RESEARCH COMMUNICATION

Analysis of Smoking Behaviour among Iranian Population: a Cohort and Period Analysis

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Abstract

Background: The patterns of smoking in ageing cohorts are important to public health authorities. The aim of this study is to describe the patterns of smoking among Iranian population.

Methods: Data from cross-sectional surveys of Health and Disease Survey (HDS) in Iran were utilized. Smoking was categorized as no smoker, light smoker (less than 10 cigarettes a day), moderate smokers (10 to 20 cigarettes a day), and heavy smoker (more than 20 cigarettes a day). Age group cohorts were constructed by following each age group to the next age group in two consecutive surveys. The change in smoking behavior was express as the difference of smoking prevalence and 95% confidence interval around the difference were constructed. Three birth cohorts of 1930, 1960, and 1975 were constructed among smoker and their age at initiation of smoking were assessed for the three cohorts.

Results: Smoking was more prevalent among age group 25-39 in males and age group 40-60 in females. Smoking prevalence increased in all categories of smoking behavior among male cohort of 15-25 year age-group and stayed stable afterward up to their 40's. After age 40, the prevalence of smoking decreased in heavy smokers and stayed stable in light and moderate smokers. A different pattern was seen among female smokers. Age at initiation of smoking decreased in the last decades. Among the male birth cohort of 1930, just 32.6% of smokers started smoking before age 20 compared with 48.7% in birth cohort of 1975, P value <0.0001. Similar pattern was seen among the female smokers.

Conclusions: The pattern of smoking in Iranian population high lights the fact that smoking behavior is highly age dependent.

Key Words: Smoking behaviour - Iran - age group - Cohort analysis

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Introduction

While in most industrialized countries the smoking habit is decreasing and becoming socially less acceptable, in developing countries, it is on the rise, fuelled by intensive promotional campaigns of the tobacco companies (Chaloupka et al., 2000). The World Health Organization (WHO) estimates that 4 million people die each year worldwide from tobacco-related illnesses. If current trends continue, this figure will rise to about 10 million per year by 2030, with 70% of those deaths occurring in the developing world (WHO, 2001). Studies of smoking related behavior in developed countries (as well as developing countries where data is available) have shown that the prevalence of smoking changes in different time periods and cohort born to a calendar period may experience different smoking related behaviors due to a range of factors in which tobacco advertising, socioeconomic status, taxation and price of cigarettes play a major role (Chaloupka et al., 2000; Lewit and Coate, 1982; Chaloupka and Grossman, 1996; Murphy et al., 2003). The demographic composition of smoking specially age at which smoker starts smoking has major impact on morbidity and mortality in later life resulting in tobacco control policies to target youth smoking (Ross and

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Chaloupka et al., 2003; Paffenbarger et al., 1978). Data on trends and changes of smoking prevalence has proven that cohort and ageing play a major role in smoking behaviors among smokers, a birth cohort analysis of smoking by adults in United Kingdom showed how the smoking prevalence is decreasing as cohorts of smoker are ageing (Kemm, 2001). These facts highlights how important are to study the patterns of smoking behavior in any population.

The trend and changes in smoking behavior among Iranian population has not been studied. Recent small surveys have estimated a prevalence of smoking as 20 to 26% among males and 2 to 4% among females (Jamshid et al., 2000; Azizi, 2001). The aim of this study was to explore the rate and magnitude of smoking behavior changes across ageing cohort of smokers in Iranian Population using data generated by National Health and Diseases Survey.

Materials and Methods

The Health and Disease Survey (HDS) is a repeated multipurpose national survey covering all Iranian households. The Ministry of Health, under-Secretary for Research, conducts the survey. The survey repeats each ten years and so far the result of two surveys has been published. One of the major aims of the survey is to assess risk factors and indicators of health and illness in Iranian population. The survey samples almost 0.001 of total population of Iran through a complex cluster sampling. The information generated through HDS is reported for each province and a report is made for the whole country by pooling all the data for all provinces. The survey is done through face-to-face interview of subjects by a team of trained interviewers. The questions related to smoking (interest of this paper) included, age at the initiation of smoking and amount of cigarette smoking per day. Smoking were categorized as light smoker if subject smoked less than 10 cigarettes per day, moderate smoker defined as smoking 10-20 cigarettes per day and heavy smoker defined as smoking more than 20 cigarettes per day. Ten-year age group cohorts were constructed by following each age group to the next age group; for example, the cohorts of 15-24-years-old in 1989 were the 25-35-years-old in 1999. Three birth cohorts of 1930, 1960, and 1975 were constructed among smokers and their age at initiation of smoking were assessed across the period 1930 through 1999. The changes of smoking rate across cohorts were expressed as prevalence difference and 95% confidence intervals of the difference were constructed to measure statistical significance. The analyses were done using Microsoft Excel, Office 2000.

Results

The 1989 survey included 12521 males and 12097 females and the 1999 survey included 16714 males and 19784 females. The crude prevalence rate of smoking was 27% in 1989 and 24% in 1999. In both surveys, smoking was more prevalent among age group 25-39 in males and age group 40-60 in females. Table 1 shows the distribution of age and severity of smoking in 1989 and 1999 for different categories of smoking behaviors and gender.

The male cohort of 15-25 years-age in 1989 kept smoking and smoking prevalence increased in all three categories of smoking behaviors and the increase was statistically significant (Table 2). In male cohort of 25-39, the heavy smoking increased 2.0% with 95% confidence interval of 0.5, 3.4; the light smoking decreased 6.3% with 95% confidence interval of –7.6, -5.1; and the moderate smoking did not changed (Table 2). In male cohort of 40-60 years-age, except the light smoker who kept smoking, the smoking rate dropped for heavy smoker 9.6% with 95% confidence

Table 1. Frequency of Smoking Behaviors among Different Age Groups Surveyed in 1989 and 1999 for Male and Female Population

Smoking Status	Age group 15-24		Age group 25-39		Age group 40-60		Age group >70	
	1989 No(%)	1999 No(%)	1989 No(%)	1999 No(%)	1989 No(%)	1999 No(%)	1989 No(%)	1999 No(%)
Male								
No smoking	2568(86.5)	4922(92.9)	2792(63.6)	3663(67.2)	2704(65.7)	3377(67.7)	*	755(77.2)
10<	207(7.0)	206(3.9)	622(14.2)	741(13.6)	356(8.7)	435(8.7)	*	87(8.9)
10+19	94(3.2)	94(1.8))	376(8.6)	448(8.2)	287(7.0)	396(7.9)	*	48(4.9)
>20	99(3.3)	77(1.5)	600(13.7)	598(11.0)	766(18.6)	779(15.6)	*	88(9.0)
Total	2968(100)	5299(100)	4390(100)	5450(100)	4113(100)	4987(100)	*	978(100)
Female								
No Smoking	4982 (99.3)	6749 (99.8)	4839(97.5)	6481(99.1)	3802 (92.5)	5379(96.3)	*	843(94.3)
10<	26(0.5)	4(0.1)	87(1.8)	41(0.6)	169(4.1)	125(2.2)	*	25(2.8))
10+19	3(0.1)	5(0.1)	27(0.5)	7(0.1)	61(1.4))	39(0.7)	*	11(1.2)
>20	5(0.1)	3(0.1)	11(0.2)	12(0.2)	80(1.9)	45(0.8)	*	15(1.6)
Total	5016(100)	6761(100)	4964(100)	6541(100)	4112(100)	5588(100)	*	894(100)

*No data were reported for this age group in 1989
*Table was reconstructed from original report

interval of -11.9, -7.5; and moderate smoker 2.1% with 95% CI of -3.7 , -0.6.

In females, there was no increase in the smoking rates in 15-24 year-age cohort and a slight decrease was seen in the heavy smoker category. There were no major changes of smoking rate in 25-40 and 40-60 age group cohorts (Table 2).

The age at initiation of smoking differed in the three birth cohorts born in 1930, 1960 and 1975 (Table 3). In males, smokers born in 1975 started smoking at younger age compared with the smokers born in 1960 and 1930 and the difference was statistically significant, P< 0.001 (39.2% of smoker born in 1975 start smoking at age less than 30 compared with 23% of birth cohort of 1960, and 20% of cohort born in1930). A trend in lowering of age at initiation of smoking was seen for three birth cohorts (Cohort of 1930, 1960, 1975) and the trend was statistically significant, P-vale<00001. The same pattern was seen among women born in 1930, 1960, and 1975, table 3.

Table 3. Percent of Smokers in each Birth Cohort who Started Smoking at Age Less than 20 Years for Male and Female

Birth Cohort	Female	Male
1930	20.5	32.6
1960	23.8	38.8
1975	39.2	48.7

* P-value for trend for both sexes <0.0001

Discussion

Our study showed that how age affects the smoking behavior of smokers in Iranian population. The fact that the prevalence of smoking increased among the male cohort of 15-25-years-age in all categories of smoking behaviors and stayed, almost, stable at the 25-40- years-age cohort is indicative of pattern of smoking in our population. As our data shows, after age 30, there is no increase in smoking rate among light and moderate smokers and even a slight decrease is seen in the rate of smoking. This indicates that most of smokers initiate smoking in younger age and as the cohort ages chance of becoming smoker is stable or even decreases in the cohort. This pattern of smoking has a public health implication, that is, any public health program that plans reduction of smoking prevalence in our population needs to address age group less than 25 years. The fact that a stable rate of smoking was seen in ageing cohort of 25 years implies that any intervention addressed to this age group should have more ingredient of smoking cessation. Result of our study is consistent with studies done in smoking behavior on individual levels in which a positive correlation is established in age at initiation of smoking and smoking in later age and the fact that there is more attempts of smoking cessation than initiation in older age (Ma et al., 2003). Our study complements these facts in providing information needed to plan smoking reduction strategies at the community level. The overall pattern of smoking rate for cohort of 25 and 40 indicates that the rate of light and moderate smoking tends to stay stable and rate of heavy smoking sharply decreases after 40's. The decrease in smoking rate among heavy smokers may be due to the fact that heavy smokers can feel the overt effects of smoking such as chronic obstructive pulmonary diseases and even signs and symptoms of more sever adverse effects such as emphysema (Cheng and Li, 2002). Such an overt effect results in reduction of prevalence among heavy smokers, in contrary, light and moderate smokers are in covert stage of smoking damage to their health lacking a reduction in smoking prevalence rate among them. A stable rate of smoking in light and moderate smokers well into their 50 or 60's will expose these smokers to the cumulative effects of smoking (Chen, 2003) and consideration should be given to this fact both in public education and smoking reduction strategies.

A very low rate of smoking and an lack of increase in the female rate of smoking over ageing cohort of 15 years (contrary to pattern seen in male population) indicates the very conservative life of women in Iranian society in which an early marriage among girls imposes certain social behavior in which women are no longer exposed to the

Table 2. Changes of Smoking Behavior Over Ten Years Period for Different Age-group Cohorts for Females and Males

Smoking Behavior	15-25 age cohort			25-40 age cohort			40-60 age cohort		
	Estimated Change	95%	CI	Estimated Change	95%	CI	Estimated Change	95%	CI
Female									
10<	0.1	-0.4	0.2	-0.4	-0.5	1.0	-1.3	-2.7	-0.2
10+19	0.1	-0.1	0.0	0.2	-0.2	0.5	-0.3	-1.3	0.4
>20	0.1	-0.1	0.21	0.6	0.3	0.9	-0.3	-1.4	0.5
Male									
10<	6.6	5.2	8.0	-6.3	-7.6	-5.1	0.2	-1.6	2.3
10+19	6.5	5.6	7.3	-0.6	-1.7	0.5	-2	-3.7	-0.6
>20	7.6	6.7	8.8	1.9	0.5	3.3	-9.6	-11.9	-7.5

A negative sign in the estimated change indicates a reduction in the smoking rate across aging cohort.
A Confidence Interval (CI) including zero indicates no change in the smoking rate across aging cohort.

factors that contribute to increasing smoking rates, especially peer pressures. The impact of reproductive life of women on chronic disease risk factors such as smoking has been demonstrated in other study (Freedman et al., 2002).

Age at initiation of smoking is a major predictor of adverse effects of smoking on health as it has been demonstrated in US college students who reported their smoking behavior between 1916 and 1950 risk of cancer and cardiovascular diseases were increased among individuals who smoked in young adulthood (Chen, 2003, Paffenbarger et al., 1978) or in large cohort of women it was demonstrated that initiation of smoking before age 15 was associated with higher risk of mortality from cardiovascular diseases, cancer and even injury (Chen, 2003, Kawachi et al., 1993). Our study showed that age at initiation of smoking has decreased in the last 50 years expecting more adverse impact of smoking in mortality and morbidity in recent years and future. The decrease in age at initiation of smoking in recent years has been demonstrated in other societies in both developed and developing countries and such decrease has been attributed to urbanization and exposure to smoking advertisement at early age (Lovato et al., 2003).

It should be noted that although analyzed as a cohort this study is strictly a multiple cross-sectional study based on repeated samples of whole population implying its limitation in attributing results to individual subjects. The Health and Disease Survey (HDS) in Iran uses a multi-stage cluster sampling procedure done every ten years. This may question the comparability of different samples but it has been proven that cohort based on cross-sectional survey is more robust and any differences arising from methodological changes in the surveys are likely to be small compared with cohort of the same individuals (Laaksonen et al., 1999). Although the Health and Disease Survey (HDS) is not immune to the problem of non-response and social acceptability bias but these are minimized by detailed interviewing protocols, trained interviewers and quality control programs implemented in the survey.

In conclusion, this cohort analysis showed the very effect of age on smoking behaviors in Iranian population plus it highlighted on the changes that are taking place over decades in lowering age at initiation of smoking that has very profound effect on mortality and morbidity attributed to smoking.

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