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ORIGINAL ARTICLE

Results of the Global Youth Tobacco Survey and implementation of WHO Framework Convention on Tobacco Control in former Soviet Union countries

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Abstract
Objectives We used data from the Global Youth Tobacco Survey (GYTS) to monitor articles of the World Health Organization Framework Convention on Tobacco Control in Former Soviet Union (FSU) countries.
Methods The GYTS is a school-based survey, which uses a two-stage sample design to produce representative, independent, cross-sectional estimates. The GYTS was conducted in 10 out of 12 FSU countries from 1999 to 2008.
Results The prevalence of ever smoking and current smoking, smoking initiation, and exposure to second-hand smoking decreased over time. Overall, willingness to stop smoking, supporting smoking bans, and receiving information about the dangers of smoking increased over time.
Conclusions Overall, our study shows that FSU countries had positive changes in tobacco-use prevalence and perception among youth over time. Our findings should be used as baseline measures for future tobacco-control interventions aimed at reducing tobacco use among youth. Moreover, our results call for the enforcement of restricting advertising for tobacco products.

Keywords Tobacco · Prevalence · Youth · Policy · FSU

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Introduction

Tobacco use continues to be a leading global cause of preventable death (World Health Organization 2011). Globally, 12 % of all deaths among adults aged 30 years and over is attributed to tobacco (World Health Organization 2012). Every day, approximately 82,000–99,000 young people start smoking throughout the world; many are children under age 10, and most reside in low- or middle-income countries (Lando et al. 2010).

The WHO FCTC was developed in response to the globalization of the tobacco epidemic. It was adopted by the 56th World Health Assembly in May 2003 and became international law on February 27, 2005. Today, the WHO FCTC is embraced by 176 parties (as of October 31, 2012), covering 87 % of the world's population (World Health Organization 2011).

Article 20 of the WHO FCTC recommends conducting research, establishing surveillance, and exchanging information in the field of tobacco control (World Health Organization 2003). To attain Article 20, in December 1998, WHO, the Centers for Disease Control and Prevention (CDC), and the Canadian Public Health Association (CPHA) developed the Global Tobacco Surveillance System (GTSS) to assist countries in establishing tobacco control surveillance and monitoring programs (The Global Tobacco Surveillance System Collaborating Group 2005). GTSS includes the collection of data through four surveys: Global Youth Tobacco Survey (GYTS), Global School Personnel Survey, Global Health Professions Student Survey, and Global Adult Tobacco Survey (GATS) (CDC 2008).

When the Soviet Union collapsed in 1991, FSU countries were targeted by the international tobacco industry

(Gilmore and McKee 2004b). Overall, between 1991 and 2000, transnational tobacco companies established a local manufacturing presence, investing more than $2.7 billion in ten countries of the FSU. As a result, elsewhere in FSU countries, smoking rates have risen among adults (Perlman et al. 2007; Andreeva and Krasovsky 2007; Gilmore et al. 2004c; Kislitsyna et al. 2010; Usmanova et al. 2011; Cockerman et al. 2004; Bobak et al. 2006; Global Adult Tobacco Survey Russian Federation 2009; Global Adult Tobacco Survey Ukraine 2010). These studies showed high prevalence among men (43–70 %) rather than women (1–12 %). Another feature of the tobacco epidemic in the Central Asian part of the FSU is smokeless tobacco. Nasway, a sublingually used product made of tobacco, butter, and slaked lime (International Agency for Research on Cancer 2007), is known to be common. Recent estimates indicate that 20 % of Uzbek men regularly use nasway (Usmanova et al. 2011), while smokeless tobacco is extremely uncommon in Russia and Ukraine—1 and 0.5 % of men in these countries reported smokeless tobacco use (GATS Russia 2009; GATS Ukraine 2010). Due to lack of data, not all FSU countries were included in the cited publications, and these studies used a different study design, which makes it difficult to compare results across countries in the region. One solution is to use data from common survey methodology, such as the GYTS (The Global Tobacco Surveillance System Collaborating Group 2005).

During the last decades, several attempts have been made to measure the tobacco epidemic among youth in the FSU using different methodology (The Global Tobacco Surveillance System Collaborating Group 2005; Warren et al. 2006; CDC 2008; Baška et al. 2008; Stojiljkovic et al. 2008; Page and Danielson 2011; Andreeva and Krasovsky 2011; Gilmore et al. 2001).

To our knowledge, this is the first paper to use data collected in the FSU for the GYTS (ages 13–15) and to monitor the WHO FCTC articles.

Methods

Sample design

Within each FSU country, GYTS standard sampling methodology was used as described in detail elsewhere (The Global Tobacco Surveillance System Collaborating Group 2005; CDC 2008). Briefly, GYTS standard sampling methodology uses a two-stage cluster sample design that produces samples of students in grades associated with youth aged 13–15 years. Each sampling frame includes all schools in a geographically defined area. Schools were selected using probability proportional to the number of students enrolled in the specified grades. Classes within the selected schools were randomly selected. All enrolled students in selected classes who attended the day of the survey were eligible to participate. Student participation was voluntary and anonymous, and self-administered data-collection procedures were used (The Global Tobacco Surveillance System Collaborating Group 2005).

The detailed description of survey date, sample size, and response rates are given in the Table 1. For cross-country comparisons, data in this paper are limited to students aged 13–15.

Data for each country for each year along with the questionnaire were downloaded from the CDC, Global Tobacco Surveillance Data web site (CDC, Global Tobacco Surveillance Data 2006). STATA 12 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP) software was used for analysis and to account for survey design.

Questionnaire

The GYTS questionnaire consists of a core set of questions and country-specific questions. Questionnaires are translated in-country into local languages and back translated to check for accuracy.

Table 2 presents the indicators related to the WHO FCTC articles and corresponding questions from the GYTS.

Results

In general, the response rate was between 98.8 % (Kyrgyzstan, 2004) and 72.4 % (Ukraine, 2005).

Prevalence of ever and current cigarette smoking, initiating smoking before age 10, susceptibility to initiate smoking in the next year, and smokeless tobacco use (Table 3)

Overall, 7.1 % youth in Tajikistan (2004) and 73.6 % in Ukraine (1999) were ever smokers. The prevalence of current smoking varied between 1.1 % in Tajikistan (2004) and 33.7 % in Ukraine (1999). In general, the prevalence of current and ever smoking cigarettes decreased in all countries over time, with the most dramatic decrease in Georgia and Ukraine. The likelihood of initiating smoking in the next year was high (69.5 %) in Georgia (2003) and low (11.7 %) in Moldova (2008). Between the first and second survey, it decreased in Georgia and Moldova, increased in Kyrgyzstan, Russia, and Ukraine. More than 50 % of youth initiated smoking before age 10 in Kazakhstan (2004), Moldova (2004, 2008), Russia (2004), and Ukraine (2005). In general, it decreased in Georgia, while in Russia and Ukraine, it increased. More than 5 %

Table 1 Date of GYTS data collection, population, and sample counts of schools, classes, and students and survey response rates in FSU (Centers for Disease Control and Prevention)

No.	Country	Date of GYTS data collection	Date of FCTC entering into force	Total sample size	Number of students (age 13–15)	School response rate (%)	Class response rate (%)	Student response rate (%)	Overall response rate (%)
1	Armenia	2004[N]	27/02/2005	1,451	1,300	100	100	84.7	84.7
2	Azerbaijan	Not collected	30/01/2006						
3	Belarus	2004[N]	07/12/2005	5,522	3,909	100	100	86.5	86.5
4	Georgia	2003[N]	15/05/2006	4,543	3,410	100	100	85.3	85.3
		2008[N]		1,348	891	100	100	81.7	81.7
5	Kazakhstan	2004[N]	22/04/2007	11,946	9,871	100	100	89.4	89.4
6	Kyrgyzstan	2004[N]	23/08/2006	4,270	3,434	100	100	98.8	98.8
		2008[N]		4,038	3,004	100	100	93.2	93.2
7	Moldova	2004[N]	04/05/2009	4,828	3,977	100	100	89.7	89.7
		2008[N]		4,703	3,501	100	100	84.25	84.25
8	Russia	1999[CC]	01/09/2008	4,091	3,157	99		86.2	86.2
		2002[C]		1,495	1,121	100	100	97.2	97.2
		2004[N]		14,112	10,956	97.7	100	87.9	85.9
9	Tajikistan	2004[N]	Not ratified	6,406	5,121	100	100	96.6	96.6
10	Turkmenistan	Not collected	11/08/2011						
11	Ukraine	1999[CC]	04/09/2006	4,101	4,156	100		81.4	81.4
		2005[N]		7,7127	6,579	85.9	100	84.3	72.4
12	Uzbekistan	2008[CC]	13/08/2012	2,133	1,375	100	100	95.4	95.4

N at the national level, *CC* capital city, *C* city

of youth in Russia (1999, 2004), Tajikistan (2004), and Ukraine (1999) also used smokeless tobacco. The prevalence of nasway was higher in Tajikistan (8.4 %) than that in Uzbekistan (0.6 %).

Exposure to SHS and information about dangers of tobacco (Table 4)

SHS at home ranged from 84.4 % (Georgia, 2003) to 24.4 % (Moldova, 2008). Overall, SHS exposure at home decreased over time in all countries except Kyrgyzstan; in Russia, it decreased and increased again. More than 90 % of youth were exposed to SHS outside of home in Belarus (2004), Georgia (2003), and Moldova (2004). Exposure to SHS outside of home increased over time in Kyrgyzstan, Russia, and Ukraine, while it decreased in Georgia and Moldova. More than 90 % of youth thought that smoking should be banned in public places in Armenia, Kyrgyzstan, Moldova, Tajikistan, and Uzbekistan. Overall, it increased over time in Georgia, Russia, Ukraine, Kyrgyzstan and Moldova. Overall, 86.7 % of Ukrainian youth (2005) and 10 % of Georgian youth (2003) were taught about the danger of smoking, and the number increased in Georgia (2008). Classes on this subject increased in all countries, except Kyrgyzstan and Moldova. The prevalence of discussion reasons why people of their age smoke ranged from 11 % in Georgia (2003) to 80.9 % in Moldova (2004). It increased in Georgia, Russia, and Ukraine and decreased in Moldova and Kyrgyzstan. Classes on the effects of smoking were taught to 9.9 % of Georgian (2003) and 88.6 % of Ukrainian youth (2005). The number increased in Georgia, Ukraine, and Russia and slightly decreased in Moldova over time.

Exposure to media and advertisement of tobacco products (Table 5)

More than 90 % of youth in Belarus, Russia, and Ukraine saw actors smoking on TV, in videos, or in movies in the month before the survey. The number did not change significantly over the past years. It is noteworthy that in 1999, 100 % of Ukrainian youth saw cigarette advertisements on billboards in the month before the survey. The number declined in Ukraine, Georgia, and Moldova; increased in Kyrgyzstan; first decreased (2002) and then increased (2004) in Russia over time. More than 80 % of youth in Ukraine (1999) saw advertisements of cigarettes in newspapers and magazines in the previous month. In general, the number declined over the past years in all countries except Russia, where it declined and increased again. Approximately 60 % of youth in Russia and Ukraine saw cigarette advertisements at sporting events in the previous month in the baseline survey. The number declined over

Table 2 Articles of WHO FCTC and GYTS related measures

Articles of WHO FCTC	GYTS measures
Article 21 reporting and exchange of information	
Each party shall submit to the conference of parties, through secretariat periodic reports on its implementation of this convention which should include the following:	Ever smoked cigarettes
(d) Information on surveillance and research as specified in Article 20 (research, surveillance and exchange of information) of this convention	Current cigarette smoking
	Current smokeless tobacco users
	Initiating smoking before age 10
	Likelihood of smoking initiation by never smokers during the next 12 months
Article 8 protection from exposure to tobacco smoke	
Each party shall adopt and implement in areas of existing national jurisdiction as determined by national law and actively promote at other jurisdictional levels the adoption and implementation of effective legislative, executive, administrative and/or other measures, providing for protection from exposure to tobacco smoke in indoor workplaces, public transport, indoor public places and, as appropriate, other public places	Exposure to SHS at home
	Exposure to SHS in public places
	Opinion about smoking ban in public places
Article 12 Education, communication, training and public awareness	
Each party shall promote and strengthen public awareness of tobacco control issues, using all available communication tools, as appropriate	Taught about the dangers of smoking in school
	Taught about effects of smoking in school
Towards this end, each party shall adopt and implement effective legislative, executive, administrative or other measures to promote:	Discussed reasons why people of their age smoke in school
(f) Public awareness of and access to information regarding the adverse health, economic, and environmental consequences of tobacco production and consumption	
Article 13 Tobacco advertising, promotion and sponsorship	
Each party shall, in accordance with its constitution or constitutional principles, undertake a comprehensive ban of all tobacco advertising, promotion and sponsorship	Saw actors smoking on TV, in videos, or in movies
	Saw ads for cigarettes on billboards in city
This shall include, subject to the legal environment and technical means available to that Party, a comprehensive ban on cross-border advertising, promotion and sponsorship originating from its territory	Saw ads in newspapers or magazines
	Saw ads at sports events
	Owning an object with a cigarette brand logo on it
	Being offered a free cigarette by tobacco company
Article 14 Demand reduction measures concerning tobacco dependence and cessation	
Each party shall develop and disseminate appropriate, comprehensive and integrated guidelines based on scientific evidence and best practices, taking into account national circumstances and priorities, and shall take effective measures to promote cessation of tobacco use and adequate treatment for tobacco dependence	Current smokers who desire to stop smoking
	Current smokers who tried to stop during the past year
	Current smokers who received help to stop smoking
	Current smokers who have or feel like having a cigarette first thing in the morning
Article 16 Sales to and by minors	
Each party shall adopt and implement effective legislative, executive, administrative or other measures at the appropriate government level to prohibit the sales of tobacco products to persons under the age set by domestic law, national law or eighteen	Current smokers who were not refused purchase cigarettes because of their age

time to 39.4 % in Georgia (2008), 31.3 % in Russia (2004), and 39.3 % in Ukraine (2005). More than 20 % of youth in Ukraine, Russia (1999), and Georgia (2003) owned an object with a tobacco logo. Ownership of these objects increased in Kyrgyzstan and Ukraine and decreased in Georgia, Moldova, and Russia. The prevalence of being offered free cigarettes ranged from 18.9 % in Kyrgyzstan (2008) to 4 % in Armenia (2004). In Georgia, Kyrgyzstan, and Ukraine the number increased, while it decreased in Moldova and Russia.

Smoking cessation and dependency and minors' access to tobacco products (Table 6)

Current smokers who desire to stop smoking were at 26.7 % in Uzbekistan and 53 % in Armenia. It did not change significantly over time. More than 50 % of current smokers tried to quit smoking in Armenia, Belarus, Russia, and Ukraine during the year before the survey. It increased in Georgia and Ukraine and declined in Kyrgyzstan and Moldova over time. Receiving help to stop smoking ranged

Table 3 Total prevalence of ever and current cigarette smoking, initiating smoking before age 10, susceptibility to initiate smoking in the next year and smokeless tobacco use (Article 21 of WHO FCTC)

Countries	Ever smoked cigarettes % (95% CI[a])	Current cigarette smokers % (95% CI)	Smokers who initiated smoking before age 10 % (95% CI)	Never smokers likely to initiate smoking next year % (95% CI)	Current smokeless tobacco users % (95% CI)
Armenia, 2004	23.9 (21.4-26.6)	5.0 (3.9-6.5)	13.9 (11.9-16.1)	58.8 (52.5-64.9)	1.4 (0.8-2.5)
Belarus, 2004	62.5 (60.8-64.3)	26.5 (24.9-28.1)	31.8 (30.1-33.4)	51.0 (48.7-53.2)	3.1 (2.5-3.8)
Georgia, 2003	*45.8 (44.0-47.7)*	*23.7 (22.2-25.3)*	*31.9 (30.2-33.6)*	*69.5 (66.8-72.1)*	*1.9 (1.4-2.5)*
Georgia, 2008	*28.2 (25.1-31.6)*	*8.6 (6.8-10.8)*	*13.2 (10.9-15.9)*	*47.1 (40.3-54.1)*	*Not included*
Kazakhstan, 2004	28.5 (27.5-29.5)	9.4 (8.7-10.1)	52.0 (49.8-54.0)	26.2 (25.0-27.3)	2.6 (2.0-2.6)
Kyrgyzstan, 2004	*19.7 (17.9-21.7)*	*5.5 (4.5-6.7)*	*43.0 (37.8-48.3)*	*21.2 (19.0-23.5)*	*1.6 (1.2-2.3)*
Kyrgyzstan, 2008	*17.7 (15.8-19.8)*	*4.4 (3.4-5.6)*	*46.9 (40.5-53.4)*	*57.8 (54.9-60.5)*	*2.5 (1.9-3.4)*
Moldova, 2004	*41.7 (40.0-43.4)*	*13.7 (12.5-14.9)*	*60.5 (57.8-63.1)*	*20.3 (18.2-22.0)*	*3.7 (3.1-4.5)*
Moldova, 2008	*39.2 (37.2-41.2)*	*11.3 (10.2-12.6)*	*60.2 (57.2-63.2)*	*11.7 (10.3-13.3)*	*3.8 (3.1-4.7)*
Russia, 1999	*67.2 (65.5-68.9)*	*33.4 (31.6-35.1)*	*48.9 (46.7-51.1)*	*24.2 (21.7-27.0)*	*10.7 (9.6-11.8)*
Russia, 2002	*62.2 (59.3-65.0)*	*32.9 (30.1-35.9)*	*44.0 (40.2-47.8)*	*27.8 (23.6-32.3)*	*8.8 (7.2-10.7)*
Russia, 2004	*55.0 (53.0-56.0)*	*25.4 (23.7-27.3)*	*54.8 (52.1-57.5)*	*33.2 (30.5-35.9)*	*3.8 (3.1-4.7)*
Tajikistan, 2004	7.1 (6.4-7.9)	1.1 (0.8-1.5)	31.6 (26.2-37.5)	47.3 (45.8-48.9)	8.4 (7.6-9.2)
Ukraine, 1999	*73.6 (71.9-75.3)*	*33.7 (32.0-35.8)*	*33.4 (30.3-36.8)*	*19.8 (16.9-23.1)*	*6.8 (5.9-7.9)*
Ukraine, 2005	*57.5 (55.6-59.4)*	*24.0 (22.3-25.8)*	*54.7 (52.1-57.3)*	*47.3 (44.4-50.2)*	*1.5 (1.2-1.9)*
Uzbekistan, 2008	7.7 (6.3-9.3)	1.8 (1.2-)	3.0 (2.2-4.1)	30.9 (21.5-42.2)	0.6 (0.3-1.1)

Significant changes are highlighted

[a] Confidence interval

Table 4 Exposure to SHS (Article 8 of WHO FCTC) and information about dangers of tobacco (Article 12 of WHO FCTC)

Countries	Exposed to smoke from others at home % (95% CI)	Exposed to smoke from other in public places % (95% CI)	Think that smoking should be banned from public places % (95% CI)	Taught dangers of smoking % (95% CI)	Discussed reasons people their age smoke % (95% CI)	Taught about the effects of smoking % (95% CI)
Armenia, 2004	75.5 (72.8-78.0)	85.1 (82.7-87.2)	90.3 (88.4-91.9)	31.1 (28.4-34.0)	37.1 (34.2-40.1)	52.2 (49.2-55.3)
Belarus, 2004	53.0 (51.2-54.7)	90.1 (88.9-91.1)	86.4 (85.2-87.6)	79.8 (78.3-81.2)	69.5 (67.8-71.1)	77.1 (75.5-78.5)
Georgia, 2003	*84.4 (83.0-85.7)*	*93.8 (92.8-94.7)*	*76.1 (74.4-77.7)*	*10.1 (9.0-11.3)*	*11.0 (9.8-12.3)*	*9.9 (8.8-11.2)*
Georgia, 2008	*81.9 (79.2-84.4)*	*87.5 (85.1-89.5)*	*82.5 (79.7-85.0)*	*28.5 (25.5-31.7)*	*35.8 (32.6-39.2)*	*40.4 (37.0-43.8)*
Kazakhstan, 2004	48.3 (47.3-49.4)	71.8 (70.8-72.7)	89.9 (89.2-90.5)	83.9 (83.1-84.6)	66.4 (65.7-67.8)	80.2 (79.3-81.1)
Kyrgyzstan, 2004	*39.9 (37.5-42.3)*	*64.9 (62.4-67.3)*	*91.1 (89.7-92.4)*	*63.7 (61.2-66.0)*	*55.4 (52.9-57.8)*	*62.1 (59.6-64.5)*
Kyrgyzstan, 2008	*46.0 (43.5-48.6)*	*73.9 (71.5-76.1)*	*91.5 (89.9-92.8)*	*58.4 (55.9-60.9)*	*46.3 (43.8-48.9)*	*64.8 (62.3-67.1)*
Moldova, 2004	*36.8 (35.2-38.6)*	*96.7 (96.1-97.3)*	*92.4 (91.4-93.2)*	*80.8 (79.4-82.2)*	*80.9 (79.5-82.2)*	*79.7 (78.2-81.1)*
Moldova, 2008	*24.4 (22.7-26.2)*	*84.1 (82.6-85.6)*	*92.5 (91.4-93.4)*	*75.2 (73.4-76.9)*	*73.4 (71.6-75.2)*	*76.7 (75.0-78.4)*
Russia, 1999	*55.3 (53.5-57.1)*	*72.5 (70.9-74.0)*	*71.0 (69.4-72.6)*	*35.6 (33.9-37.3)*	*23.0 (21.6-24.6)*	*32.3 (30.6-33.9)*
Russia, 2002	*36.5 (33.7-39.4)*	*73.6 (70.9-76.2)*	*77.6 (75.0-80.0)*	*57.8 (54.8-60.7)*	*44.3 (41.4-47.3)*	*54.8 (51.8-57.7)*
Russia, 2004	*48.8 (46.8-50.8)*	*89.4 (88.2-90.5)*	*82.6 (81.0-84.1)*	*64.0 (62.0-65.9)*	*58.0 (56.0-60.0)*	*62.6 (60.6-65.6)*
Tajikistan, 2004	30.7 (29.3-32.1)	69.7 (68.3-71.0)	93.2 (92.4-94.0)	83.2 (82.1-84.3)	39.5 (38.1-41.0)	84.1 (82.9-85.2)
Ukraine, 1999	*49.0 (47.1-51.0)*	*71.8 (70.0-73.5)*	*66.9 (65.1-68.7)*	*54.4 (52.5-56.3)*	*37.8 (36.0-39.7)*	*48.0 (46.0-49.9)*
Ukraine, 2005	*47.9 (45.9-49.8)*	*84.4 (83.0-85.6)*	*83.2 (81.7-84.6)*	*86.7 (85.4-87.9)*	*79.8 (78.1-81.3)*	*88.6 (87.4-89.7)*
Uzbekistan, 2008	40.0 (37.3-42.6)	74.2 (71.7-76.5)	91.7 (90.1-93.1)	71.8 (69.3-74.2)	45.5 (42.8-48.2)	58.2 (55.5-61.0)

Significant changes are highlighted

from 41.1 % (Ukraine, 1999) to 83.1 % (Georgia, 2008). It dramatically increased in Georgia and Ukraine, decreased in Kyrgyzstan and Moldova, and increased and then decreased in Russia. The prevalence of current smokers who have or feel like having a cigarette first thing in the morning ranged from 11.1 % (Tajikistan, 2004) to 45.8 % (Armenia, 2004). The number increased in Georgia and Kyrgyzstan, in Russia decreased (2002) and then increased (2004), remained almost the same in Ukraine, and decreased in Moldova. The rate of current smokers who were not refused because of age when buying cigarettes was 80 % in Ukraine (1999) and 27.2 % in Uzbekistan (2008). The number decreased in Georgia, Kyrgyzstan, and Ukraine; increased in Moldova; in Russia, increased (2002) and then decreased (2004).

Briefly, the following figures were high among boys compared to girls (web appendix): prevalence of ever smoking and currently smoking, initiation of smoking in the next year and before age 10, use of smokeless tobacco, seeing advertisements for cigarettes at sports events, ownership of objects with a tobacco logo, being offered free cigarettes, desire to stop smoking (except Kyrgyzstan and Uzbekistan), current smokers trying to quit smoking, and not being refused the purchase of cigarettes because of age (Armenia, Georgia, Moldova). The following figures were high among girls compared to boys: exposure to SHS at home [Armenia, Belarus, Georgia, Kyrgyzstan (2008), Russia (2002, 2004), Ukraine (2005), and Uzbekistan]; receiving help to quit smoking [Kazakhstan, Kyrgyzstan (2004), Russia (1999), and Uzbekistan]; having or feel like

Table 5 Exposure to media and advertisement of tobacco products (Article 13 of WHO FCTC)

Countries	Saw actors smoking on TV, in videos, or in movies % (95% CI)	Saw ads for cigarettes on billboards in past month % (95% CI)	Saw ads for cigarettes in newspapers or magazines in past month % (95% CI)	Saw ads for cigarette at sporting event in past month % (95% CI)	Have an object with a cigarette brand logo on it % (95% CI)	Offered free cigarettes % (95%CI)
Armenia, 2004	87.8 (85.5-89.7)	62.4 (59.3-65.4)	56.0 (53.0-59.0)	31.3 (28.6-34.2)	15.6 (13.6-17.9)	4.0 (29.5-53.1)
Belarus, 2004	92.6 (91.6-93.4)	56.5 (54.7-58.3)	63.8 (62.1-65.5)	31.6 (30.0-33.2)	13.5 (12.3-14.5)	5.3 (4.6-6.1)
Georgia, 2003	*89.6 (88.5-90.6)*	*80.0 (78.5-81.4)*	*74.3 (72.6-75.9)*	*58.1 (56.3-59.9)*	*27.8 (26.2-29.6)*	*10.8 (9.7-12.1)*
Georgia, 2008	*89.2 (86.9-91.2)*	*53.6 (50.1-57.0)*	*47.2 (43.7-50.7)*	*39.4 (36.1-42.8)*	*14.6 (12.3-17.2)*	*17.4 (14.8-20.2)*
Kazakhstan, 2004	86.4 (85.7-87.1)	72.9 (72.0-73.9)	73.5 (72.5-74.4)	40.6 (39.6-41.7)	14.8 (14.1-15.6)	6.1 (5.6-6.6)
Kyrgyzstan, 2004	*83.0 (81.1-84.8)*	*66.0 (63.5-68.3)*	*57.3 (54.6-59.9)*	*31.2 (29.0-33.6)*	*12.9 (11.4-14.7)*	*10.6 (9.2-12.1)*
Kyrgyzstan, 2008	*85.4 (83.6-87.1)*	*70.6 (68.2-72.8)*	*55.2 (52.7-57.8)*	*41.9 (39.4-44.4)*	*18.2 (16.4-20.2)*	*18.9 (17.0-21.0)*
Moldova, 2004	*85.2 (83.9-86.5)*	*60.4 (58.6-62.1)*	*64.6 (62.9-66.3)*	*32.5 (30.8-34.2)*	*11.3 (10.3-12.5)*	*6.2 (5.4-7.0)*
Moldova, 2008	*89.9 (88.5-91.1)*	*50.7 (48.7-52.8)*	*58.1 (56.1-60.1)*	*29.8 (28.0-31.8)*	*8.0 (6.9-9.1)*	*5.0 (4.2-6.0)*
Russia, 1999	*97.7 (97.1-98.2)*	*94.9 (94.1-95.6)*	*77.0 (75.5-78.4)*	*66.6 (64.9-68.2)*	*22.9 (21.5-24.5)*	*16.7 (15.5-18.1)*
Russia, 2002	*97.5 (96.3-98.3)*	*69.2 (66.4-71.9)*	*65.6 (62.7-68.4)*	*43.4 (40.5-46.3)*	*16.1 (14.0-18.3)*	*6.1 (4.8-7.7)*
Russia, 2004	*91.2 (90.0-92.2)*	*76.8 (75.4-78.2)*	*71.0 (69.3-72.7)*	*31.3 (29.5-33.2)*	*14.7 (13.3-16.2)*	*9.6 (8.5-10.9)*
Tajikistan, 2004	71.1 (69.8-72.5)	38.3 (36.8-39.7)	37.7 (36.3-39.2)	28.6 (27.3-29.9)	10.3 (9.4-11.2)	5.5 (4.8-6.2)
Ukraine, 1999	*98.3 (97.8-98.8)*	*100*	*87.8 (86.5-89.1)*	*68.0 (66.2-69.8)*	*25.0 (23.4-26.7)*	*6.7 (5.7-7.7)*
Ukraine, 2005	*94.1 (93.3-94.8)*	*77.9 (76.3-79.4)*	*72.9 (71.2-74.5)*	*39.3 (37.4-41.2)*	*26.1 (24.4-27.8)*	*10.1 (9.0-11.3)*
Uzbekistan, 2008	81.2 (79.0-83.3)	52.1 (49.4-54.8)	42.1 (39.4-44.8)	27.2 (25.0-29.7)	6.9 (5.6-8.4)	5.3 (4.2-6.7)

Significant changes are highlighted

Table 6 Smoking cessation and dependency (Article 14 of WHO FCTC) and minors' access to tobacco products (Article 16 of WHO FCTC)

Countries	Current smokers who desire to stop smoking % (95% CI)	Current smokers who tried to stop during the past year % (95% CI)	Current smokers who received help to stop smoking % (95% CI)	Current smokers who have or feel like having a cigarette first thing in the morning % (95% CI)	Current smokers who usually buy their cigarettes in a store and were not refused purchase because of their age % (95% CI)
Armenia, 2004	53.0 (38.9-66.5)	52.9 (38.9-66.8)	77.4 (63.9-86.9)	45.8 (32.3-60.0)	68.0 (53.7-79.6)
Belarus, 2004	48.1 (44.5-51.6)	55.1 (51.5-58.6)	72.0 (68.6-75.1)	29.4 (26.3-32.7)	30.0 (26.9-33.4)
Georgia, 2003	*33.6 (30.3-37.2)*	*38.5 (35.0-42.3)*	*55.3 (51.6-58.9)*	*14.3 (11.9-17.1)*	*77.1 (73.7-80.2)*
Georgia, 2008	*37.4 (26.1-50.3)*	*47.9 (35.7-60.5)*	*83.1 (72.3-90.2)*	*19.8 (11.7-31.4)*	*43.4 (31.1-56.6)*
Kazakhstan, 2004	43.6 (39.9-47.5)	41.1 (37.4-44.9)	73.1 (69.6-76.3)	20.1 (17.2-23.3)	44.0 (40.2-47.9)
Kyrgyzstan, 2004	*27.7 (20.5-36.3)*	*36.6 (27.8-46.4)*	*63.2 (53.0-72.3)*	*13.0 (7.8-21.0)*	*56.9 (46.8-66.6)*
Kyrgyzstan, 2008	*35.0 (24.3-47.5)*	*18.5 (11.5-28.4)*	*54.1 (41.8-66.0)*	*16.5 (9.4-27.2)*	*46.8 (34.7-59.3)*
Moldova, 2004	*37.8 (33.1-42.7)*	*48.2 (43.4-52.9)*	*80.5 (76.5-84.0)*	*22.3 (18.8-26.4)*	*25.5 (21.5-29.8)*
Moldova, 2008	*47.3 (41.6-46.5)*	*42.5 (36.9-48.3)*	*77.0 (71.7-81.5)*	*21.0 (16.8-25.9)*	*50.6 (44.9-33.3)*
Russia, 1999	*49.0 (45.8-52.2)*	*59.1 (55.9-62.2)*	*43.6 (40.4-46.8)*	*32.9 (29.9-36.0)*	*64.4 (61.2-67.4)*
Russia, 2002	*49.4 (44.0-54.8)*	*53.6 (48.2-58.9)*	*74.3 (69.4-78.7)*	*39.7 (34.5-45.0)*	*31.2 (26.3-36.4)*
Russia, 2004	*46.7 (42.6-50.8)*	*59.5 (55.4-63.5)*	*71.7 (67.7-75.3)*	*34.9 (31.1-39.0)*	*56.9 (52.8-60.9)*
Tajikistan, 2004	42.9 (28.5-58.7)	26.6 (15.2-42.1)	64.3 (48.1-77.8)	11.1 (4.3-25.8)	43.5 (29.0-56.0)
Ukraine, 1999	*50.5 (47.1-54.0)*	*55.8 (52.3-59.2)*	*41.1 (37.7-44.5)*	*32.0 (28.9-35.3)*	*80.0 (77.1-82.7)*
Ukraine, 2005	*49.0 (44.7-53.2)*	*59.6 (55.4-63.6)*	*74.2 (70.2-77.8)*	*32.3 (28.3-36.5)*	*47.0 (42.8-51.3)*
Uzbekistan, 2008	26.7 (11.3-51.1)	45.5 (24.7-68.0)	67.0 (43.4-84.3)	12.5 (3.6-35.6)	27.2 (11.5-51.8)

Significant changes are highlighted

having a cigarette first thing in the morning [Uzbekistan, Tajikistan, Russia (2004), Kazakhstan].

Discussion

The prevalence of youth currently smoking and ever smoking in Belarus, Georgia (2003), Russia and Ukraine was higher compared to the average in the WHO regions of the Americas (14.3 and 49.4 %), Europe (19.2 and 44.1 %), Western Pacific (13.4 and 30.3 %), South East Asia (5.9 and 9.9 %), Eastern Mediterranean (4.9 and 14.8 %), and Africa (8.0 and 22.9 %) (Warren et al. 2008). The dramatic decrease in the prevalence of current cigarette smoking in Georgia (23.7 vs. 8.6 %) within 5 years should be interpreted with caution.

Our study revealed that there was a wide variation in the changes among FSU countries over time: increase in smoking, smoking initiation, SHS exposure, decrease in supporting bans on smoking, having classes on the effects and dangers of smoking, desire to stop smoking, attempts to stop smoking, receiving smoking-cessation advice, and seeing fewer tobacco advertisements on newspapers and billboards. Indeed, these are encouraging changes and need to be maintained. In contrast, seeing actors smoking on TV stayed almost unchanged over time, and ownership of an object with a tobacco logo increased in Ukraine and Kyrgyzstan, while more youth in all countries except Moldova were offered free cigarettes.

Our study has some limitations: first, smoking was self-reported and not validated using biomarkers such as salivary cotinine. Second, the GYTS is limited to students and not representative of all youth aged 13–15 in FSU countries. However, these countries have a high rate of school attendance.

Our study also has the following strengths: first, all GYTS surveys use exactly the same sampling procedures, core questionnaire items, and training in field procedures;

second, the GYTS was designed in a way to help countries monitor some articles of the WHO FCTC; finally, have substantial implications for monitoring specific WHO FCTC articles and progress in implementing tobacco control programs among youth.

Discussion of the findings and their relation to current tobacco-control policies (available from authors upon request) is examined here within the WHO FCTC articles.

WHO FCTC Article 21: reporting and exchange of information

Despite WHO recommendations to monitor tobacco use to inform tobacco control policies, the GYTS was not conducted in two of the FSU countries (Azerbaijan and Turkmenistan). Four out of twelve FSU countries participated in the GYTS twice (Georgia, Kyrgyzstan, Moldova, and Ukraine). Russia conducted the GYTS three times, and five countries (Armenia, Belarus, Kazakhstan, Tajikistan, and Uzbekistan) conducted it once. Tobacco use by 13- to 15-year-old school-attending youth varies among countries over time, and is a serious problem that is global in nature (Warren et al. 2006).

Current cigarette smoking was higher among boys than girls in all countries, comparable with findings from other GYTS sites (Warren et al. 2006; Stojiljkovic et al. 2008; Erguder et al. 2009) and studies (Roohafza et al. 2011). Furthermore, the surveys have shown that the difference in current cigarette smoking is smaller between boys and girls than the difference between men and women (Warren et al. 2006; Lazuras et al. 2009; The Global Youth Tobacco Survey Collaborative Group 2003). This could be attributed to the fact that transnational tobacco companies are targeting girls and directing their initial marketing and distribution efforts in major cities (Pomerleau et al. 2004; Perlman et al. 2007). Moreover, after the USSR collapsed, transnational companies actively entered the market and invested in this region (Gilmore and McKee 2004a, 2005), and the high prevalence of smoking in earlier years could be explained by this fact.

The chairman of British American Tobacco in 1990 described the political changes in this region as "the most exciting times I have seen in the tobacco industry in the last 40 years" (Gilmore and McKee 2004a). Tobacco use across countries can be expected to vary because the determinants of tobacco use are many and varied, including such factors as cultural and religious norms, availability of different types of tobacco products, local and national tobacco control strategies, and differences in tobacco control industry (The Global Youth Tobacco Collaborative Group 2002).

The specific role of smokeless tobacco in the regional tobacco epidemic should be noted separately. Nasway is common in Central Asian countries. The prevalence of current nasway use in Kyrgyzstan, Uzbekistan, and Tajikistan was available from the GYTS. We have found that youth in Tajikistan use more nasway compared to cigarettes, and Uzbek youth use less nasway compared to cigarettes. The surveys of adults in Uzbekistan showed that nasway is more common than cigarettes among men (Usmanova et al. 2011; Analytical and Information Center 2004). The higher prevalence of nasway is attributed to price differences, where the cheapest brand of cigarettes costs around US$ 0.35 per pack and nasway costs around US$ 0.20.

Initiating cigarette smoking before the age of 10 was higher in Georgia, Kazakhstan, Moldova, Russia, and Ukraine than the average in European countries (Baška et al. 2008) and USA (Swahn et al. 2012). Moreover, the susceptibility to initiate smoking in the next year by youth who had never smoked was higher than the number of current cigarette smokers.

WHO FCTC Article 8: protection from exposure to tobacco smoke

In FSU countries, exposure to SHS is higher outside of home than at home. SHS exposure at home and outside of home for Ukraine (1999) and Russia (1999, 2002) during the last 7 days before the survey was used for comparison. SHS exposure at home and outside of home during the week preceding the survey is lower in Russia and Ukraine compared to the average European rate (CDC 2008; Baška et al. 2008). All FSU countries have smoke-free policies, and smoking is allowed in specially designated areas (Campaign for Tobacco Free Kids 2012) with different levels of compliance, according to WHO (World Health Organization 2011). Thus, in Belarus, Russia, and Uzbekistan, up to two public places are completely smoke free; in Armenia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, and Ukraine three to five public places are smoke free; in Tajikistan six to seven public places are smoke free; in Turkmenistan all public places are completely smoke free.

WHO FCTC Article 12: education, communication, training and public awareness

The present survey cannot assess the quality of classes about the dangers and effects of smoking. Because increased teaching is a positive measure for tobacco control, it is important that in each country, the Ministry of Health and Ministry of Education work together to meet the objectives of Article 12 of the WHO FCTC on education, communication, training, and public awareness (World Health Organization 2003). However, school programs alone cannot be an effective tobacco-control

strategy. A review of the effect of school-based tobacco-prevention programs showed that education will be most successful if it occurs after other tobacco-control policies are in place, such as tax and price policies aimed at reducing tobacco consumption, 100 % smoke-free environments in all public places and workplaces, and a comprehensive ban on all tobacco advertising, promotion, and sponsorship (Wiehe et al. 2005).

WHO FCTC Article 13: tobacco advertising, promotion, and sponsorship

As the number of countries that have imposed bans on direct advertising has increased, the tobacco industry has increased "indirect advertising" methods, such as sponsoring events, putting their logos on promotional items, brand stretching, giving away free samples at events where young people concentrate, and sponsoring entertainment events (Framework Convention Alliance for Tobacco Control 2006). Thus, a substantial proportion of youth in FSU countries saw actors smoking on TV, tobacco advertisements on billboards, newspapers, or magazines, or sporting events during the last month, had an object with a tobacco logo on it, and were offered free cigarettes. This could be confirmed by that fact that in the mid-1990s, it was estimated that up to 50 % of all billboards in Moscow and 75 % of plastic bags in Russia carried tobacco advertisements (Perlman et al. 2007).

It is noteworthy that 11 FSU countries of 12 have ratified the WHO FCTC (Table 1), and are required to "undertake a comprehensive ban on tobacco advertising, promotion and sponsorship within 5 years of ratification." Even though Armenia, Belarus, and Georgia ratified the WHO FCTC 5 years ago and are subject to the ban on advertisement, promotion, and sponsorship (World Health Organization 2011), there is no ban on all forms of direct and indirect advertisement in those countries, and enforcement is low. Moreover, little reduction was observed in terms of seeing actors smoking on TV, and tobacco companies in some countries are still distributing objects with tobacco logos. In Ukraine, a national law banning all forms of advertising, promotion, and sponsorship by the tobacco industry was signed in March 2012 (WHO FCTC, accessed March 25, 2012).

WHO FCTC Article 14: demand-reduction measures concerning tobacco dependence and cessation

It is important to note that desire to stop smoking did not change much over time in FSU countries. However, more current smokers tried to stop smoking, and more current smokers received smoking-cessation advice during the last years. In FSU countries, tobacco-control policies include smoking-cessation help (Campaign for Tobacco Free Kids 2012). Treatment of tobacco dependency in the form of nicotine-replacement therapy and services (neither cost covered) is also available (World Health Organization 2011). The rate of "feeling like having a cigarette first thing is the morning" did not decrease much over time, and indicates how addictive tobacco can be shortly after young people start to smoke. The lack of change in these responses presents challenges and requires careful planning by the Ministries of Health and other sectors of government.

WHO FCTC Article 16: sales to and by minors

The WHO FCTC recommends that sales of tobacco products be prohibited to persons under age 18. This survey showed that in the majority of countries, more than 40 % of current 13- to 15-years-old smokers were not refused the purchase of cigarettes, despite the fact that all countries in this region have a law prohibiting the sale of tobacco products or individual cigarettes to minors (Campaign for Tobacco Free Kids 2012). One possible obstacle could be street merchandising, or so-called kiosks, which is a common place for buying small, inexpensive consumables, such as newspapers, magazines, lighters, and cigarettes. While further research is necessary, these kiosks can be observed selling cigarettes individually and are believed to be a major source of sales to children (Danishevski et al. 2008).

Possible cause of changes in smoking in FSU countries

Important changes in tobacco-control legislation have occurred over time in Georgia, Kyrgyzstan, Moldova, Russia and Ukraine. These countries started to develop tobacco-control laws before ratifying the FCTC.

In Ukraine, the first tobacco-control law was adopted in 2005, and GYTS surveys in Ukraine were conducted before that law came into force.

In Georgia, the first tobacco-control law was implemented in 2003. After FCTC came into force in 2006, the Georgian government made amendments to the law for advertisement and tobacco control in 2008.

In the case of Kyrgyzstan and Moldova, observed changes were not as dramatic as in Georgia. That could be attributed to the first tobacco-control law coming into force in 2006 (Kyrgyzstan) and 2007 (Moldova). GYTS surveys were conducted in 2004 and 2008, and there is not enough time between the law enforcement and the surveys to reach a conclusion about the possible impact of tobacco-control laws in these countries.

In Russia, tobacco-control legislation was first implemented in 2001. However, this law does not provide detailed regulation of tobacco advertising, promotion, and sponsorship; instead, it states that "tobacco and tobacco

articles shall be advertised in compliance with advertisement legislation of the Russian Federation." The Administrative Offenses Code (2001) identifies several violations of smoke-free policies, establishes punishments for those violations, and designates the officials authorized to hear cases about these administrative offenses (Campaign for Tobacco Free Kids 2012).

In general, compliance with tobacco control laws is moderate in all FSU countries (World Health Organization 2011). The changes in tobacco-control policy were observed in Ukraine and Uzbekistan and increase in tobacco taxes in Kazakhstan and Kyrgyzstan in 2008–2010.

Conclusion

The GYTS data show some encouraging successes of the tobacco control programs in FSU countries. Despite these successes, however, prevalence of tobacco use and SHS exposure remains at a level that will cause serious health problems in the future. Extensive programs to decrease harm from tobacco use in FSU countries are urgently needed, and further efforts should target media and advertisement of tobacco products.

The WHO FCTC provides a useful framework for implementing such a comprehensive approach. The government of Tajikistan should set a goal to ratify the WHO FCTC or at least follow the guiding principles of the treaty until ratified. In addition, Azerbaijan and Turkmenistan should initiate the GYTS and other surveillance efforts to enable monitoring and evaluation of national tobacco control programs. Indeed, all FSU countries should conduct tobacco-surveillance studies every 3–4 years. Moreover, there is a need to establish smoking-cessation advice for youth, as all smoking-cessation advices currently available in these countries target adults.

Indeed, it is time to establish a regional network to facilitate enactment and effective enforcement of comprehensive tobacco-control policies according to WHO recommendations in the FSU countries.

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