

FACTORS ASSOCIATED WITH SEXUAL RISK BEHAVIOUR AMONG YOUNG PEOPLE IN UKRAINE

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SUMMARY

We used data from a behavioural survey of Ukrainian men and women aged 14–24 to examine the relationship between nine potential risk factors and two HIV risk outcomes: non-use of condom at last sex, and multiple sexual partnerships. Younger age at first sex was positively associated with both health risk outcomes, and condom non-use at first sex was associated with subsequent non-use of condoms at last sex. There were regional differences in frequencies of both HIV risk behaviours. Compared with those who reported living in the place they were born, not living permanently at the current place of residence was associated with a fivefold increase in the odds of multiple partnership for women but not for men. Alcohol and drug use were associated with higher odds of multiple partnership and the effect was greater among women than among men. The data analysed are cross-sectional so cannot establish causality. More studies are needed to confirm these results and investigate causal relationships between the possible risk factors and the two health risk behaviours.

Key words: HIV, sexual risk behaviour, young men, young women, survey, Ukraine

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INTRODUCTION

The STI (Sexually Transmitted Infections) increase which took place in the countries of Eastern Europe after the collapse of the Soviet Union was particularly pronounced among young people and indicates high prevalence of sexual risk behaviours in this group (1).

Currently the number of new HIV infections in Ukraine is the second highest in the WHO European Region (2). In 2006, the 18–24 yearolds constituted 17,6% of the new HIV cases in Ukraine (3).

The HIV epidemic in Ukraine started among populations such as injecting drug users. Transmission through non-sexual means (e.g. sharing contaminated needles) is still the most important mode of infection (3, 4). However, the role of heterosexual transmission has increased in the last decade: proportionally fewer affected individuals have any direct relationship with drug users (3). From 1997 to 2006, the proportion of HIV transmission attributed to injecting drug use decreased from 83,6% to 44,3%, and the proportion of heterosexual transmission increased from 11,3% to 35,3% (3).

In the first six months of 2007, most new HIV infections in Ukraine occurred either through non-sexual blood transmission routes, primarily injecting drug use (41,8%), or through unprotected sexual contact (37,4%) (4). From 1998 to the present day, most HIV infection through heterosexual transmission has occurred among 20- to 39- year-old men and women, with increasingly higher proportions of cases among women than men (4).

In Ukraine, there are important inter-regional differences in incidence of HIV, which is the highest in the east and south of

the country and in the city of Kiev, and lowest in the west. These differences have been attributed to the different prevalence of injecting drug use in those regions (3).

There has been a limited research on young people's sexual behavior in the countries of the former Soviet Union. However, this is a group with distinctive characteristics compared with adults with regard to health risk behaviour, which need to be taken into account for targeted interventions (5).

Research outside the former Soviet Union has identified a number of factors associated with high risk sexual behaviour among young people. Early sexual debut has been associated with lower odds of using contraceptives and increased odds of multiple sexual partners (6, 7). Condom use at first sexual intercourse has been associated with subsequent condom use (8, 9). Large age differences between partners at first sex has been associated with less safe sexual behaviour (10–12).

Greater religiosity has been reported to be associated with less sexual activity and proportionally less condom use when sexual activity does occur (13).

There is no clear correlation between reported perceived HIV risk and reported risk behaviour. In some cases, perceived susceptibility to HIV is a significant predictor of higher condom use (14), but in others, perceiving the risk of becoming infected as high or medium does not correspond with higher condom use (15). In one study, young men reporting high risk behaviours also perceived themselves (probably accurately) at risk of HIV (16).

Migration has been identified as an independent risk factor for the acquisition of HIV (17, 18). Use of alcohol and drugs are associated with increased sexual risk behaviour and infection with STIs and HIV (19–22).

The purpose of this study was to examine factors associated with risky sexual behaviour among Ukrainian young people aged 14-24. We examine the effects of several exposure variables found to be associated with sexual risk behaviour in other settings on two outcomes representing sexual risk behaviour: condom non-use at last sex and having three and more sexual partners within the last year. The proportion of sexually active young people who report using a condom for their most recent sexual intercourse is used as an estimate of sexual risk behaviour in other studies (23). Recall of behaviour such as condom use, is acknowledged to be less challenging to respondents when linked to a specific event and may be less prone to social desirability bias (24, 25). Also, use of condom at most recent sexual intercourse appears to be a reasonable proxy for consistent use, as the two measures have been found to be highly correlated both in cross sectional and prospective studies (26, 27).

METHODS

Study Population

This analysis is based on the sample of young people from the survey 'Monitoring of Youth Behaviour as a Component of Second-Generation Epidemiological Surveillance' conducted by the State Institute of Family and Youth Problems and the Ukrainian Institute for Social Research, with the support of AIDS Alliance Ukraine. The survey was carried out between October 22 and November 13, 2004, in all the regions of Ukraine, AR Crimea, and the city of Kiev among young people 14 to 24 years old. The survey used a multistage stratified random sampling approach to ensure that the sample represents the general population by main socio-demographic characteristics (sex, age, type of the place of residence, region). Overall, 95% of the identified young men and women were interviewed.

The survey method was a structured face-to-face interview. A combined interview approach was used. This consisted of a face-to-face individual interview collecting general information, and a confidential self-administered questionnaires containing sensitive questions. After the face-to-face interview, the respondents filled in the self-administered questionnaire, sealed it in a separate envelope and returned it to the interviewer.

The survey collected information from young people about their sexual behaviour, sources of condoms, pregnancy history, knowledge of and attitudes to HIV/AIDS. Demographic data were also collected.

Measures

Sexual risk behaviour among those who reported being sexually active during the last 12 months in this study is based on two indicators: multiple sexual partners during the last year, and condom non-use at last sex.

Multiple partnership is defined as having three or more sexual partners in the last 12 months.

Because of the way the questionnaire was worded, for the purpose of analysis it was necessary to combine variables indicating condom use at most recent vaginal sex and most recent anal sex. If a person reported using condom at both vaginal and anal sex, or either kind of sex (when reporting just one of them), they are considered 'lower risk'; if a person reported not using condom at either vaginal or anal sex or both, they are considered 'higher risk'.

Respondent characteristics/exposure variables include current age, sex and marital status of respondent, age at first sex, age difference from partner at first sex, condom use at first sex (the survey did not distinguish between anal and vaginal sex in questions about "first sex"), religiosity, perceived risk of HIV, migration status, current region of residence, alcohol and drug use.

We used χ^2 tests to assess univariate associations between the dichotomous outcome variables and the exposure variables. Logistic regression was used to calculate the odds ratios for both outcomes, adjusted for the explanatory variables described above. In the logistic regression models, current age was fitted as continuous variable, while age at first sex, age difference from partner at first sex, alcohol use, and perceived risk of HIV were treated as ordered categorical variables. Interaction between each exposure variable and demographic variables (current age, sex, marital status) were assessed with likelihood ratio tests. For significant interactions, we conducted logistic regression stratifying by the exposure variable that showed a significant correlation. Because sex interacted with marital status, we analyzed men and women separately.

RESULTS

The distribution of responses by exposure and outcome variables is presented in Tables 1 and 2.

Condom Non-use at Last Sex – Univariate Results

Forty-nine percent of respondents (539 individuals) reported non-use of condoms at last sex. Table 3 shows the crude odds ratios for non-use of condom among women and men, and each exposure variable.

Men and women who reported not using condom at first sex were significantly more likely to report unprotected intercourse at last sexual encounter: OR 4.39 (95% CI 3.07, 6.27) for men and OR 4.01 (95% CI 2.74, 5.88) for women. Compared with women who estimate their HIV risk as high, women who believe they are not at risk of contracting HIV were more likely to report non-use of condoms, OR 1.76 (95% CI 1.11, 2.78). Region of residence was significantly related to condom non-use among men who live in the north and east [respective odds ratios 2.12 (95% CI 1.18, 3.8) and 2.53 (95% CI 1.55, 4.13)], compared with men who live in the west. There was no such relationship among women.

Age at first sex, age difference between partners at first sex, religiosity, recent migration, reported alcohol and drug use were not significantly related to likelihood of condom use at last intercourse for men or women.

Multivariate Results

Marital status, sex, and current age were significantly associated with non-use of condoms. Married and cohabiting respondents were more likely to report condom non-use, and proportionally more women than men reported not using condoms at most recent intercourse. Increasing age was related to decreasing condom use at last sex.

Table 4 shows the odds ratios for non-use of condom among women and men adjusted for marital status and current age.

Older age at first sex seems to have a protective effect in that it is associated with higher odds of condom use at last sexual in-

Table 1. Distribution of the responses of the Ukrainian men and women aged 14–24 who had sex in the last year, on the selected exposure variables, by multiple sexual partnership

Whether or not the respondent reported multiple partnership							
	Reported multiple partnership		Row total		Reported multiple partnership		Row total
Variable	N	% (row)		Variable	N	% (row)	
Marital status				Condom use at first sex			
<i>Not married/divorced/widowed</i>	301	33.78	891	<i>Yes</i>	166	25.38	654
<i>Married/cohabiting</i>	39	9.42	414	<i>No</i>	157	27.07	580
Total	340	26.05	1305	Total	323	26.18	1234
Pearson $\chi^2(1) = 87.0778$ $P \leq 0.001$				Pearson $\chi^2(1) = 0.4526$ $P = 0.501$			
Current age				Religiosity			
<i>14–16</i>	26	27.96	93	<i>Believers</i>	161	23.03	699
<i>17–19</i>	97	27.25	356	<i>Doubting</i>	96	26.89	357
<i>20+</i>	217	25.29	858	<i>Non-believers/atheists</i>	73	34.60	211
Total	340	26.01	1307	Total	330	26.05	1267
Pearson $\chi^2(2) = 0.6965$ $P = 0.706$				Pearson $\chi^2(2) = 11.4368$ $P = 0.003$			
Sex				Age at first sex			
<i>Female</i>	81	13.39	605	<i>10–16</i>	178	34.50	516
<i>Male</i>	259	36.89	702	<i>17–19+</i>	135	19.68	686
Total	340	26.01	1307	Total	313	26.04	1202
Pearson $\chi^2(1) = 93.2880$ $P \leq 0.001$				Pearson $\chi^2(1) = 33.5693$ $P \leq 0.001$			
Estimated HIV risk				Migration status			
<i>Absolutely real/quite real</i>	103	36.27	284	<i>Born and live here</i>	260	25.62	1015
<i>50–50</i>	86	36.13	238	<i>Do not live permanently</i>	26	40.00	65
<i>Unlikely/not at risk absolutely</i>	127	18.51	686	<i>1–5 years</i>	30	25.64	117
Total	316	26.16	1208	<i>6–16+</i>	24	21.82	110
Pearson $\chi^2(2) = 48.0465$ $P \leq 0.001$				Total	340	26.01	1307
				Pearson $\chi^2(3) = 7.7044$ $P = 0.053$			
Age difference with the partner at first sex				Region of residence			
<i>Older</i>	166	22.83	727	<i>West</i>	62	23.66	262
<i>Same age</i>	78	27.56	283	<i>Centre</i>	34	20.12	169
<i>Younger</i>	56	31.82	176	<i>North</i>	62	33.33	186
Total	300	25.30	1186	<i>East</i>	91	24.14	377
				<i>South</i>	44	27.85	158
				<i>Crimea</i>	15	23.44	64
				<i>Kiev</i>	32	35.16	91
				Total	340	26.01	1307
Pearson $\chi^2(2) = 7.0637$ $P = 0.029$				Pearson $\chi^2(6) = 14.1266$ $P = 0.028$			
Drug use				Alcohol use last month			
<i>No</i>	278	23.13	1202	<i>At least once a week</i>	172	44.91	383
<i>Yes</i>	54	61.36	88	<i>Less than once a week</i>	143	21.83	655
Total	332	25.74	1290	<i>Never used</i>	20	8.47	236
				Total	335	26.30	1274
Pearson $\chi^2(1) = 62.7202$ $P \leq 0.001$				Pearson $\chi^2(2) = 113.8699$ $P \leq 0.001$			

tercourse. Men who were over 17 years old at sexual debut were less likely to report non-use of condom at last sex compared with the baseline category of those who were 10–16 years old at their first sex (OR 0.67 (95% CI 0.45, 0.97)).

Young women and men who reported not using condoms at their first sexual intercourse were nearly four times more likely to report non use of condom at last sex compared with those who reported using condom at sexual debut. Young men who lived in

Table 2. Distribution of the responses of the Ukrainian men and women aged 14–24 who had sex in the last year, on the selected exposure variables, by non-use of condom at last sex

Whether or not the respondent reported non-use of condom at last sex							
	Reported condom non-use		Row total		Reported condom non-use		Row total
Variable	N	% (row)		Variable	N	% (row)	
Marital status				Condom use at first sex			
<i>Not married/divorced/widowed</i>	282	36.67	769	<i>Yes</i>	175	32.29	542
<i>Married/cohabiting</i>	256	76.42	335	<i>No</i>	340	67.06	507
Total	538	48.73	1104	Total	515	49.09	1049
Pearson $\chi^2(1) = 147.5531$ $P \leq 0.001$				Pearson $\chi^2(1) = 126.7438$ $P \leq 0.001$			
Current age				Religiosity			
<i>14–16</i>	27	32.93	82	<i>Believers</i>	283	49.13	576
<i>17–19</i>	122	40.13	304	<i>Doubting</i>	153	49.84	307
<i>20+</i>	390	54.17	720	<i>Non-believers/atheists</i>	90	46.39	194
Total	539	48.73	1106	Total	526	48.84	1077
Pearson $\chi^2(2) = 25.7107$ $P \leq 0.001$				Pearson $\chi^2(2) = 0.6072$ $P = 0.738$			
Sex				Age at first sex			
<i>Female</i>	288	56.69	508	<i>10–16</i>	225	50.11	449
<i>Male</i>	251	41.97	598	<i>17–19+</i>	276	48.59	568
Total	539	48.73	1106	Total	501	49.26	1017
Pearson $\chi^2(1) = 23.8201$ $P \leq 0.001$				Pearson $\chi^2(1) = 0.2317$ $P = 0.630$			
Estimated HIV risk				Migration status			
<i>Absolutely real/quite real</i>	115	45.63	252	<i>Born and live here</i>	422	48.62	868
<i>50–50</i>	89	44.95	198	<i>Do not live permanently</i>	25	46.30	54
<i>Unlikely/Not at risk absolutely</i>	292	51.32	569	<i>1–5 years</i>	50	53.76	93
Total	496	48.68	1019	<i>6–16+</i>	42	46.15	91
Pearson $\chi^2(2) = 3.6234$ $P = 0.163$				Total	539	48.73	1106
				Pearson $\chi^2(3) = 1.3172$ $P = 0.725$			
				Region of residence			
Age difference with the partner at first sex				<i>West</i>	92	41.26	223
<i>Older</i>	317	52.05	609	<i>Centre</i>	77	55.40	139
<i>Same age</i>	95	39.09	243	<i>North</i>	65	48.51	134
<i>Younger</i>	70	47.30	148	<i>East</i>	172	54.09	318
Total	482	48.20	1000	<i>South</i>	62	41.06	151
				<i>Crimea</i>	33	55.93	59
				<i>Kiev</i>	38	46.34	82
				Total	539	48.73	1106
Pearson $\chi^2(2) = 11.7376$ $P = 0.003$				Pearson $\chi^2(6) = 16.0833$ $P = 0.013$			
Drug use				Alcohol use last month			
<i>No</i>	493	48.76	1011	<i>At least once a week</i>	141	41.96	336
<i>Yes</i>	42	53.16	79	<i>Less than once a week</i>	275	50.09	549
Total	535	49.08	1090	<i>Never used</i>	107	56.91	188
Pearson $\chi^2(1) = 0.5679$ $P = 0.451$				Total	523	48.74	1073
				Pearson $\chi^2(2) = 11.6041$ $P = 0.003$			

the east and north were over twice as likely to report non-use of condoms compared with those who live in the western regions (OR 2.58 (95% CI 1.52, 4.37) and OR 2.39 (95% CI 1.28, 4.45) respectively).

Women who assessed their HIV risk as ‘unlikely’ or ‘no risk at all’ were 1.9 times more likely to report not using a condom at most recent intercourse, after taking account of the effect of marital status and current age.

Table 3. Likelihood of reporting non-use of condom at last sex, for 14–24 years old Ukrainian women and men, unadjusted odds ratios (OR) using logistic regression analysis

Exposure variable	Crude OR	95% CI	p	Crude OR	95% CI	p
	Women			Men		
Age at first sex						
10–16	1			1		
17+	0.80	0.53, 1.20	0.265	0.80	0.57, 1.13	0.208
Age difference with partner at first sex						
Partner 5+ years older	1			1		
Partner 1–4 years older	0.99	0.65, 1.50	0.945	0.81	0.40, 1.62	0.545
Same age	0.78	0.44, 1.41	0.414	0.64	0.32, 1.28	0.206
Partner 1–4 years younger	1.25	0.35, 4.48	0.729	1.04	0.51, 2.11	0.912
Condom use at first sex						
Yes	1			1		
No	4.01	2.74, 5.88	< 0.001	4.39	3.07, 6.27	< 0.001
Religiosity						
Believer	1			1		
Doubt	1.19	0.79, 1.79	0.397	0.97	0.65, 1.43	0.869
Non-believer	1.22	0.67, 2.21	0.517	0.97	0.64, 1.46	0.879
Estimated HIV risk						
Absolutely real/quite real	1			1		
50–50	1.28	0.71, 2.32	0.413	0.80	0.49, 1.29	0.364
Unlikely/not at risk at all	1.76	1.11, 2.78	0.015	0.90	0.6, 1.33	0.587
Recent migration						
Born and live here	1			1		
Do not live permanently	0.91	0.32, 2.57	0.863	1.04	0.54, 2.02	0.90
Less than a year/1–5 years	1.43	0.79, 2.59	0.239	0.90	0.47, 1.74	0.754
6–16+ years	1.17	0.59, 2.33	0.65	0.79	0.44, 1.42	0.438
Region of residence						
West	1			1		
Centre	1.84	0.94, 3.61	0.074	1.76	0.97, 3.18	0.062
North	0.74	0.38, 1.44	0.375	2.12	1.18, 3.8	0.011
East	1.00	0.60, 1.67	0.988	2.53	1.55, 4.13	< 0.001
South	0.84	0.46, 1.54	0.575	1.04	0.56, 1.9	0.908
AR Crimea	2.65	0.98, 7.20	0.055	1.49	0.67, 3.30	0.327
Kiev	0.80	0.38, 1.69	0.552	1.74	0.86, 3.53	0.125
Drug use						
No	1			1		
Yes	1.2	0.46, 3.16	0.706	1.46	0.86, 2.48	0.166
Alcohol use in past month						
At least once a week	1			1		
Less than once a week	1.02	0.61, 1.71	0.929	1.24	0.88, 1.76	0.222
Never used	1.25	0.71, 2.23	0.441	1.44	0.8, 2.59	0.219

Multiple Sexual Partners – Univariate Results

Twenty-six percent of the respondents (340 individuals) reported having three or more sexual partners within last 12 months. Table 5 presents the crude odds ratios for multiple sexual partnership among men and women.

In the univariate analysis, older age at first sex was significantly related to reduced odds of having three or more sexual partners in the last year. Women whose first sexual partner was 1–4 years older were less likely to have multiple partners compared with women whose first partner was 5 or more years older, OR 0.48

(95% CI 0.28, 0.83). Compared with those who estimate their HIV risk as real, women and men who believe they are not at risk of HIV were less likely to report multiple partnerships (OR = 0.39 (95% CI 0.22, 0.7) and OR=0.45 [(95% CI 0.31, 0.66), respectively]. Women living in Kiev were over three times as likely to report multiple partnerships as women in the west. Women and men who reported using drugs were also more likely to report multiple partnerships [OR=9.03 (95% CI 3.61, 22.58) and OR=3.39 (95% CI 2.02, 5.70) respectively].

Condom use at first sex, religiosity, recent migration, and alcohol use in the past month were not significantly related to multiple partnership in the univariate analysis.

Multivariate Results

Marital status and sex, but not current age, were significantly associated with reports of multiple sexual partnerships in the multivariate analysis. Unsurprisingly, never-married people were more likely to report multiple partners in the last year compared with married and cohabiting respondents. Among unmarried, non-cohabiting respondents who were sexually active in the last year, 66% reported having one or two partners, and 34% reported having three or more. More men than women said they had three or more sexual partners.

Table 6 presents the adjusted odds ratios for multiple partnership in women and men.

Respondents who were 17 years and older at sexual onset were less likely to report having three or more partners during the last year, compared with those who were 16 or younger at first sex [adjusted OR 0.59 (95% CI 0.35, 0.99) for women; adjusted OR 0.45 (95% CI 0.32, 0.64) for men]. Reporting a partner at first sex who is 1–4 years older, of same age, or younger, was associated with reduced odds of multiple partnership, compared with individuals whose partner was substantially (five or more years) older.

Women who report condom non-use at first sex are over twice as likely to report multiple partnerships than women who report having used condoms at first sex.

Estimating one's HIV risk as 'unlikely' or 'no risk at all' was associated with lower likelihood of reporting multiple partnership by women [OR 0.39 (95% CI 0.21, 0.71)] and men [adjusted OR 0.47 (95% CI 0.32, 0.70)].

Women who reported not living permanently in their current place of residence were over five times more likely to report multiple sexual partners compared with women who reported living in the town or city where they were born. There was no such relationship for their male counterparts.

Odds of multiple partnership were higher for women residing in Kiev [adjusted OR 2.78 (95% CI 1.04, 7.4)], compared with women living in the west of the country. Region of residence was not significantly related to multiple partnership for men.

Drug use was significantly associated with reports of multiple partnership among both among men and women, with the effect much stronger in women [OR 8.97 (95% CI 3.38, 23.76)] for women compared with OR 3.57 (95% CI 2.08, 6.13) for men.

Drinking less alcohol was associated with reduced odds of reporting multiple sexual partnership for both men and women, with the strongest effect among women who reported using no alcohol during the last month.

DISCUSSION

The purpose of this study was to investigate relationships between nine potential risk factors and sexual risk behaviour among young people aged 14–24 in Ukraine. The results suggest that most of the exposure variables are associated with either multiple sexual partnership or condom non-use. Some of the variables are associated with both risk outcomes.

Significant positive relationships for men and women were found between condom non-use at first sex and non-use of condoms at last sex. Younger age at first sex was also positively associated with both multiple partnership and condom non-use.

Women who report that their own risk of HIV is very low were almost twice as likely as women who consider themselves at high risk to report non-use of condoms after taking account of marital status and current age. These women may therefore be more likely to assume they are not at risk despite having unprotected sex, perhaps because they perceive their sexual partner as safe or for other reasons. This may put some of them at risk if the partner is not monogamous or is infected with HIV.

Among both men and women, perception of low HIV risk was associated with reduced likelihood of reporting multiple partnership and could be the consequence of less risky behaviour.

Alcohol non use was associated with significantly reduced likelihood of reports of multiple sexual partnership among both men and women, with the protective effect most prominent among women who never drink alcohol. However, frequency of alcohol use was not related to condom use at last sex. This is consistent with previous research findings of the positive link between drinking and indiscriminate behaviours such as having multiple sex partners, and the inconsistent link between alcohol use or non-use and protective behaviours such as condom use (28–31).

The relationship between the region of residence and reported condom non-use was significant only for men living in the eastern and northern regions but it suggests possible regional differences in risk behaviour, or at least of reporting that behaviour, as does the significant positive relationship between residing in the city of Kiev and multiple sexual partnerships among women. The city of Kiev and the east and north regions belong to the group of regions most affected by the HIV epidemic, and respondents from these regions are more likely to report non-use of condoms and multiple partnerships compared with respondents from the west region where HIV prevalence is lower. This suggests that the east and north regions as well as Kiev should be a priority area for interventions to tackle sexual risk behaviour.

A significantly older partner, as well as younger age at first sexual intercourse is associated with increased odds of reporting multiple sexual partnerships, even after accounting for the influence of other demographic variables. This finding chimes with studies in other settings which indicate that having a much older partner is associated with subsequent sexual risk behaviour (10, 11).

The association between migration status and multiple partnerships was only significant for women who reported they did not live permanently in the current place of residence. It is possible that being in a temporary location might give women opportunities for sexual activity otherwise restricted by family members or others, but this would need to be investigated by future research.

In common with other studies (31–33), reported drug use is signifi-

Table 4. Likelihood of reporting non-use of condom at last sex, for 14–24 years old Ukrainian women and men, adjusted odds ratios (OR) using logistic regression analysis

Exposure variable	Adjusted OR	95% CI	p	Adjusted OR	95% CI	p
	Women			Men		
Age at first sex						
10–16	1			1		
17+	0.74	0.48, 1.12	0.158	0.67	0.45, 0.97	0.036
Age difference with partner at first sex						
Partner 5+ years older	1			1		
Partner 1–4 years older	0.89	0.57, 1.39	0.608	0.86	0.41, 1.81	0.70
Same age	0.72	0.38, 1.34	0.299	0.57	0.27, 1.21	0.145
Partner 1–4 years younger	1.37	0.36, 5.28	0.647	1.01	0.47, 2.15	0.983
Condom use at first sex						
Yes	1			1		
No	3.74	2.49, 5.60	< 0.001	3.95	2.71, 5.73	< 0.001
Religiosity						
Believer						
Doubt	1.14	0.74, 1.76	0.544	0.95	0.62, 1.46	0.818
Non-believer	1.32	0.70, 2.48	0.396	1.14	0.73, 1.77	0.569
Estimated HIV risk						
Absolutely real/quite real	1			1		
50–50	1.56	0.82, 2.97	0.172	0.78	0.46, 1.3	0.346
Unlikely/not at risk at all	1.90	1.16, 3.12	0.011	0.77	0.5, 1.18	0.23
Recent migration						
Born and live here	1			1		
Do not live permanently	1.02	0.35, 3.02	0.97	0.89	0.43, 1.82	0.742
Less than a year/1–5 years	1.27	0.67, 2.40	0.467	0.57	0.27, 1.21	0.142
6–16+ years	1.16	0.56, 2.41	0.685	0.76	0.41, 1.41	0.380
Region of residence						
West	1			1		
Centre	1.49	0.73, 3.03	0.274	1.73	0.91, 3.27	0.093
North	0.88	0.43, 1.78	0.721	2.39	1.28, 4.45	0.006
East	1.16	0.67, 1.99	0.593	2.58	1.52, 4.37	< 0.001
South	0.98	0.52, 1.88	0.959	1.15	0.68, 1.69	0.683
AR Crimea	2.59	0.9, 7.41	0.076	1.58	0.68, 3.69	0.292
Kiev	1.06	0.48, 2.34	0.891	1.96	0.93, 4.15	0.079
Drug use						
No	1			1		
Yes	1.47	0.53, 4.08	0.456	1.55	0.88, 2.72	0.126
Alcohol use in past month						
At least once a week	1			1		
Less than once a week	0.72	0.41, 1.24	0.233	1.16	0.8, 1.68	0.432
Never used	0.73	0.39, 1.36	0.322	1.02	0.53, 1.96	0.948

cantly associated with risk – in this case, a higher likelihood of reporting multiple sexual partnership, with a much stronger effect in women.

This study has several limitations. We rely on young people’s reports of their behaviour, which may not be accurate, although the self-administered questionnaire format may have reduced social

desirability bias. Type of partner (permanent, casual, commercial) of the reported last vaginal and anal sex is not specified. We suspect this would have been illuminating. Frequency of alcohol use was assessed only for the past month; therefore we do not know the frequency of alcohol intake which occurred outside this

Table 5. Likelihood of reporting three or more sexual partners during the last year, for 14–24 years old Ukrainian women and men, unadjusted odds ratios (OR) using logistic regression analysis

Exposure variable	Crude OR	95% CI	p	Crude OR	95% CI	p
	Women			Men		
Age at first sex						
10–16	1			1		
17+	0.52	0.32, 0.85	0.009	0.52	0.38, 0.73	< 0.001
Age difference with partner at first sex						
Partner 5+ years older	1			1		
Partner 1–4 years older	0.48	0.28, 0.83	0.009	0.85	0.44, 1.64	0.634
Same age	0.58	0.26, 1.29	0.18	0.62	0.32, 1.2	0.153
Partner 1–4 years younger	0.41	0.05, 3.29	0.4	0.61	0.31, 1.19	0.146
Condom use at first sex						
Yes	1			1		
No	1.61	0.98, 2.65	0.058	1.10	0.8, 1.51	0.564
Religiosity						
Believer	1			1		
Doubt	1.00	0.58, 1.74	0.989	1.23	0.85, 1.78	0.267
Non-believer	1.46	0.71, 3.01	0.299	1.37	0.92, 2.04	0.121
Estimated HIV risk						
Absolutely real/quite real	1			1		
50–50	1.12	0.57, 2.18	0.75	0.96	0.61, 1.49	0.84
Unlikely/not at risk at all	0.39	0.22, 0.7	0.002	0.45	0.31, 0.66	< 0.001
Recent migration						
Born and live here	1			1		
Do not live permanently	5.78	2.39, 13.95	< 0.001	0.99	0.53, 1.9	0.99
Less than a year/1–5 years	0.87	0.38, 1.99	0.736	1.25	0.71, 2.20	0.44
6–16+ years	0.69	0.24, 2.01	0.499	0.73	0.42, 1.27	0.27
Region of residence						
West	1			1		
Centre	0.87	0.3, 2.49	0.791	0.81	0.46, 1.42	0.465
North	2.36	1.0, 5.57	0.049	1.51	0.90, 2.52	0.118
East	2.08	0.98, 4.42	0.057	0.84	0.53, 1.32	0.443
South	1.21	0.45, 3.21	0.708	1.46	0.84, 2.54	0.179
AR Crimea	0.39	0.05, 3.14	0.373	1.16	0.55, 2.46	0.694
Kiev	3.36	1.28, 8.8	0.014	1.44	0.75, 2.76	0.278
Drug use						
No	1			1		
Yes	9.03	3.61, 22.58	< 0.001	3.39	2.02, 5.70	< 0.001
Alcohol use in past month						
At least once a week	1			1		
Less than once a week	0.35	0.21, 0.61	< 0.001	0.45	0.32, 0.63	< 0.001
Never used	0.05	0.02, 0.16	< 0.001	0.31	0.17, 0.56	< 0.001

period. Also, we have very little information about the frequency or type of drugs used by the respondents. contributed to the two health risk behaviours which have not been examined in this study.

Another limitation is that the data analyzed in our study are cross-sectional, therefore causal relationships can not be established. Finally, as with any survey, there may be factors that

Table 6. Likelihood of reporting three or more sexual partners during the last year, for 14–24 years old Ukrainian women, adjusted odds ratios (OR) using logistic regression analysis

Exposure variable	Adjusted OR	95% CI	p	Adjusted OR	95% CI	p
	Women			Men		
Age at first sex						
10–16	1			1		
17+	0.59	0.35, 0.99	0.049	0.45	0.32, 0.64	< 0.001
Age difference with partner at first sex						
Partner 5+ years older	1			1		
Partner 1–4 years older	0.45	0.26, 0.80	0.006	0.78	0.38, 0.88	0.467
Same age	0.55	0.24, 1.26	0.16	0.57	0.3, 0.78	0.113
Partner 1–4 years younger	0.34	0.04, 2.81	0.32	0.55	0.26, 0.76	0.1
Condom use at first sex						
Yes	1			1		
No	2.01	1.21, 3.36	0.007	1.30	0.93, 1.81	0.122
Religiosity						
Believer	1			1		
Doubt	1.05	0.59, 1.84	0.87	1.30	0.89, 1.9	0.175
Non-believer	1.5	0.72, 3.15	0.28	1.35	0.9, 2.03	0.145
Estimated HIV risk						
Absolutely real/quite real	1			1		
50–50	0.99	0.5, 1.98	0.99	0.97	0.62, 1.53	0.90
Unlikely/not at risk at all	0.39	0.21, 0.71	0.002	0.47	0.32, 0.70	< 0.001
Recent migration						
Born and live here	1			1		
Do not live permanently	5.35	2.14, 13.38	< 0.001	1.11	0.57, 2.18	0.75
Less than a year/1–5 years	0.97	0.41, 2.27	0.95	1.58	0.86, 2.87	0.14
6–16+ years	0.70	0.24, 2.06	0.52	0.75	0.43, 1.33	0.33
Region of residence						
West	1			1		
Centre	1.14	0.39, 3.34	0.816	0.89	0.50, 1.59	0.699
North	2.2	0.92, 5.28	0.077	1.52	0.9, 2.58	0.117
East	1.93	0.89, 4.16	0.096	0.90	0.57, 1.44	0.674
South	1.1	0.41, 2.97	0.854	1.42	0.8, 2.49	0.229
AR Crimea	0.41	0.05, 3.39	0.406	1.20	0.56, 2.59	0.643
Kiev	2.78	1.04, 7.4	0.041	1.37	0.70, 2.68	0.352
Drug use						
No	1			1		
Yes	8.97	3.38, 23.76	< 0.001	3.57	2.08, 6.13	< 0.001
Alcohol use in past month						
At least once a week	1			1		
Less than once a week	0.43	0.25, 0.77	0.004	0.47	0.33, 0.66	< 0.001
Never used	0.07	0.02, 0.21	< 0.001	0.36	0.19, 0.67	0.001

REFERENCES

- Kelly JA, Amirkhanian YA. The newest epidemic: a review of HIV/AIDS in Central and Eastern Europe. *Int J STD AIDS*. 2003Jun;14(6):361–71.
- Euro HIV. HIV/AIDS Surveillance in Europe. End-year report 2005. No73. Saint-Maurice: Sanitary Surveillance Institute; 2006.
- Sakalska OP, Scherbinska AM, Bochkova LV, Schkurko TV, Gural AL, Kruglov YV, et al. HIV Infection in Ukraine. Information Bulletin. No. 27. Kyiv: Ministry of Health of Ukraine; 2007. (In Ukrainian.)
- Scherbinska AM, Bochkova LV, Gural AL, Kruglov YV, Martsynovska VA, Nguen IV, et al. HIV Infection in Ukraine. Information Bulletin. No. 28. Kyiv: Ministry of Health of Ukraine; 2007. (In Ukrainian.)
- Roberts S T, Kennedy BL. Why are young college women not using condoms? Their perceived risk, drug use, and developmental vulnerability

- may provide important clues to sexual risk. *Arch Psychiatr Nurs*. 2006 Feb;20(1):32-40.
6. Kirby D, Lepore G, Ryan J. Sexual risk and protective factors: factors affecting teen sexual behaviour, pregnancy, childbearing, and sexually transmitted disease - which are important? Which can you change? Washington, D.C.: The National Campaign to Prevent Teen Pregnancy; 2005.
 7. Harrison A, Cleland J, Gouws E, Frohlich J. Early sexual debut among young men in rural South Africa: heightened vulnerability to sexual risk? *Sex Transm Infect*. 2005 Jun;81(3):259-61.
 8. Teixeira AM, Knauth DR, Fachel JM, Leal AF. Teenagers and condom use: choices by young Brazilians from three Brazilian State capitals in their first and last sexual intercourse. *Cad Saude Publica*. 2006 Jul;22(7):1385-96. Erratum in: *Cad Saude Publica*. 2006 Sep;22(9):2003-4. (In Portuguese.)
 9. Miller KS, Levin ML, Whitaker DJ, Xu X. Patterns of condom use among adolescents: the impact of mother-adolescent communication. *Am J Public Health*. 1998 Oct;88(10):1542-4.
 10. Ford K, Sohn W, Lepkowski J. Characteristics of adolescents' sexual partners and their association with use of condoms and other contraceptive methods. *Fam Plann Perspect*. 2001 May-Jun;33(3):100-5, 132.
 11. Di Clemente RJ, Wingood GM, Crosby RA, Sionean C, Cobb BK, Harrington K, et al. Sexual risk behaviours associated with having older sex partners: a study of black adolescent females. *Sex Transm Dis*. 2002 Jan;29(1):20-4.
 12. Leitenberg H, Saltzman H. A statewide survey of age at first intercourse for adolescent females and age of their male partners: relation to other risk behaviours and statutory rape implications. *Arch Sex Behav*. 2000 Jun;29(3):203-15.
 13. Zaleski EH, Schiaffino KM. Religiosity and sexual risk-taking behaviour during the transition to college. *J Adolesc*. 2000 Apr;23(2):223-7.
 14. Adih WK, Alexander CS. Determinants of condom use to prevent HIV infection among youth in Ghana. *J Adolesc Health*. 1999 Jan;24(1):63-72.
 15. Bensyl D, Iuliano D, Colley Gilbert B. Perceived HIV risk and condom use in the behavioral risk factor surveillance system (BRFSS). *Ann Epidemiol*. 2000 Sep;13(8):594-5.
 16. Reitman D, St Lawrence JS, Jefferson KW, Alleyne E, Brasfield TL, Shirley A. Predictors of African American adolescents' condom use and HIV risk behaviour. *AIDS Educ Prev*. 1996 Dec;8(6):499-515.
 17. Lagarde E, Schim van der Loeff M, Enel C, Holmgren B, Dray-Spira R, Pison G, et al; MECORA Group. Mobility and the spread of human immunodeficiency virus into rural areas of West Africa. *Int J Epidemiol*. 2003 Oct;32(5):744-52.
 18. Zuma K, Gouws E, Williams B, Lurie M. Risk factors for HIV infection among women in Carletonville, South Africa: migration, demography and sexually transmitted diseases. *Int J STD AIDS*. 2003 Dec;14(12):814-7.
 19. Koniak-Griffin D, Brecht ML. Linkages between sexual risk taking, substance use, and AIDS knowledge among pregnant adolescents and young mothers. *Nurs Res*. 1995 Nov-Dec;44(6):340-6.
 20. LaBrie J, Earleywine M, Schiffman J, Pedersen E, Marriot C. Effects of alcohol, expectancies, and partner type on condom use in college males: event-level analyses. *J Sex Res*. 2005 Aug;42(3):259-66.
 21. Baskin-Sommers A, Sommers I. The co-occurrence of substance use and high-risk behaviours. *J Adolesc Health*. 2006 May;38(5):609-11.
 22. Cooper ML. Alcohol use and risky sexual behaviour among college students and youth: evaluating the evidence. *J Stud Alcohol Suppl*. 2002 Mar;(14):101-17.
 23. Wellings K, Collumbien M, Slaymaker E, Singh S, Hodges Z, Patel D, et al. Sexual behaviour in context: a global perspective. *Lancet*. 2006 Nov 11;368(9548):1706-28.
 24. Reitmeijer CA, Lansky A, Anderson JE, Fichtner RR. Developing standards in behavioural surveillance of HIV/STD prevention. *AIDS Educ Prev*. 2001 Jun;13(3):268-78.
 25. Catania JA, Dolcini MM, Laumann EO, Osmond D, Bolan G, Canchola J. A response to „developing standards in behavioural surveillance for HIV/STD prevention“. *AIDS Educ Prev*. 2002 Aug;14(4):343-7.
 26. Lagarde E, Auvert B, Chege J, Sukwa T, Glynn JR, Weiss HA, et al; Study Group on the Heterogeneity of HIV Epidemics in African Cities. Condom use and its association with HIV/sexually transmitted diseases in four urban communities of sub-Saharan Africa. *AIDS*. 2001 Aug;15 Suppl 4:S71-8.
 27. Myer L, Mathews C, Little F. Measuring consistent condom use: a comparison of cross-sectional and prospective measurements in South Africa. *Int J STD AIDS*. 2002 Jan;13(1):62-3.
 28. Santelli JS, Brener ND, Lowry R, Bhatt A, Zabin LS. Multiple sexual partners among U.S. adolescents and young adults. *Fam Plann Perspect*. 1998 Nov-Dec;30(6):271-5.
 29. Wechsler H, Dowdall GW, Davenport A, Castillo S. Correlates of college student binge drinking. *Am J Public Health*. 1995 Jul;85(7):921-6.
 30. Wechsler H, Davenport A, Dowdall G, Moeykens B, Castillo S. Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *JAMA*. 1994 Dec 7;272(21):1672-7.
 31. Lowry R, Holtzman D, Truman BI, Kann L, Collins JL, Kolbe LJ. Substance use and HIV-related sexual behaviors among US high school students: are they related? *Am J Public Health*. 1994 Jul;84(7):1116-20.
 32. Tapert SF, Aarons GA, Sedlar GR, Brown SA. Adolescent substance use and sexual risk-taking behavior. *J Adolesc Health*. 2001 Mar;28(3):181-9.
 33. Staton M, Leukefeld C, Logan TK, Zimmerman R, Lynam D, Milich R, et al. Risky sex behavior and substance use among young adults. *Health Soc Work*. 1999 May;24(2):147-54.

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