDEL M, MANSOOR MA, UGLEM S, FROLICH W. BMI, lipid profile, physical fitness and smoking habits of young male adults and the association with parental education. *Eur J Public Health* 2008; 19: 46-51.
30. JHA P, PETO R. Global effects of smoking, of quitting, and of taxing tobacco. *N Engl J Med* 2014; 370: 60-68.
31. MAMUDU HM, HAMMOND R, GLANTZ S. Tobacco industry attempts to counter the world bank report curbing the epidemic and obstruct the WHO framework convention on tobacco control. *Soc Sci Med* 2008; 67: 1690-1699.

32. The burden of disease in Russia from 1980 to 2016: a systematic analysis for the global burden of disease study 2016. *Lancet* 2018; 18: 31485-31495.
33. WARREN CW, JONES NR, ERIKSEN MP, ASMA S. Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet* 2006; 367: 749-753.
34. JHA P. Avoidable global cancer deaths and total deaths from smoking. *Nat Rev Cancer* 2009; 9: 655-661.
35. WIPFLI H, SAMET JM. One hundred years in the making: the global tobacco epidemic. *Annu Rev Public Health* 2016; 37: 149-166.
36. SARRAF-ZADEGAN N, BOSHTAM M, SHAHROKHI S, NADERI GA, ASGARY S, SHAHPARIAN M, TAFAZOLI F. Tobacco use among Iranian men, women and adolescents. *Eur J Public Health* 2004; 14: 76-78.
37. SARRAFZADEGAN N, TALAEI M, SADEGHI M, KELISHADI R, OVEISGHARAN S, MOHAMMADIFARD N, SAJJADIEH AR, KABIRI P, MARSHALL T, THOMAS GN, TAVASOLI A. The isfahan cohort study: rationale, methods and main findings. *J Hum Hypertens* 2011; 25: 545-553.
38. ABOLFOTOUH MA, AZIZ MA, ALAKIJA W, AL-SAFY A, KHATAB MS, MIRDAD S, AL-JUHANI A, AL-HUMAIDI M. Smoking habits of king saud university students in Abha, Saudi Arabia. *Ann Saudi Med* 1998; 18: 212-216.
39. NG M, FREEMAN MK, FLEMING TD, ROBINSON M, DWYER-LINDGREN L, THOMSON B, WOLLUM A, SANMAN E, WULF S, LOPEZ AD, MURRAY CJ, GAKIDOU E. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA* 2014; 311: 183-192.
40. MEHRABI S, DELAVARI A, MORADI G, ESMAILNASAB EN, POOLADI A, ALIKHANI S, ALAEDDINI F. Smoking among 15- to 64-year-old Iranian people in 2005. *Iran J of Epidemiol* 2007; 3: 1-9.
41. GERRARD M, GIBBONS FX, STOCK ML, LUNE LSV, CLEVELAND MJ. Images of smokers and willingness to smoke among African American pre-adolescents: an application of the prototype/willingness model of adolescent health risk behavior to smoking initiation. *J Pediatr Psychol* 2005; 30: 305-318.
42. CHALOUPIKA FJ, STRAIF K, LEON ME. Effectiveness of tax and price policies in tobacco control. *Tob Control* 2011; 20: 235-238.
43. GUINDON GE, DRIEZEN P, CHALOUPIKA FJ, FONG GT. Cigarette tax avoidance and evasion: findings from the International Tobacco Control policy evaluation (ITC) project. *Tob Control* 2014; 23: 13-22.
44. LOPEZ NICOLAS A, VIUDES DE VELASCO A. Possibilities and limitations of fiscal policies as health instruments: taxes on harmful consumption. *SESPAS Report 2010. Gac Sanit* 2010; 1: 85-89.