HIV COMMUNICATION BETWEEN HUSBANDS AND WIVES: EFFECTS ON HUSBAND HIV TESTING IN NORTHERN THAILAND

Chomnad Manopaiboon[1], Peter H Kilmarx[1,2], Somsak Supawitkul[3], Supaporn Chaikummao[1], Khanchit Limpakarnjanarat[1], Nartlada Chantarojwong[1], Fujie Xu[2], Frits van Griensven[1,2] and Timothy D Mastro[2]

[1]Thailand MOPH - US CDC Collaboration, Nonthaburi, Thailand; [2]National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, GA, USA; [3]Provincial Public Health Office, Ministry of Public Health, Chiang Rai, Thailand

Abstract. In northern Thailand, where substantial male-to-female transmission of HIV has occurred in stable partnerships, the relationships between counseling, communication, and HIV-preventive behaviors in married couples have not been well studied. In a study of HIV incidence among women in northern Thailand, each participant was advised to learn her husband's HIV-infection status and was asked to bring him for an interview at the final 12-month follow-up visit. Of the 337 men interviewed, 58% reported having ever had an HIV test. More men reported testing following their wives' enrollment: 12% in the year prior to enrollment *vs* 22% during the 1-year study ($p < 0.001$). In the univariate analysis, men's HIV testing during the 6 months before being interviewed was associated with communication about HIV testing with their wife and extra marital sex with non-FSW while married. Testing following their wife's request was the most common reason reported. Agreement between husband's and wife's reports was poor for most issues, such as whether HIV-related communication had occurred, but agreement as to whether the husband had ever been tested for HIV was relatively high (kappa = 0.62). However, in the logistic regression analysis, only sex with non-FSW while married remained associated with HIV testing ($p = 0.02$). The results suggest a relationship between counseling, communication, and husband HIV testing. Better communication by couples may result in more effective use of HIV testing, which is already prevalent in this population, to prevent HIV transmission.

INTRODUCTION

Thailand is one of the Asian countries hardest hit by the AIDS epidemic. Chiang Rai, Thailand's northernmost province, has among the highest rates of heterosexual HIV infection in Asia, largely due to male patronage of female sex workers (FSWs) (Kilmarx *et al,* 2000). HIV prevalence was highest in northern Thai male conscripts who reported having had first sexual experience with FSWs more than their counterparts from other regions (Kitsiripornchai *et al*, 1998). HIV seroprevalence among these young men in Chiang Rai peaked at 17% in 1992 (Kilmarx *et al*, 2000).

As these cohorts of young HIV-positive men in the early 1990s got married, they consequently transmitted HIV to their wives. This was supported by rapid increase of HIV seroprevalence among primigravidas in Chiang Rai, aged < 24 years, which peaked

Correspondence: Chomnad Manopaiboon, Thailand MOPH - US CDC Collaboration, DMS 6 Building, Ministry of Public Health, Tivanon Road, Nonthaburi 11000, Thailand.
Tel: 66 (0) 2591-8358; Fax: 66 (0) 2591-5443
E-mail: cfm9@tuc.or.th

at 11% in 1994 (Bunnell *et al*, 1999). Several studies have suggested that most HIV-infected women probably acquired HIV infection from their primary partner (Siriwasin *et al,* 1998; Xu *et al,* 2000a). HIV intervention for non-commercial partners is necessary, particularly if evidences continue to show that HIV transmission among this group still occur.

In response to the rapid spread of the HIV epidemic among commercial sex partners, Thailand launched a 100% Condom Use Program in 1991. This program successfully reduced HIV transmission between FSWs and their clients (Mastro and Limpakarnjanarat, 1995; Nelson *et al,* 1996; Rojanapithayakorn and Hanenberg, 1996). Outside the commercial sex setting, condoms are infrequently used (Nagachinta *et al,* 1997). Low condom use with non-commercial partners was reported among young male conscripts (Van Landingham *et al*, 1993; Kitsiripornchai *et al*, 1998). In Chiang Rai, only 2% of women reported consistent condom use with steady male partners (Xu *et al,* 2000). Major barrier to condom use among Thai men was the belief that condoms interfere with sexual pleasure, and condoms are hardly used as a contraceptive method among marital partners in Thailand (Knodel and Pramualratana, 1996).

The low condom use among non-commercial partners could have an implication for the HIV epidemic in the future, as this HIV risk behavior may help maintain the epidemic (Kitsiripornchai *et al*, 1998). The governmental and non-governmental campaigns that coincide with the 100% Condom Use Program often emphasizes non-promiscuity or condom use with FSWs as a mean to protect wives and families (Maticka-Tyndale *et al*, 1994; Ungphakorn and Sittitrai, 1994; Lyttleton, 1996). It appears that preventing HIV transmission in non-commercial partners has not been as successful as in the commercial sex setting. In addition, there has been relatively little information about risk perception and HIV preventive behaviors among married couples (Nagachinta *et al,* 1997).

The low condom use among noncommercial partners implies that HIV strategies focusing on condom use alone may not be the best HIV prevention option for noncommercial and/or married partners (Frerichs, 1996). Voluntary testing of HIV among persons with high risk of HIV infection, in combination with condom use in extramarital sex has been advocated as possibly a more practical strategy for HIV prevention among married couples (Knodel and Pramualratana, 1996). With increasing access to anti-retroviral therapy in Thailand, it is also possible that HIV testing may become more appealing than in the past. However, few studies in Thailand to date have explored the prevalence of HIV testing and factors related to it.

Studies in other countries have suggested that HIV-related communication; *eg,* talking about risk of getting HIV from one's partner, discussing condom use and HIV testing including test results, and asking one's partner to reduce risk behavior, could decrease risk of transmission between noncommercial heterosexual partners (Moore *et al*, 1995; van der Straten *et al,* 1995; Saul *et al*, 2000). In Thailand, however, cultural norms prevent women to openly discuss matters related to sexuality. HIV risk behaviors such as husband's extramarital sex were never directly and openly discussed among husbands and wives, as women need to maintain the norms of discretion and silence (Ford and Kittisuksathit, 1994; Maticka-Tyndale *et al*, 1994; Havanon, 1996). There is some evidence that discussion of sexual matters among men and women who are acquainted is possible with appropriate, cultural sensitive intervention (Maticka-Tyndale *et al*, 1994; Cash *et al*, 1997). In this study, we determined whether women would be able to talk to their husbands about HIV risk reduction, following our counseling on preventive behaviors. We also determined whether

communication has effect on HIV preventive behaviors with a focus on male HIV testing. We interviewed both husbands and wives regarding HIV communication and HIV preventive behaviors and assessed agreement within couples. We also explored the factors related to HIV testing in men. We hypothesize that couples who communicated about HIV infection would be more likely to take HIV preventive action such as HIV testing of the male partner. Information from this study can help shed light into areas of HIV intervention that are appropriate for non-commercial partners in Thailand.

MATERIALS AND METHODS

This cross-sectional study was a substudy from a prospective cohort of HIV incidence among 779 HIV-negative women conducted in the north of Thailand in 1998. Women aged 16-45 years were recruited from public family planning clinics and a public hospital postpartum ward by our study nurse. Women were offered enrollment if they met the following eligibility criteria: age 16-45 years, spoke and understood spoken Thai well, and planned to live in Chiang Rai for the following 12 months. HIV-positive women were not followed. Factors related to enrollment were described in Xu *et al* (2000). In the prospective study, women came for follow-up visits at 6 and 12 months, during which time they received HIV counseling and testing. Pre-test and post-test HIV counseling was provided by trained study nurse-counselors at enrollment and at each follow-up visit. Counseling sessions lasted for about 20 to 45 minutes. Counseling messages were tailored to each woman's own HIV risk profile based on her risk behavior and her partner's HIV-infection status and risk behavior. All women were encouraged to talk to her husband about possible risk of getting HIV from him, discuss condom use, and learn her husband's HIV infection status if not yet known. Condom use was recommended if the husband HIV status was positive. Condom use and partner testing were recommended if the husband's recent HIV status was unknown. The nurse demonstrated condom use and condoms were given out to women. Reimbursement for husband's HIV testing was offered. Results of the prospective cohort showed that HIV prevalence of women at baseline was at 3.1%. Most women had a low personal risk profile and HIV-positive women were likely infected by their husbands. HIV seroconversion rate was low; only 1 woman seroconverted during follow-up. Detail results of the prospective study have been reported elsewhere (Xu *et al,* 2000, 2002).

For our substudy, each woman was asked to bring her husband to the 12-month interview. Of the 704 women who came for the 12-month follow-up visit and who were living with their husband at the time, 337 women (48%) brought their husband (Fig 1). Husbands and wives were interviewed separately. Using a structured questionnaire, trained female research nurses fluent in northern Thai language conducted face-to-face interviews. Questions covered sociodemographic characteristics, recent communication about HIV, sexual and HIV preventive behaviors, and perception of HIV risk and HIV prevention responsibility. Interviews lasted about 45 minutes, and questions were similar for both partners. After the face-to-face interview was completed, the study nurse left the respondents alone in the interview room to complete a self-administered questionnaire concerning issues related to extramarital sex. Men and women were reimbursed 200 Thai baht each (~US$ 5.2) for their time and travel.

All participants provided written informed consent. The study protocol was approved by the Ethical Review Committee of the Thai Ministry of Public Health and by an Institutional Review Board of the US Centers for Disease Control and Prevention (CDC).

Data analysis

Data were double-entered and validated using Epilnfo, Version 6.04 (CDC, Atlanta, GA). Data analysis were performed in SAS, Version 6 (SAS Institute Inc, Cary, NC).

We matched the responses from the men with those from their wives and used the unweighted kappa statistic to assess the rate of agreement. Kappa measures the excess of agreement between responses over the level of agreement that would have been obtained by chance alone. The kappa coefficient will equal 1 when agreement is perfect; whereas 0 means that agreement would be expected by chance. We used conventional criteria to describe the level of agreement when interpreting kappas: <0.40 (poor), 0.40-0.59 (fair), 0.60-0.80 (good), and >0.80 (excellent) (Cohen, 1960; Cicchetti and Feinstein, 1990; Feinstein and Cicchetti, 1990). We examined factors associating with HIV testing in men 6 months prior to the interview using chi-squared tests. Factors that were associated univariately at $p<0.1$ were then included in a stepwise multiple logistic regression model to assess the factors adjusted for one another.

RESULTS

Description of participants

A total of 337 couples participated in the study (Fig 1). The mean age was 31 years for the men and 27 years for the women (Table 1). The mean education years of men and women were 3 years lower than the 9-year mandatory education in Thailand. The majority of the participants were farmers or unskilled laborers. Most couples (71%) earned less than 5,000 baht (~US$ 132) per month, which was lower than average monthly household income in the northern region (10,253 baht, approximately US$ 270). Most couples had a long-term relationship; roughly half had lived together for 4 to 10 years, while almost one third lived together for more than 10 years. Two men (1%) said they were HIV-infected, and each said his wife was aware of his infection status. Overall, women in this sample resemble women screened in the baseline HIV incidence study on education, income, occupation, and age.

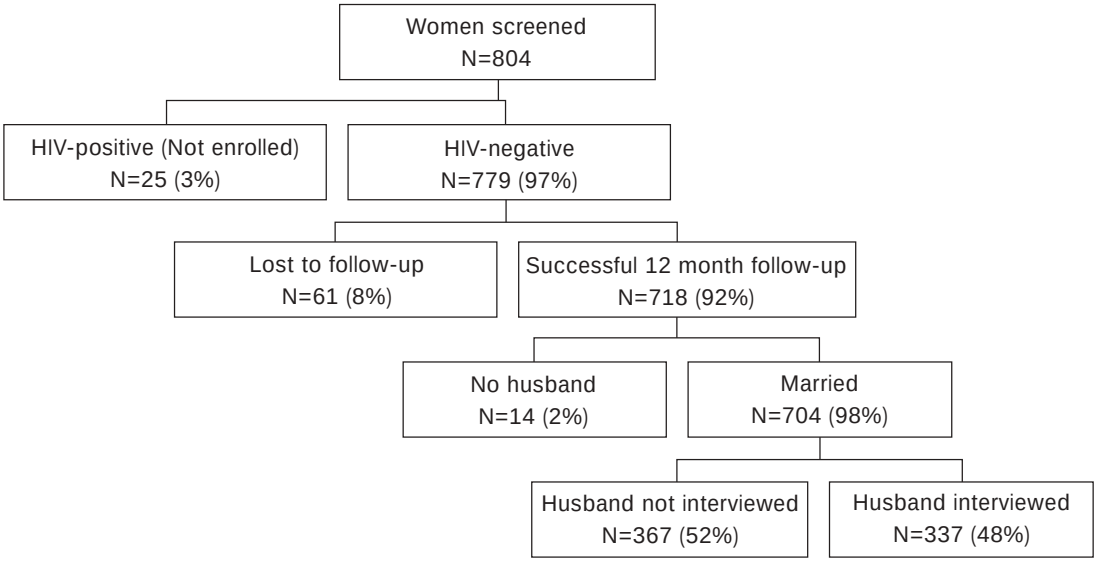

Fig 1–Participation in a study of married couples, Chiang Rai, Thailand 1999-2000.

Table 1
Demographic characteristics of 337 couples in Chiang Rai, Thailand, 1999-2000.

Characteristic	No. of couples
Education, mean years	
Men	6
Women	6
Occupation	
Farmer or unskilled laborer, %	
Men	64
Women	62
Semi-skilled laborer, %	
Men	29
Women	9
Not in the work force, %	
Men	1.5
Women	26
Monthly household income, %	
< 5,000 baht[a]	71
5,000-9,999 baht	23
10,000-20,000 baht	6
Duration of relationship, %	
≤ 3 years	23
4-10 years	49
>10 years	29
Husband ever tested for HIV[b], %	
Yes	58
No	42
Test results of those tested, %	
HIV-positive	1
HIV-negative	92
Indeterminate result	0.5
Don't know	6

[a]US$1 = ~38 baht; [b]Based on the men's report

Comparison with women whose husband did not participate

Compared with women whose husbands did not participate, women whose husbands came for interview were younger (27 years *vs* 29 years, mean; p = 0.003), had lower income (29% *vs* 38% > 5000 baht per month; p = 0.01), and had been married for less time (7 *vs* 8 years, mean; p = 0.02). Fewer women who brought their husbands for the 12-month interview perceived him at risk for HIV infection (9% *vs* 16%; p = 0.007) and thought he had ever visited FSWs (70% *vs* 78%; p = 0.03) than did women who did not bring their husbands. There were no significant differences between those who brought and those who did not bring their husbands in regard to their education and report of couple's communication about HIV risk, HIV testing, and condom use (p>0.05).

Reported behaviors and agreement between partner's reports

Sixteen percent of the men reported having ever had extramarital sex with an FSW and 12% with women who were not FSWs compared to 4% of the women who reported that they had ever had extramarital sex (Table 2). Agreement between partners was relatively poor on this issue. Of the 55 men who said that they had sex with an FSW while married, only 17 of their wives reported knowledge of such (kappa = 0.26).

Little consistent condom use was reported by couples (Table 2), but half (51%) of the men who had ever had extramarital sex with FSWs reported they had always used condoms. Agreement within couples regarding the couple's condom use was fair (kappa = 0.46). However, agreement in reports of partner's condom use with extramarital sex was poor; the men reported more consistent condom use than the women expected (kappa = 0.04, data not shown).

HIV testing of husbands was common; 58% of the men reported that they had ever been HIV tested. Agreement between husbands' and wives' reports of whether or not the man had ever been tested was relatively good (kappa = 0.62, Table 2). According to the men, more of them had been tested in the year following their wife's enrollment into the study than had been tested in the year before her enrollment. Twelve percent of men reported having had an HIV test in the year be-

Table 2
Comparison of husband and wive reports of behaviors of 337 couples, Chiang Rai, Thailand, 1999-2000.

Behavior	Man n (%)	Woman n (%)	Concordant responses n (%)	Kappa
Extramarital sex				
Husband with FSW				
Yes	55 (16)	39 (12)	17 (5)	
No	282 (84)	298 (88)	260 (77)	0.26
Husband with woman not an FSW				
Yes	41 (12)	26 (8)	11 (3)	
No	295 (88)	310 (92)	280 (83)	0.26
Wife with other man				
Yes	5 (2)	12 (4)	2 (0.5)	
No	329 (98)	322 (96)	319 (95)	0.22
Sexual behavior				
Frequency of sexual intercourse				
≥ 5 times per week	15 (4)	11 (3)	1 (0.3)	
1-4 times per week	266 (79)	267 (80)	223 (67)	
1-3 times per month	51 (15)	52 (16)	19 (6)	
<1 time per month	3 (1)	5 (1)	0 (0)	0.19
Husband used condom with wife, during prior 6 months				
100%	11 (3)	12 (4)	7 (2)	
Sometimes	52 (15)	85 (25)	32 (9)	
Never	274 (81)	240 (71)	223 (66)	0.46
HIV testing				
Husband ever had HIV test				
Yes	195 (58)	217 (64)	176 (52)	
No	142 (42)	120 (36)	101 (30)	0.62
Had HIV test during year after women's study enrollment				
Yes	73 (22)	93 (28)	56 (17)	
No	264 (78)	244 (72)	227 (67)	0.57

FSW=female sex worker.

fore the women's enrollment, while 22% of men reported being HIV tested within 1 year after enrollment ($p < 0.001$). Similarly, 20% of women reported that their husband had an HIV test in the year prior to women's enrollment, while 28% of women reported that their husband had HIV testing within 1 year after enrollment ($p = 0.03$). Common reasons for HIV testing as reported by men who had an HIV test within 1 year after women's enrollment (n = 74) were: their wives' request (28%), workplace or life insurance company requirement (23%), being sick and worried about HIV (11%), donating blood (10%), and thinking that wife or his casual partners may be at risk for HIV (7%). Of those who said they had an HIV test because of their wife's request (n=21), 81% also reported talking about HIV testing with their wife in the prior six months.

Communication about HIV risk and HIV prevention was common, but fewer men than women reported that they discussed risk for HIV infection (46% *vs* 88%), condom use (42% *vs* 75%), and husband getting an HIV test

Table 3
Comparison of communication between husband and wive about HIV prevention, 337 couples, Chiang Rai, Thailand, 1999-2000.

	Man n (%)	Woman n (%)	Concordant responses n (%)	Kappa
HIV communication during prior 6 months				
Discussed risk of transmitting HIV from husband to wife				
Yes	154 (46)	295 (88)	138 (41)	
No	183 (54)	42 (12)	26 (8)	0.03
Discussed condom use				
Yes	142 (42)	254 (75)	117 (35)	
No	195 (58)	83 (25)	58 (17)	0.11
Discussed husband getting HIV test				
Yes	243 (72)	306 (91)	226 (67)	
No	94 (28)	31 (9)	14 (4)	0.09

(72% *vs* 91%) (Table 3). Agreement within couples as to whether HIV prevention communication had occurred was poor.

Agreement about perception of HIV-related issues

The majority of men and women believed in the benefit of communication with their partners about HIV risk (60% and 77%, respectively, kappa = 0.17) and HIV testing (70% and 68%, respectively, kappa = 0.13), but most did not believe in the benefit of discussion about condom use (27% and 21%, kappa = 0.30) (Table 4). Congruence on the perception of benefit of communication was poor between husbands and wives.

Few men perceived themselves (16%) or their wives (11%) to be at moderate or high risk for HIV infection (Table 4). In contrast, 51% of the women perceived their husbands to be at risk for HIV, while 31% thought they themselves were at risk. Poor agreement about each partner's risk was found among couples (kappa = 0.14 on husband's risk, kappa = 0.07 on wife's risk).

With regard to responsibility for initiating discussion about HIV, 63% of the men and 52% of the women believed that both husbands and wives were responsible, but almost two times more women than men (44% *vs* 24%) believed that raising discussion was the women's responsibility. About half of the men and half of the women believed that HIV prevention should be the man's responsibility; the second most common response was that each partner is responsible. Nevertheless, agreement regarding who should take the lead in HIV prevention was very poor (kappa = -0.008 in initiating discussion, kappa = 0.04 in responsibility for HIV prevention).

Association of HIV testing of the husband

Because participants were asked if they had HIV communication with their partner during the 6 months prior to the interview, therefore, to determine association between husband HIV testing and HIV communications we have selected only men who reported HIV testing in the 6 months prior to the interview. Overall, 48 (14%) men reported having had an HIV test in the previous 6 months. In the univariate analysis, HIV testing was associated with sex with non-FSW while married and talking about husband HIV testing with wife (Table

Table 4
Comparison of husbands' and wives' perceptions of usefulness of communication, partner's risk for HIV infection, and prevention roles among 337 couples in Chiang Rai, Thailand, 1999-2000.

Perception	Man n (%)	Woman n (%)	Concordant responses n (%)	Kappa
Usefulness of communication[a]				
Talking about HIV risk helped reduced risk				
Yes	92 (60)	229 (77)	67 (20)	
No	62 (40)	66 (23)	17 (5)	0.17
Talking about condom use increased condom use				
Yes	38 (27)	53 (21)	16 (5)	
No	104 (73)	201 (79)	72 (21)	0.30
Talking about HIV testing made men more likely to get tested				
Yes	171 (70)	209 (68)	115 (34)	
No	72 (30)	97 (32)	26 (8)	0.13
Partner's risk for HIV infection				
Husband at moderate or high risk				
Yes	53 (16)	171 (51)	39 (12)	
No	277 (84)	164 (49)	146 (43)	0.14
Wife at moderate or high risk				
Yes	36 (11)	102 (31)	15 (4)	
No	285 (89)	235 (70)	202 (60)	0.07
Prevention roles				
Who should initiate discussion about HIV prevention?				
Man	45 (13)	14 (4)	3 (1)	
Woman	80 (24)	148 (44)	29 (9)	
Both	212 (63)	175 (52)	108 (32)	-0.008
Who should take responsibility for HIV prevention?				
Man	165 (49)	174 (52)	87 (26)	
Woman	10 (3)	24 (7)	0 (0)	
Both	162 (48)	139 (41)	72 (21)	0.04

[a]Among men and women who said they communicated on these issues.

5). However, in the logistic regression analysis, only sex with non-FSW while married remained associated with HIV testing (p = 0.02). In addition, testing because of the wife's request was the most common reason (31%) for testing as reported by men who tested during this period.

DISCUSSION

In this study of married couples in northern Thailand, women were advised to talk with their husbands about HIV prevention, including discussions about their husbands getting a HIV test. Our data suggest that this counseling led to an increase in number of men being tested for HIV. According to both men's and women's reports, more husbands were tested within 1 year after the women enrolled and received specific counseling messages. The proportion of men who were tested was higher among men who reported communicating about HIV testing with their partners and among men who reported having extra-mari-

Table 5
Association between husband HIV testing in the prior 6 months among 296[a] couples, Chiang Rai, Thailand, 1999-2000.

Men's reports	Husband had HIV test %	p-value
Age		
0-35	17	0.4
≥36	13	
Education		
0-6	15	0.3
≥7	19	
Perception of future HIV risk		
High/moderate	14	0.8
Low/no risk	16	
Had sex with FSW while married		
Yes	20	0.5
No	16	
Had sex with non-FSW while married		
Yes	33	0.005
No	14	
Talk about HIV in general		
Yes	19	0.2
No	14	
Talk about condom use		
Yes	17	0.9
No	16	
Talk about husband getting HIV test		
Yes	19	0.05
No	10	

[a]Excluding those who could not remember the date of their last HIV test

tal sex with non-FSW. We also found poor agreement within couples, indicating that there may be some misunderstanding in HIV communication between partners.

It has been suggested that improving communication between partners may facilitate behavioral change, particularly if the communication is specific to a risk-reduction technique (van der Straten *et al,* 1995). Despite the norms that makes open discussion of sexuality difficult for women in Thailand (Ford and Kittisuksathit, 1994; Havanon, 1996), our data suggest that open communication about HIV initiated by women is possible. Many women were able to follow our counseling advice to talk to their husbands about HIV and HIV testing, as demonstrated by the observed increase in HIV testing in men during the study period and the association between talking about HIV risk and husband HIV testing. Other studies had also demonstrated that married women could openly discuss HIV and encourage their husbands to use condoms with female sex workers (Maticka-Tyndale *et al*, 1994). Results from this and other studies further suggest that norms may be changing or may have changed enough to allow women the ability to initiate and openly discuss sexual matters that are prevention related, which would be considered inappropriate in the past. However, a strong association between husband HIV testing and reports of having extramarital sex with non-FSW in the multivariate analysis further suggests that communication itself may not be a direct predictor of behavior change, but more likely an encouraging factor for desired behavior.

Our data confirm that condom use among married couples is not popular. The difficulties and the reasons why married couples do not use condoms have been reported previously (De Zoysa *et al*, 1996; De Boer, *et al*, 1998). Such barriers imply that HIV prevention strategies focusing on condom use alone may not be the best HIV prevention option for married couples (Frerichs, 1996). On the other hand, the relatively high prevalence of HIV testing shows that HIV testing of the husband was already introduced in this population. A considerable number of men also reported that testing was a result of their wives' request. It appears that promotion of HIV communication and partner HIV testing as part of an HIV prevention strategy for married couples is feasible. HIV testing, compared to other HIV prevention approaches such as condom use, does not require change in sexual behavior and can be done as part of routine physical

check-up. While promotion of general HIV risk communication could target all married couples, promotion of HIV testing as additional HIV precaution may be more relevant to couples who feel they are at risk of HIV *eg*, those who have unprotected extra-marital sex or those with HIV discordant status.

Despite a high level of communication reported by participants, there are limited agreements within couples. These discrepancies in couples reports may reflect communication gap or lack of understanding between partners. These may have negative implications in term of HIV risk *ie* only 30% of women whose husband reported that they had sex with FSW while married knew of such incidence. Similarly, among 217 women who said their husband had ever had an HIV test, 41 (19%) of their husbands denied having been tested. Discrepancies in reports of husband behavior were also found in other Thai study (Bennetts *et al*, 1999). These discrepancies could lead to some women underestimating their HIV risk. Interventions that allow both partners to participate simultaneously (*eg*, couple counseling) may provide the couple an opportunity to openly discuss HIV prevention issues and minimize communication gaps. Couple counseling could enhance the effectiveness of communication reported by our participants and could provide them a chance to discuss if any other additional HIV prevention strategy such as HIV testing is necessary. Currently, the Thai Ministry of Public Health is revising the national guideline for HIV counseling and testing service and couple counseling will be included as part of the guideline.

Although this study has provided some useful information regarding communication about HIV prevention within married couples in northern Thailand, these data are limited as they are based on self-reports. The low kappas between husbands and wives underscore the limitations of these self-reported behavioral data. On the other hand, interviewing both men and women enabled us to determine reliability of the data, which although not a perfect substitute for validity, is a precondition for determining validity (De Boer *et al*, 1998). In our study, we found that women tended to overreport HIV preventive behaviors and HIV communication compared with men. Since at enrollment and at the 6-month follow-up visit, all women were advised to talk to their husbands about these issues, by the time of the 12-month follow-up visit the reporting of these behaviors may have been a socially desirable response. In the main study cohort, women's reports of their husband's HIV testing increased after enrollment, indirectly indicating the effect of the study's counseling messages (Xu *et al,* 2002). According to the men's and women's responses, we also found a similar increase in reports of HIV testing of the men. Interviewing both partners therefore can help to better assess the reliability of the answers about the other partner's behaviors (De Boer *et al,* 1998; Bennetts *et al,* 1999). In our study, though we found that the women overreported HIV testing of their husband, interviewing their partners on the same issues indicated similar increases in testing.

It is not known to what extent the couples in our study were representative of couples in general. In order to participate in our study, men had to agree to come to his wife's clinic to talk about sex and HIV risk. These couples are therefore likely to have better communication than other couples who did not participate. However, substantial communication gaps and differences in HIV perceptions were found. Compared to women who did not bring their husband for interview, women who did bring their husband thought that he was at lower risk for HIV infection, and, although no difference was reported by the women, the husbands who did not participate in our study may have been less likely to have had HIV testing. In addition, although we observed an increase in HIV testing of the husband after the

woman received counseling, the lack of a control group, and the cross-sectional nature of the data makes it difficult to ascertain that the observed increase in HIV testing was related to counseling.

Our study suggests that it is possible for women, with professional facilitation (*eg*, counseling), to have open communication about risk of HIV that could subsequently lead to preventive action such as HIV testing. It also suggests that preventive approach such as counseling and husband HIV testing may be more acceptable to Thai couples than condom use, particularly now that antiretroviral therapy is part of the Thailand 30-baht Health Scheme. However, the poor agreement within couples could limit the couple's ability to reduce their HIV infection risk. Interventions to promote/ improve open communication within couples is therefore needed to enhance partner cooperation in HIV preventive behaviors in this population. For those couples who are unable to communicate about preventing HIV transmission risk, development of self-controlled methods such as a microbicide or vaccine is still necessary.

ACKNOWLEDGEMENTS

We thank the staff of the Thailand MOPH and US CDC Collaboration, Nonthaburi, Thailand, and the staff of Chiang Rai Health Club, Chiang Rai, Thailand for their time and dedication to this study and Dr Jordan Tappero for his critical review of the manuscript.

REFERENCES

Bennetts A, Shaffer N, Phophong P, *et al.* Differences in sexual behaviour between HIV-infected pregnant women and their husbands in Bangkok, Thailand. *AIDS Care* 1999; 11: 649-61.

Bunnell RE, Yanpaisarn S, Kilmarx PH, *et al*. HIV-1 seroprevalence among childbearing women in northern Thailand: monitoring a rapidly evolving epidemic. *AIDS* 1999; 13: 509-15.

Cash K, Sanguansermsri J, Busayawong W, Chuamanochan P. AIDS prevention through peer education for Northern Thai single migratory factory workers. (Women and AIDS Program Research Report in Brief). Washington, DC: International Center for Research on Women, 1997.

Cicchetti DV, Feinstein AR. High agreement but low kappa: II. Resolving the paradoxes. *J Clin Epidemiol* 1990; 43: 551-8.

Cohen J. The coefficient of agreement for nominal scales. *Educ Psychol Measure* 1960; 21: 37-46.

De Boer MA, Celentano DD, Tovanabutra S, *et al*. Reliability of self-reported sexual behavior in human immunodeficiency virus (HIV) concordant and discordant heterosexual couples in Northern Thailand. *Am J Epidemiol* 1998; 147: 1153-61.

De Zoysa I, Sweat MD, Denison J. Faithful but fearful: reducing HIV transmission in stable relationships. *AIDS* 1996; 10 (suppl A): S197-S203.

Feinstein AR, Cicchetti DV. High agreement but low kappa: I. The problems of two paradoxes. *J Clin Epidemiol* 1990; 43: 543-49.

Ford NJ, Kittisuksathit S. Destinations unknown: The gender construction and changing nature of the sexual expressions of Thai youth. *AIDS Care* 1994; 6: 517-31.

Frerichs R. HIV testing policies for married couples–theoretical impact of considered strategies in Thailand [Abstract We.C.3516]. Vancouver: XI International Conference on AIDS, 1996.

Havanon N. Talking to men and women about their sexual relationships: insights from a Thai study. In: Zeidenstein S, Moore K, eds. Learning about sexuality: a practical beginning. New York: International Women's Health Coalition and Population Council, 1996: 110-8.

Kilmarx PH, Supawitkul S, Wankrairoj M, *et al*. Explosive spread and effective control of human immunodeficiency virus in northernmost Thailand: the epidemic in Chiang Rai province, 1988-99. *AIDS* 2000; 14: 2731-40.

Kitsiripornchai S, Markowitz LE, Ungchusak K, *et al*.

Sexual behavior of young men in Thailand: regional differences and evidence of behavior change. *J Acquir Immune Defic Syndr Hum Retrovir* 1998; 18: 282-8.

Knodel J, Pramualratana A. Prospects for increased condom use withing marriage in Thailand. *Int Fam Plann Perspect* 1996; 22: 97-102.

Lyttleton C. Messages of distinction: the HIV/AIDS media campaign in Thailand. *Med Anthropol* 1996;16: 363-89.

Mastro TD, Limpakarnjanarat K. Condom use in Thailand: how much is it slowing the HIV/AIDS epidemic? *AIDS* 1995; 9: 523-35.

Maticka-Tyndale E, Haswell-elkins M, Kuyyakanond T, Kiewying M, Elkins D. A research-based HIV intervention in northeast Thailand. *Health Transit Rev* 1994; 4: 349-67.

Moore J, Harrison J, Kay KL, Deren S, Doll LS. Factors associated with Hispanic women's HIV-related communication and condom use with male partners. *AIDS Care* 1995; 7: 415-27.

Nagachinta T, Duerr A, Suriyanon V, *et al*. Risk factors for HIV-1 transmission from HIV-seropositive male blood donors to their regular female partners in northern Thailand. *AIDS* 1997; 11: 1765-72.

Nelson KE, Celentano DD, Eiumtrakul S, *et al*. Changes in sexual behavior and a decline in HIV infection among young men in Thailand. *N Engl J Med* 1996; 335: 297-303.

Rojanapithayakorn W, Hanenberg R. The 100% Condom Program in Thailand. *AIDS* 1996; 10: 1-7.

Saul J, Norris FH, Bartholow K, Dixon D, Peters M. Heterosexual risk for HIV among Puerto Rican women: does power influence self-protective behavior? *AIDS Behavior* 2000; 4: 361-71.

Siriwasin W, Shaffer N, Roongpisuthipong A, *et al*. HIV prevalence, risk, and partner serodiscordance among pregnant women in Bangkok. *JAMA* 1998; 280: 49-54.

Ungphakorn J, Sittitrai W. The Thai response to the HIV/AIDS epidemic. *AIDS* 1994; 8 (suppl 2): S155-63.

Van der Straten A, King R, Grinstead O, *et al*. Couple communication, sexual coercion and HIV risk reduction in Kigali, Rwanda. *AIDS* 1995; 9: 935-44.

Van Landinghan M, Suprasert S, Sittitrai W, Vaddhanaphuti C, Grandjean N. Sexual activity among never-married men in northern Thailand. *Demography* 1993; 30, 3: 297-313.

Xu F, Kilmarx PH, Supawitkul S, *et al*. HIV-1 seroprevalence, risk factors and preventive behaviors among women in northern Thailand. *J AIDS* 2000; 25: 353-9.

Xu F, Kilmarx PH, Supawitkul S, *et al*. Incidence of HIV infection and effects of clinic-based counseling on HIV preventive behaviors among married women in northern Thailand. *J AIDS* 2002; 29: 284-8.