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Prevalence of Active and Passive Smoking among Adult Population: Findings of a Population-Based Survey in Kerman (KERCADRS), Iran

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Original Article

Abstract

Background: Smoking is one of the major modifiable risk factors for non-communicable diseases. Our aim was to report the pattern of active and passive smoking using the data collected through a population-based household survey in Kerman, Iran [(KERCADRS) Kerman Coronary Artery Disease Risk Factors Study].

Methods: Using a cluster random sampling design, we recruited 5900 adult persons (15-75 years old) into our survey. After consenting, every participant was interviewed by a trained interviewer. The section for smoking included questions about daily (smoking at least one cigarette per day), non-daily, past and passive cigarette smoking as well as the duration of the exposure. We used Kerman population distribution (as the target population) to adjust our estimates using direct standardization method.

Findings: Overall, 8.3% of study participants (15.5% in men vs. 0.8% in women, $P = 0.010$) reported themselves as daily smokers and an additional 1.7% (2.9% in men vs. 0.4% in women, $P = 0.010$) as non-daily smokers. The passive smoking was common in total (27.5%), while women experienced more exposure than men (30.1% vs. 25.0%, $P = 0.010$). In daily smokers, 3.2% smoked more than 20 cigarettes per day. Among passive smokers, 62.6% were exposed to cigarette smoke more than 6 days per week.

Conclusion: Smoking is pretty common among adult populations, particularly in men. A majority of tobacco-free young adult women are exposed to passive smoking. Age and gender oriented interventions are required to change this risk pattern in Kerman community to prevent from further smoking related morbidities and mortalities.

Keywords: Cigarette smoking; Active smoking; Passive smoking; Coronary artery disease risk factors

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Introduction

Although smoking is one of the major modifiable risk factors for malignancies,^{1,2} it is still a frequent leading carcinogen in the world, in particular in high-income countries.³ In 2010, tobacco smoking including second-hand smoke (i.e., passive smoking) as the second leading risk factor for global disease burden after high blood pressure, accounted for 6.3% of global disability-adjusted life years (DALYs). Moreover, active smoking and the second-hand smoke combined contributed to 6.3 million deaths worldwide, reflecting a remarkable share in the burdens of disease in 2010.⁴ In the United States, despite a downward trend in the tobacco-related DALYs since 1990, it remained the second leading risk factor after obesity in 2010.³

The Middle East region is experiencing epidemiological transition which has led to a large shift from communicable to non-communicable diseases (NCDs), with increasing levels of the NCDs' risk factors such as high blood pressure, high body-mass index, tobacco use, high blood glucose, and low physical activity.⁵ In Iran, it is estimated that tobacco use accounted for more than 11000 annual deaths in all ages, with an upward trend in smoking prevalence over the recent decades. Such upward trend in tobacco use in Iran has not been observed in western countries and even in East Asia.⁶

It has been reported that smoking affected regions, cities, and communities so differently.⁷ Recently, many surveys have studied cigarette smoking, but a few conducted in southern part of Iran and even less recruited subjects based on household random sampling method and none addressed comprehensively the smoking problem including both active and passive exposure and exposure levels. In a study among 1335 participants in Shiraz, 26.0% of men and 3.6% of women smoked cigarette at the time of survey.⁸ Fotouhi et al.⁹ reported almost the same prevalence rates (20.6% men, 2.9% women) in residents of Tehran, Iran. It showed a declining trend compared to previous studies,¹⁰ but still high.

The prevalence of daily smoking in adult population varied from 5.9% in the Northern Eastern of Iran, to 50.0% in Sabzevar, Iran.¹¹ We found one study among Iranian dental students that reported exposure to environmental tobacco

smoke as high as 74.0%; interestingly, male students were more exposed than females.¹²

Given the availability of high-quality data from a population-based survey [Kerman Coronary Artery Disease Risk Factor (KERCADR) study], Iran, in this paper we report the estimates of both active and passive cigarette smoking prevalence among adolescent and adult population in Kerman.

Methods

The study population was adolescents and adult population (15-75 years old) of residents living in Kerman city and countryside that agreed to participate in the survey. The 5900 study subjects were recruited in 2009-2011 from 14 subpopulations' strata (15-19, 20-24, 25-34, 35-44, 45-54, 55-64 and 65-75 years by sex) using a one-stage cluster sampling. The study target sample size was to recruit 1000 participants from each 10 years subpopulation stratum.¹³

Given the 250 postal codes randomly selected in proportion to the population size of the four urban regions in Kerman, the recruiting team visited the area, listed and invited all the eligible (15-75 years old) household members living in the same zip code. Participants were given referral coupon with an appointment to the study clinics located at Kerman downtown. Recruitment continued to reach to the total sample of 24 within each cluster. The details of sampling procedure were explained elsewhere.¹³

The study protocol and all procedures were reviewed and approved by the Ethical Committee of Kerman University of Medical Sciences (No. 89/110KA).

Regarding smoking, using an interview-assist questionnaire, we collected several measurements. Based on self-reported data, we assigned the study participants into four mutually exclusive subgroups:

- Never smokers: Those who have never smoked cigarettes
- Past smokers: Those smoked cigarettes in the past but quit. Hence, at the time of the interview, they mentioned that during the past month they were not smoking cigarettes by any kind
- Non-daily smokers: Those active smokers who have reporting smoking cigarette currently, but not daily
- Daily smokers: Those acknowledged smoking at least one cigarette/day.

We also asked about exposure to cigarette smoke at home or work and anybody who acknowledged such exposure, were considered as a passive smoker. To measure the amount of exposure to active and passive smoking, we asked about the number of cigarettes smoked/day and in passive smokers we measured the number of days/week and hours/day that they were usually exposed to smokes.

The data were analysed using survey data analysis package in Stata software (version 12, Stata Corporation, College Station, TX). The cluster code was used as the primary sampling unit for analysis, and the estimates were weighted based on the real population distribution of Kerman and the inverse of response rate. The analysis was done for each gender strata and overall, and the test for linear trend (Wald test statistics) was applied using survey ordinal logistic regression model.

Results

Overall, 5900 individuals were participated in the study. On average, they were 43.6 [standard deviation (SD) 15.6] years, 45.1% males, 23.15% had their own private business while 40.5% were housekeepers, and only 14.1% were illiterate while 32.7% had diploma.

The prevalence of current, past and passive smoking are presented in table 1. Overall, 8.3% of study participants (15.5% in men vs. 0.8% in women, $P = 0.001$) reported themselves as daily smokers and an additional of 1.7% (2.9% in men vs. 0.4% in women, $P = 0.010$) as non-daily smokers. About 4.4% of subjects (8.1% of men vs. 0.6% of women, $P = 0.001$) quit smoking sometime in the past. Passive smoking was common in total (27.5%), while women experienced more exposure than men (30.1% vs. 25.0%, $P = 0.010$). Active smoking (daily plus non-daily) increased by age in overall ($P = 0.001$) and in both men ($P = 0.001$) and women ($P = 0.100$) by the age of 55 years and then decreased. Passive smoking had a linear decreasing trend regarding age groups.

As presented in table 2, 3.2% of daily smokers smoked more than 20 cigarettes/day, and 34.8% smoked between 10 and 20 cigarettes. Overall, men smoked more cigarettes/day than women ($P = 0.010$). The proportion of study subjects who smoked more than 20 cigarettes/day increased by age, peaked at the age group of 45-54 years (4.5%)

and then dropped to 2.8%.

Among passive smokers, 62.6% were exposed to cigarette smoke more than 6 days/week. This figure was significantly higher among women (67.8%) than in men (57.5%). Among men, such exposure had a decreasing trend regarding age. Women at 45-54 years reported the highest exposure to passive smoking (78.3%). Regarding the average of daily exposure hours, overall 18.2% were exposed more than 3 hours/day. Women's exposures to smoking more than 3 hours/day were higher than men (19.7 vs. 16.8%). Also, the levels of exposure to smoking measured as hours per day, had a significant decreasing trend among men ($P = 0.005$) (Table 3).

Discussion

We found that the prevalence of smoking and level of smoking was significantly higher among men compared to women. About 5% of men were reported as heavy smokers (> 20 cigarettes/day). One out of three women was passive smoker while passive smoking was reported by one out of four men. The majority of passive smokers were exposed to smoking almost all days during a week and half reported to be exposed more than 1 hour/day.

The burden of smoking in developing countries is increasing.¹⁴ Our smoking prevalence of 15.5% in men and 0.8% in women, are lower than that reported in the Iran 2011 national estimates (23.4% men, 1.4% women).¹⁵ In recent three meta-analyses on the prevalence of smoking among women in Iran, the range was reported as 0.3-0.9% in different regions of Iran,¹⁶⁻¹⁸ comparable to our estimates. Regarding men, our estimate is considerably lower than the range (19.2-22.9%) reported by recent systematic review of smoking in Iran.¹⁶⁻¹⁸ It is well-documented that men smoke more frequently than women in Iran.^{15,16,18} Stigma around cigarette smoking by women still exists in Iran and so either women shift to use less-stigmatized type of tobacco like water-pipes, or underreport cigarette smoking.¹⁵

Worldwide, 47.0% of deaths from the second-hand smoke occurred in women, 26.0% in men, and 28.0% in children.¹⁹ Although tobacco use in enclosed public places is banned, about 25-35% of women, and 21-24% of men in the Middle East region are exposed to tobacco smoke, highlighting more efforts needed to fully implement smoke-free policies.²⁰

Table 1. Prevalence of current, past and passive smokers by age groups

Age groups (year)	Women					Men					Total				
	Daily smoker	Non-daily	Past smoker	Never smoker	Passive smoker**	Daily smoker	Non-daily	Past smoker	Never smoker	Passive smoker	Daily smoker	Non-daily	Past smoker	Never smoker	Passive smoker
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
15-19	0 (0.0)	0 (0.0)	0 (0.0)	133 (100)	33 (26.5)	0 (0.0)	2 (0.5)	4 (2.2)	164 (97.3)	55 (30.5)	0 (0.0)	2 (0.3)	4 (1.1)	297 (98.6)	88 (28.6)
20-24	0 (0.0)	1 (0.7)	2 (0.9)	284 (98.4)	100 (37.4)	13 (5.4)	5 (3.3)	3 (2.2)	184 (90.1)	59 (31.9)	13 (2.8)	6 (2.0)	5 (1.7)	468 (93.5)	159 (34.6)
25-34	4 (1.0)	2 (0.3)	0 (0.0)	595 (98.7)	135 (26.4)	73 (16.5)	18 (4.2)	35 (7.8)	345 (71.5)	123 (29.2)	77 (8.9)	20 (2.3)	35 (3.9)	940 (84.9)	258 (27.8)
35-44	5 (0.8)	2 (0.3)	3 (0.5)	597 (98.4)	180 (30.6)	108 (24.7)	18 (3.8)	48 (11.5)	268 (60.0)	92 (21.8)	113 (12.9)	20 (2.1)	51 (6.0)	865 (79.0)	272 (26.2)
45-54	16 (1.8)	3 (0.4)	7 (0.9)	686 (96.9)	196 (27.3)	161 (34.4)	14 (2.9)	73 (14.8)	238 (47.9)	66 (13.4)	177 (18.4)	17 (1.7)	80 (7.9)	924 (72.0)	262 (20.3)
55-64	9 (1.4)	5 (0.9)	7 (1.5)	514 (96.2)	130 (26.6)	116 (23.4)	14 (2.9)	83 (15.9)	269 (57.8)	49 (11.2)	125 (12.8)	19 (1.9)	90 (8.9)	783 (76.4)	179 (18.7)
65-75	4 (1.5)	2 (0.8)	2 (0.7)	252 (97.0)	43 (17.5)	48 (16.6)	1 (0.3)	54 (20.7)	184 (62.4)	34 (11.8)	52 (9.4)	3 (0.5)	56 (11.1)	436 (79.0)	77 (14.6)
Total	38 (0.8)	15 (0.4)	21 (0.6)	3071 (98.2)	822 (30.1)	519 (15.5)	72 (2.9)	300 (8.1)	1657 (73.5)	480 (25.0)	557 (8.3)	87 (1.7)	321 (4.4)	4728 (85.6)	1302 (27.5)
P*	0.020					0.010					0.010				

*Wald test statistics P value using survey ordinal logistic regression, P values assess the trend of smoking status regarding age, **Passive smoking is not complemented to other smoking status, % of daily, non-daily, past and never smoker added up to 100% in each row in women, men and total; for the passive smoker, which was a binary variable, we only report the % of study participants who were passive smoker.

Table 2. Number of smoked cigarettes/day in daily smokers

Age groups (year)	Women			Men			Total		
	< 10/day	10-20/day	> 20/day	< 10/day	10-20/day	> 20/day	< 10/day	10-20/day	> 20/day
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
15-19	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
20-24	0 (0.0)	0 (0.0)	0 (0.0)	6 (57.8)	6 (34.8)	1 (7.4)	6 (57.8)	6 (34.8)	1 (7.4)
25-34	4 (100)	0 (0.0)	0 (0.0)	35 (48.7)	38 (51.3)	0 (0.0)	39 (74.1)	38 (25.9)	0 (0.0)
35-44	4 (90.0)	1 (10.0)	0 (0.0)	49 (40.9)	57 (54.7)	4 (4.4)	53 (65.3)	58 (32.5)	4 (2.2)
45-54	11 (57.3)	5 (42.7)	0 (0.0)	52 (31.3)	96 (59.8)	15 (8.9)	63 (44.1)	101 (51.4)	15 (4.5)
55-64	9 (92.7)	1 (7.3)	0 (0.0)	46 (34.8)	67 (58.7)	6 (6.5)	55 (62.7)	68 (33.9)	6 (3.4)
65-75	2 (60.4)	2 (39.6)	0 (0.0)	21 (39.6)	24 (55.1)	2 (5.3)	23 (49.6)	26 (47.6)	2 (2.8)
Total	30 (85.9)	9 (14.1)	0 (0.0)	209 (47.5)	288 (47.3)	28 (5.2)	239 (62.0)	297 (34.8)	28 (3.2)
P*	0.260			0.040			0.040		

*Wald test statistics P value using survey ordinal logistic regression, P values assess the trend of smoking status regarding age

Table 3. Level of exposure to smoking among passive smokers

Days exposed/week	Women			Men			Total		
	1-2 days	3-5 days	6-7 days	1-2 days	3-5 days	6-7 days	1-2 days	3-5 days	6-7 days
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
15-19	10 (26.0)	6 (19.1)	17 (54.9)	9 (19.4)	6 (9.5)	40 (71.1)	19 (22.6)	12 (14.1)	57 (63.3)
20-24	23 (22.5)	9 (8.3)	68 (69.2)	13 (22.3)	8 (14.5)	38 (63.2)	36 (22.4)	17 (11.5)	106 (66.1)
25-34	35 (22.7)	18 (15.9)	82 (61.4)	29 (18.4)	21 (17.2)	72 (64.4)	64 (20.6)	39 (16.5)	154 (62.9)
35-44	30 (18.4)	20 (10.1)	130 (71.5)	32 (33.9)	13 (15.8)	47 (50.3)	62 (26.3)	33 (12.9)	177 (60.8)
45-54	30 (15.6)	15 (6.1)	151 (78.3)	18 (31.9)	17 (26.9)	30 (41.2)	48 (23.9)	32 (16.7)	181 (59.4)
55-64	30 (24.9)	9 (6.8)	91 (68.3)	23 (46.9)	8 (12.8)	18 (40.3)	53 (36.4)	17 (9.8)	109 (53.8)
65-75	12 (27.6)	5 (12.3)	26 (60.1)	16 (48.1)	4 (10.5)	14 (41.4)	28 (38.2)	9 (11.4)	40 (50.4)
Total	170 (21.3)	82 (10.9)	570 (67.8)	141 (26.6)	78 (15.9)	259 (57.5)	311 (23.9)	160 (13.5)	829 (62.6)
P*		0.352			0.001			0.111	
		Women			Men			Total	
Hours exposed/24 hours	< 1 hour	1-3 hours	> 3 hours	< 1 hour	1-3 hours	> 3 hours	< 1 hour	1-3 hours	> 3 hours
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
15-19	16 (45.4)	8 (28.0)	9 (26.6)	25 (51.6)	19 (30.9)	11 (17.5)	41 (48.5)	27 (29.6)	20 (21.9)
20-24	61 (60.9)	29 (30.4)	10 (8.7)	30 (52.5)	18 (27.6)	11 (19.9)	91 (56.6)	47 (28.9)	21 (14.5)
25-34	76 (56.8)	40 (30.2)	18 (13.0)	74 (62.1)	27 (20.0)	20 (17.9)	150 (59.4)	67 (25.1)	38 (15.5)
35-44	79 (45.5)	51 (27.7)	50 (26.8)	50 (57.1)	22 (24.0)	19 (18.9)	129 (51.4)	73 (25.8)	69 (22.8)
45-54	73 (37.3)	60 (31.2)	63 (31.5)	42 (67.1)	14 (20.8)	8 (12.1)	115 (52.4)	74 (25.9)	71 (21.7)
55-64	63 (52.9)	38 (27.4)	29 (19.7)	34 (75.8)	9 (15.7)	5 (8.5)	97 (64.8)	47 (21.3)	34 (13.9)
65-75	25 (66.7)	8 (12.4)	10 (20.9)	23 (70.7)	7 (17.1)	4 (12.2)	48 (68.8)	15 (14.8)	14 (16.4)
Total	394 (51.8)	234 (28.5)	193 (19.7)	280 (59.5)	116 (23.7)	78 (16.8)	674 (55.7)	350 (26.1)	271 (18.2)
P*		0.113			0.005			0.975	

*Wald test statistics P value using survey ordinal logistic regression, P values assess the trend of smoking status regarding age

In the Eastern Mediterranean, and South-East Asia, women are at least 50.0% more likely to be exposed to cigarette smoke than men.¹⁹ As such, in our study, although the frequency of first-hand smoking was much less in women, however, they have been exposed much more to second-hand smoke than men. This also reported by the World Health Organization (WHO) in 2009 in their smoke-free environment guideline.²¹ High exposure to active and passive smoking contributes to increasing trend of mortality and morbidities of NCDs and malignancies that we are observing in Iran.²² This pattern need to be changed by implementing effective participatory and community-based interventions.^{4,6}

It has been reported that men, mid-elderly population and those with low socio-economic status and education smoked more tobacco.¹⁶ We also observed the same pattern with gender and age. This also has been reported by other studies in Iran²³ and in other countries such as China, Korea, European countries, and USA.²⁴ It means that smoking prevention interventions should be gender and age-oriented to be effective.

The downward trend in passive smoking from young adults to adult population and from women to men is again emphasize that still passive smoking disproportionately affected young population and women. Our findings are in agreement with results of other studies,²⁵ highlights the fact that non-smoker women are more susceptible to have exposure to tobacco smoke than non-smoker men.^{19,22} This finding indicates that despite the well-established smoking bans in public places, non-smokers including women still have extremely high exposures at home, particularly in lower-income countries.

Moreover, according to the current evidence implementing legislative bans has not led to any decline in either the prevalence or duration of exposure to smoke at homes.²⁶ Protecting non-smokers particularly women and children from exposure to cigarette smoke at residential areas and home should be a serious priority in terms of implementing effective programs to prevent, eliminate or quit smoking.

Similar to previous reports,²³ we observed that the prevalence of active tobacco smoking and proportion of people who smoked more than 20 cigarettes/day decreased in both men and women after the age of 55 years old. The downward trend

in active tobacco smoking after 55 years, at least in part, could be due to higher rate of mortality due to NCDs, e.g., cardiovascular diseases (CVD). This need to be investigated in proper study designs like cohort studies. Furthermore, decrease in a number of cigarette smoking in old ages may be due to complications, such as chronic obstructive pulmonary disease, that occurred after a long time exposure to smoke. In fact, such smokers were not able to smoke cigarettes as many as they did before.

We should acknowledge the limitation of our study. Since we only collected active and passive smoking behaviors and doses of exposure by self-report, we might misclassify some of the exposed and un-exposed groups. However, this misclassification should not be differential and we believe that our comparisons among the groups may be accurate enough, while some estimates may be underreported. However, given the existing biomarkers to identify the smoking status, in future studies these could be used to reevaluate the accuracy of responses. Another limitation to our findings is that we did not asked for the locations, home, work or public, where the passive smokers were exposed to tobacco. Anyway, overall, we found a high-level of passive exposure.

Conclusion

In summary, we found that smoking is pretty common among adult populations, particularly men. A majority of tobacco-free young adult women are exposed to passive smoking. Age and gender oriented interventions are required to change this risk pattern in our community to prevent from further smoking related morbidities and mortalities.

Conflict of Interests

The Authors have no conflict of interest.

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whose brilliance and passion to NCD prevention

will be forever missed.

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الگوی مصرف فعال و غیر فعال سیگار در جمعیت بالغین: مطالعه جامعه‌نگر کرمان (KERCADRS)

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مقاله پژوهشی

چکیده

مقدمه: مصرف سیگار یکی از مهم‌ترین عوامل خطر قابل تغییر برای بیماری‌های غیر واگیر است. هدف از انجام این مطالعه، گزارش الگوی مصرف فعال و غیر فعال سیگار در مطالعه جامعه محور شهر کرمان بود.

روش‌ها: با استفاده از روش نمونه‌گیری خوشه‌ای، ۵۹۰۰ نفر از جمعیت بالغین ۱۵ تا ۷۵ ساله شهر کرمان وارد مطالعه شدند. بعد از اخذ رضایت آگاهانه، هر فرد توسط یک مصاحبه‌گر آموزش دیده، مورد پرسشگری قرار گرفت. سؤالات بخش سیگار پرسش‌نامه شامل مصرف روزانه (حداقل یک سیگار در روز) و غیر روزانه سیگار در حال حاضر، مصرف سیگار در گذشته، مصرف غیر فعال و مدت زمان مصرف سیگار بود. با استفاده از روش استانداردسازی مستقیم، برآوردهای محاسبه شده بر اساس توزیع سنی جمعیت کرمان (به عنوان جمعیت هدف) به برآوردهای تطبیق داده شده تبدیل گردید.

یافته‌ها: در کل، ۸/۳ درصد از شرکت کنندگان (۱۵/۵ درصد از مردان در مقابل ۰/۸ درصد از زنان، $P = ۰/۰۱۰$)، خود را مصرف کننده روزانه و ۱/۷ درصد (۲/۹ درصد از مردان در مقابل ۰/۴ درصد از زنان، $P = ۰/۰۱۰$) خود را مصرف کننده غیر روزانه سیگار معرفی کردند. مصرف غیر فعال سیگار در ۲۷/۵ درصد از افراد گزارش گردید و این در حالی بود که این نسبت در زنان بیش از مردان مشاهده شد (۳۰/۱ درصد در زنان در برابر ۲۵/۰ درصد در مردان، $P = ۰/۰۱۰$). استعمال بیش از ۲۰ نخ سیگار در روز در ۳/۲ درصد از افراد مصرف کننده روزانه سیگار گزارش شد. در بین مصرف کنندگان غیر فعال سیگار، ۶۲/۶ درصد بیش از شش روز در هفته در معرض دود سیگار بودند.

نتیجه‌گیری: مصرف سیگار در جمعیت بالغین شهر کرمان به ویژه مردان، تا حدود زیادی شایع می‌باشد. علاوه بر این، نسبت بالایی از زنانی که خودشان مصرف کننده سیگار نیستند، به صورت غیر مستقیم در تماس با دود سیگار قرار دارند. بنابراین، طراحی و اجرای مداخلات متناسب با توزیع سنی و جنسی جمعیت، در جهت تغییر الگوی مصرف در جامعه و به دنبال آن پیشگیری و کاهش ناتوانی و مرگ و میر ناشی از استعمال سیگار ضروری به نظر می‌رسد.

واژگان کلیدی: مصرف سیگار؛ مصرف فعال سیگار؛ مصرف غیر فعال سیگار؛ عوامل خطر بیماری‌های قلبی-عروقی

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