FACTORS ASSOCIATED WITH CONDOM BREAKAGE AMONG MEN IN THE KANCHANABURI DEMOGRAPHIC SURVEILLANCE SYSTEM, THAILAND

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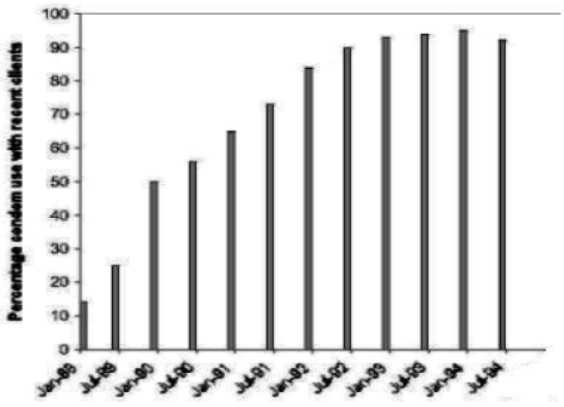
Background

In 1980, the HIV virus or "AIDS" was identified. Subsequently, in 1984, the discovery of the first HIV patient in Thailand made people aware of the importance of condoms for protection, because AIDS could not be cured at that time. Thailand has been promoting condom use for more than 20 years and in the first period of condom use it was promoted for family planning programs. After the HIV/AIDS epidemic, the Ministry of Public Health (MOPH) has been promoting condom use for prevention and has focused on sex workers (SW) and men who have sex with men (MSM) at the national policy level because they considered these two groups as the major routes of transmission of the spread of HIV. However, at present the HIV epidemic has spread to the general population. Therefore, condom use is now considered as a prophylactic method for sexually transmitted infections, especially for HIV/AIDS, as well as a contraceptive method in family planning programs (Manoke, 2007).

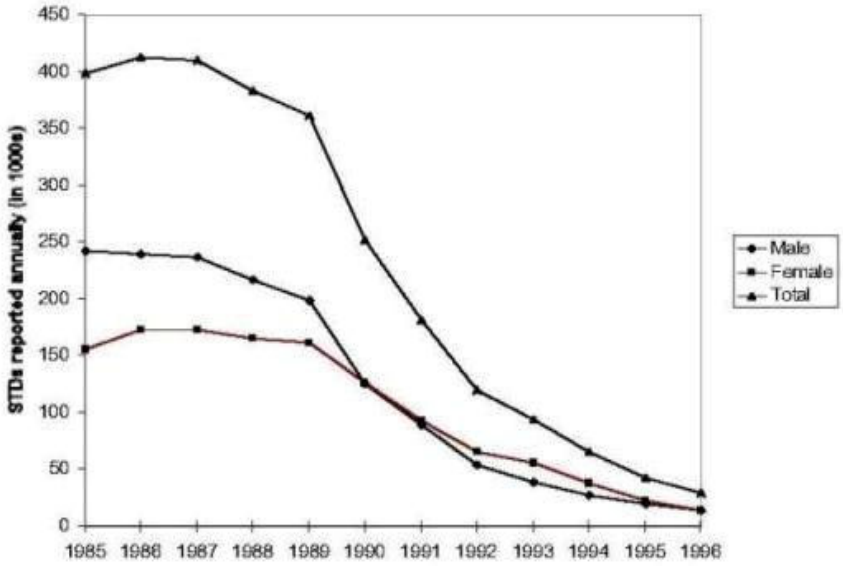
Condom use in Thailand has been considered an effective method of reducing sexually transmitted infections since 1989 when it was promoted for sex workers. A subsequent reduction in male and female STDs were reported at government clinics

Figure 1 **Increase in condom use with recent clients as reported by sex workers at direct sex establishments in the sentinel serosurveillance**



Epidemiology Division, Ministry of Public Health, Thailand

Figure 2 **Reduction in male, female, and total STDs reported at government clinics, 1985-1996**



Venereal Disease Division, Ministry of Public Health, Thailand

Table 1: Illustrates the status of HIV and progress with the 100 percent condom program.

1980	HIV virus or "AIDS" was identified
1984	Discovery of first HIV patient in Thailand
Mid 1989	A national sentinel sero surveillance system was established First round of testing in 14 provinces conducted
June 1989	High infection levels among FSW (3.1 percent)
June 1990	System expanded to include all provinces. HIV prevalence among FSW rose from 3.1 percent to 9.3 percent at national level
June 1991	HIV rose to 15.2 percent. Among conscripts it rose from 0.5 per cent in November 1989 to 3.0 per cent in November 1991.
Moving the 100 percent Condom Program to the national level	
August 1991	National AIDS Committee implements the 100 percent Condom on a national policy.
Mid 1992	All provinces reported that the 100 percent Condom Program was in place.
MOPH began providing approximately 60 million condoms a year free of charge	

Condom quality

Condom production in Thailand has been regulated by TISI standards (Thai Industrial Standard Institute) since 1985, and condom companies must meet certain quality standards in order to pass ISO 4074:1996,2002. In addition, in 1989, MOPH announced that the condom was a medical device, requiring that producers had to indicate the expiry date and register and requalify the condoms sold in the market. The Department of Medical Sciences (DMS) also conducted condom quality testing at the national level during 2003-2006. Moreover, UNFPA released a report on the status of condom pre-qualification in 2007 from all around the world and three major condoms companies, SSL manufacturing, Suretex Ansell, and Thai Nippon rubber in Thailand, passed the test. Condoms have to pass the Food and Drug Association (FDA) tests before export and distribution to the market. These regulations increase confidence of the quality in both local and foreign markets. (K-Econ Analysis, 2004; DMS, 2003-2006; UNFPA, 2007; FDA, 2007)

The results of a study from the Department of Medical Sciences (Thailand) on the monitoring of the quality of condoms distributed in Bangkok in 1988 and another study in 1997 that focused on the whole country can be used to retrospectively determine condom quality. Clinical tests in 1988 found that only 48.4 percent of condoms met quality standards. Improvement in the quality of condoms from 1993 to 1996, in both Central Thailand and nationally are illustrated in the following table.

Table 2: Monitoring of quality of condom in Thailand

Location	**Test**	**1993**	**1994**	**1995**	**1996**
Central	Pre	99 percent	97 percent,	99.8 percent,	99.6 percent
Central	Post	84 percent,	87 percent,	96 percent,	93 percent
Nation	Post	86 percent	85 percent,	95 percent,	96 percent

(Isaragool, 1988; Chongthamawat, 1997)

However, it is still unsure if the quality of condoms in Thailand is high, as they have to be kept under proper conditions, and if they have deteriorated they can be prone to breakage. In addition, an example of the diffusion of knowledge on quality of

condom can be seen by a question on the People Living with HIV/AIDS web board about how to buy condoms from a 24 hours shop because it had been suggested by a friend not to use free condoms provided by a doctor from the hospital. (How to buy condom from 24 hrs shop, http://pha.narak.com/topic.php?No=20700)

Cause of condom breakage

There is no specific study on condom breakage in Thailand. However, a Guttmacher Institute study at four New Zealand Family Planning Association (NZFPA) clinics on condom breakage and slippage **provides** an understanding on cause of breakage.

Table 3: Factors contributing to condom breakage

Cause of breakage from user	Predictor of increasing risk of breakage
1. Incorrect way of putting on a condom. 2. Use oil based lubricant. 3. Reuse of condom. (after putting on the wrong side) 4. Duration or intensive intercourse.	1. No condom experience. 2. Condom breaks in previous year. 3. Not living with only one partner. 4. Having had 12 years or lower of schooling.

Types of condom breakages

Condom breakages which occur during intercourse or on withdrawal are defined as clinical breaks, while non-clinical breaks are those which occur before intercourse is attempted (e.g. a tear while opening the condom foil package). (Steiner, 1994)

Determinants of condom breakage

A study of condom use from Guttmacher Institute (1994) indicated that 11 percent of problems were reported by younger respondents, which was higher than for older respondents. Educational underachievement was significantly associated with multiple

condom breaks. Young men who were two or more years behind in school or had dropped out, were almost three times as likely to report multiple breaks as compared with those who had a higher level of education (Lindberg, 1997). Experience of condom use among couples who had five or more years experience in the use of condoms had a breakage rate of two percent while those with less than five years experience had a failure rate of seven percent

Type and number of partners are also a cause of condom failure. There are three types of relationships generally accepted in Thai culture: A) Spouse: A relationship by marriage and or permanent co-habitation (e.g. de-facto or common law marriage). B) Regular: A relationship conducted on a regular basis with a girl/boy friend or with a sex worker and C) Temporary: A relationship of opportunity, e.g. "a one night stand" or irregular contact with a sex worker. Even couples who use condoms at the beginning tend to discontinue later on, and condom use declines significantly with age and with the longevity of their relationship (Guttmacher Institute, 1994). Couples who were not living together had significantly higher failure rates. The lowest failure rates were for couples aged 30 or older who had been living as a couple for more than 12 years **(**Joanis, 1993).

Condoms are not 100 percent effective

According to a meta-analysis by UNAIDS, the use of condoms is 90 percent effective in preventing HIV transmission and it has been a key element in the reduction of HIV and other STIs in many countries. For example, in Thailand where sexually transmitted infections have been primarily found within the sex trade, condom promotion has been an especially effective method. However, an observational study found that the levels of disease transmission among condom users were actually much lower than that based on laboratory data. Misuse is an explanation why condoms provide less protection in real life than under laboratory conditions (Steiner, 1994).

From a study based on 3,210 respondents, 63.5 percent replied that they "must be careful or it may break" (Williams, 1993). The study does not make it clear as to what factors contributed to such a high response. In addition, the effectiveness of condoms in preventing disease transmission depends on the quality of the product and

its correct use. Evidence from family planning programs over many years makes it abundantly clear that the condom is a safe and relatively effective method, but that compliance is difficult to achieve with consistency over extended periods (Sinding, 2005).

Objective: To explore condom breakage experiences among men in Kanchanaburi Province during 2004.

Specific objectives

1. Explore the correlation between condom outlets and condom breakage.
2. Explore the correlation between user characteristics and condom breakage.
3. Examine other factors contributing to condom breakage.

Hypothesis:

1. Condoms from different outlets have different breakage rates.
2. Condom breakage rates are different among users with different characteristics.

Methodology

The Kanchanaburi Demographic Surveillance System (KDSS) project is a demographic surveillance system, which records population changes in demographic, social, economic and health areas. It has a study size of 100 villages/census blocks and is conducted by the Institute for Population and Social Research, Mahidol University. KDSS data employed in this study is from the fifth round and the data is from 42,923 participants (20,396 male and 22,542 female). This quantitative study uses a cross-sectional design. The population of this study is men aged 15-59 who used condoms from 1 July 2003 until 28 August 2004. Female respondents were excluded from this study because condom use was asked of male respondents only.

The 8th September 2007 annual report from the Kanchanaburi Provincial Health Office (KPHO) indicated that within the Province and since 2004, HIV infection increased by 34.03 percent (1,343 to 1,800 cases) and AIDS patients increased by 45.87 percent (1,016 to 1,482 cases). In 2004, a KDSS survey reported a relatively high condom breakage rate of 7.2 percent.

Data Analysis

Chi-square tests were used to examine the relationship among independent variables and the dependent variable, which was condom breakage. Logistic regression was employed to examine the association of user characteristics and condom outlets on experience of condom breakage.

Limitation of the study

There is no information on the quality of condoms in the KDSS. Information on condom quality in Thailand comes from both industrial certification and laboratory tests from DMS in the MOPH and has been used to describe condom quality. Generally, results from the condom manufacturer or distributer sponsored surveys regarding consumer preferences are not made available to researchers, program planners and policy makers. (William, 1993)

Results

Demographic characteristics of the study population are summarized in Table 4. In addition, this section explores: 1) the behavior and experience with condom use, 2) the outlets where condoms are obtained and, 3) tobacco and alcohol effects on condom use.

Table 4: Demographic characteristics of the study population

Variables		Percentage (N=608)
Characteristic of condom users		
Mean age	30.8 years	
Resident		
Urban/semi-urban		36.0
Rice field		14.3
Plantation		12.2
Uplands		20.1
Mixed economy		17.4
Marital status		
Single		47.2
Married		46.4

Table 4: Demographic characteristics of the study population (cont.)

Variables		Percentage (N=608)
Widowed		0.7
Divorced		1.5
Separated		4.3
Completed education level		
No education		0.7
Informal education		11.8
Primary		28.9
Early secondary level		16.3
Late secondary level		17.4
Bachelor degree and above		24.8
Type of partner of condom use		
Use condom with spouse		31.3
Use condom with regular partner		28.3
Use condom with temporary partner		40.4
Reasons of condom use with any types of partner		
Prevent pregnancy		57.4
Prevent STD		38.5
Dual preventions		4.1
Types of partners of condom use based on SW and Non SW (N= 589)		
Only with Spouse		31.2
Only with Regular partner who is not SW		23.8
Only with Temporary partner who is not SW		19.2
Only with Regular or Temporary partner who is SW		22.2
Use condom with more than one type of partner		3.6
Behavior and experience of condom use		
Mean years condom use	9.8 years	
Months of condom use before interview		
Within last 6 months		81.4
Longer than 6 months		18.6
Percentage of condom use		
100 percent		62.7
51-99 percent		10.7
1-50 percent		26.6
Mean percentage of condom use	77.6 percent	
Last condom outlets and price		
Last condom outlet categorized by characteristic of staff		
Health facilities		23.0
Drugstores		22.9
Retail shop (24-hour services)		40.1
Others		14.0

Table 4: Demographic characteristics of the study population (cont.)

Variables	Percentage (N=608)
Condom outlets	
Health (Hospital , Clinic, Drugstore)	45.9
Non health	54.1
Last condom price (price group)	
Free	29.9
1-10 B (0.1-0.3 US)	27.5
11-20 B (0.3-0.6 US)	39.1
21 B above (0.6 US above)	3.5
Mean price of last condom (piece) 9 B (0.38 US)	
Smoking, alcohol and energy drink consumption	
Heavy Smoker (7 days per week)	
Everyday	44.6
Not consume everyday	55.4
Heavy alcohol consumer (7 days per week)	
Everyday	18.1
Not consume everyday	81.9
Heavy energy drink consumer (7 days per week)	
Everyday	8.6
Not consume everyday	91.4
Heavy smoker –a determinant of consistency of multiple consumption	
Smoking leads to alcohol consumption	
Not everyday	28.2
Everyday	71.8
Smoking lead to Energy drink consumption	
Not everyday	34.6
Everyday	65.4
Experienced condom break	
Condom break	
Never	92.8
Yes	7.2

Bivariate analysis

Table 5 shows the relationship between condom breakage and the age of men in this study. Men in the 40 to 59 and 20 to 24 age groups had the highest percentage of condom breakage (9.6 percent and 8.9 percent), while men age 25 to 29 had the lowest (3.3 percent) Men who resided in the upland areas had the highest proportion of condom breakage (11.5 percent), followed by men in rice field areas (10.3 percent),

with men from plantation areas having the lowest proportion reporting condom breakage (2.7 percent). The relationship was statistically significant among men who resided in different areas. Uneducated men had the highest percentage of condom breakage (25 percent) follow by informally educated men (11 percent). Although, this is not statistically significant, it shows that when education level increased there was an increase in condom breakage. Men who worked in sales and services had the highest percentage of condom breakage (11.0 percent) followed by labor and transportation workers. Professionals and managers had the lowest percentage of condom breakage. This evidence is statistically significant among different occupational sectors. Interestingly, the men who had intercourse with sex workers experienced a lower breakage rate (5.3 percent) than those who had sex with their spouse or a partner who is not a sex worker. Men with multiple sex partners had the highest breakage rate at 14.3 percent. It can be seen that men who used condoms 50 percent of the time or less had the highest breakage rate at 12.3 percent as against 6.2 percent for those who used condoms 51 percent to 99 percent Those who used condoms 100 percent of the time had the lowest breakage at 5.2 percent This evidence is statistically significant.

Condoms bought from a drugstore had the highest breakage rate of 10.8 percent, followed by those who purchased from the ‘others’ source at 7.1 percent. Condoms obtained through health facilities also had a higher breakage rate (6.4 percent) than condoms from retail shops (5.7 percent), which had the lowest percentage of breakage. There is no statistical difference in the percentage of breakage from these sources. Men who were heavy consumers of energy drinks, had almost four times more condom breakages (20.5 percent) compared to those with average or no consumption (7.6 percent).

Table 5: Relationship between dependent and each independent variables

Variables	Break percent	Total (N)	X^2	Sig.
Age group			4.256	0.374
Age 15-19	8.2	94		
Age 20-24	7.4	101		
Age 25-29	3.3	120		
Age 30-39	7.0	157		
Age 40-59	9.6	136		
Residence			8.018	0.091†
Urban	6.4	219		
Rice field	10.3	87		
Plantation	2.7	74		
Uplands	11.5	122		
Mixed economy	4.7	106		
Complete education level			5.664	0.344
No education	25.0	4		
Informal education	11.1	72		
Primary	8.0	176		
Early secondary level	8.1	99		
Late secondary level	5.7	106		
Bachelor above	4.6	151		
Occupation			8.142	0.087†
Professional and Managerial	1.2	85		
Sale and services	11.0	100		
Agriculture	8.1	185		
Labor and transportation	8.5	153		
Not working	4.7	85		
Types of partners (SW and Non SW)			2.721	0.606
Only with Spouse	8.2	184		
Only with Reg. who is not SW	7.9	140		
Only with Tem. who is not SW	6.2	113		
Only with Reg or Tem who is SW	5.3	131		
Multiple partners	14.3	21		
Percentage of condom use			8.654	0.013**
100 percent	5.2	381		
51-99 percent	6.2	65		
1-50 percent	12.3	162		
Condom outlets			3.573	0.313
Health facilities	6.4	140		
Drugstores	10.8	139		
Commercial outlet	5.7	244		
Others	7.1	85		

Table 5: Relationship between dependent and each independent variables (cont.)

Variables	Break percent	Total (N)	X^2	Sig.
Alcohol drinking			0.00	0.987
Heavy consumption	18.2	44		
No or average consumption	18.1	564		
Energy drinking			8.591	0.003**
Heavy consumption	20.5	44		
No or average consumption	7.6	564		

Note: † p<0.10 *p<0.05; **p<0.01;***p<0.001

Multivariate analysis

Men who live in plantation and mixed economic areas have odds of condom breakage that are 88 percent and 65 percent less respectively compared with those who live in upland areas. Men who have more than one type of partner were five times more likely to experience condom breakage compared to those who have a partner who was a sex worker. Moreover, frequency of condom use played a major role in condom breakage, with men who used condoms more than six months before data collection, three times more likely to experience condom breakage than those who had used less than 6 months. Consistency of condom use was also associated with condom breakage, with men who practiced 100 percent condom use reducing the chance of condom breakage by 44 percent compared with those who did not use condoms 100 percent. There was no statistical difference in breakage for source of condom as well as price of condom. Men who consume energy drink are more likely to experience condom breakage.

Table 6: Odds Ratio from Logistic Regression for factors associated with condom breakage

Factors	Coefficient	Odds Ratio	Sig
Characteristics of condom user			
Age group			
Age 20-24	-.092	0.905	0.862
Age 25-29	-.469	0.365	0.163
Age 30-39	-.116	0.879	0.845
Age 40-59	.260	1.799	0.386
Age 15-19 (ref.)			

Table 6: Odds Ratio from Logistic Regression for factors associated with condom breakage (cont.)

Factors	Coefficient	Odds Ratio	Sig
Area of residence			
Urban/semi-urban	-.319	0.565	0.204
Rice field	-.029	0.978	0.967
Plantation	-.709	0.231	0.076 †
Mixed economy	-.604	0.361	0.085 †
Uplands (ref.)			
Level of education			
≤12 years	.062	1.181	0.672
>12 years (ref.)			
Occupation			
Agriculture	-.014	0.990	0.980
Not Agriculture (ref.)			
Marital status			
Single	.114	1.21	0.723
Married and ever married (ref.)			
Behavior and Experienced with condom use during past year			
Type of partner of condom use during past year			
Spouse	.189	1.497	0.481
Regular partner who is not SW	.236	1.798	0.333
Temporary partner who is not SW	.154	1.455	0.552
Multiple partners	.704	4.478	0.073 †
Only with Reg. and Tem. partner who is SW (ref.)			
Duration of condom use			
> 5 years	-.247	0.556	0.129
≤ 5 years(ref.)			
Frequency of condom use during the study period			
Last condom use > 6 months period	.612	3.463	0.001***
Last condom use ≤ 6 months period (ref)			
Frequency of condom use during intercourse			
100 percent use	-.296	0.544	0.092 †
<100 percent use (ref.)			
Last source and price of condoms			
Source			
Non-health outlets	.049	1.044	0.908
Health outlets (ref.)			
Last price paid			
Free condom	.364	1.879	0.152
> 10 B	-.320	0.512	0.107
≤10 B (ref.)			

Table 6: Odds Ratio from Logistic Regression for factors associated with condom breakage (cont.)

Factors	Coefficient	Odds Ratio	Sig
Tobacco, Alcoholic and Energy drink consumption during study period			
Heavy Tobacco consumption	-.016	0.940	0.743
No or average consumption (ref.)			
Heavy alcoholic drinks consumption	-.208	0.721	0.478
No or average consumption (ref.)			
Heavy energy drinks consumption	.162	1.353	0.010**
No or average consumption (ref.)			
Log Likelihood		-132.36268	
Prob> (X^2)		0.0096	
Pseudo R^2		0.1401	

Note † p<0.10 *p<0.05; **p<0.01;***p<0.001

Conclusion, discussion and recommendations

Conclusion

Based on our hypothesis, it was found that condoms from different outlets did not affect breakage rates, but factors associated with condom breakage differed among users with different characteristics, such as those who have multiple partners, did not use 100 percent of time, and were heavy consumers of energy drinks.

Discussion

Characteristic of condom user

Bivariate analysis found that men who live in upland areas may have difficulty in: 1) accessing condom outlets, 2) experience reduced product quality by keeping and using condoms past their "use by date", and 3) have little or no access to condom education programs. The government and NGOs should therefore consider providing the appropriate programs to the upland areas

Behavior and experience of condom use during the study period

Bivariate analysis found that men who used a condom with a partner who was not a sex worker experienced condom breakage more often than men who used a condom with a partner who was a sex worker (7.9 percent per 5.3 percent), even though the difference was not statistically different. However, this finding could be supported by "The 100 percent condom promotion program in Thailand", which since 1991 has taught sex workers to properly use condoms.

Three-fourths of men had sex during the last six months and there was a statistical difference between those who had sex and those not having sex in the last six months. It was found that over half of men practiced 100 percent of condom use, and a quarter of men used condoms 50 percent and lower. Men who used condoms lower than 50 percent have the highest percentage of condom breakage. Condom use promotion or campaigns were highly effective for those who had a single partner. For those who had multiple partners it may not be effective because it can be assumed that condoms were hidden or kept improperly to avoid disclosing it to one of the partners and this could cause condoms to deteriorate.

Sources of condoms and price paid

There is no statistical difference in breakage level by source of condom. However, the results can be explained based on the storage of the product and rollover rate associated with quality of products as well as nature of service of each outlet. Commercial outlets had a high rate of product turnover because they were convenient to access and kept in air-conditioned room and can just be picked up and paid for. This was followed by health outlets which are usually in good condition but turnover may be lower because users need to ask for them from the health provider which can lead to personal discomfort.

There is a perception that the higher the price paid for a condom, the better the quality. Some people are wary of condoms provided free because of quality concerns. These concerns may have been justified prior to 1989 when there were no government or industry standards for Thai manufactured condoms. When condoms were promoted, either for family planning (since 1970) or HIV prevention (since 1991), the

government sector, especially the MOPH, was considered as the key organization both to implement and to subsidize the cost either free or at a low cost. Initially this was done without knowledge of condom quality or use. DMS conducted condom quality testing at the national level during 2003-2006, but this was much later than the date at which they first promoted condoms. This lag could help explain the lack of diffusion in knowledge on the quality of condoms.

It is assumed that higher condom prices are related in part to the provision of better quality storage conditions, such as those of air conditioned 24 hour retail outlets. Government and NGOs should therefore maintain the quality of their condom supplies by keeping them under the appropriate storage conditions. This may improve the image of condoms, which are distributed free of charge or at reduced costs.

Cigarette, Alcohol and Energy drink consumption

A Thai health organization stated that for every 100 smokers there are 88 drinkers and 67 people who had sex. The percentage of single men who use condoms after drinking was much higher, than those who used them without drinking, but still less than one-half. Alcohol and energy drink consumption were associated with condom breakage when the condom was not properly kept or incorrectly put on, or during intensive intercourse. An incidental finding of this study was that men who were heavy smokers were most probably heavy drinkers of alcohol and energy beverages as well as having a high level of sexual activity. However, these habits had no significant affect on condom breakage figures, although it was noted that those who preferred energy drinks were more likely to experience condom breakage.

Recommendations

There are many obstacles to encourage people to have only one partner, so how can men who have more than one type of partner assess their risk of condom breakage? Condom packages should be developed to resist deterioration. Alternatively, a package that can made it difficult to determine that it is used for condoms should be designed. The 100 percent condom use program not only directly reduces the chances of infection of HIV but also reduces the chance of condom break,

which indirectly reduces HIV infection. This policy still has to be emphasized. Lastly, given the situation of HIV/AIDS in Thailand, where there is a focus on prevention programs that provide condom use; there is a need to monitor condom breakage so that we can understand factors associated with breakage.

REFERENCES

Chongthamawat, Supawan. (1997). *Monitoring of Condom Quality in Thailand*. Division of Toxicology, Department of Medical Sciences, 39 (2), 67-74

FDA. (2001). *Monitoring of Condom Quality from Government in 2000 - 2001*. [WWWpage].http://www.fda.moph.go.th/fda-net/html/product/doctor/condom-control.htm

FDA.(2007).*Quality of condom during 2003-2006*. [WWW page]. http://www.fda.moph.go.th/www_fda/view_news.php?Submit=Clear&ID_Inf_Nw_Manager=0000000161

How to buy condom from 24 hrs shop, (n.b) [WWW page]. http://pha.narak.com/topic.php?No=20700

Isarangool Prachuab. (1988). *Monitoring* of *Condoms Quality Distributed in Bangkok*. Division of Toxicology, Department of Medical Sciences, 30(3), 203-208

Guttmacher Institute. (1994). *Condom Breaks and Slips Occur More Often among Less Experienced Users*. Family Planning Perspectives, *26*(6), 283-284.

K-Econ Analysis. (2004).*Thai Condom Export*. *Kasikorn Bank Research Center*, [WWW page].http://www.kasikornbank.com/portal/site/KResearch/

Manok. (2007). *How well do you know condom*.[WWW.page].www.oknation.net/blog/bigboom007/11/27/entry-1

Sinding, S. W. (2005). Does 'CNN' (Condoms, Needles and Negotiation) Work Better than 'ABC'(Abstinence, Being Faithful and Condom Use) in Attacking the AIDS Epidemic? ,International Family Planning Perspectives *No. 1*(Vol. 31, . (Mar., 2005),), 38-40.

Steiner, M. (1994). *Condom Breakage and Slippage Rates Among Study Participants in Eight Countries*. International Family Planning Perspectives, *20*(2), 55-58.

UNFPA. (2007).*Status of condom pre-qualification in 2007*.Report

UNAIDS. (2000). *Evaluation of the 100 percent Condom Programme in Thailand.* 14,17-18,32-33.

Williams R, (1993) .*Condom Characteristics: The Perceptions and Preferences of Men in the United States*. Family Planning Perspectives, 25(2), (Mar-Apr., 1993), 67-73