



Cigarette Smoking in Iran

***A Meysamie¹, R Ghaletaki¹, N Zhand¹, M Abbasi^{2, 3}**

¹ *Dept. of Community and Preventive Medicine, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran*

² *Endocrinology and Metabolism Research Centre, Dept. of Endocrinology, Vali-asr Hospital, Tehran University of Medical Sciences, Tehran, Iran*

³ *Research Institute for Nuclear Medicine and Molecular Imaging, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran*

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Abstract

Background: Cigarette smoking is the largest preventable cause of death worldwide. No systematic review is available on the situation of the smoking in Iran, so we decided to provide an overview of the studies in the field of smoking in Iranian populations.

Methods: Published Persian-language papers of all types until 2009 indexed in the IranMedex (<http://www.iranmedex.com>) and Magiran (<http://www.magiran.com>). Reports of World Health Organization were also searched and optionally employed. The studies concerning passive smoking or presenting the statistically insignificant side effects were excluded. Databases were searched using various combinations of the following terms: cigarette, smoking, smoking cessation, prevalence, history, side effects, and lung cancer by independent reviewers. All the 83 articles concerning the prevalence or side effects of the smoking habit in any Iranian population were selected. The prevalence rate of daily cigarette smoking and the 95% confidence interval as well as smoking health risk associated odds ratio (OR) were retrieved from the articles or calculated.

Results: The reported prevalence rates of the included studies, the summary of smoking-related side effects and the ORs (95%CI) of smoking associated risks and the available data on smoking cessation in Iran have been shown in the article.

Conclusion: Because of lack of certain data, special studies on local pattern of tobacco use in different districts, about the relationship between tobacco use and other diseases, especially non communicable diseases, and besides extension of smoking cessation strategies, studies on efficacy of these methods seems to be essential in this field.

Keywords: Surveillance, Prevalence, Smoking Related Complications, Cessation, Iran

Introduction

Cigarette smoking is the largest preventable cause of death worldwide. According to WHO, tobacco related death was five million people in the year 2008 and would reach 8 million a year by 2030. Currently, one person is killed every six seconds by tobacco (1).

The history of tobacco use is back to the time when Columbus's found some people in the New World using "strange leaves" of plant

Nicotina tobacum (2). Current estimates suggest that almost one third of the world population smoke (3). Around 35% of men and 22% of women in developed countries smoke. These figures in developing countries are about 50% and 9%, respectively (2). About 84% of global smokers live in developing countries comprising about 1.3 billion people (4). In Iran, cigarette smoking was started in the Shah Abbas Safavi

(1571 – 1629) kingship era. It rapidly spread throughout the country and in 1937 the first cigarette factory with the capacity of producing 600 million cigarettes per year started to work (5). Currently, Iranian Tobacco Company, a governmental organization, with more than 10 divisions/manufactories throughout Iran, produces about 12 billion cigarette sticks per year. In addition almost same amount is legally imported. We recently showed that the prevalence rate of current and daily cigarette smoking in Iran is correspondingly 12.5% (23.4% males and 1.4% females; burden: 6.1 million) and 11.3% (21.4 males and 1.4 females; burden: 5.6 million). We also reported that the average number of cigarettes smoked daily by an Iranian smoker was 13.7 sticks (6). Subsequently it is estimated that roughly 30 billion cigarette sticks is consumed a year in Iran. Recent data in Iran shows 62% increase in the manufactured cigarette from the period of 2000-2004 to 2005-2009 (7). Globally, more than five trillion cigarettes are manufactured yearly. Although there is no exact assessment of the world cigarette marketing expenditures/incomes, it seems that the cigarette is the most marketed production. Considering that in the USA more than \$10 billion is spent yearly on tobacco trade, the market is certainly more pronounced in developing countries (1). Two third of the world's tobacco is produced in 5 countries- China, USA , India, Brazil and Turkey with more than 100,000 hectares devoted to growing tobacco (1). In Iran 10,000-100,000 hectares are probably devoted to tobacco agriculture (2).

Nonetheless, no systematic review is available on the situation of the smoking in Iran, probably because most of the reported data are published in Persian journals and are unavailable to the international readership. In this review, the authors intended to bring the light into the more hidden/unavailable part of the researches in the field of cigarette smoking in Iran. Furthermore, certain national/international studies were included in order to mention the smoking cessa-

tion programs designed worldwide to provide a direction for policy makers and future studies.

Methods

We conducted an integrated review of the literature on tobacco use (i.e. smoking and cessation smoking) and its related harms, focusing on Iranian population. Eighty three published Persian-language papers of all types until 2009 were collected by using IranMedex (index of 183 Iranian medical Journals; <http://www.iranmedex.com>) and Magiran (index of more than 1300 Iranian journals; <http://www.magiran.com>) databases using various combinations of the following terms: cigarette, smoking, smoking cessation, prevalence, history, side effects, and lung cancer. Reports of WHO were also searched and optionally employed. The studies concerning passive smoking or presenting the statistically insignificant side effects were excluded. The prevalence rate of daily cigarette smoking (which is mostly defined as consuming at least one cigarette stick per day) has been collected from the results of the included articles. The 95% confidence interval (CI 95%) of the prevalence rates as well as smoking health risk associated odds ratio(OR) and CI 95% of ORs were retrieved from the articles or calculated.

The results are presented in three main sections: first the summary of the prevalence studies; second, side effect studies; and finally the articles discussing the cessation strategies in Iran.

Results

Prevalence of daily cigarette smoking

The reported prevalence rates of the included studies are shown in Table 1. The target populations, sample sizes and the gender as well as time and location of the studies are also presented. Cigarette smoking in Iran has been studied mostly among specific communities such as high school and university students, whereas studies on smoking among various occupations

and rural areas are limited, and seemingly the situation of smoking among men has been at the center of attention.

There are 3 studies which report the amount of cigarette smoking over the whole country Iran; the former study was conducted between 1991 and 1999. In 1991 the prevalence of smoking was reportedly 14.6%; and 11.7% in the 1999 (8). In second study conducted at 2005 the prevalence rate was 15.3% (9); and lastly in 2007 daily cigarette consumption was 11.3% (CI=95%=9.0-14.1) (6). In the view of 95% CIs there is no significant gap between the results of these studies. The observed differences are somehow due to various definitions of daily smoking especially between studies of 2005 and 2007.

In regard with geographical distribution, the prevalence rate of daily smoking among adults ranged from 5.9% (CI=95%=3.5%-8.3%) in Gonabad, northeastern of eastern, (10) to 50% (CI=95%=45.6%-54.4%) in Savejbelagh near Tehran the capital (11). Among men and women specifically available data suggests that Savejbelagh owns the highest rates with 38.5% (CI=95%=47.1%-56.1%) and 21.2% (CI=95%=2%-39.4%) respectively, whereas the lowest rates belong to women in Isfahan (12) and in Gonabad with 0.5% (CI=95%=0%-1%) and 12.9% (CI=95%=7.4%-18.5%), respectively (10).

Smoking rate among male students ranged from 2.3% (CI=95%=0.3%-4.3%) in Zahedan, the center of an eastern province (13) to 39.6% (CI=95%=36.8%-42.5%) in Tehran (14). Prevalence of smoking among female students was between 13% in Guilan, northern Iran, (15) and 0.4% (CI=95%=0%-0.9%) in Kerman located at the mid-eastern Iran (16).

Also some focused populations show high prevalence of smoking such as traumatic patients and patients suffering bladder carcinoma with the rate of 38% and 44.5%, respectively (17, 18).

Side effects of active cigarette smoking

The summary of smoking-related side effects and the ORs (95% CI) of smoking associated risks are presented in Table 2. We found 37 articles on smoking associated damages conducted in Iran from 1999 to 2009. There were studies which investigated the relation of smoking and health problems among students. In a study on university students, smoking was inversely linked to general health levels (49). Kelishadi et al. reported that the levels of LDL and HDL were respectively higher and lower among smoking students (27) and the mean systolic and diastolic pressures were higher among smoking population. Among studies focused on adult populations, in 2000 Azizi et al. documented that smokers had lower HDL levels than non-smokers, OR=2.57 (CI=95%=2.24-2.76) (50); their study included almost 9500 participants. Also, among 9632 individuals over 20, increased risk of dyslipidemia was found among smoking participants; OR was 1.30 (CI95%=1.13-1.5) (51). In a review the hazardous effect of smoking on risk of tuberculosis infection has been emphasized (52). Smoking during pregnancy was reported to be a significant risk factor for maternal and fetal untoward outcomes with OR=2.71 (CI95%=1.52-4.84) (53). Also oral and dental problems were reported among smoking individuals in a few studies (56). Risks of bladder cancer and infertility were also increased among cigarette smokers (54, 55).

Smoking cessation

The available data on smoking cessation in Iran suggests that the prevalence of quitting daily smoking is 3.4% of whole population. This rate was higher among those aged 55-64 years, 7.9% (6).

We included the main conclusions of the 4 available studies on the smoking cessation methods in Iranian population along with some international suggestions in Table 3.

Table1: Prevalence of smoking among different populations studied so far in Iran

Group	Location	Sample size	Male	Female	Total	Year	Reference
Youth at the military service	Tehran	976	20.8(18.3-23.3)	-	-	1999	19
Medical students	Arak	475	29.5(25.4-33.6)	-	-	1999	20
Medical students	Shiraz	694	15.4(11.8-18.9)	0.7(0-1.6)	9.1(6.9-11.2)	2000	21
Senior high school students	Tehran	4023	7.2(6-8.2)	1(0.6-1.4)	4(3.4-4.6)	2001	22
Medical students	Yasuj	206	18.4(13.2-23.7)	-	-	2001	23
High school students	Urmia	1096	12.1(10.2-14.1)	-	-	2001	24
High school students	Rasht	1297	15(13.1-17)	-	-	2002	25
University students	Tehran	1066	25.4(21.9-28.9)	5(3.1-7)	16.3(14.1-18.5)	2003	26
High school students	Isfahan-Arak	1950	12.9(10.5-14.7)	4(2.8-5.2)	8.7(7.5-10)	2004	27
Junior high school students	Shiraz	1132	2.5(1.6-3.4)	-	-	2004	28
High school students	Tabriz	1000	12.6(10.5-14.7)	-	-	2004	29
High school students	Tehran	1119	6.06 -	1.5 -	4.4(3.2-5.6)	2004	30
High school student	Zahedan	475	2.3(0.3-4.3)	0.4(0-1.1)	1.3(0.3-2.3)	2004	13
Medical students	Ardebil	1106	22.1(17.6-26.6)	1.2(0.5-2.1)	7.4(5.9-9)	2005	31
High school students	Gilan	1950	25.9(24.0-27.8)	13(10.8-15.2)	20(18.2-21.8)	2007	15
University students	Tehran	2297	39.6(36.8-42.5)	14.8(12.7-16.8)	24.2(22.7-25.7)	2008	14
University students	Kerman	833	-	-	4.5(3-5.8)	2008	32
University students	Kerman	1677	21.5(18.5-24.4)	2.4(1.4-3.4)	11(9.5-12.5)	2008	33
High school students	Birjand	1233	3.9 (2.8-5)	-	-	2008	34
Junior high school students	Kerman	860	2.3(0.7-3.9)	0.4(0-0.9)	1.2(0.4-1.9)	2008	16
over 15	National	26618	27.2(26.4-28)	3.4(3.1-3.7)	14.6(14.2-15)	1991*	8
over 15	National	36475	23.9(23.3-24.6)	1.7(1.5-1.9)	11.9(11.5-12.2)	1990*	8
Adult (over 20)	Yazd	2154	31.2(29.2-33.1)	-	-	2000	35
Adult (over 15)	Meibod	330	14.8(11.-	-	-	2000	36

Table1: Continued...

Adult (over 15)	Fars province	1998	18.7) 25.3(22.4-28.2)	1.2(0.6-1.9)	11.5(10.1-12.9)	2001	37
Adults (19-25)	Isfahan	1315	18.5(15.5-21.5)	0.5(0-1)	9.3(7.7-10.8)	2003	12
Traumatic patients	Tehran	339	40.1(35.9-45.3)	-	-	2006	17
Population of a rural area	Kerman	1670	33.5(30.4-36.7)	2.9(1.8-4.1)	18.5(16.6-20.3)	2006	38
High school teachers	Rasht	582	20.4(17.2-23.7)	-	-	2005	39
Patients with bladder cancer	Mashad	200	-	-	44.5(37.6-51.4)	2002	18
Adults(18-84)	Ahvaz	1600	-	-	30(28-33)	2002	40
Adults (20- 40)	Gonabad	356	12.9(7.4-18.5)	1.7(0-3.6)	5.9(3.5-8.3)	2002	10
Adults (over 15)	Tehran	11801	22(20.9-23.1)	2.1(1.8-2.4)	10.6(10-11.1)	2003	41
Adults (over 20)	Rafsanjan	491	38.5(32.42-44.86)	9.9(6.53-14.45)	24.3(20.56-28.32)	2003	42
Rural area	North of Iran	310	-	-	17.15(13.12-21.82)	2004	43
Soldiers	Guilan	612	25.7(22.2-29.1)	-	-	2005	44
Adults	Savejbelagh	500	51.6(47.1-56.1)	21.2(2-39.4)	50(45.6-54.4)	2007	11
Soldiers	Tehran	385	14.3 (10.8-17.8)	-	-	2007	45
Adults (15-64)	National	84706	26.6(26.1-27)	4.2(4.1-4.4)	15.3(15.1-15.5)	2005	9
Adults (over 15)	Bandar Abbas	1810	22.7(20-25.5)	0.9(0.3-1.5)	11.7(10.2-13.2)	2008	46
Infertile couples	Tehran	684	19.9(15.7-24.1)	0.6(0-1.4)	10.2(8-12.5)	2008	47
General practitioners	National	5140	-	-	16(15-17)	2007	48
Adults (15-64)	National	5278	21.4(19.2-23.8)	1.4(1-2)	11.3(9-14.1)	2007	6

The prevalence rates are% and 95% confidence limits in parentheses.

The studies are sorted by the study date (Not publication date).

Table 2: Reported adverse effects of active cigarette smoking

Sample size	Effects	OR (CI95%)	Year	Reference
206	Oral mucosal lesions	13.06(3.83-44.52)	1999	56
20	Increased number and abnormalities in alveolar macrophages	UA*	1999	57
340	Increased sperm morphological abnormalities	2.69(1.64-4.40)	1999	55
390	Perforated peptic ulcer	2.4	2000	58
9514	Decreased HDL level (<35mg/dL)	2.57 (2.24-2.76)	2000	50
150	Increased dental plaques	UA	2001	59

Table 2: Continued...

	Dislipidemia,	UA		
200	Increased carboxy hemoglobin level		2001	60
	Atherosclerosis			
120	Depression	2.73 (1.00-7.44)	2001	61
20	Dermal adverse effects	UA	2001	62
356	Psychological disorders	3.71 (1.36-10.09)	2002	10
200	Bladder cancer initiation and progress	UA	2002	54
140	Hyperactivity of airways	49.33(13.80-176.46)	2002	63
68	Decreased IgM, IgG and IgA levels	UA	2002	64
	Increased IgE level			
96	Insulin resistance	UA	2002	65
300	Periodontal diseases	4.66 (1.53-14.21)	2002	66
113	Higher fatality of TB	4.19 (1.75-10.1)	2003	67
384	Increased risk of stroke	1.85 (1.18-2.91)	2003	68
299	Pigmentation of oral mucosa	9.07 (4.13-19.97)	2003	69
96	Increased insulin resistance	UA	2003	70
192	Airway constriction	UA	2003	71
56	Progression of asbestosis	22.5 (2.7-187.6)	2004	72
	Increased LDL	UA		
1950	Decreased HDL		2004	27
	Increased systolic and diastolic blood pressure			
86	Increased oxidative stress level	UA	2004	73
Review of 17 articles	Increased risk of tuberculosis	UA	2005	52
710	Increased female/male conception	UA	2005	74
46	Increased hemoglobin and hematocrite	Non-achievable	2005	75
146	Delaying tibia fracture fusion	UA	2005	76
252	Cataract	1.90(1.03-3.50)	2005	77
9632	Dislipidemia	1.30 (1.13-1.5)	2006	51
	Coated tongue	7.17 (4.48-11.48)		
534	Hairy tongue	41.10 (5.60-301.86)	2006	78
4317	Maternal and fetal untoward outcomes	2.71 (1.52-4.84)	2007	53
240	Coronary artery disease	2.47 (1.24-4.94)	2007	79
128	TB infection	2.44 (1.97-4.96)	2007	80
200	Cardiac arrhythmias after acute MI	UA	2009	81
220	Decreased saliva	UA	2009	82
100	Short-term memory decline	UA	2009	83

The prevalence rates are% and 95% confidence limits in parentheses.

* Unavailable

Table 3: Qualitative results of international cessation programs, (Ordered by the study date)

Publication date	Participants	Result of cessation programs	Reference
1985	Pregnant women from public health maternity clinics of USA	More success of health education vs. standard clinic	86
1990	Unites States adult smokers	More success of self-managed quitting vs. cessation programs	84
1992	Randomized placebo-controlled trial in a smoke clinic in london	Success of nasal nicotine spray	93
1994	Randomized placebo-controlled trial in a research clinic	Success of nicotine patch and mecamlamine	94
1999	Female smokers of a behavioral-cognitive cessation program	Success of exercise involved cessation programs with less weight gain	95
2000	Cochrane review on hypnotherapy	No success of hypnotherapy	96
2000	Cochrane review on training	No strong evidence of the efficacy of training health personnel	97
2002	Cochrane review of 45 randomized trails	More success of self-help materials vs. no intervention	98
2002	Cochrane systematic review of cessation programs	No success of acupuncture	99
2002	Participants of the programs of first cessation clinic in Iran	Success of lighter smokers and attending clinical courses	91
2003		Importance of educational and behavioral therapy	89
2006	Cochrane review of nursing interventions	Success of nursing support	88
2007	Cochrane review of NRT trials	Success of 5 NRT programs (gum, transdermal patch, nasal spray, inhaler and sublingual tablets/lozenges) Nasal spray most effective	87
2008	4 quit and win campaigns in Isfahan	Success of Quit and Win contest	90
2009	00	Success of using bupropion with less weight gain and side effects	100

Discussion

Our result is significant as a summary of internationally unavailable part of smoking related researches is Iran; nevertheless a reasona-

ble level of uncertainty should be considered in terms of credibility for the studies published in internationally unavailable literature.

The prevalence of cigarette smoking in Iran ranges from 0.4% to 41% in various subpopulations, both extremes correspond to the adolescence and in students. The latest data of the prevalence of daily smoking in the whole country is 11.3% with no significant change from 1991 to 2008. Whilst we cannot conclude a generalized pattern for the prevalent smoking and particularly its geographical distribution, the summary of the studies gathered in Table 1 could be helpful in somewhat retrospective way for the future studies and researchers. Obviously the males are the population requiring attention in addition to teenagers with smoking rates as high as 40% and 13% in male and female students in certain areas. Seemingly the smoking rate associates with the regional income westernized lifestyle highest in the central and northern provinces and lowest in the eastern and border provinces.

The reported smoking-related complications in Iran are comparable with studies elsewhere and a wide range of diseases possibly affecting every organ have been linked to smoking. Dyslipidemia, oral cavity and respiratory disorders / infections have been reflected mostly in Iranian studies. Considering these effects and smoking burden on health care system, increased tobacco production in Iran is a major obstacle for public health and challenge for policy makers.

The only way to reduce hazard risk in the smokers is the complete cessation. Unfortunately there are limited studies on the efficacy of smoking cessation strategies in Iran. Tobacco control program strategies should be on preventing initiation and fostering cessation. However, these are not attainable in many smokers. So, a comprehensive tobacco control program should also include methods to reduce risks in those individuals who continue to smoke (84). Smoking-cessation treatment consists of three phases: preparation, intervention, and maintenance. Preparation aims to increase the smoker's motivation to quit and to build confidence. Intervention can take certain methods or a combination of them to help smokers to achieve abstinence.

Maintenance, including support, coping strategies, and substitute behaviors, is necessary for permanent abstinence (85).

The efficacy of different methods to quit smoking in Iran has been investigated in 4 studies. In the study by Shahrokhi and Kelishadi the strategy "Quit and win contest" has been reported as a successful program in Iran and the authors claimed that the quit rates of smoking individuals participating this strategy increased from 1998 to 2004. Quit and win contest was designed by WHO as an effective and low-cost cessation programs especially for low and middle income countries (90). Education and behavioral therapy had a significant role in the successfulness of smoking cessation (89). Also, the lighter smoking and attending clinical courses by smokers comprised the success to quit smoking (91). The effect of smoking cessation on improving hematological disorders attributed to smoking was underscored (92).

Many smokers stop smoking by themselves, but support with advice and information may be helpful to increase the success rate. Health education methods have been shown successful in changing smoking behavior (86). In the Cochrane review of five different forms of Nicotine Replacement Therapy (87), all were significantly effective compared to placebo. The result of some studies revealed that the role of education and behavioral therapy in implementing smoking cessation program is essential (86, 88, 89). In general literature, intervention methods are divided into two categories. First, unassisted methods: these include quitting "cold turkey"; gradually decreasing the number of cigarettes smoked per day; using low-tar or low-nicotine cigarettes; quitting with friends, relatives, or acquaintances; using special cigarette filters or holders; using over the counter products; or substituting with another tobacco product (snuff, chewing tobacco, pipes, or cigars). Second, assisted methods: these include attending a program or course for a fee, consulting a psychiatrist or psychologist, using hypnotherapy, acupuncture, or nicotine gum. The latter method

is "assisted" because nicotine gum requires a prescription and the physician should provide cessation counseling with the gum.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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The authors declare that there is no conflict of interests.

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