

# Persistent High Rates of Smoking among Israeli Arab Males with Concomitant Decrease among Jews

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**ABSTRACT:** **Background:** During the last few decades much effort has been invested into lowering smoking rates due to its heavy burden on the population's health and on costs for the health care services.

**Objectives:** To compare trends in smoking rates between adult Arab men and Jewish men and women during 2000–2008.

**Methods:** Six random telephone surveys were conducted by the Israel Center for Disease Control in 2000–2008 to investigate smoking rates. The number of respondents was 24,976 Jewish men and women and 2564 Arab men. The percent of respondents reporting being current smokers was calculated for each population group (Jews and Arabs) by age, gender and education, and were studied in relation to time.

**Results:** Among Jewish men aged 21–64 smoking declined during 2000–2008 by about 3.5%. In the 21–44 age group this decline occurred only among respondents with an academic education. Among Jewish women this decline also occurred at ages 21–64, and in the 45–64 age group this decline was due only to a decline in smoking among those with an academic education. Among Arab men aged 21–64 an increase in smoking rates of about 6.5% was observed among both educated and less educated respondents.

**Conclusions:** Smoking prevalence is declining in Israel among Jews, but not among Arab men. The larger decrease in smoking rates among academics will, in the future, add to the inequalities in health between the lower and higher socioeconomic status groups and between Arabs and Jews. This calls for tailored interventions among the less educated Jews and all Arab men.

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**KEY WORDS:** smoking, trends, education, Jews, Arabs

health care system, the school system, etc.) [1]. These interventions have brought about a large change in smoking rates around the world [2,3].

The global smoking trends differ around the world: in some developed countries the prevalence of smoking has decreased over the last few decades, but in other less developed countries the opposite trend has been observed [4–6]. According to the cigarette epidemic model [7], socioeconomic distribution in smoking is related to stages of the tobacco epidemic. However, there are several small discrepancies in smoking prevalence trends compared with Lopez's model as suggested by Khang and Cho [8].

In the United States, trend analysis of smoking prevalence during the years 1998–2007 indicated that smoking decreased in 44 states, but there was no substantial change in prevalence in 6 states after controlling for age, gender and race/ethnicity [9]. Data comparing 36 populations from the MONICA study showed that trends differ between men and women. Among men, 16 populations showed a decrease in smoking prevalence and the rest remained stable, whereas among women smoking prevalence increased in six populations and decreased in nine. Among women, smoking tended to increase among populations that had low initial rates of smoking and decreased in populations that had high initial rates [10]. Other studies also show differences between men and women, such as in South Korea where smoking decreased during the years 1989–2003 among men but not among young women [8].

The prevalence of smoking depends also on socioeconomic status; the rates of smokers in the lower socioeconomic strata are higher compared to those of higher socioeconomic status. This is especially pronounced when comparing more educated people with the less educated. Many studies in different parts of the world have shown that smoking prevalence was lower among higher educated people and that the decrease occurred among this group more so than among the less educated [8,11–13]. In the USA, adults with only a high school education or less had the lowest quit ratios [14]. Gruer et al. [15] suggested that "smoking itself was a greater source of health inequality than social position....," as these

**M**uch effort has been invested into reducing levels of smoking during the last few decades. Attempts to reduce smoking on a national level include different strategies, such as policy making (banning smoking in public places, cigarette taxation) and communication campaigns and education (anti-smoking intervention programs in the

differences in trends in the decline of smoking contribute to the increase of inequalities in health.

Ethnicity within the same country is also related to smoking [16,17]. Wagenknecht and colleagues [16] noted that in the USA the prevalence of smoking was decreasing among young European American adults, but increasing among African American men and was stable among African American women. Therefore, it seems that although most interventions are implemented on a national level their effect is not equally distributed among all population groups. The unequal distribution of the behavioral change between ethnic groups may in the long run also enhance inequalities in health.

Following trends of smoking in the general population, as well as in specific subpopulations, has important benefits. It is useful for evaluating strategies or interventions for smoking prevention and smoking cessation in a given population, for assessing needs, and for identifying different subpopulation groups with special needs [18,19].

In this report, we present data collected from several cross-sectional surveys on cigarette smoking rates in the adult population in Israel by gender, education level and ethnicity. A special emphasis was put on the comparison between the Arab and the Jewish population who are entitled to the same health services covered by the National Health Insurance Law and who are equally exposed to national interventions, such as bans on smoking in public places. These data can be used to evaluate national strategies for decreasing smoking and can be of help in planning future interventions for specific population groups.

## SUBJECTS AND METHODS

The Israel Center for Disease Control in the Ministry of Health conducted six national telephone cross-sectional surveys between 2000 and 2008. Four of these surveys were conducted in collaboration with the Ministry of Health's Department of Health Promotion and Education as part of an ongoing biennial national survey to monitor trends in Knowledge, Attitudes, and Practices relating to health during the years 2000, 2002, 2004 and 2006. Two additional surveys were part of the ICDC Israeli National Health Interview Survey. Two surveys were run so far: the first (INHIS-1) from April 2003 to October 2004 and the second (INHIS-2) from June 2007 to March 2009. The INHIS study questionnaire is based on the European Health Interview Survey (EUROHIS) framework initiated in 2000 by the World Health Organization Regional Office for Europe and was slightly modified to address local variables and factors.

The Israel Ministry of Health has the authority and responsibility to conduct national health surveys including

data analysis and dissemination of findings. Informed consent for each interview was obtained over the telephone.

All six surveys used the same methodology for sampling potential respondents. This included a random sample of telephone numbers that was drawn from a computerized list of subscribers to the national telephone company. According to the Central Bureau of Statistics data for the year 2007, 84.3% of all Israeli households had at least one active land telephone line and 6.6% had at least two [20]. Exclusion of fax numbers, disconnected numbers, commercial numbers and numbers of households where no residents aged 18 or over were available comprised the total sample. Each household was contacted on at least six occasions at different times of the day before it was considered inaccessible. The total number of Jewish male and female respondents was 24,976 and the total number of Arab male respondents was 2564. The response rate ranged from 64% to 37.1% and averaged 51.9%.

The Arab population was over-sampled in order to ensure a large enough population for analysis. For the KAP survey of 2000 there was no over-sampling of the Arab community, therefore the 2000 data for Arabs are not presented. Since smoking among Arab women is very low (around 5%) the sample was not large enough to enable analysis by age and education, therefore the smoking data for Arab women are not presented.

The questionnaire was administered over the telephone by trained interviewers from the corresponding population group for each language – Hebrew, Arabic and Russian. The questionnaire was translated into Arabic and Russian and back-translated into Hebrew to ensure correct translation.

The estimation of the prevalence of adult cigarette smoking in Israel during the years 2000–2008 was based on the self-reporting of the respondents. Respondents were asked whether they smoked. In the INHIS surveys the possible answers were "yes" or "no," and in the KAP surveys the options were "yes, sometimes," "yes, everyday" and "no." Current smokers were those who responded affirmatively to the question, including the "yes, sometimes" answer. The time points referred to were 2000 (KAP 2000 survey), 2002 (KAP 2002 survey), 2003–4 (the first INHIS survey), 2004 (KAP 2004 survey), 2006 (KAP 2006 survey) and 2008 (the second INHIS survey, conducted mainly in 2008). Additionally, a dummy variable of smoking rate was added for the years 2001, 2005 and 2007 based on an averaged estimate of the former and later time point to smoothen the trend graphs.

Education was defined in the two first surveys (KAP 2000 and KAP 2002) by the question "What is your education," with possible answers of: elementary, junior high, high school, or academic. In all other surveys the question was "What is the highest degree you have achieved – a high school diploma, a

ICDC = Israel Center for Disease Control

INHIS = Israeli National Health Interview Survey

KAP = Knowledge, Attitudes, and Practices

professional diploma, or an academic degree." Those reporting anything except an academic degree were categorized as non-academic and those reporting an academic degree were categorized as having an academic education.

The percent of smokers was calculated for each group (Arabs and Jews) by gender, age (three subgroups) and education level. Trends in smoking between 2000 and 2008 by gender, education and ethnicity were based on the calculated slope of the regression line, using Excel software.

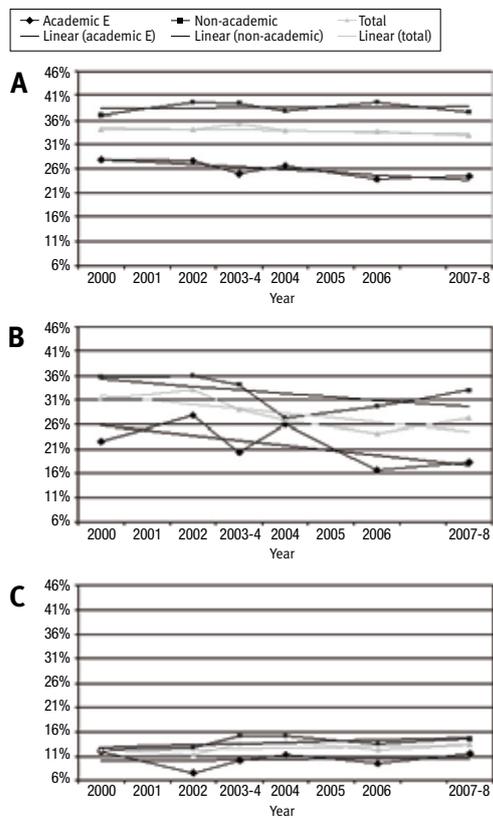
**RESULTS**

The six waves of the surveys included 24,976 Jewish respondents; 43.5% of them were men and 56.5% women. Thirty-eight percent of Jewish men and 33.3% of Jewish women had an academic education. Among Arab men (total 2564), only 21.3% had an academic education. Among Jews, 42% were aged 21–44, 38% were 45–64, and 20% were over 64. Among Arab men, 57% were 21–44 years old, 32% were 45–64, and 11% were over 64.

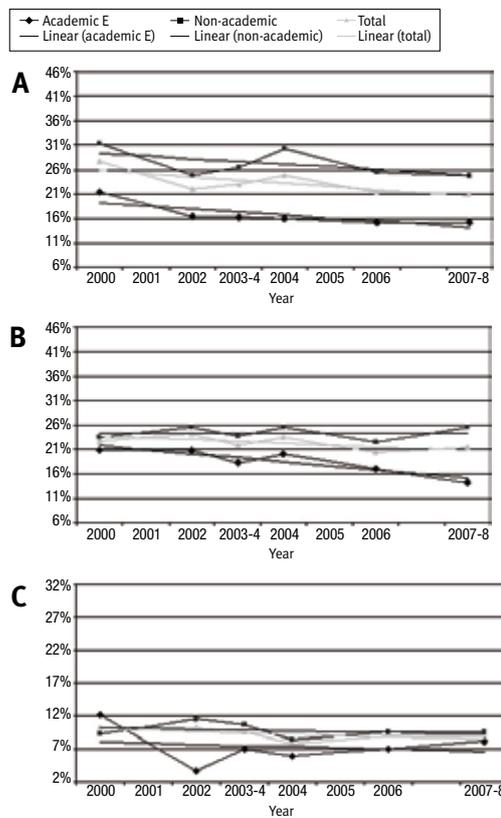
Generally, smoking rates among Arab men were significantly higher than those of Jewish men, and Jewish women had lower smoking rates compared to men. Among Jewish men,

rates of smoking decreased during the years 2000–2008 in all age groups up to 64. Over 64, rates remained low and constant (around 13% among non-academics and 11% among academics). Among young Jewish men (ages 21–44) the decline in smoking can be attributed to a decline in smoking among those with an academic education, whereas among those without an academic education there was no change in smoking [Figure 1A]. Table 1 presents the computed slope of the trend and the mean annual change in smoking. In the younger age group (21–44 years) the decline in smoking among academic Jewish men was around 2% every year, whereas among the non-academic Jewish men there was no substantial change (0.1% per year) ( $P = 0.024$ ). Among Jewish men aged 45–64, both those with and without an academic education showed a pronounced decline in smoking rates [Figure 1B]. The academic men had a larger decline each year (4.2%) compared to the non-academic men (2%) ( $P = 0.623$ ); however, the difference was not significant. The time trends in smoking rates among Jewish women showed a different pattern compared to Jewish men [Figure 2]. The changes in young women (ages 21–44) were independent of education level [Figure 2A]. However, among older women (ages 45–64), the decline in smoking was due to a decline in

**Figure 1.** Smoking trends among Jewish men by education. [A] Age 12–44, [B] age 45–64, [C] age < 64 (%)



**Figure 2.** Smoking trends among Jewish women by education. [A] Age 12–44, [B] age 45–64, [C] age < 64 (%)



**Table 1.** Trends in smoking rates during the years 2000–2008, by population group, age group and education

	Age	Education	Mean rate of smokers (%)	Slope	Annual percent change
Jewish men	21–44*	Non-academic	38.5	0.04	0.10
		Academic	25.8	-0.50	-1.9
	45–64	Non-academic	32.6	-0.61	-1.9
		Academic	22.0	-0.91	-4.2
	65+	Non-academic	13.9	0.21	1.6
		Academic	10.4	0.05	0.5
Jewish women	21–44	Non-academic	27.2	-0.60	-2.2
		Academic	16.8	-0.64	-3.8
	45–64	Non-academic	24.3	0.005	0.2
		Academic	18.5	-0.83	-4.5
	65+	Non-academic	9.8	-0.09	-0.9
		Academic	7.3	-0.22	-3.0
Arab men**	21–44	Non-academic	48.6	1.45	3.0
		Academic	36.9	1.66	4.5
	45–64*	Non-academic	48.6	1.44	3.0
		Academic	33.9	0.34	1.0
	65+	Non-academic	28.0	-2.2	-7.8
		Academic	–	–	–

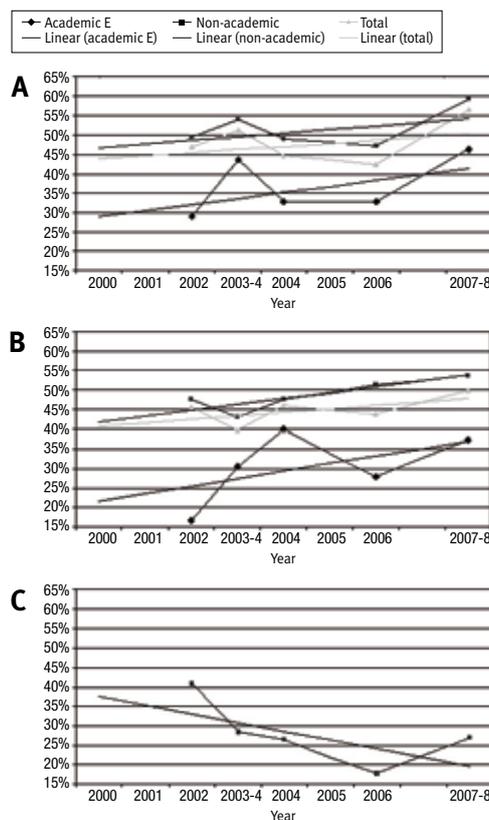
\*  $P < 0.05$  comparing trends among non-academics and academics

\*\* Including years 2002–2008

smoking only among those with an academic education (4.5% decline each year) [Figure 2B and Table 1]. Those without an academic education showed no change in smoking prevalence during those years (0.2% change each year with a slope of 0.05); again these differences were not statistically significant. Among women over 64, only about 9% smoked and no further decline was observed [Figure 2C].

Figure 3 presents the trends in smoking among Arab men. Rates of smoking among Arab men aged 21–64 did not decline; on the contrary, it seems that the rates of smoking among Arab men are increasing, both among academics and non-academics [Figure 3 A,B]. Among the younger age group of Arab men, the increase in smoking was on average 3% each year among non-academics and 4.5% among academics ( $P = 0.734$ ) [Table 1]. Among 45–64 year old Arab men the increase in smoking was greater among non-academics (3% annual change) compared to academics (1% annual change) and was statistically significant ( $P = 0.001$ ). In 2008, over 50% of Arab men reported smoking. In the older age group (over 64) the rates of smoking declined drastically during the period 2000–2008, with an average of 7.8% each year among non-academics [Figure 3C]. Even so, the reported smoking rates in this age group were much higher compared to the parallel age group of Jewish men: 26% and 13% in 2008,

**Figure 3.** Smoking trends among Arab men by education. [A] Age 12–44, [B] age 45–64, [C] age < 64 (%)



respectively ( $P = 0.002$ ). Smoking rates were higher among Arab non-academic men compared to academics.

**DISCUSSION**

Smoking trends in Israel follow the pattern of smoking in the developed world both for majority and minority populations. Smoking rates have been decreasing during the last decade in the majority population of Jews, whereas in the minority population (Arab men) the rates are increasing. A similar pattern was described in the USA CARDIA study among young adults, where smoking among black men increased, was stable among black women and declined among white men and women [16]. The rates of smoking among Arab men are nearly twice as high as among Jewish men. This smoking pattern among Arabs is characteristic of the first stages of the cigarette epidemic, with high rates of smoking among men and low rates among women [7]. In the past, most other communities that had high levels of smoking among men and low levels among women have lower levels of smoking rates among men today; however, it seems that the Arab community has not changed its pattern of smoking as occurred

in other communities, e.g., the Jewish community in Israel. Smoking among men in the Arab community is an acceptable social norm, and it seems that this has not changed as in other societies and is similar to other neighboring Arab countries. Smoking is socially accepted also in other Arab countries such as Jordan, with similar rates of smoking in men (50%) and women (less than 10%) [21], and Lebanon, with 53.6% smoking among men [22]. The interventions implemented in Israel seem not to have the desired effect on this community; we may add that these interventions were mostly not tailored for the Arab community. In Israel, the Arab population receives their health care from the same health care services as the Jewish population and these services have implemented interventions aimed at increasing smoking cessation. However, it seems these interventions had no effect within the Arab community. This may be due both to ineffective interventions and fewer intervention efforts in this community.

As the increase in smoking rates among Arab men parallel the decrease in smoking among Jewish men, in the future the differences in rates of diseases such as lung cancer and cardiovascular diseases may increase the inequalities in health. This trend was already noted: in the 1980s there was no difference in mortality rates from heart diseases between Jewish and Arab men, but in the 1990s mortality was higher among Arab men [23]. These high rates of smoking also explain the relatively high levels of lung cancer among Arab men compared to Jewish men [24]. These results indicate that a decrease in health inequalities between Arabs and Jews should not be expected in the near future, as smoking is a major risk factor in general.

Rates were highest in the younger age group among all groups monitored in this study – men, women, Jews, and Arabs. However, in each population group the trends vary by age and education. Among Jews (men and women) up to the age of 64, smoking rates are decreasing. However, over age 64 the rates are stable. It seems that the 10–15% that are still actively smoking are highly addicted and find it very hard to stop smoking. Among Arabs aged 65 and over, smoking is decreasing unlike the trends in the younger age groups; however, it is still far from the low levels among Jews. It is not clear why the trends in smoking are different in those 65 years of age and older compared to the other groups, especially among Arabs.

A major phenomenon observed in this study is the large difference in smoking trends in the educated population compared to the less educated population. Most of the decrease in smoking in Jewish men aged 21–44 and Jewish women aged 45–64 is due to a decrease in smoking in those with an academic education. Those without an academic education do not show any signs of changing their smoking norms. This phenomenon has been reported in other countries. In

Canada between the years 1974 and 2005 both relative and absolute educational inequalities in smoking widened [11]. In Italy, the gap between high and low educated people who smoke has been increasing especially in the younger age group [12], and higher educated smokers have higher cessation rates compared to lower educated smokers. In South Korea for the years 1989–2003 the inequalities by education increased for both men and women aged 20–44 [8]. Giskes et al. [13] examined trends in nine European countries and in a combined country analyses and noted a greater decline in smoking rates among the more educated men and women compared to the less educated; however, a country-specific analysis showed greater declines in smoking among less educated British men and women and Italian men compared to the more educated. In the USA a decline in all white women's educational groups was reported, while a similar trend was reported only in the more educated white men [16]. This phenomenon seems to be universal in populations that have declining rates of smoking, apart from a few exceptions.

The decrease in the percent of smokers may be due to increased rates of smoking cessation, or decreased levels of initiation of smoking. As smoking initiation occurs mainly under the age of 21 [25] it seems logical that the decrease in smoking in the older age groups is mainly due to cessation, whereas in the 21–44 age group both a decrease in initiation and an increase in cessation may add to the declining trends in smoking rates. This well-reported phenomenon is not observed among Arabs: both educated and less educated Arab men have not ceased to smoke. Many factors may be the cause of this difference: the high rates of smoking (above 50%) have formed a positive social norm towards smoking within Arab society; these positive norms prevent smoking cessation and form an environment, both physical and social, that support smoking. Going against the norm in a more collective and traditional society may be more difficult than in a more individualistic society. Better tailored interventions targeting Arab society may bring a change that was not observed during the last decade.

This analysis utilizes a large representative sample of the Israeli population. However, it has several limitations: the information regarding smoking and education levels were self-reported, a different population was interviewed each year, and respondents were not followed throughout the years.

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## CONCLUSIONS

Rates of smoking are decreasing in the Jewish Israeli population and increasing in the Arab male population; however, the decrease among Jews occurred mainly among those with an academic education. This may have profound effects on inequalities in health generally and especially between Arabs and Jews in the future.

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