

# SEXUAL BEHAVIOR AND HIV INFECTION AMONG PREGNANT HILLTRIBE WOMEN IN NORTHERN THAILAND

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**Abstract.** A case-control study was carried out to determine factors associated with HIV infection among pregnant hilltribe women who attended the antenatal clinics of six hospitals in northern Thailand (Mae Suai, Wieng Pa Pao, Mae Sai, Mae Chan, Wieng Kaen, Mae Fa Luang, and Chiang Rai hospitals) between 1 January 2005- 31 May 2007. Data were collected using questionnaires and analysis was by univariate ( $p$ -value=0.100) and multivariate analysis ( $p$ -value=0.050) in the model of unconditional multiple logistic regression. The ratio of cases to controls was 1:4. The sample consisted of 255 subjects; 51 cases and 204 controls. The mean age of the women was 26.9 years (min=15, max=52, and SD 7.3). The majority of the women were Lahu (49.8%) or Akha (36.9%). Nearly half the women were Christian (48.2%), followed by Buddhist (42.4%). Most of the women were not educated (60.4%). The largest group for family income was 10,000-49,999 baht/year (62.6%). After controlling for family income, family debt, education, occupation and household members, the findings showed that the "not married to debut partner" group were at greater risk than the "married to debut partner" group by 6.6 times ( $OR_{adj}=6.6$ , 95%CI=2.9-14.9). The "use of alcohol" group were at higher risk by 4.5 times ( $OR_{adj}=4.5$ , 95%CI=2.0-10.3) compared to the no alcohol use group, and a history of genital ulcer group had an increased risk of 6.3 times ( $OR_{adj}=6.3$ , 95%CI=1.2-31.1) the chance of having HIV infection compared to no history of genital ulcers in pregnant hilltribe women.

## INTRODUCTION

It has been more than 25 years and 25 million deaths since the first case of AIDS was diagnosed. In 2006, the WHO/UNAIDS estimated that 39.5 million men, women and children were living with the human immunodeficiency virus (HIV). Globally 2.9 million people had died, of which nearly half were children. Close to 4.3 million people were newly infected with the virus in 2006.

The number of people living with HIV has increased in all regions of the world. The Asia-Pacific region (WHO, 2005) is home to 60% of the world's population; 19% of them were living with HIV in 2004, 5.2 million men, 2 million women, and 168,000 children. For each adult woman living with HIV in the Asia-Pacific region, four men were living with the virus in the same region.

In Asia, 8.6 million people were living with HIV in 2006 (UNAIDS/WHO, 2006), including 960,000 people who became newly infected in 2006. Approximately 630,000 died from AIDS-related illnesses in 2006.

In Southeast Asia, although HIV preva-

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lence is still low, it is one of the most rapidly growing HIV/AIDS epidemics globally, because of the presence of several factors that enhance the spread of HIV, including poverty, gender inequality, and social stigma. In 2006 an estimated 7.8 million people were living with HIV/AIDS, while < 10% of infected persons were aware of their HIV status. At the end of 2005, an estimated 580,000 people were living with HIV/AIDS in Thailand. Approximately one third of new infections in 2005 were in married women who probably were infected by their spouses (UNAIDS/WHO, 2006).

In Thailand, the first reported AIDS case was a Thai student returning from the USA, who died in 1984, this case had a homosexual risk factor (Wangroongsarb and Wasi, 1985). Rapid spread of HIV-1 was noted among injecting drug users in 1987 (Kitayaporn *et al*, 1994), and in the female commercial sex-workers in 1989 (Siraprapasiri *et al*, 1991). The prevalence of HIV was highest in northern Thailand, with approximately 50/100,000 population (Sirisopana *et al*, 1996; MOPH, 2005). Northern Thailand along the upper North, the Myanmar border, and some coastal regions had the highest seroprevalence of HIV (Dobbins *et al*, 1992; Sirisopana *et al*, 1996; Kitsiripornchai *et al*, 1998). The highest number of HIV/AIDS cases was in Chiang Rai Province (MOPH, 2004).

Hill tribes are comprised of about 20 ethnic groups living in northern Thailand, bordering Lao PDR and Myanmar. The hill tribes together number approximately 550,000 people (Department of Social Welfare, 2001). Most of them migrated to Thailand from Tibet, China, and Myanmar in the 19<sup>th</sup> and 20<sup>th</sup> centuries. The main groups are the Mien (*Yao*), Karen (*Gariang*), Akha (*Egaw*), Lahu (*Mursay*), Hmong (*Meo*), and Lisu (*Lisaw*). Chiang Rai has the second largest number of hill tribes consisting (Department of Social Welfare, 2001) of six main hilltribe groups: Akha, Lahu, Karen, Lisu, Hmong, and Yao.

Hilltribe people are living in HIV epidemic areas in northern Thailand, therefore they may be particularly vulnerable to HIV infection. Little is known about sexual risk factors and sexual practice of hilltribe people. The accelerating commercialism of Thailand and the gap in earning potential between rural and urban areas have motivated some hilltribe people to move to urban areas for financial reasons. It has been estimated the 70-90% of young hilltribe women are sexually active before marriage (Cash, 1999). In most hilltribe cultures, there is gender inequality and women are often not in a position to negotiate safe sex, and putting them at risk for infection from husbands and partners (Morison, 2001). Hilltribe women (Bayrer, *et al*, 1997) appear to be at risk for HIV infection at a younger age than men; the highest rate of HIV infection was among women 20-24 years old (3.9%). There is an urgent need to identify risk factors, such as polygamy, sexual culture, and labor migration.

In Thailand, the proportion of women giving birth who receive antenatal care is very high. In 2001, of 573,655 women who gave birth in Thailand, 554,912 (96.7%) received antenatal care, and 517,488 (93.3%) were tested for HIV before giving birth (Amornwichee *et al*, 2002).

To date, no research has studied the relationship between HIV/AIDS infection in hilltribe people and their current social and sexual behavior, and sexual practices in both women and men, or the conflicts between "traditional" and "modern" values. The economic migratory movements of hilltribe people may increase their risk for infection. One study objective was to use pregnant women as a model to study risk factors for HIV/AIDS in northern hilltribe people and the socioeconomic effects of the infection on them.

## MATERIALS AND METHODS

This study was of case-control design.

The study sites were 7 antenatal clinics in Chiang Rai Province, Thailand; Chiang Rai, Mae Chan, Mae Suai, Wieng Pa Pao, Mae Fa Luang, Wieng Kaen, and Mae Sai. The target populations were pregnant women from 6 hilltribes (Akha, Lahu, Lisu, Yao, Hmong, Karen) living in Chiang Rai Province. The study population was hilltribe women who were pregnant and lived in Chiang Rai Province, Thailand. Cases and controls were recruited from antenatal clinic (ANC) logbooks. Two rapid HIV tests, or an enzyme-linked immunosorbent assay (ELISA) were used to identify cases with positive results (WHO, 1988). All cases and controls in the study were pregnant hilltribe women attending one of the 7 hospital ANCs at least once from 1 January 2005 to 30 March 2007. The cases were selected by collecting all positive women from 1 January, 2005, until 51 cases had been collected. Controls were obtained by simple random sampling from the ANC logbook in each 3-month interval from the same clinics as the cases. The ratio of cases to controls was 1:4. Therefore, the controls numbered 204 samples.

#### Sample size

The sample size was calculated to arrive at a minimum sample size of 46 cases and 184 controls (Schlesselman, 1998). Increasing the sample size by 10% for any errors in the study, resulted in 51 cases and 204 controls, for a total of 255.

#### Recruitment

The eligibility criteria were a) pregnant hilltribe women, b) willingness to give informed consent to participate, for women younger than 18 years old consent was sought from their guardian or parents and c) having attended one of the 7 ANCs. Voluntary, written informed consent (in Thai) was obtained from all study participants, after the researcher read it to the subjects.

Inclusion criteria for the cases included: a) pregnant women, identified by a positive

urine pregnancy test who attended the ANC clinic at least once for their current pregnancy during the study period, b) a newly identified HIV positive test with a positive serum HIV antibody identified on two rapid tests and confirmed by ELISA, the subjects either never had been tested or had a negative test in the past, c) subjects who resided in Chiang Rai Province for at least one year, d) and give informed consent after having been given an oral explanation as well as reading out a written statement before obtaining a voluntary signature or fingerprint.

Inclusion criteria for controls included: a) pregnant women, identified by positive urine pregnancy test who attended the ANC clinic at least once for their current pregnancy during the study period, b) negative results on a rapid HIV test or ELISA, c) subjects who had resided in Chiang Rai Province for at least one year, d) and written informed consent was obtained.

Exclusion criteria included: potential subjects a) who were unable to understand and could not give informed consent, b) who had previously been included in the study, c) and cases who were previously known to be HIV positive were excluded.

#### Research instruments

The research instrument was a questionnaire constructed from a literature review. The questions were developed from the standard questions of Behavioral Surveillance Surveys of USAID and FHI (Amon *et al*, 2000). The study questionnaire was divided into 3 parts: a socio-demographic and economic profile, a pregnancy profile, and a sexual behavior profile. The questionnaire was tested for validity and reliability in a similar group of subjects before the commencement of the study. The questionnaire had also been tested for convergent validity in the pilot stage.

#### Laboratory

The study used secondary information

from laboratory results. Two laboratory tests for HIV antibody were used to test the serum of all subjects. The first test was SERODIA-HIV (FUJIREBIO, Tokyo, Japan). The second rapid test was DETERMIN™ HIV1/2 (Abbott Laboratories, Bangkok, Thailand). The confirmatory test was an ELISA (Enzygnost, HIV1/2 Plus; Dade Behring, Marburg, Germany).

#### Data collection procedure

Information regarding personal and sexual experiences was obtained in a face-to-face, one-on-one confidential interview, conducted in a private room. All subjects were interviewed by a same sex interviewer. The interviewer was blinded to the subject's HIV status. Each interview lasted approximately 45 minutes. Subjects were presented with a small gift in appreciation of their participation.

#### Data management and data analysis

Data were double-entered and validated using Microsoft Excel. Data analyses were performed using SPSS (version 11.5; 2006 SPSS, Chicago, Illinois), STATA (version 8.2; Stata Corp, College Station, TX), and Epi-Info, version 6.04d (US Centers for Disease Control and Prevention, Atlanta, GA).

**Descriptive statistics.** Frequency, percentage, means and standard deviation were used to explain the characteristics of the samples.

**Inferential statistics.** Univariate analysis was performed to assess associations among categorical risk factors and HIV positivity. Odds ratios and their 95%CI were also calculated. Factors found significantly associated with HIV infection on univariate analysis at a p-value  $\leq 0.1$  were considered for inclusion in the multivariate model with the enter mode. On multivariate analysis, unconditional logistic regression was used to determine risk factors for HIV infection. Adjusted odds ratios and their 95%CI were estimated. For all statistical tests, associations were considered significant at p-value  $\leq 0.05$ .

#### Ethical considerations

All study forms and procedures were approved by the Committee for the Protection of Human Subjects of Mahidol University, Thailand. Since the youngest pregnant hilltribe women were as young as 12 years old (Amornwichee *et al*, 2002), consent for women under the age of 18 was obtained from their parents or guardians.

## RESULTS

The majority of those studied were Lahu women (49.8%), followed by Akha (36.9%), Lisu (5.1%), Karen (4.7%), Hmong (2.4%), and Yao (11.8%). Those 21-30 years old represented the largest group (48.6%). The mean age was 26.91 years (SD 7.25); the minimum age was 15 and the maximum was 52 years old. Subjects were recruited from Mae Suai Hospital (45.9%), Mae Chan Hospital (29.4%), Mae Fa Luang Hospital (19.2%), and Wiang Pa Pao Hospital (5.5%). One hundred seventy persons (66.7%) had Thai National ID cards with 13 digits (Thai national ID cards with 13 digits entitles the holder to travel and work freely to any part of the country), 15.7 % had no ID card, 9.8% had hilltribe cards (hilltribe cards and immigrant cards restricts the holder to live and work only in their residential province) and 7.8% had immigrant cards. Forty-eight point two percent were Christian and 42.4% were Buddhist. Eighty-eight point two percent were married, 10.6% were cohabiting and 1.2% were recently divorced. Sixty point four percent were illiterate or had no schooling, 26.3% had a primary school education, 13.3% had a secondary school education. The largest income group earned 10,000-49,999 baht/year (62.8%), followed by  $\geq 50,000$  baht per year (24.3%), and  $\leq 9,999$  baht per year (10.6%). Sixty-three percent of the subjects had a family debt of 10,000-49,999 baht, 24.3% had a family debt of 10,000-49,999 baht and 10.6% had a family

Table 1  
Crude odds ratio of women's risk behaviors on univariate analysis.

Characteristics	Total	Case (%)	Control (%)	OR	95%CI	p-value
History of work in big cities						
No	169	31 (18.3)	138 (81.7)	1.00		
Yes	86	20 (23.3)	66 (76.7)	1.35	0.72-2.54	0.355
History of work as masseuses						
No	248	50 (20.2)	198 (79.8)	1.00		
Yes	7	1 (14.3)	6 (85.7)	0.66	0.08-5.61	0.703
Alcohol consumption						
No	180	23 (12.8)	157 (87.2)	1.00		
Yes	75	28 (37.3)	47 (66.7)	4.07	2.14-7.72	0.000 <sup>a</sup>
Smoking						
No	219	39 (17.8)	180 (82.2)	1.00		
Yes	25	7 (28.0)	18 (72.0)	1.79	0.70-4.59	0.222
Ever	11	5 (45.5)	6 (54.6)	3.85	1.12-13.24	0.033 <sup>a</sup>
Taking amphetamine						
No	246	44 (17.9)	202 (82.1)	1.00		
Yes	9	7 (77.8)	2 (22.2)	16.07	3.23-79.98	0.001 <sup>a</sup>
Taking opiates						
No	244	43 (17.6)	201 (82.4)	1.00		
Yes	11	8 (72.7)	3 (27.3)	12.47	3.18-48.92	0.000 <sup>a</sup>
History of tattooing						
No	250	49 (19.6)	201 (80.4)	1.00		
Yes	5	2 (40.0)	3 (60.0)	2.74	0.45-16.82	0.278
History of blood transfusion						
No	228	42 (18.4)	186 (81.9)	1.00		
Yes	27	9 (33.3)	18 (66.7)	2.21	0.93-5.27	0.072
History of illegally injection drug use in the past 5 months						
No	245	46 (18.8)	199 (81.2)	1.00		
Yes	10	5 (50.0)	5 (50.0)	4.33	1.20-15.57	0.025

<sup>a</sup>Significance at  $\alpha = 0.100$

debt  $\geq 50,000$  baht.

Table 1 shows the univariate analysis of women's risk behavior. There were 4 variables which showed a statistically significant association with HIV infection in women. The risk for HIV infection among pregnant hilltribe women increased in proportion with the frequency of alcohol consumption. The "rarely drinking" group (OR=3.41, 95%CI=1.74-6.69) had a greater risk than the "non-drinking" group. The "often drinking" group's risk

(OR=13.65, 95%CI=3.19-58.39) was compared to the "non-drinking" group.

Subjects who smoked (OR=3.89, 95%CI=1.12-13.24) were at greater risk than those in the "non-smoking" group. Subjects with a history of taking amphetamines had a greater risk than the "non-taking" group (OR=16.07, 95%CI=3.23-79.98). Subjects who took opiates were at greater risk than those in the "non-taking" group (OR=2.37, 95%CI=1.03-5.43).

Table 2  
Crude odds ratio of women's sexual behaviors on univariate analysis.

Characteristics	Total	Case (%)	Control (%)	OR	95%CI	p-value
Age at first sexual intercourse						
≤ 15	67	13 (19.4)	54 (80.6)	1.00		
16-20	139	29 (20.9)	110 (79.1)	1.09	0.53-2.28	0.807
21-25	40	6 (15.0)	34 (85.0)	0.61	0.20-1.87	0.387
≥ 26	9	3 (33.3)	6 (66.7)	2.08	0.46-9.42	0.344
Number of sexual partners						
1	188	24 (12.8)	164 (87.2)	1.00		
2	39	10 (25.6)	29 (74.4)	2.36	1.02-5.44	0.045 <sup>a</sup>
≥ 3	25	16 (64.0)	9 (36.0)	12.15	4.83-30.55	0.000 <sup>a</sup>
History of CSW						
No	248	46 (18.6)	202 (81.5)	1.00		
Yes	7	5 (71.4)	2 (28.6)	10.98	2.07-58.37	0.005 <sup>a</sup>
Married to partner						
Yes	179	18 (10.1)	161 (89.9)	1.00		
No	76	33 (43.4)	43 (56.6)	6.86	3.53-13.36	0.000 <sup>a</sup>
Frequency of marriage						
Married once only	144	14 (9.7)	130 (90.3)	1.00		
Married more than once	45	14 (31.1)	31 (68.9)	4.19	1.81-9.69	0.001 <sup>a</sup>
Cohabiting	19	7 (36.8)	12 (63.2)	5.42	1.83-15.99	0.002 <sup>a</sup>
Frequency of sexual intercourse						
<1 time/week	47	19 (40.4)	28 (59.6)	7.13	2.19-23.18	0.001 <sup>a</sup>
1-2 times/week	162	28 (17.3)	134 (82.7)	2.19	0.73-6.61	0.163
≥ 3-5 times/week	46	4 (8.7)	42 (91.3)	1.00		
Having sexual intercourse during pregnancy						
No	48	13 (27.1)	35 (72.9)	1.00		
Yes	207	38 (18.4)	169 (81.7)	0.61	0.29-1.25	0.176
Oral sex						
No	234	43 (18.4)	191 (81.6)	1.00	1.07-7.00	0.036 <sup>a</sup>
Yes	21	8 (38.1)	13 (61.9)	2.73		
Anal sex						
No	248	45 (18.1)	203 (82)	1.00		
Yes	7	6 (85.7)	1 (14.3)	27.07	3.18-230.4	0.003 <sup>a</sup>
Have had voluntary sexual intercourse before marriage						
No	193	28 (14.5)	165 (85.5)	1.00		
Yes	60	22 (36.7)	38 (63.3)	3.41	1.76-6.60	0.000 <sup>a</sup>
Have had voluntary sexual intercourse outside marriage						
No	238	47 (19.8)	191 (80.3)	1.00		
Yes	7	1 (14.3)	6 (85.7)	0.68	0.08-5.76	0.720
History of genital discharge						
No	240	42 (17.5)	198 (82.5)	1.00		
Yes	10	7 (70.0)	3 (30.0)	11.00	2.73-44.29	0.001 <sup>a</sup>
History of genital ulcer						
No	242	43 (17.8)	199 (82.2)	1.00		
Yes	11	7 (63.5)	4 (36.5)	8.09	2.27-28.89	0.001 <sup>a</sup>

<sup>a</sup>Significance at  $\alpha = 0.100$

Table 3  
Adjusted odds ratio for risk factors for HIV infection among pregnant hilltribe women on multivariate analysis.

Characteristics	OR	95%CI	p-value
Married to partner	6.55	2.89-14.85	0.000 <sup>b</sup>
No	1.00		
Yes			
Alcohol consumption			
Yes	4.54	2.00-10.32	0.000 <sup>b</sup>
No	1.00		
History of genital ulcer			
Yes	6.27	1.23-31.09	0.025 <sup>b</sup>
No	1.00		

<sup>b</sup>Significance at  $\alpha = 0.050$

There were no statistically significant associations with HIV infection in the rest of the variables, namely, history of working in big cities, history of work as masseuses, having tattoos, history of a blood transfusion or history of illegal using injection drugs in the past 5 months.

Table 2 shows the univariate analysis of women's sexual behaviors at the p-value of 0.100. There were 14 variables which established a statistically significant association with HIV infection in pregnant hilltribe women.

The number of sexual partners was a risk factor for HIV infection. The "2 or more partners" group presented greater risk than the "1 partner" group (OR=2.36, 95%CI=1.02-5.44); the "3 or more partners" group had OR=12.15 (95%CI=4.83-30.55).

A history of commercial sex-work (OR=10.98, 95%CI=2.07-58.37) was highly associated with HIV infection among pregnant hilltribe women when compared with the "no" group.

When the variable of "marriage to partner" was applied, it was found that the subjects who were not married to their partners (OR=6.86, 95%CI=3.53-13.91) faced a higher risk than those who were married to their part-

ners. Women who had pre-marital sex were at greater risk than those practicing marital sex (OR=2.71, 95%CI=1.26-9.75) while the women who "cohabited" had OR=3.50 (95%CI=1.26-9.74).

The variable of frequency for marriage showed that the "cohabiting" group was at higher risk than the "1 time" group (OR=5.42, 95%CI=1.83-15.99) and the "more than 1 time" group had OR=4.19 (95%CI=.81-9.69).

Under "the frequency of sexual intercourse with current partners", an increase in the number of episodes of sexual intercourse per week presented less opportunity to be infected with HIV in pregnant hilltribe women. The "less than 1 time/week" group showed OR=7.13 (95%CI=2.19-23.18), a greater risk than the "3-5 times or more/week".

The practice of "oral sexual intercourse" by women was connected to a higher risk than the absence of such a practice (OR=2.73, 95%CI=1.07-7.00). Women practicing "anal sexual intercourse" were at a higher risk than those in the "no" group (OR=27.07, 95%CI=3.18-230.40).

The subjects who "had voluntary sexual intercourse before marriage" were found to be

at greater risk than those without such behavior (OR=3.41, 95%CI=1.76-6.60).

Comparing the subjects who had "heard about STIs" and those who had not, the latter group faced more risk (OR=2.40, 95%CI=1.24-4.66) than the former group did. Subjects with genital discharge had OR=11.00 (95%CI=2.73-44.29) and those with a genital ulcer was at greater risk than those in the "no" group (OR=8.09, 95%CI=2.27-28.89).

Multiple logistic regression analysis was applied for controlling confounders and for evaluating the effects of risk factors on HIV infection among pregnant hilltribe women. After controlling for family income, family debt, education, occupation and household member, there were three variables which showed statistically significant association: not married to partner increased the risk of HIV infection by a factor of 6.55, alcohol consumption increased the risk of HIV infection by a factor of 4.54, and history of genital ulcer increased the risk of HIV infection by a factor of 6.27. The other variables were not found to be statistically significant.

## DISCUSSION

The results of multiple logistic regression showed that "not being married to partner", "alcohol consumption" and "history of genital ulcer" were factors associated with HIV infection in pregnant hilltribe women with statistical significance. For the factors of "not being married to partner" or having had other partner(s) before marriage, the risk was greater than being married to the partner. These findings are similar to those of previous studies (Omiri, 1996; Siriwasin *et al*, 1998; Bennetts *et al*, 1999; Xu *et al*, 2000; Lertpiriyasuwat and Jenkins 2003; Boisson, 2006) which reported that HIV-positive women were more likely to have had >1 lifetime sex partner, and increasing the number of partners was a strong risk factor for HIV infection in women and among a subpopula-

tion of women in the UK. This also coincides with a study by White and Cereal (2000) when younger age at sex, marriage to someone other than the partner, and a higher number of sex partners before first marriage, were significantly associated with extramarital intercourse in the past year. The sexual behavior of pregnant hilltribe people also coincides with a study by Omiri (1996) who found that premarital sex for both men and women, and extramarital sex for men, was widespread among hilltribe people.

Another important risk factor in our study was the history of a genital ulcer. This finding concurs in previous studies (Siriwasin *et al*, 1998; Bunnell *et al*, 1999). Siriwasin *et al* (1998) found OR 3.99 (95%CI 2.16-7.37) for the factor of STIs history among pregnant women after controlling for confounders. Bunnell *et al* (1999) found that women who were VDRL-reactive were more likely to be HIV-positive.

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