*Original Article*

# Multiple Sex Partners, Sexual Networks, and Condom Use in Thailand

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***Objective:*** Empirical studies indicate that having multiple sex partners is an important risk factor for HIV infection. The present study investigates the extent and determinants of multiple sex partners and condom use among men in Thailand.

***Materials and Methods:*** Data used were from the National Sexual Behavior Study 2006, a national representative sample from Thailand of 3,024 men age 18 to 59. Multivariate analysis is used to examine the determinants of having multiple sex partners and condom use.

***Results:*** About 13% of men reported having multiple sex partners in a 12-month period. Younger men, single men, men with high education, men who drank alcohol more frequently, and men who lived in Bangkok were more likely to have multiple sex partners. Married and single men who have multiple sex partners were about equally likely to use condom when having sex with casual partner (about 85% "always" did). Compared to their behavior when they had sex with casual partner, both married and single men who had multiple sex partners were less likely to use condom when they had sex with girlfriend. However, compared to single men, married men were more likely to use a condom when they had sex with girlfriends. Married men typically did not use condom when having sex with their wives.

***Conclusion:*** Due to the inconsistency of using condom with casual sex partners, the risk of transmission of HIV from casual partners to girlfriends or wives remains the serious concern in Thailand. Policy implications on HIV prevention are addressed.

***Keywords:*** Sexual behaviour, Sexual health, Condoms, HIV, Thailand

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There are various avenues for the transmission of HIV, but sexual transmission is obviously one important method of transmission. Numerous epidemiological studies indicate that having multiple sex partners is an important risk factor for HIV infection among women and men[1]. The transmission of HIV depends on both becoming infected and passing the infection to others[2]; this sequence is obviously facilitated by having multiple sex partners. The importance of multiple sex partners is highlighted by the fact that the proportion of men age 15 to 49 who have had sexual intercourse with more than one partner in the past 12 months is an UNAIDS core indicator for monitoring HIV epidemics and the progress of transmission-prevention campaigns[3]. Having multiple sex partners or having a partner who has multiple sex partners can be risk factors for HIV/AIDS.

Relatively little is known about how many, and which, Thai men have multiple sex partners and who are involved in these sexual networks. There are only a few studies in which multiple sex partners was a dependent variable. The studies mostly generally focused on various target populations, including: 1) men who have sex with men[4]; 2) drug users[5]; 3) female sex workers[6]; 4) youth[7]; 5) married women[8]; 6) people living with HIV/AIDS[9] or 7) migrant workers[10]. Most of these studies examined multiple sex partners as a predictor variable (e.g., drug use, intention to use HIV testing services, or presence of STI); only one study had multiple sex partners as a dependent variable[4]. That study study was a study of men in Bangkok who had sex with men, which found several predictors of having multiple sex partners, such as binge drinking, unprotected anal intercourse, recreational drug used, and used of erectile dysfunction drugs. Thus, the present study is the first study of its kind in the Thai context.

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The present paper addressed three key questions. First, who was more likely to have multiple sex partners? Second, among those who had multiple sex partners, what did their sexual networks look like? That was, whom were they having sex with? Third, which of their partners were more likely or less likely to use condoms? These questions were addressed by using a nationally-representative sample of men in Thailand. The paper also speculated on what patterns of condom use with multiple sex partners means for transmission of HIV/AIDS in Thailand.

## Materials and Methods

### *Data source*

The data used in the present paper were from the National Sexual Behavior Study of Thailand 2006, based on a multi-stage probability sample. The sample was stratified by residence (Bangkok, other urban, and rural), age group (18 to 29 and 25 to 59), and sex. In addition to Bangkok, data were collected from urban and rural areas in 14 provinces in Thailand. These 14 provinces were sampled from the 75 provinces in Thailand with probability proportional to the size of the population of each province. Within Bangkok and the 14 provinces, districts were sampled using probability methods. Households were randomly sampled from sample districts in Bangkok and in the urban and rural areas of the other 14 provinces. Eligible household members (meeting the age requirement) in Bangkok and the 14 provinces were then interviewed by same-sex interviewers. Young adults age 18 to 24 were oversampled. The original researchers created a weight variable that adjusted for the age/sex/geographical distribution of the population as reported from the 2000 census data. When using the weights, the sample provided nationally representative estimates. Full details were available in Chamratrithirong et al[11].

This project was reviewed and approved by the Institutional Review Board of the Institute for Population and Social Research, Mahidol University, in which the authors of the present study were not a member of the IRB committee.

The key dependent variable was based on the responses to the question: "May I ask whether you had sexual intercourse during the past 12 months, [and if so] with how many partners?" This allowed the authors to identify respondents who had multiple sex partners in the 12 months prior to the survey.

After determining how many partners the respondent had during the previous 12 months, a series of questions obtained additional details, including the relationship between the respondent and each sex partner (relationship types described below), how often the respondent used a condom when having sex with each partner (1 = never, 2 = sometimes, 3 = about half the time, 4 = usually, 5 = always), and whether the respondent used a condom the last time they had sex with each partner (yes, no).

Marital status was a key independent variable. It was coded as married or single. The few widowed, divorced, or separated people were combined with singles.

### *Control variables*

Age in years was one basic control variable. Other control variables included: education (eight categories, ranging from no formal education to higher than a Bachelor's degree); religiosity ("How would you describe your religious life?", 1 = not so religious, 2 = somewhat religious, 3 = fairly religious, 4 = very religious); frequency of alcohol consumption ("Usually how often do you drink alcohol?", 1 = never, 2 = once in many months, 3 = once or twice a month, 4 = 1 or 2 times a week, 5 = more than 2 times per week, 6 = every day); and residence (Bangkok, other urban, rural).

### *Analysis plan*

There were two phases to the analysis, corresponding to the key questions being addressed. One key question had to do with the correlation of having multiple sex partners. In the present analysis, all respondents were included in the analysis and a binary variable was examined (1 = had multiple sex partners in the past 12 months, 0 = did not have multiple sex partners in the past 12 months).

Another key question was: among those who had multiple sex partners, what do their sexual networks look like? That was, whom are they having sex with? For the present analysis, only those who had multiple sex partners during the 12 months before the survey were included. Each such respondent was included in two or more sexual dyads. If a respondent had two sex partners, he belonged to two sexual dyads, with the details pertaining to the respondent and each specific partner. If a respondent had three partners, he belonged to three sex dyads, and so forth.

## Results

In terms of the unweighted number of cases, 3,024 men were in the sample. Of these, 377 never had sexual intercourse, 330 did not have sex in the 12 months prior to the interview, 2,317 had one or more partner during

the past 12 months. Of these, 1,768 had one sex partner during the past 12 months, 549 had two or more sex partners in the past 12 months. When weights were applied to the data, 7.3% of men had never had sex, 10.4% had not had sex during the 12 months prior to the interview, 69.0% had sex with one partner, and 13.3% reported having more than one sex partner in the past 12 months. Among sexually-active men, 16.2% had multiple sex partners.

Among all men in the sample, the median age was 34.0 years. About 65% were married, with the remaining 35% single (including a small number of widowed, divorced, or separated men). About 45% had from one to seven years of schooling; only about 7% had a Bachelor's degree or beyond.

The majority of the respondents (54%) indicated they were "fairly" religious; most of the rest reported they were "somewhat" religious (37%).

About 15% reported that they never drank alcohol, while another 23% indicated that they drank alcohol only once in many months. On the other hand, about 11% reported that they drank alcohol every day and 19% drank once or twice a week.

By design, men in Bangkok and other urban areas were oversampled. When weights were applied, the Bangkok men made up about 10% of the sample and those from other urban areas made up about 29% of the sample; about 60% lived in rural areas.

In the analysis of correlates of multiple sex partners, the authors focused on how the 13.3% of men who reported having multiple sex partners were different from the other 86.7%.

### *What sex acts did men engage in?*

As noted above, one question asked "How would you describe the sex acts that you had with this partner?" Prompts determined whether respondents engaged in vaginal, anal, or oral sex (yes, no for each). When the authors examined all sex dyads (n = 3,534), 99.3% of men reported they had vaginal sex, 1.2% had anal sex, and 9.6% had oral sex. When limiting the sex dyads to those involving men who had multiple sex partners (n = 1,767), 98.7% reported they had vaginal sex, 2.1% had anal sex, and 18.6% had oral sex. Clearly, the vast majority of sex acts involved vaginal sex. The questions on the use of condoms were not specific to the type of sex act (vaginal, anal, oral). Therefore, the authors did not further analyze the type of sex acts the respondents engaged in.

### *Who is more likely to have had multiple sex partners in the past 12 months?*

The bivariate analyses showed that younger men, single men, more educated men, men who drank alcohol more frequently, and urban men were significantly more likely to have multiple sex partners (Table 1). It might be surprising that more educated men were significantly more likely to have multiple sex partners. One reason might be that they had more resources to engage in social activities. Similarly, Bingenheimer[12] found that in a number of African countries, men with more education were more likely to have multiple sex partners.

In a multivariate analysis with all of these terms included most, but not all, of these variables remained significant, but the relationships tended to be weaker in the multivariate analysis. Specifically, younger men, single men, more educated men, men who drank alcohol more frequently, and men who live in Bangkok were more likely to have multiple sex partners. Religiosity was not significant in either the bivariate or the multivariate analysis.

Much of the analysis of men with multiple sex partners used marital status as a control variable, so it

**Table 1.** Who is more likely to have had multiple sex partners in the past 12 months?

| Variable | Bivariate analysis | | Multivariate analysis | |
|---|---|---|---|---|
| | Odds ratio | 95% CI | Odds ratio | 95% CI |
| Age | 0.94 | 0.93 to 0.96 | 0.97 | 0.96 to 0.99 |
| Marital status (reference is married) | | | | |
| Single | 3.80 | 2.82 to 5.12 | 2.63 | 1.76 to 3.92 |
| Education (in years) | 1.30 | 1.20 to 1.40 | 1.20 | 1.09 to 1.33 |
| Religiosity | 0.83 | 0.68 to 1.01 | 1.03 | 0.84 to 1.26 |
| Frequency of alcohol consumption | 1.27 | 1.17 to 1.38 | 1.30 | 1.18 to 1.42 |
| Residence (reference is rural) | | | | |
| Bangkok | 1.82 | 1.34 to 2.46 | 1.41 | 1.002 to 1.97 |
| Other urban | 1.49 | 1.02 to 2.16 | 1.29 | 0.87 to 1.91 |

Unit of analysis is individual men (unweighted, n = 3,021)

was worth noting that about 7.5% of married men had multiple sex partners in the past 12 months, compared to about 42.6% of single men.

Before proceeding to the analysis of sexual networks, it was worth noting the variety of sexual partners reported by the sexually-active men. This was reported in Table 2, which was based on one to five partners per respondent.

Among married men, by far the most common type of sex partner was the wife, accounting for 85% of the sex partners of married men. Married men did report a variety of other sex partners, but in fairly small numbers. Sex workers made up 4.6% of the sex partners of married men. This did not mean that 4.6% of husbands had sex with SWs. A separate analysis (not shown) showed that 3.0% of married men had sex with one or more SWs during the 12 months prior to the survey. The discrepancy was because married men who had sex with SWs sometimes had sex with more than one SW in the previous 12 months.

Among single men, girlfriends were the most common type of sex partner, accounting for 42%. "Acquaintances" and "giks" were fairly common (11% and 10%, respectively). SWs made up about 24% of the sex partners of single men. A separate analysis showed 11.3% of sexually-active single men had sex with a SW during the prior 12 months. The discrepancy between 24% and 11.3% was because some single men reported having sex with two, three, four, or even five SWs in the past 12 months. Since details were obtained only on five sex partners, it was possible that some men, especially single men, had sex with more than five SWs in the previous 12 months.

The authors turned to an analysis of sexual networks.

### *Sexual networks*

As mentioned above, in the analysis of sexual networks, there was one case for each sex dyad. When the analysis included all sexually-active men, there were 3,535 sex dyads. When focusing on men with multiple sex partners, there were 1,767 sex dyads.

### *Who are the partners in sexual networks?*

An overall snapshot of the sexual networks of men with multiple sex partners was shown in Table 3. Married men were underrepresented among those having multiple sex partners; correspondingly, single men were overrepresented. Specifically, while married men made up about 65% of the study population, they were the 36% of those who had multiple sex partners (Table 3). Single men made up 35% of the population, but were about 64% of those having multiple sex partners.

**Table 2.** Sexual partners of all sexually-active men, by marital status (weighted results)

| Partner relationship | Married men (%) | Single men (%) |
|---|---|---|
| Wife | 85.4 | Inappropriate |
| Minor wife | 0.6 | Inappropriate |
| Fiance | Inappropriate | 0.3 |
| Girlfriend | 1.3 | 41.7 |
| "Gik" | 2.6 | 10.0 |
| Acquaintance | 2.5 | 11.4 |
| Friend | 1.2 | 5.4 |
| Someone I just met | 1.5 | 5.9 |
| "Beer girl" | 0.3 | 1.6 |
| Sex workers | 4.6 | 23.8 |
| Unweighted, n | 1,610 | 1,925 |

Unit of analysis is sexual dyads (unweighted, n = 3,535)

**Table 3.** Sexual network composition in the past 12 months for men with multiple sex partners (weighted percent)

| | Percent distribution (%) | Percent distribution within marital status category (%) |
|---|---|---|
| Married men | 35.7 | |
| Wife plus girlfriend(s) | 10.2 | 29 |
| Wife plus casual partner(s) | 20.8 | 58 |
| Wife plus girlfriend(s) plus casual partner(s) | 4.7 | 13 |
| Total for married men | | 100 |
| Single men | 64.4 | |
| Girlfriends | 12.8 | 20 |
| Girlfriend(s) plus casual partner(s) | 31.5 | 49 |
| Casual partners | 20.1 | 31 |
| Total for single men | | 100 |
| Total | 100 | |

Unit of analysis is individual men (unweighted, n = 549)

Most of the married men who had MSPs (58%) (Table 3) had sex with their wives and with one or more casual partners. Some (29%) had sex with their wives and one or more girlfriends, while others (13%) had sex with their wives, one or more girlfriends, and one or more casual partners.

About half of single men who had MSPs (49%) (Table 3) had sex with one or more girlfriends plus one or more casual partners. Some (31%) did not only have sex with a girlfriend but with multiple casual partners, and others had sex with two or more girlfriends.

A more detailed look at sexual networks was obtained by examining the specific relationships that the respondents reported having with their sex

partners. As shown in the first column of Table 4, the single most common description of their partner was girlfriend (22.8%), followed by sex worker (21.2%), "gik" (15.9%), and acquaintance (13.9%). Each of these accounts for at least 10% of the partners of men who reported having multiple sex partners.

Table 4 also showed the cross-tabulation between marital status and partner status. Among married men who have multiple sex partners, the most common type of partner was wife (31.6%), sex worker was the second most common type of partner (20.6%). "Gik" and acquaintance were also somewhat common types of sex partners for married men (about 14% for each). Among single men who had multiple sex partners, the most common type of partner was girlfriend (28.5%), sex worker was the second most common type of partner (21.4%). As with married men, "gik" and acquaintance were also the common types of sex partners for single men (about 17% and 14%, respectively).

The last row of Table 4 reported the mean and median number of sex partners in the past 12 months for men in each marital status category. Among married men who had multiple sex partners in the past 12 months, the mean number of sex partners was 4.8 (median 2.8); for single men, the mean was 5.3 (median 3.2).

Note that in the cross-tabulation of marital status by partner status, some of the cells had very few cases, while other cells were empty by definition. For example, none of the single men had sex with a wife or a minor wife and no married men had sex with a fiancé. Also, few men in the sample had a minor wife, suggesting that this traditional practice might be uncommon at this time.

### *Did condom usage vary depending on the nature of the relationship?*

With the detailed coding of partner status, there were too few cases for some cells to produce reliable results on condom use. Therefore, in the present analysis, the various partner relationships were collapsed into three categories (wife, girlfriend, and casual partner). The present model assumed that each individual had a certain underlying propensity to use a condom while having sex. His propensity to use a condom might be modified by certain factors. In particular, the authors hypothesized that the likelihood that a respondent used a condom varied depending on his relationship with the particular sex partner. The Generalized Linear Mixed Model (GLIMMIX) estimates the likelihood of using a condom for a man with an average underlying propensity to use a condom, based on the particular type of partner he is having sex with. The fixed effects account for the covariance structure for each individual respondent.

Men are most likely to use a condom with a casual partner and least likely to use a condom with their wives. Specifically, about 81% reported they always used a condom with a casual partner and only about 8% reported they never used a condom with a casual partner (Table 5). Conversely, about 67% reported they had never used a condom with their wives and only about 5% reported they always used a condom with their wives. Condom use with girlfriends was intermediate between these other two groups. Specifically, about 46% of men reported they always used a condom with a girlfriend, but about 25% reported they did not. The analysis of the mean level of

**Table 4.** Marital status by partner status, for men with multiple sex partners

| | Total (%) | Married (%) | Single (%) |
|---|---|---|---|
| Wife | 7.4 | 31.6 | 0.0 |
| Minor wife | 0.6 | 2.2 | 0.0 |
| Fiance | 0.1 | 0.0 | 0.1 |
| Girlfriend | 22.8 | 3.7 | 28.5 |
| "Gik" | 15.9 | 13.5 | 16.6 |
| Acquaintance | 13.9 | 13.7 | 13.9 |
| Friend | 7.1 | 4.9 | 7.7 |
| Someone I just met | 7.9 | 5.6 | 8.6 |
| "Beer girl" | 3.2 | 4.2 | 2.9 |
| Sex worker | 21.2 | 20.6 | 21.4 |
| Total | 100 | 100 | 100 |
| Number of sex partners, mean (median) | 5.2 (3.1) | 4.8 (2.8) | 5.3 (3.2) |

The percent reported in each cell is based on weighted analysis; see text for details

Unit of analysis is sexual dyads (unweighted, n = 1,767)

**Table 5.** Does condom usage vary depending on the nature of the relationship?

| | Wife | Girlfriend | Casual partner |
|---|---|---|---|
| When you had sex with this partner, did you use condom, and how often? | | | |
| Always (%) | 5.5 | 46.0 | 81.3 |
| Never (%) | 67.2 | 25.0 | 8.4 |
| | Pearson Chi-squared = 452.48, $p$<0.001, based on 5 by 3 tables | | |
| Mean* | 1.6 | 3.4 | 4.5 |
| | F = 287.3, $p$<0.001 | | |

* 1 = never, 2 = sometimes, 3 = about half the time, 4 = usually, 5 = always

Unit of analysis is sexual dyads involving men with multiple sex partners (unweighted, n = 1,767)

condom use showed a similar pattern (Table 5).

What accounted for the difference in likelihood of using a condom, based on partner status? One possible explanation was whether the partner relationship was exclusive. A wife may assume that she was her husband's exclusive sex partner; in that case, using condom was unnecessary (except as a means of birth control). A casual partner can reasonably assume that she was not the man's exclusive sex partner; in that case, used of a condom was prudent. A girlfriend may assume she had an exclusive relationship with her boyfriend, but may take into account that her boyfriend might have previous girlfriends. Furthermore, in the Thai context, a girlfriend might not even assume that she was her boyfriend's only sexual partner, in that case the use of a condom would also be prudent.

### *Did the relationship between condom use and partner status vary by marital status?*

The authors hypothesized that not only partner status, but also marital status affected the likelihood of using a condom. As before, the model estimated the propensity of using a condom, as modified by certain factors, in this case partner status and marital status. The mean level of condom use with casual partners is about the same for married men and single men. Specifically, the mean was 4.44 for married men and 4.46 for single men (4 = usually, 5 = always) (Table 6). The mean level of condom use with girlfriends was somewhat higher for married men than for single men. Specifically, the mean was 3.26 for married men, and 3.04 for single men (3 = about half the time, 4 = usually). As reported above, married men were not likely to use a condom with their wives: the mean was 1.52 (1 = never, 2 = sometimes). The results reported in Table 6 were without controls.

The authors re-analyzed the data adding controls for age, education, alcohol consumption, residence, and number of sex partners. The first four control variables were introduced because they were significantly related to whether or not a man had multiple sex partners. The number of sex partners was introduced as a control because it seemed plausible that the decision about using a condom could be related to the number of sex partners. It turned out that none of the control variables was significantly related to the use of condoms. After the control variables were introduced, partner status and marital status were still significantly related to the use of condoms.

Reports of the use of condoms during the last sexual encounter with each partner were fairly consistent with the reports of the typical use of condoms. Both married and single men were extremely likely to use a condom the last time they had sex with a casual partner. For married men, the predicted probability of using a condom the last time they had sex with a casual partner was 0.965; the comparable probability for a single man was 0.970 (Table 7). Married men and single men were less likely to use condom with girlfriend (predicted probabilities of 0.651 and 0.613, respectively) (Table 7), but both groups of men were similar in this respect. Married men were unlikely to use condom the last time they had sex with their wife (0.046) (Table 7).

The results reported in Table 7 were without controls. The authors re-analyzed the data adding controls for age, education, alcohol consumption, residence, and number of sex partners, as shown on Table 6. It again turned out that none of the control variables was significantly related to the use of condoms. After the control variables were introduced, partner status and marital status were still significantly related to the predicted probability of using a condom the last time the respondent had sex with the specific type of sex partner.

The relationship between marital status, partner status, and condom use, explored in Table 6, was further explored in Table 8. Where Table 6 focused

**Table 6.** Condom use by partner status and marital status: means

| Marital status | Partner status | | |
|---|---|---|---|
| | Wife | Girlfriend | Casual |
| Married | 1.52 | 3.26 | 4.44 |
| Single | (null) | 3.04 | 4.46 |

This table was created using mixed model that accounts for the covariance structure of the each individual's different partnering

With no controls, Cochran-Mantel-Haenszel test = 88.604, $p<0.001$

With controls for age, education, alcohol consumption, residence, and number of partners, the Cochran-Mantel-Haenszel test = 48.772, $p<0.001$

Unit of analysis is sexual dyads involving men with multiple sex partners (unweighted, n = 1,767)

**Table 7.** Condom use by partner status and marital status: predicted probabilities

| Marital status | Partner status | | |
|---|---|---|---|
| | Wife | Girlfriend | Casual |
| Married | 0.046 | 0.651 | 0.965 |
| Single | (null) | 0.613 | 0.970 |

With no controls, the Cochran-Mantel-Haenszel test is 73.715, $p<0.001$

With controls for age, education, alcohol consumption, residence, and number of partners, the Cochran-Mantel-Haenszel test is 46.135, $p<0.001$

Unit of analysis is sexual dyads involving men with multiple sex partners (unweighted, n = 1,767)

on the central tendency, Table 8 provided information about the two extremes: always or never use a condom. These data confirmed that both married and single men were highly likely to always use a condom with a casual partner (about 85% for both groups). The data also confirmed that married and single men were less likely to always use a condom with a girlfriend than with a casual partner. Furthermore, the data showed, comparing to single men, married men were more likely to use condom with girlfriend (60% versus 49%). The data also indicated that married men were much less likely to use a condom with their wives; only 6% always used condom with their wife and 69% never use condom with their wife.

Putting together the information about sexual networks with information about patterns of condom use, the authors concluded that most of the married men having multiple sex partners (MSP) had sex with their wife and one or more casual partners (58%) (Table 3). Married men with MSP typically did not use condom with their wives (6% always do, 69% never do) (Table 8), and about 14% of married men with MSP did not always use condom with their casual partners (14% = 100–86%) (Table 8). About 29% of married men with MSP had sex with their wives and one of more girlfriends (Table 3); about 40% of married men with MSP did not always use a condom with their girlfriends. About 13% of married men with MSP had sex with their wives and one or more girlfriends plus one or more casual partners (Table 3); the percent who did not always use condom with girlfriends or casual partners was noted earlier.

**Table 8.** Condom use by partner status and marital status: percents

| | Wife | Girlfriend | Casual |
|---|---|---|---|
| Married men: When you had sex with this partner, did you use condom, and how often? | | | |
| Always (%) | 6.3 | 60.5 | 86.3 |
| Never (%) | 69.4 | 24.4 | 8.5 |
| | Fisher's exact test: table probability (p) <0.0001 Pr <= p<0.0001 | | |
| Single men:When you had sex with this partner, did you use condom, and how often? | | | |
| Always (%) | No cases by definition | 48.7 | 84.0 |
| Never (%) | No cases by definition | 23.7 | 6.0 |

Pearson Chi-square is significant for married, for single, and for total, but the expected count is less than five in several cells and therefore the Chi-square and the significance level are not reported

Unit of analysis is sexual dyads involving men with multiple sex partners (unweighted, n = 1,767)

Many of the single men with MSP had sex with one or more girlfriends plus one or more casual partners (49%) (Table 3). Single men with MSP often did not use condom with their girlfriends (24% never do, only 49% always do) (Table 8), and about 16% of single men who had MSP did not always use condom with a casual partner. Some of the single men who had MSP only had sex with casual partners, not girlfriends (31%) (Table 3). As noted, 16% of single men who have MSP did not always use a condom with casual partners. Finally, some single men with MSP had two or more girlfriends (20%). As noted, single men with MSP did not consistently use a condom with girlfriends.

Although the likelihood of using a condom with a casual partner was high, it was not completely consistent: about 14% of married men and 16% of single men did not always use condom when having sex with a casual partner.

Using a condom with a girlfriend was far from reliable. Compared to single men, married men were somewhat more consistent in their use of condoms with girlfriends. About 60% of married men always used condom with a girlfriend, while only about 49% of single men always used condom with girlfriend. Although this was not a large difference, there were several possible explanations. Married men may be more likely than single men to use condom with girlfriend to avoid transmitting disease to their wife. Also the married man might have greater concern about impregnating his girlfriend. And if the girlfriend knew that her partner was married, she might assume that he had additional partners and encouraged him to use a condom. A single man's girlfriend, on the other hand, might assume that she was his exclusive sex partner and did not ask him to use condom. The unreliable use of condoms creates the potential of spreading HIV from casual partners to the other sexual partners whom the use of condoms were less common.

## Discussion

To put the data from the present study into comparative perspective, a recent study used Demographic and Health Surveys for the 15 sub-Saharan countries to examine the percent of men age 15 to 49 who had multiple sex partners in the 12 months prior to the survey[12]. These surveys were carried out in 2001 to 2006. The percent of men age 15 to 49 who had multiple sex partners varied dramatically among the 15 countries, from a low of 1.0% to a high of 27.8%. It is interesting that the data presented here

suggested that Thailand was near the middle of this continuum: the percent of men age 18 to 59 in Thailand with multiple sex partners in the 12 months prior to the survey was 13%, compared to the 1% to 28% found in sub-Saharan Africa.

The authors also compare Thailand to some of its close neighbors based on data from a UNAIDS report[13]. This document indicates that in Myanmar in 2006, 13% of men age 15 to 49 reported having more than one sex partner in the 12 months prior to the survey; in Singapore, the comparable figure was 7% (2007); in the Philippines, the comparable figure was 6% (2003), and in Indonesia, the comparable figure was 0% (2007). No data are provided for Malaysia or Laos. The same report indicated that the comparable figure for Thailand was 18% (2006). In short, the UNAIDS report suggests that a higher percent of men in Thailand have multiple sex partners than its close neighbors.

Even, though Morris et al's study[14] of "bridge" populations in Thailand is not strictly comparable to the present study, it is interesting to compare the results of the two studies. While Morris et al focused on whether men's sex partners were SWs or non-SWs, the authors employed three categories: "casual" partners included SWs and some non-SWs; categories of girlfriend and wife correspond to non-SWs. In order to make the results as comparable as possible, the authors re-analyze the present data to obtain some additional results not presented in the tables. In re-analyzing data, the authors define the "bridge" population as men who had sex with SWs and with non-SWs. Before comparing the results of the two studies, it is important to recognize some other differences between the two studies. 1) Morris et al's study[14] was based on a non-probability sample of low-income men and truckers in three provinces in Thailand. As such, their sample was not strictly comparable to the present nationally-representative sample. 2) They asked about sex partners in the six months prior to the study, while the authors asked about sex partners in the twelve months prior to the study. The 12-month time period might have produced higher estimates of the size of the "bridge" population, compared to their 6-month time period. 3) They studied low-income men, while the authors studied a cross-section of men. In as much as the present study found that men with higher levels of education were more likely to have multiple sex partners, this implies that if Morris et al had included men from a full range of incomes, they might have found higher percent of men who reported having sex with a CSW. Bingenheimer[12] found that in a number of African countries men with more education and more wealth are more likely to have multiple sex partners. If Morris et al had interviewed men from the whole range of incomes and asked about sex partners over the prior 12 months, they presumably would have had higher estimation of the size of the "bridge" population. Despite these differences, the comparison of the results of the two studies may be useful.

The comparison suggests that the situation has changed fairly dramatically in ways that make the transmission of HIV less common than it had been 10 years earlier. 1) The study by Morris et al[14] found that 16.8% of low-income men reported having sex with both SWs and non-SWs in the six months prior to the study, while the present study found that 4.4% of men reported having sex with both SWs and non-SWs in the 12 months prior to the study. 2) The study by Morris et al[14] found that only 27.7% of low-income men report consistent use of condoms when they have sex with SWs, while the present study found that 95.1% of men report that they "always" use a condom when they have sex with a SW.

While contact with SWs is much less frequent in the present sample than in Morris et al's sample[14], and while the use of condoms with SWs is far more consistent in the present sample than in Morris et al's[14], it must also be recognized that in the present sample many men have contact with a variety of casual sex partners and they are not always consistent in their use of condoms with these casual sex partners. This obviously creates a risk for their medium- and long-term sexual partners.

## Conclusion

The present paper makes several contributions to the literature. Most, if not all, previous research in Thailand on multiple sex partners has focused on very specific target populations (e.g., men who have sex with men). By contrast, the present research provides a look at a broad cross-section of Thai society. Furthermore, most previous researches on multiple sex partners had focused on the consequences of having multiple sex partners. By contrast, the present research examines who is most likely to have multiple sex partners.

Another key contribution of the present paper is that it not only looks at who is likely to have multiple sex partners, but it also examines the sexual networks of those with multiple sex partners. Unlike most previous studies, the authors examine data on sexual dyads, allowing more in-depth analyses. As seen above, the present study examines married and single

men separately; their variety of sex partners; and those they do and do not use condoms with. Analyzing sexual dyads sheds more light on the potential for spreading of HIV/AIDS than if simply examined the characteristics of men who do or do not have multiple sex partners.

In the multivariate analysis, younger men, single men, men with more education, men who drink alcohol more frequently, and men who live in Bangkok are more likely to have multiple sex partners.

About 13% of men had multiple sex partners in the twelve months prior to the survey. Single men are more likely to have multiple sex partners than married men. Not surprisingly, the mix of relationships a respondent has with his sex partners varies depending on his marital status. Married men multiple sex partners are more likely to have sex with casual partners (implying limited commitment and duration) than with girlfriends (implying longer duration of the relationship). Single men who have multiple partners may have multiple girlfriends, but are more likely to have one girlfriend plus casual partners; or, they may simply have a variety of casual partners.

Married men with MSPs rarely include SWs in their sexual network. However, married men who do have sex with SWs are not always consistent in their use of condom; in fact, only 67% of married men who have sex with a SW report that they "always" use condom with the SW (not reported above). Unfortunately, married men who have MSPs, tend not to use condom when having sex with their wives: 69% report that they never use condom with their wives.

About 84% of single men with MSPs use condom when they have sex with a casual partner, but a distinction can be made between SWs and non-SWs. Such men are fairly consistent about using condom when they have sex with SW (96% report they "always" do so; not reported above), but they are less consistent in their use of condoms with non-SW casual sex partners (72% of single men with MSP always use condom with non-SW casual partners; not reported above). Single men with MSPs are less likely to use condom with girlfriends (only 49% always do).

The authors divided men's sex partners into three broad categories: those with long-term sexual relationship (i.e., their wife); those with short-term sexual relationship (i.e., a SW, a friend, an acquaintance, or someone they just met); and those with medium-term sexual relationship (i.e., a girlfriend, "gik", minor wife, or fiancé). Men tend to use condoms when they have sex with partners as a short-term sexual relationship, although there is certain room for improvement. Men are less likely to use condom when they have sex with someone as a medium-term sexual relationship; they are still less likely to use condom when they have sex with someone as a long-term relationship. Thus, the risk of transmission of HIV from casual partners to girlfriends or wives remains a serious concern.

## What is already known on this topic?

Relatively little is known about how many, and which, Thai men have multiple sex partners, who is involved in these sexual networks, and which partners men use condoms with. Two studies, in particular, are particularly relevant to the questions we ask, but both of these studies have limitations in terms of addressing the questions we ask.

A study of all conscripts to the Royal Thai Navy in a two-month period in 2010 found that a majority of these conscripts reported having multiple sex partners in the three months prior to the survey but that less than a quarter of those with multiple sex partners reported consistent condom use. The fact that the sample is relative young (87% are less than 23 years of age) limits the generalizability to the adult Thai male population. Although the study finds that a majority of the respondents reported having multiple sex partners in the three months prior to the study, it does not identify the nature of these relationships (e.g., spouse, girlfriend, or sex worker) nor does it attempt to identify who is more likely to have multiple sex partners. Although the study asked about consistent condom use, the question allows only a single overall summary and thus does not distinguish the consistency of condom use with different types of sex partners.

A study based on a non-probability sample of low-income men and truckers in three provinces in Thailand in 1996 found that men who had sex with both sex workers (SWs) and non-SWs tended to be inconsistent in their use of condoms with both types of partners. The main focus of the 1996 study was to identify men who had sex with both sex workers (SWs) and non-SWs and the consistency of use of condoms with both types of partners. The study finds that condom use is more consistent with SWs than with non-SWs. However, the 1996 study does not report what percent of the respondents had multiple sex partners nor does it attempt to identify who was more likely to have multiple sex partners. A large but unspecified percent of the subjects in the 1996 study were married, but the analysis combined single and married men, so we do not know who to what extent single and married men differ in terms of having multiple sex partners and their

use of condoms.

Various other studies provide some relevant information, but these studies tend to be limited in terms of the target population and sampling methods and provide little information about who has multiple sex partners and how their condom use may differ among various types of partners.

## What this study adds?

The present paper makes several contributions to the literature. First of all, the present study is the only study that is at a national level on this topic. Most, if not all, previous research in Thailand on multiple sex partners has focused on very specific target populations (e.g., men who have sex with men). By contrast, the present research provides a look at a national representative sample of men from a broad cross-section of Thai society. Furthermore, most previous researches on multiple sex partners had focused on the consequences of having multiple sex partners. By contrast, the present research examines who is more likely to have multiple sex partners.

Another key contribution of the present paper is that it not only looks at who is likely to have multiple sex partners, but it also examines the sexual networks of those with multiple sex partners. Unlike most previous studies, the authors examine data on sexual dyads, allowing more in-depth analyses. The present study examines married and single men separately; their variety of sex partners and those who do and do not use condoms. Analyzing sexual dyads sheds more light on the potential for spreading of HIV/AIDS than if simply examined the characteristics of men who do or do not have multiple sex partners.

Overall, about 13% of men had multiple sex partners in the twelve months prior to the survey. About 7.5% of married men had multiple sex partners in the prior 12 months compared to about 42.6% of single men. In the multivariate analysis, not only were single men more likely to have multiple sex partners, but also younger men, men with more education, men who drink alcohol more frequently, and men who live in Bangkok were more likely to have multiple sex partners.

Not surprisingly, the mix of relationships a respondent has with his sex partners varies depending on his marital status. Married men with multiple sex partners are more likely to have sex with casual partners (implying limited commitment and duration) than with girlfriends (implying longer duration of the relationship). Single men with multiple partners may have multiple girlfriends, but are more likely to have one girlfriend plus casual partners; or, they may simply have a variety of casual partners.

Married men with MSPs rarely include SWs in their sexual network. However, married men who do have sex with SWs are not always consistent in their use of condom; in fact, only 67% of married men who have sex with a SW report that they "always" use condom with the SW. Unfortunately, married men who have MSPs, tend not to use condom when having sex with their wives: 69% report that they never use condom with their wives.

About 84% of single men with MSPs use condom when they have sex with a casual partner, but a distinction can be made between SWs and non-SWs. Such men are fairly consistent about using condom when they have sex with SW (96% report they "always" do so), but they are less consistent in their use of condoms with non-SW casual sex partners (72% of single men with MSP always use condom with non-SW casual partners). Single men with MSPs are less likely to use condom with girlfriend (only 49% always do).

Men tend to use condoms when they have sex with partners with short-term sexual relationship, although there is certainly room for improvement. Men are less likely to use condom when they have sex with someone as a medium-term sexual relationship; they are still less likely to use condom when they have sex with someone as a long-term relationship. Thus, the risk of transmission of HIV from casual partners to girlfriends or wives remains a serious concern.

## Potential conflicts of interest

The authors declare no conflict of interest.

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