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ORIGINAL ARTICLE

Trends in condom use among Bangkok students, 2002-2006

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Abstract

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This study was conducted to determine trends in condom use among Bangkok adolescents from 2002 to 2006 according to gender, age, type of school and type of sexual activity. Data from five Be havior Surveillance Surveys (BSS) of adolescents in high schools and vocational colleges in Bangkok from 2002 to 2006 were analyzed. Confidence intervals for the chances of having sex, of not using condoms, and of having multiple partners were classified by gender, age, type of school attended and year of survey were plotted on graphs using odds plots. Logistic regression was used to model the risk factors for these outcomes.

There were 9563 adolescents who responded to the five surveys, mostly aged from 16 to 18. Twenty-one percent of them had had sex in the preceding year, 9.5% of high school students and 32.4% of vocational college students. The rate increased from 2003 to 2005 but decreased in 2006. Among those who had had sex in the preceding year, 81% did not always use condoms, with this rate decreasing gradually from 86.8% in 2002 to 78.2% in 2006; 30% of this group had multiple partners. Gender is a risk factor for each outcome, with boys more likely to have had sex in the previous year and to have had multiple partners. Females who had sex were more likely to not always use condoms. Vocational college students were more likely to have had sex and to not always use condoms.

Although the rate trend of not always using condoms decreased in the most recent year of the survey, the proportion of those not using condoms was still high, particularly among girls and vocational college students. Condom use rates were not optimal in this population; specific targeted interventions are needed for this young population. Intervention efforts are also needed to increase condom use.

Keywords: condom use, multiple partners, high school students, vocational college students

Introduction

The development of secondary sexual characteristics and the teenage growth spurt make sexuality a new and important aspect of life among adolescents. Unprotected sex increases the risk of unintended pregnancy and sexually transmitted infections (STIs) including HIV/AIDS.[1] These negative consequences are major public health concerns resulting from new trends among Thai teenagers who are sexually activity. This affects not only the adolescents themselves, but also their families and society.[2]

Based on epidemiological surveillance reports in 2005, 2,929 adolescents aged 10 to 19 years old suffered from AIDS and 736 died from AIDS. In addition, 96,416 young adults (aged 20-29 years) suffered from AIDS as a result of having been infected with HIV during adolescence.[3] In spite of the seriousness of HIV/AIDS, most sexually active adolescents do not always use condoms. The most common reasons given for not using condoms are that condoms are not comfortable, that the respondents do not have any diseases, that they engaged in sexual activity while drunk, that they trusted their partner, that they did not expect to have sex, they did not having a condom in their possession, that the need was too urgent, and that sex without condoms provided more fun and pleasure.[4]

A review of sexual behavior among middle school children and adolescents in Thailand from 1989 to 1999 revealed that among vocational college students, 18-68% of males and 3.7-15% of females had experienced sexual intercourse but only 11.3-21.2% of them always used condoms. Among high school students, 15.3-48.2% of males and 0.5-8.8% of females had experienced sexual intercourse but only 9.6-22.3% of them always used condoms.[5] The Youth Risk Behavior Survey of 9th - 12th grade students in 2003 in the United States found that one-third of adolescents who had experienced sex did not use condoms.[6]

HIV risk behavioral surveillance is a useful way of determining whether behavior change has occurred in specific population groups. Behavioral changes do not occur uniformly but vary depending on the sexual dyad and the population group under study. Behavioral surveillance is a useful methodology for attempting to understand the local dynamics of HIV epidemics.

Bangkok, the capital of Thailand, is one of the most populous cities in the world. Many entertainment areas in the city tempt the young into unhealthy behavior such as drinking alcohol, drug abuse, and unprotected sex. The Bangkok Metropolis Administration (BMA) has placed a high priority on HIV/AIDS prevention and control by conducting a Behavioral Surveillance Survey (BSS) since 2000 among target groups vulnerable to HIV/AIDS, including adolescents. The results of the BSS are used as input into programs to reduce the incidence of new cases of HIV/AIDS. The aims of this study are to determine trends in having sex, using condoms, and having multiple partners, and to explore the risk factors for sexual risk behavior among adolescents in Bangkok.

Methods

Data source

The data used in this study were obtained from the BSS for HIV/AIDS of the BMA. The adolescents in grade 11 of high schools and the second year of vocational colleges were recruited in this survey

every year from 2002 to 2006. These two groups were chosen because of known differences in their sexual activity. Vocational college students are more sexually active than the high school students . From 2002 to 2005 the data were collected in January using self-administered questionnaires. In 2006, the survey was conducted in June using a web-based questionnaire.

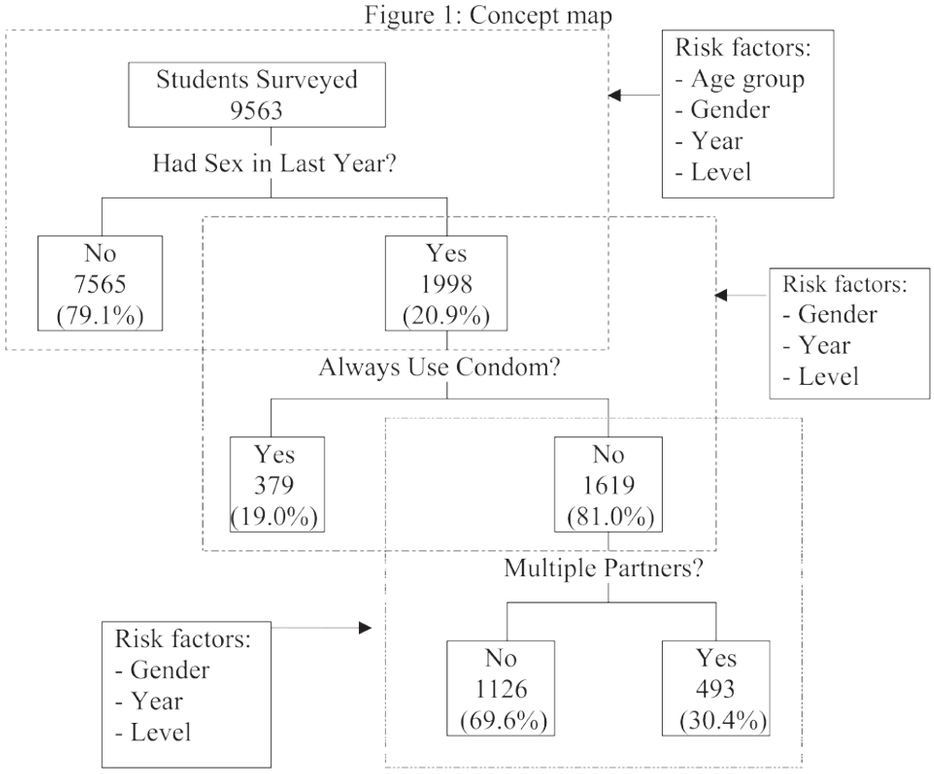
Sampling Technique

In 2002 and 2003 one high school and one vocational college were randomly selected from each of six administrative zones in Bangkok. In 2004 the BMA rearranged its administrative area, creating 12 zones and one high school and one or two vocational colleges were randomly selected from each zone. Three classes were randomly selected from each high school and one academic program was randomly selected from each vocational college to ensure a sufficient sample size. Twelve different high schools participated, with six of these included in all five years and six more included in 2004, 2005, and 2006. Of the fifteen vocational colleges participating, four provided data for all five years, two for 2002 and 2003 only, three for 2004 and 2005 only, and a further six for 2004 to 2006.

Concept map

Figure 1 shows a concept map for the statistical analysis. After omitting the small proportion of students who gave inconsistent responses, there were 9563 who responded to the five surveys from 2002 to 2006, mostly aged from 16 to 18. The target population is students attending high schools or vocational colleges in Bangkok.

Figure 1: Concept map



For this target population, the risk of a person contracting HIV/AIDS through sexual intercourse can be separated into three groups , each involving a binary adverse outcome (having had sex in the preceding year, or not using a condom, or having multiple partners). First, they need to have engaged in sexual intercourse. The questionnaire obtains this information by asking if they had had sex in the preceding 12 months (event A). The risk is minimal unless they did not always use a condom (event B); the risk increased if they had multiple partners (event C). We analysed these risks by estimating (a) the probability of A in the population at risk, (b) the probability of B in population A, and (c) the probability of C in population B.

For each risk assessment, we considered four determinants: age group (16 or less, 17, 18 or more), gender, year of survey, and type of school (high school or vocational college).

Statistical analysis

Confidence intervals for odds

If p is the proportion of adverse outcomes in a sample of size n, the odds are defined as

$$\text{odds} = \frac{p}{1 - p} \quad (1)$$

An asymptotically valid (for large n) formula for the standard error of the log-odds, defined as In (*odds*) = In (*p*) - In (1 – *p*), is

$$\text{SE}(\text{In}(\text{odds})) = \sqrt{\frac{1}{np} + \frac{1}{n - np}} \quad (2)$$

A 95% confidence interval odds for the population is thus provided by

$$odds \times \exp(-1.96 \times SE),\ odds \times \exp(1.96 \times SE). \quad (3)$$

For each risk group, these confidence intervals can be plotted as an odds plot.

Logistic Regression

The probabilities of the various adverse outcomes can be analyzed using logistic regression, which provides a method for modeling the association between a binary outcome and multiple determinants. In this model the risk of an adverse outcome associated with a specified demographic factor (gender, age, type of school, or year of survey) is expressed as a set of odds ratios, one for each factor level compared to a specified referent level.[7]

Results

Preliminary analysis

Table 1 gives cross tabulations for the respondents by year and gender and age. There were approximately equal numbers of male and female students surveyed at each type of institution in each year. The students were asked about the partners that they had sex with in the previous year and whether they had used a condom or not. These partners included girl/boy friend, other friend, casual acquaintance, sex worker, or gay person.

Table 2 gives the percentages for students who said that they had had sex in the preceding year by gender and level. The percentage for those having had sex in the preceding year was lowest for high school girls (7.1% average overall) and highest for vocational college boys (39.3% average). The corresponding odds are plotted in Figure 2.

Table 1: Numbers of students surveyed by year, age and gender for each institutional level

	Year of survey					Total
	2002	2003	2004	2005	2006	
High school	748	845	1125	1065	1019	4802
Age: ≤ 16 yrs	42.38	34.79	40.89	36.53	46.81	40.34
17	51.60	56.69	54.93	55.31	48.18	53.37
≥ 18	6.02	8.52	4.18	8.17	5.00	6.29
Gender: boy	48.40	49.59	47.91	48.92	47.11	48.33
girl	51.60	50.41	52.09	51.08	52.89	51.67
Vocational college	762	844	1208	1041	906	4761
Age: ≤ 16 yrs	27.43	22.39	25.33	22.19	31.68	25.67
17	54.33	55.45	54.80	45.34	46.25	51.14
≥ 18	18.24	22.16	19.87	32.47	22.08	23.19
Gender: boy	48.56	47.99	50.58	51.01	55.19	50.77
girl	51.44	52.01	49.42	48.99	44.81	49.23
Total students	1510	1689	2333	2106	1925	9563

Figure 2: Odds and 95% confidence intervals for having had sex in the preceding year by gender, type of institution, year of survey and age group (16 or below, 17, 18 and above, reading from top to bottom within each group)

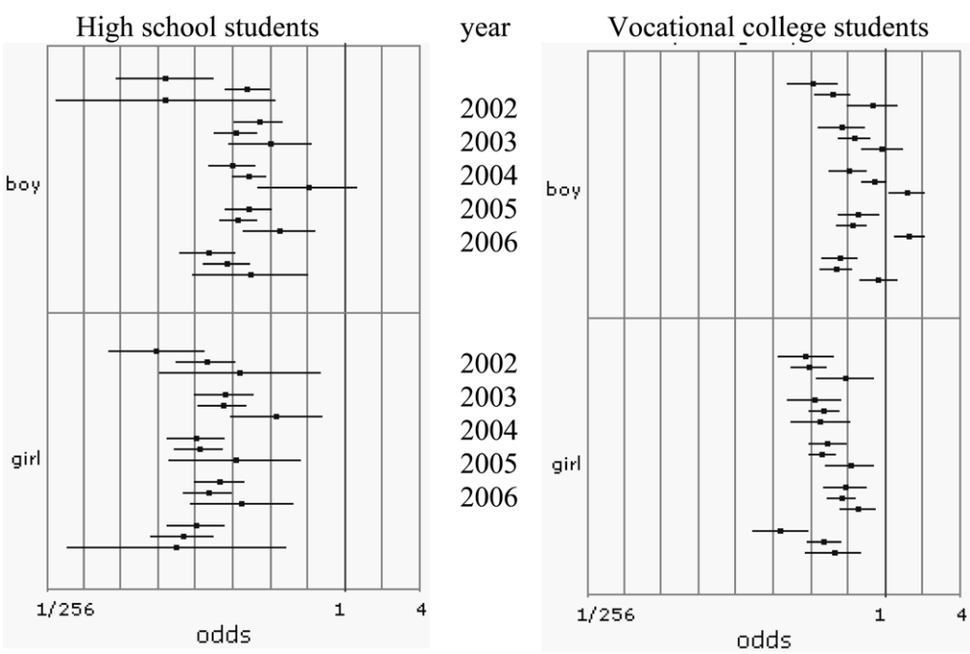


Table 2 also gives the percentage for students who had had sex in the preceding year and said that they did not always use a condom classified by year, gender and type of institution. High school boys were more likely to not always use a condom in 2005 and 2006 than was the case in 2003 and 2004. The other groups were less likely to not always use a condom in the present year than in previous years. The corresponding odds are plotted in Figure 3.

Table 2: Sexual behavior among adolescents by year of surveys (percentages)

Characteristics	Year of survey					Total
	2002	2003	2004	2005	2006	
High school boys						
- had sex in last year	8.8	14.1	13.7	13.8	9.0	12.1
- condom not always used	84.4	66.1	63.5	72.2	74.4	70.4
- had multiple partners	7.4	56.4	44.7	34.6	28.1	36.5
High school girls						
- had sex in last year	5.4	10.3	6.3	8.3	5.2	7.1
- condom not always used	85.7	86.4	75.7	77.8	67.9	78.9
- had multiple partners	5.6	2.6	10.7	11.4	15.8	8.7
Vocational college boys						
- had sex in last year	28.6	38.3	46.2	44.6	33.8	39.3
- condom not always used	86.8	82.6	81.2	81.0	80.4	81.9
- had multiple partners	16.3	52.3	48.0	60.4	35.3	45.8
Vocational college girls						
- had sex in last year	21.2	23.5	25.6	33.1	21.2	25.3
- condom not always used	88.0	86.4	84.3	87.6	79.1	85.4
- had multiple partners	4.1	12.4	9.3	14.9	7.4	10.5
Total Students						
- had sex in last year	16.0	21.4	23.4	24.8	16.9	20.9
- condom not always used	86.8	81.4	79.3	81.6	78.2	81.0
- had multiple partners	10.0	34.4	33.7	37.5	25.5	30.0

Figure 3: Estimated odds and 95% confidence intervals for not always using condoms among students who had sex in the preceding year, by gender, type of institution and year of survey

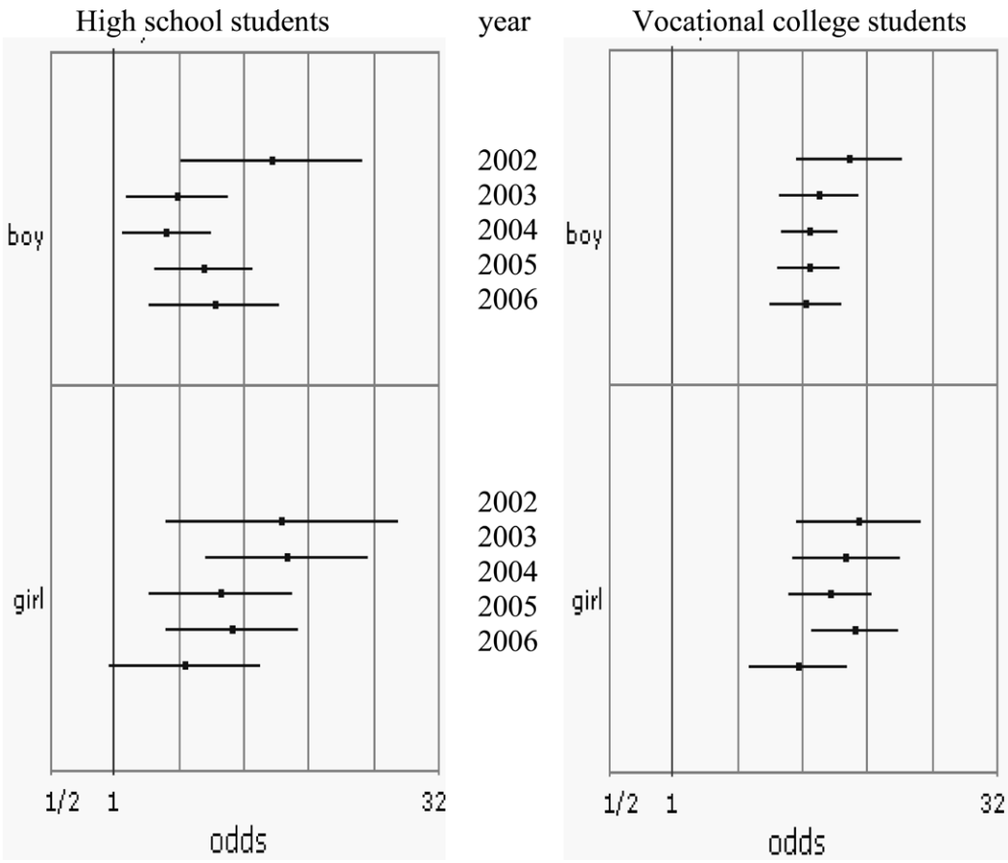
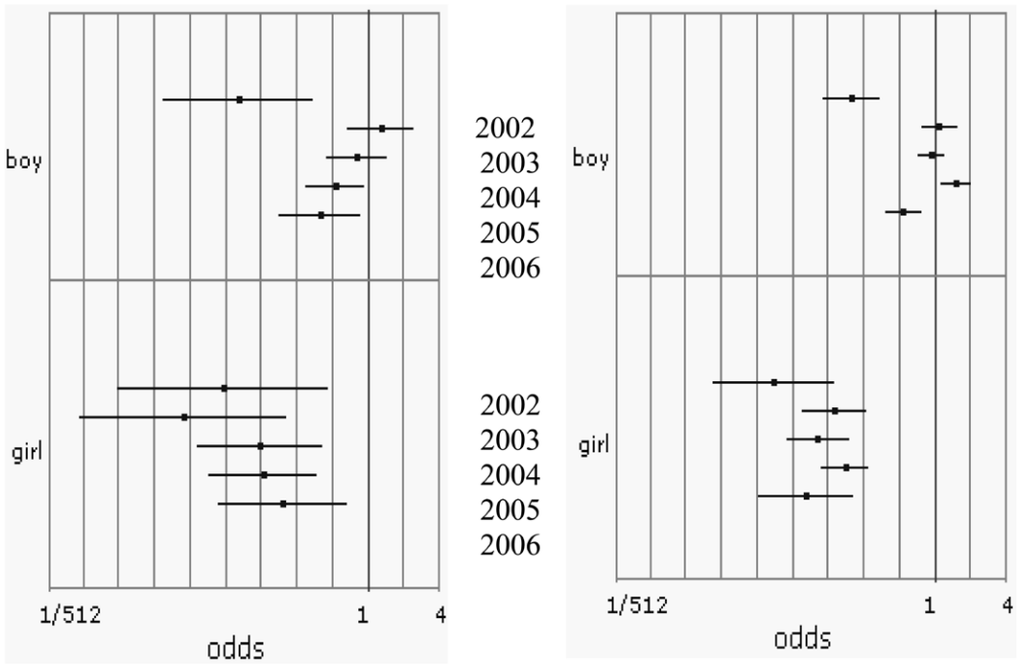


Table 2 gives the percentages for students who had had sex in the preceding year without always using a condom who said that they had had multiple sex partners, classified by year, gender and type of institution. The percentage increased sharply from 2003 to 2005 and dropped in 2006 in most groups for high school girls. The corresponding odds are plotted in Figure 4.

Figure 4: Estimated odds and 95% confidence intervals for having multiple partners among students who had sex in the preceding year and did not always use condoms, by gender, type of institution and year of survey



Logistic regression model

Tables 3 gives the results from the logistic regression model for each of the three components of the study. In each case all four demographic determinants (gender, age group, school type and year of survey) were initially included, but the results show the reduced models after omitting from the model determinants found not to be statistically significant.

Table 3: Reduced logistic models for each outcome showing adjusted odds ratios (Adj.OR)

Outcome	"had sex in last year"		"did not always use condom" given "had sex in the last year"		"had multiple partners" given "had sex and did not always use condom"	
Risk factors	**Adj.OR**	**95% CI**	**Adj. OR**	**95% CI**	**Adj. OR**	**95% CI**
Age group (year)						
16 or less	1					
17	1.15	1.02, 1.31				
18 or more	2.08	1.78, 2.42				
Type of institution						
high school	1		1			
vocational college	4.11	3.65, 4.62	1.80	1.40, 2.31		
Gender						
male	1		1		1	
female	0.59	0.49, 0.61	1.34	1.06, 1.70	0.13	0.09, 0.17
Year of survey						
2002	1		1		1	
2003	1.44	1.19, 1.74	0.70	0.44, 1.10	5.60	3.29, 9.55
2004	1.63	1.36, 1.94	0.59	0.38, 0.90	4.72	2.83, 7.86
2005	1.72	1.44, 2.06	0.68	0.44, 1.05	6.55	3.93, 10.9
2006	1.09	0.90, 1.32	0.55	0.35, 0.88	2.90	1.67, 5.02

The results indicate that gender is a risk factor for each factor, with girls less likely to have had sex in the previous year (Adj.odds ratio = 0.59, 95% CI = 0.49, 0.61). However, there was some evidence that girls who had had sex in the preceding year were more likely not to use condoms every time (Adj.odds ratio = 1.34, 95% CI = 1.06, 1.70). The risk of having had multiple sex partners among those who had sex without always using condoms is substantially lower for girls (Adj.odds ratio = 0.13, 95% CI = 0.09 – 0.17). Vocational students were more likely to have had sex than high school students (Adj.odds ratio = 4.11, 95% CI = 3.65, 4.62) and were more likely to not always use condoms (Adj.odds ratio = 1.8, 95% CI = 1.40, 2.31).

There is also evidence of a trend from 2002 to 2006. Students in 2003 to 2005 were more likely to have had sex in the preceding year than those surveyed in 2002. The proportion dropped back almost to the 2002 level in 2006. Students saying they had had sex in the preceding year were less likely to not always use condom in 2004 and 2006 than in 2002 and more likely to have had multiple partners the current year.

Discussion

In the sample of 9563 students, 20.9% had had sex in the preceding year. This percentage is low compared with young people in western countries. In Haiti 58% of adolescents aged 15-19 years were sexually active.[8] A study of Tennessee Adolescent Romantic Relationships revealed that 34% of adolescent dating couples aged 14-21 years engaged in sexual intercourse.[9] In addition, a review of unsafe sexual behavior among young people in South Africa showed that at least 50% were sexually active by the age of 16 years. 10 And among Japanese aged 15-18 years in 2002, a survey reported that 23.5% had experienced sexual intercourse.[11]

Our finding that most sexually active adolescents were vocational college students is consistent with previous studies in Thailand,[5] and the higher rate found among males (1.6:1) is consistent with the study of Santelli et al..[12] However, this finding contrasts with the Japanese conclusion that females were more sexually active than males (27.8% and 18.9% respectively).[11] In Thailand, high school students tend to study hard because their ultimate goal in education is to gain entrance to highly-ranked and highly competitive universities. Being enrolled in a high-ranked university is considered to have a positive effect on their future career.

The findings show that the percentage of those having sex increased from 2002 to 2005 and then dropped in 2006 among three groups, boys in both types of school and girls at vocational collages. This result may be due to proactive approaches of the BMA, which has used the findings from past surveys to identify appropriate strategies to delay onset of sexual activity and to reduce unsafe sex practices. If so, these strategies need to be continued in future years. On the other hand, the drop in the 2006 survey could be a consequence of the fact that the surveys were web-based,with the data collected by a teacher at school instead of by a researcher.

Among adolescents who had had sex in the preceding year, 81% did not always use condoms, thus increasing the risk of unwanted pregnancy and sexually transmitted diseases including HIV/AIDS. The rate of not always using condoms decreased slightly in most groups from 2002 to 2006, except among high school boys. Students from vocational colleges had higher proportions of not always using condoms as compared to high school students. The findings are consistent with a study in Japan which found that 44.1% of vocational college students had not used a condom during their most recent sex experience, compared to 37.2% ofgeneral school students.[11] The percentage not always using a condom in our study is quite high compared to other studies. Widman et al.9 found that almost half of dating couples aged 14-21 years did not use contraception every time they had sex. The seven Youth Risk Behavior Surveys of 9th -12th graders conducted from 1991 to 2003 showed that condom use during the most recent act of sexual intercourse increased from 46.2% in 1991 to 63.0% in 2003.[6] Eaton et al.10 reviewed unsafe sexual behavior in South African youth between 1990 and 2000 and found that 50% to 60% of sexually active youth reported never using condoms. However, our findings are supported by a study in Haiti in 1998, where 82% of sexually active young people did not use condoms and only 27% of them reported having used a condom the last time they had sex.[8]

Our finding that one-third of adolescents not always using condoms had multiple partners is consistent with the studies of Kelley et al.[13] and Lescano et al.,[14] who found that 35% of sexually active teens had more than one partner. And the high proportion we found among vocational college students is consistent with the Japanese study.[11] Our study also found a fourfold higher rate of multiple partners among males than among females. This finding is consistent with the studies from Haiti and South African.[8, 10]

The results from logistic regression indicate that gender, school type and survey year were all associated with having sex and condom use. Girls were more likely to not always use condoms. The study from Haiti found similar results, with females only 0.46 as likely to have consistently used condoms during their lifetime when compared to males.[8] The 2003 Youth Risk Behavior Survey in the United States also showed that unprotected or poorly protected last sex was greater among females.[6] However, our finding that adolescents in later years of the survey were less likely to always use condoms compared to those surveyed 2002 contrasts with the results of the Youth Risk Behavior Surveys in the United States from 1991 to 2003, which found an increasing rate of using condoms.[6]

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