RESEARCH PAPER

Changes in smoking prevalence in Ukraine in 2001–5

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Tobacco Control 2007;16:202–206. doi: 10.1136/tc.2006.019588

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Received 10 December 2006
Accepted 8 March 2007

Objectives: To analyse trends in smoking prevalence in Ukraine from three surveys conducted in 2001–5, and to explore correlates of observed changes, in order to estimate the stage of tobacco epidemic in Ukraine.

Design: Repeated national interview surveys in Ukraine in 2001, 2002 and 2005.

Main outcome measure: Prevalence of current smoking among the population aged ≥ 15 years.

Results: The age-standardised prevalence of current smoking in Ukrainian men was 54.8% in 2001 and 66.8% in 2005. Among Ukrainian women, prevalence increased from 11.5% in 2001 to 20.0% in 2005. ORs for yearly increase in prevalence were estimated as 1.164 (95% CI 1.111 to 1.220) for men and 1.187 (1.124 to 1.253) for women, which implies that, on average, 3–4% of men and 1.5–2% of women living in Ukraine join the smoking population each year.

Conclusions: In Ukraine, smoking prevalence is increasing in most population groups. Among men, the medium deprivation group with secondary education has the highest smoking prevalence. Among women, while the most educated, young and those living in larger cities are the leading group for tobacco use, other groups are also increasing their tobacco use. Tobacco promotion efforts appear to have been significantly more effective in Ukraine than smoking control efforts. The decrease in real cigarette prices in Ukraine in 2001–5 could be the main factor explaining the recent growth in smoking prevalence.

Ukraine is a large eastern European country with high smoking prevalence. Tobacco products are widely available at very low prices, and the transnational tobacco industry is extremely successful in promoting its products and lobbying for its interests in the legislative field. Advocacy of tobacco control has only recently achieved some success in the legislative field, with the first tobacco control law being adopted in late 2005. Ukraine ratified the Framework Convention on Tobacco Control in 2006, but there is still much cause for concern regarding the enforcement and effectiveness of the adopted legislative measures. Unfortunately, the government is not yet involved in nationwide surveillance of the tobacco problem, and the available data have mostly been gathered with funding from foreign donors.

Several attempts have been made to measure the extent of the tobacco epidemic in the countries of the former Soviet Union (FSU).^{1–7} Most of these studies have shown rather high smoking prevalence among men (50–70%) and comparatively low prevalence among women (5–20%). Most countries in the FSU have similar smoking rates, while certain trends are shown to be related to the differences in how the transnational tobacco industry succeeds in every national tobacco market.⁶ Unfortunately, few studies have been published showing trends in smoking prevalence in the FSU.⁷ In Ukraine, two studies^{3,4} provided point estimates of smoking prevalence.

The aim of this study was to analyse trends in smoking prevalence in Ukraine, on the basis of three surveys conducted in 2001–5, and to explore correlates of observed changes in order to estimate the stage of the tobacco epidemic in Ukraine.

METHODS

Study samples

The study is based on three national surveys of tobacco use. In all three surveys, samples of the Ukrainian population aged ≥ 15 years were interviewed face-to-face; in all three cases, the distribution of the samples by age, sex and education corresponded well with that of the general population. All the surveys utilised the multistage sampling procedures, and

respondents were recruited from all 26 administrative territories of Ukraine.

The Ukrainian Institute of Social Research (Kiev, Ukraine) conducted the 2001 survey in June. Tobacco-related questions were administered within an omnibus including other topics. The sample included 1168 men and 1338 women. The 2002 survey was conducted in November, again by the Ukrainian Institute of Social Research. The sample included 1057 men and 1203 women, and the omnibus technique was used again. The 2005 survey was conducted by the Kyiv International Institute of Sociology; 920 men and 1232 women were interviewed. The survey used a more extensive questionnaire compared with those in the previous surveys, and it covered all areas of tobacco control.⁸

Measurements

With all three surveys, the authors either commissioned the surveys or were responsible for the questionnaire development. Questions in the 2002 and 2005 surveys were based on the WHO recommendations regarding tobacco epidemic monitoring.⁹ The outcome measure was “current smoking”, and the question asked was: “Currently, do you smoke every day, some days or not at all?” Those who smoked every day or some days were considered current smokers. In the 2001 survey,¹⁰ respondents were asked, “Do you smoke? Yes/no”. Those who responded “yes” were considered current smokers.

Respondents' level of education was measured according to different scales from four to seven points by the different agencies involved. These were all collapsed to the three-point scale, as “primary”, “secondary” or “university” education.

The deprivation measurement was based on a scale of material status, which included very low, low, lower middle, middle, upper middle, high and very high. Some of these options were less popular than the others, so the groups were not comparable. None of the respondents chose the high or very high options. According to the real distribution of the answers, the deprivation scale was re-constructed in the following way.

Abbreviation: FSU, former Soviet Union

Low deprivation included middle and upper middle material status; medium deprivation included lower middle material status; and high deprivation included low and very low material status.

Settlement size was categorised as villages, small towns, cities, and cities with more than one million inhabitants. The settlement types were assigned to all the respondents by the interviewers.

For age categorisation, we used the WHO 15-year age groups that allow comparisons within samples of limited size: 15–29, 30–44, 45–59, 60–74 and ≥ 75 .

Statistical analysis

As smoking has different prevalence rates and different correlates between men and women, data were analysed separately for these two categories. Smoking prevalence rates were standardised for age by the direct method, using the population as per the census conducted in Ukraine in 2001 as standard population.

The trend for smoking prevalence was analysed using logistic regression analysis with year of the survey as a continuous independent variable. Sociodemographic characteristics (age, education, settlement type and level of deprivation) were controlled as potential confounders. Effect modification was explored by means of including combinations of the same variables with year of survey in the logistic regression model.

RESULTS

Table 1 shows the distribution of the samples, separately for men and women, by age group, education, material deprivation, place of living and smoking. Within each gender, there were no major differences between the surveys. However, there were relatively more young people in the 2001 sample, and there were more women aged ≥ 60 years in the 2002 and 2005 surveys.

In earlier samples, there were more people with secondary education and more deprivation, and in later surveys more people with university education and lower level of deprivation.

The proportion of respondents from large cities increased, and decreased from small towns. The proportion of population living in villages was stable (29–32%).

The raw data regarding current smoking revealed an upward trend.

The crude prevalence of smoking by gender and age group is shown in table 2.

The overall upward trend is seen in most age and gender groups.

Results of logistic regression of smoking prevalence rates on the survey year are shown in tables 2 and 3. Overall, the average yearly increase of smoking prevalence is expressed in OR, which is 1.164 (1.111 to 1.220) for men and 1.187 (1.124 to 1.253) for women.

The highest prevalence rates were seen in the youngest group of women (aged 15–29 years), and in the group of men aged 30–44 years. For both men and women, age was found to be a significant effect modifier. For both genders, upward trends were more considerable in those age groups which were older than the age group with the highest prevalence—that is, 45–74-year age group for men and 30–74-year age group for women.

Age-standardised prevalence of current smoking for men and women is shown in table 3.

Like age, education was found to be both a confounder and an effect modifier of smoking prevalence trends. Unlike many other countries, the highest prevalence was seen in the group with secondary education among men and in the group with university education among women, rather than in the group with only primary education. This may be partly due to the age characteristics of the primary education group in Ukraine: this level of education is not typical for Ukraine, being found mostly in the oldest age group, which has a low smoking prevalence, or in the 15–16-year age group, which has not completed

Table 1 Description of the samples (crude percentages)

	Men			Women		
	2001	2002	2005	2001	2002	2005
Number of respondents	1269	1140	967	1452	1271	1272
Age group (years)						
15–29	40.0	34.3	32.7	37.5	28.6	23.0
30–44	29.3	29.8	32.0	27.1	27.1	24.8
45–59	20.9	21.9	19.8	24.6	25.4	20.6
60–74	9.5	13.9	12.4	9.8	18.9	22.2
≥ 75	0.3		3.2	1.0		9.4
Education						
Primary	13.6	16.2	12.7	14.5	17.9	19.4
Secondary	68.6	46.4	44.4	65.0	40.0	34.7
University	17.8	37.4	42.9	20.5	42.1	45.9
Material deprivation						
Low	33.3	39.3	59.6	30.7	33.0	52.8
Medium	34.3	30.7	19.1	27.6	30.5	22.0
High	32.5	30.0	21.3	41.7	36.5	25.2
Settlement size						
City >1 million	17.6	26.4	23.9	17.4	27.6	27.2
City	31.9	10.4	28.0	31.5	10.3	25.9
Towns	18.9	31.7	19.1	20.0	30.8	18.1
Villages	31.6	31.5	29.0	31.1	31.3	28.9
Smoking						
Current	56.9	66.7	66.6	14.2	17.0	19.7

Table 2 Crude prevalence of current smoking by sex and age group, by selected years

Age group (years)	Men					Women				
	2001	2002	2005	OR (95% CI)*	p value for trend	2001	2002	2005	OR (95% CI)*	p value for trend
n	1269	1140	967			1452	1271	1272		
15–29	56.1	65.0	68.4	1.136 (1.047 to 1.233)	0.002	22.4	27.0	30.4	1.093 (1.002 to 1.192)	0.045
30–44	62.9	72.9	69.6	1.111 (1.018 to 1.213)	0.018	14.5	22.9	31.7	1.243 (1.138 to 1.359)	<0.001
45–59	57.0	70.8	68.1	1.176 (1.063 to 1.301)	0.002	7.3	10.8	17.9	1.248 (1.108 to 1.407)	<0.001
60–74	41.7	50.9	58.3	1.196 (1.084 to 1.320)	<0.001	0.7	1.7	3.9	1.425 (1.058 to 1.919)	0.020
≥75	50.0		41.9		0.704			2.5		
All ages†	56.9	66.7	66.6	1.164 (1.111 to 1.220)	<0.001	14.2	17.0	19.7	1.187 (1.124 to 1.253)	<0.001

*Logistic regression of smoking prevalence by year, adjusted for age, education, deprivation and level of urbanisation.

† Not standardised for age.

secondary education. The largest increase in prevalence was seen in men with lower education and in women with higher education.

Although many other countries have reported an inverse relationship between smoking and deprivation, this association was not found in Ukraine, with the highest smoking prevalence found among men with a medium level of material deprivation. This deprivation group showed the largest increase in smoking prevalence between 2001 and 2005. Among women, although an association is obvious in the table, with least deprived women having the highest smoking prevalence, this association becomes non-significant when age is controlled: those women who report being more affluent are more likely to be young and to be smokers. With deprivation as with age, we observe a specific pattern of development of the tobacco epidemic: the smoking prevalence was the highest in least deprived group, while the most deprived group demonstrated the largest increase.

Place of living was not associated with smoking prevalence in men, and the highest smoking prevalence was seen among women living in larger cities. All groups living in different settlements showed similar significant upward trends in smoking prevalence.

DISCUSSION

A considerable increase in smoking prevalence is shown. The measure of increase expressed as OR = 1.164 for men and OR = 1.187 for women represents a yearly increase in smoking of 2 percentage points in populations with low or very high prevalence (10–20% as in women in Ukraine or 80–90%), and of 4 percentage points in populations with prevalence close to 50%. This implies that, between 2001 and 2005, on average, an additional 1.5–2% of adult (15 years and older) women and 3–4% of men living in Ukraine became smokers every year. In fact, the proportion of new smokers could be even larger, as some smokers quit. This process developed in a different way between men and women. Men were more likely to be smokers if aged 30–60 years, had secondary education and had a medium level of deprivation. Yet, the risk of becoming a smoker among men was higher among the lower educated, and again among people with medium level of material deprivation. These observations show that different trends coexist in the development of tobacco epidemic among Ukrainian men: the most educated and affluent are no longer in the vanguard of smoking uptake, but smoking is by no means confined to the poorest.

In 2005, smoking prevalence among men in Ukraine was the highest in the WHO European Region.¹¹

The characteristics of the tobacco epidemic in Ukrainian women suggest that it may be related to emancipation and

social ascension. Women who are young, live in large cities and have university education are more likely to smoke. However, the epidemic is now spreading from this group, as increasing trends to become a smoker are seen in all other age groups, and in materially deprived women, despite university education remaining associated with the highest risk of smoking uptake.

Looking at the gradients of smoking prevalence between the lower and higher educated, and between the poorer and richer, we see that those gradients remain stable in men and increase in women. This trend is opposite to those seen in countries that have implemented comprehensive tobacco control measures and have observed declines in smoking prevalence. In Australia, for example, while the overall prevalence went down from 35% in 1980 to 23% in 2001, the differentials in smoking prevalence between men and women, and between younger and older people decreased as well.¹²

Limitations

In our conclusions about the course of tobacco epidemic in Ukraine, we have relied on the results of surveys with limited samples of the population, which may be more or less representative.

The comparison of the three surveys shows an increase in smoking prevalence that can seem unrealistically large, especially between 2001 and 2002, which leads to the suggestion that smoking prevalence in 2001 survey may have been underestimated. However, the results of the 2001 survey are quite close to those of other surveys conducted in Ukraine in 2000 and 2001, which estimated rates of current smoking as 57% for men and 10% for women,³ and as 53% for men and 11% for women.⁴

The large increase in smoking prevalence in Ukraine corresponds to tobacco consumption estimates, which totalled 67 billion cigarettes in 2001¹⁰ and 84 billion in 2005.⁸ This growth implies a 1.06 annual increase in cigarette consumption in Ukraine, while the annual rate of increase in smoking prevalence in the same period was also about 1.06.

Possible causes of increase in smoking in Ukraine in 2001–5

In Ukraine, the first law on tobacco control measures was not adopted until late 2005, and the first signs of enforcement, as reported by the media, were not seen until mid-2006. Surveys discussed in this paper were conducted before this law was adopted. Before this, tobacco control measures were almost non-existent.

Over the same period, efforts of the tobacco industry towards promoting cigarettes proliferated. Tobacco advertising is

Table 3 Prevalence of smoking in three surveys in Ukraine by education, material deprivation and level of urbanisation in men and women, directly standardised for age

	Men					Women				
	2001	2002	2005	OR (95% CI)*	p for trend* 2001–2005	2001	2002	2005	OR (95% CI)	p for trend*
All										
n	1269	1140	967			1452	1271	1272		
% smokers	54.8	66.8	66.8	1.164 (1.111 to 1.220)	<0.001	11.5	17.9	20.0	1.187 (1.124 to 1.253)	<0.001
Education										
Primary										
n	233	183	143			297	220	234		
% smokers	45.9	58.5	61.5	1.229 (1.094 to 1.382)	0.001	6.4	9.1	5.6		0.115
Secondary										
n	800	524	446			891	505	436		
% smokers	59.4	74.2	71.5	1.164 (1.088 to 1.245)	<0.001	13.0	18.0	21.6	1.179 (1.087 to 1.279)	<0.001
University										
n	214	433	425			275	540	551		
% smokers	47.2	61.4	63.5	1.105 (1.023 to 1.194)	0.011	12.0	21.3	24.9	1.188 (1.093 to 1.291)	<0.001
p value†					<0.001					0.036
Deprivation										
Low										
n	379	449	580			401	424	642		
% smokers	52.8	65.0	62.9	1.120 (1.049 to 1.195)	0.001	15.7	24.5	23.2	1.150 (1.064 to 1.243)	<0.001
Medium										
n	417	347	189			393	377	267		
% smokers	51.8	66.3	73.5	1.318 (1.192 to 1.457)	<0.001	14.0	14.6	16.1	1.166 (1.039 to 1.310)	0.009
High										
n	446	342	218			664	456	302		
% smokers	59.2	69.9	70.2	1.122 (1.024 to 1.229)	0.013	7.5	13.8	15.6	1.309 (1.173 to 1.460)	<0.001
p value†					<0.001					>0.05
Urbanisation										
Cities with >1 million inhabitants										
n	223	310	145			259	357	230		
% smokers	50.7	66.1	65.5	1.134 (1.007 to 1.276)	0.037	17.4	26.3	33.0	1.257 (1.134 to 1.393)	<0.001
City or regional centre										
n	382	129	317			445	141	362		
% smokers	56.3	68.2	64.0	1.133 (1.040 to 1.233)	0.004	16.4	24.1	25.7	1.173 (1.073 to 1.282)	<0.001
Towns										
n	242	361	221			310	392	256		
% smokers	56.6	63.7	68.8	1.140 (1.035 to 1.255)	0.008	10.3	15.6	17.2	1.120 (0.995 to 1.261)	0.060
Villages										
n	400	344	330			452	376	376		
% smokers	54.5	69.5	68.8	1.186 (1.094 to 1.285)	<0.001	4.2	9.6	8.0	1.177 (1.026 to 1.349)	0.020
p value†					0.314					<0.001

*Logistic regression of smoking prevalence by year, adjusted for age, education, deprivation and level of urbanisation.

†Association between the sociodemographic variable in the left column and the prevalence of smoking.

banned only on TV, radio and some printed media, whereas outdoor and point of sale advertising is still widely used.

Within the time span discussed, the real price of cigarettes in Ukraine decreased.¹³ This was especially the case for non-filter cigarettes, which are mostly smoked by more economically deprived Ukrainians. The excise tax for these cigarettes decreased from US\$1.80 (£0.919, €1.352) per 1000 pieces (plus 5% ad valorem tax) in 2000 to US\$1.30 (£0.663, €0.977; plus 8% ad valorem tax) in 2005. The average nominal price of a pack of non-filter cigarettes in Ukraine was US\$0.17 (£0.087, €0.128) in 2000 and US\$0.147 (£0.075, €0.110) in 2005.

In 2001–5, the average price for cigarettes in Ukraine increased at most by 7%.¹⁴ In the same period, the Consumer

Price Index in Ukraine increased by 33%. Hence, the real (inflation-adjusted) cigarette price in 2001–5 decreased by about 30%. This high price decrease could be the main factor responsible for the observed increase in smoking prevalence.

It is also noteworthy that, from 1996 to 1999, Ukraine experienced an increase in cigarette prices due to tax increases: the average price of a pack of non-filter cigarettes was US\$0.128 (£0.065, €0.096) in 1996 and US\$0.185 (£0.094, €0.139) in 1999.¹⁰ Hence, within the 1996–2005 time span, real tobacco prices were the highest in Ukraine in 1999–2000. This increase in tobacco price in 1996–9 may have been accompanied by a decrease in smoking prevalence. However, no reliable data on smoking prevalence in Ukraine before 2000 are available.

What this paper adds

- Ukraine was reputed to be a country with high smoking prevalence in men and comparatively low prevalence in women. Trends of smoking prevalence had not been documented previously.
- Ukraine shows a worsening of the tobacco epidemic, probably as a result of decrease in real cigarette prices, with smoking rising in all age and gender groups.
- Ukraine's experience shows specific scenarios of the tobacco epidemic development, with increase in tobacco use from the low deprivation to the medium deprivation group.

ACKNOWLEDGEMENTS

The 2001 and 2002 surveys were conducted by the Ukrainian Institute of Social Studies. The 2005 survey was commissioned by the International Centre for Policy Studies (Kyiv, Ukraine) and conducted by the Kyiv International Institute of Sociology.

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Funding: The 2001 survey was funded by the World Bank and the WHO. The 2002 and 2005 surveys were funded by the Open Society Institute.

Competing interests: None.

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The Lighter Side

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