



Gender and access to HIV testing and antiretroviral treatments in Thailand: Why do women have more and earlier access?

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ABSTRACT

In the recent scale-up of antiretroviral treatment, gender differences in access to treatment have been reported. In Thailand, as the HIV epidemic became more generalised, there has been a shift from men being disproportionately affected to increased vulnerability of women. In 2007, the Living with Antiretrovirals (LIWA-ANRS 12141) study investigated the gender distribution of all adult patients receiving antiretroviral therapy ($N = 513$ patients) in four community hospitals in northern Thailand and factors influencing the disparities observed. From this retrospective life-event history survey, we found that proportionately more women (53%) were receiving antiretroviral therapy than men, an unexpected result for a country with a higher proportion of infections among men. They were more likely to initiate treatment within one year of diagnosis and were at a more advanced stage of the disease compared to women. This gender distribution is partly explained by the evolving dynamics of the HIV epidemic, initial prioritization of mothers for treatment and earlier access to HIV testing for women. These issues are also entangled with gender differences in the reasons and timing to HIV testing at the individual level. This study found that the majority of men underwent HIV testing for health reasons while the majority of women were tested following family events such as a spouse/child death or during pregnancy. Further qualitative research on gender specific barriers to HIV testing and care, such as perceived low risk of infection, poor access to medical care, lack of social support, actual or anticipated HIV/AIDS-related stigma would provide greater insight. In the meantime, urgent efforts are needed to increase access to voluntary counselling and testing inside and outside the family setting with targeted interventions for men.

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Introduction

Thailand was the first Asian country affected by the AIDS epidemic in the late 1980s. It is estimated that over 1 million of the 64 million population has been infected with HIV of which over 460,000 have died (UNDP, 2004). At the end of 2007, there were an estimated 610,000 persons living with HIV (UNAIDS & WHO, 2008).

Gender distribution among HIV infected persons in Thailand

In 1989, the initial wave of the epidemic developed very rapidly through mostly men intravenous drug users. The second wave was predominately spread among commercial sex workers while the third

wave diffused into the general heterosexual population, initially from commercial sex workers to their clients, and then from the clients to their regular spouses (Weniger et al., 1991). The second and third waves of the epidemic were closely related to gender specific sexual norms (Brown, Sittitai, Vanichseni, & Thisyakorn, 1994; Brown & Xenos, 1994; Ford & Koetsawang, 1991). For men, visits to commercial sex workers before marriage were widely accepted as a form of sexual initiation, while after marriage, visits to commercial sex workers often occurred in the company of peers and were generally tolerated by the spouse (Maticka-Tyndale et al., 1997; Saengtienchai, Knodel, Vanlandingham, & Pramualratana, 1999; Vanlandingham, Knodel, Saengtienchai, & Pramualratana, 1998). However, women were traditionally expected to be abstinent before marriage, and extra-marital sexual relationships were considered socially unacceptable (Knodel, Saengtienchai, Vanlandingham, & Lucas, 1999).

While HIV prevalence rates in Thailand are remarkably well documented among specific populations such as pregnant women, military conscripts, men who have sex with men, direct and

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indirect sex workers and blood-donors, there is currently a lack of reliable data on the overall sex-ratio in HIV infected adults (UNAIDS & WHO, 2008). There is growing concern for the increased vulnerability of women following the dramatic decrease in the male to female sex-ratio of reported AIDS cases, from 6.8:1 in 1992 to 4.4:1 in 1996 (Reks-Ngarm, 1997). This trend appears to be continuing with the sex-ratio of reported AIDS cases decreasing further to 2.4:1 in 1999 (World Bank, 2000) and to 1.6:1 in 2007 (Ministry of Public Health, 2008). This is close to the UNAIDS, 2007 estimate that 250,000 of the 600,000 adults living with HIV/AIDS in Thailand were women, which represents a male to female sex-ratio of about 1.4:1 (UNAIDS & WHO, 2008).

National AIDS program

The Thai government made considerable efforts to curtail the HIV epidemic with a multi-sectoral AIDS program implemented beginning in 1989. Among the preventive strategies, the 100% condom campaign was uniquely successful in limiting the number of new infections in the general population by increasing the use of condoms among commercial sex workers and reducing the frequency of commercial sex visits (Ainsworth, Beyrer, & Soucat, 2003; Hanenberg, Rojanapithayakorn, Kunasol, & Sokal, 1994; Nelson et al., 1996; Phoolcharoen, Ungchusak, Sittitai, & Brown, 1998; Rojanapithayakorn & Hanenberg, 1996; UNAIDS, 2000). However, the prevalence remains high among the predominantly male high risk behavior populations such as injecting drug users, and men who have sex with men (Nelson et al., 2002; UNAIDS, 2007; van Griensven et al., 2005).

In terms of provision of antiretroviral treatment, the Department of Health piloted the Access to Care (ATC) treatment program in 2002, which prioritized HIV infected mothers. HIV infected pregnant women were identified at the antenatal clinic (ANC) through HIV screening and enrolled in the national Prevention of Mother to Child Transmission (PMTCT) of HIV program. This program, which had a very high antenatal HIV testing acceptance rate of 97%, led to a dramatic decrease in the number of pediatric AIDS cases (Amornwichet et al., 2002). The strong association between maternal and child health was the rationale for prioritizing HIV infected new mothers who, if treated, would be able to raise their children, therefore reducing the burden of orphans. The ATC program then expanded under the family centered approach of "PMTCT-Plus", which incorporated voluntary HIV counselling and testing and antiretroviral treatment for infected husbands/partners and children.

It is important to note that a major health care reform was implemented in 2001, with the introduction of a universal coverage system, providing health care at very low patient fees of "30-baht" (US\$0.75) per hospital visit to all Thai citizens (Tangcharoensathien, Wibulpholprasert, & Nitayaramphong, 2004). The universal coverage system is predominately targeted towards low income families and runs in parallel with other existing health coverage schemes – the Social Security Scheme (SSS), the Workmen's Compensation Fund (WCF) for workers in the private sector, the Civil Servant Medical Benefit Scheme (CSMBS) for government employees and some private insurance programs. For HIV infected patients, the government launched the National Access to Antiretroviral Treatment Program (NAPHA) in 2003, providing free access to antiretroviral therapy (Chasombat, Lertpiriyasuwat, Thanprasertsuk, Suebsaeng, & Lo, 2006). This program was subsequently integrated with the universal coverage system. By the end of 2007, the scale-up of antiretroviral treatments was estimated to have reached 153,000 persons (UNAIDS & WHO, 2008).

Gender, HIV and antiretroviral treatment programs

There have been increasing reports of over-representation of women enrolled in antiretroviral treatments programs compared to men in lower or middle income countries, in proportion to the number of HIV infected persons by gender (Braitstein et al., 2008; Muula et al., 2007). In addition, it appears that men in these settings are more likely to present late for testing, at more advanced stages of the disease and with greater risk of mortality compared to women (Keiser et al., 2008; Lawn & Wood, 2006).

In Thailand, a full evaluation of the gender distribution among adults in the national antiretroviral program has not been conducted. It has been suggested that Thai women were either equally or over-represented in antiretroviral treatment programs (Braitstein et al., 2008; Leusaree, Srithanaviboonchai, Chanmangkang, Ying-Ru, & Natpratan, 2002). While there have been studies in Southern Africa (Muula et al., 2007) on the reasons for gender based differences in access to HIV care, there are limited data in the Asian setting (Braitstein et al., 2008; Keiser et al., 2008) and, to our knowledge, no comprehensive study in Thailand.

In this paper, we conducted a life-event history survey of all adults receiving antiretroviral therapy in four hospitals in a semi-urban population in Northern Thailand, from which we conducted a gender based descriptive analysis. This approach enabled us to relate the gender distribution in access to antiretroviral treatments with the reasons and timing of HIV testing in the context of the individual life-course and the evolving AIDS epidemic in Thailand.

Methods

Data were collected from the "Living with Antiretrovirals" study (LIWA), a socio-demographic and economic evaluation of the impact of access to antiretroviral treatments in northern Thailand, a region heavily affected by HIV. The study targeted all HIV infected adults receiving antiretroviral treatment in four community hospitals (Mae On, San Sai, Doi Saket and Sankaempeng Hospitals) in Chiang Mai province.

Life-event history survey

In order to assess the access to antiretroviral treatments and their socio-demographic impact on the lives of patients, several approaches could be envisioned. The epidemiological approach would follow prospectively a population of HIV infected individuals from the time of their diagnosis, and assess the changes in their situation by interviewing them at different time points, in particular after treatment initiation. However, such an approach has huge logistical requirements due to the long follow-up duration and would need to address issues of attrition related to loss to follow-up. An alternative approach, chosen here, is a retrospective life-event history survey where participants are interviewed about their personal history. This approach is derived from demographic studies (Courgeau & Lelievre, 1991). Individual life histories are considered as a continuum of events of various nature involving family, housing, occupation, health, etc. This technique allows the study of the occurrence of different types of events or situations and their interactions, and enables a comparison of different periods in a person's life-course: for example, a patient's situation or life events before and after HIV diagnosis and antiretroviral initiation. However, as AIDS is a fatal disease, there is a selection bias of respondents towards survivors.

Interview process

After explaining the purpose of the study and topics covered, all HIV infected adults registered in the hospitals, aged >18 years, non

perinatally infected,¹ and receiving antiretroviral treatments were offered the opportunity to be interviewed for the study. Interviews were conducted on a one-to-one basis in a private room dedicated for the study. In the interview process, participants were informed that all answers to the interview were strictly confidential and completely anonymous. It was stressed that participants were free to decline answering any questions and that there were no good or bad answers. After this introduction, willing participants were asked to provide written informed consent. Respondents were reimbursed for their transport costs and time. However, reimbursement was not used as an incentive, and the small sum (200 Baht or approximately US\$5) was presented at the end of the interview. The interview was based on a standard questionnaire, and all dated events or periods of life were recorded on a calendar sheet (Lelièvre & Vivier, 2001). The median duration of the interviews was 50 min (ranging from 25 to 132 min).

Study setting and study population

The four community hospitals were selected based on their long-term provision of antiretroviral treatments, mostly since 2002. Consequently, they treat a large number of adults and are representative of community hospitals in semi-rural/sub-urban areas of the Northern region.

From August to November 2007, all adult patients on antiretroviral treatment at participating hospitals were contacted for an interview. Data on the socio-demographic (age, gender), clinical characteristics (disease stage as indicated by the immunologic status, as assessed by the most recent CD4 count, in cells/mm³, as of the interview date and based on hospital records, and treatment regimen) and HIV disclosure status of both respondents and non-respondents were collected and compared.

Issues explored

We analyzed data from the life-event history survey exploring the following issues:

(1) Family history: all successive unions, births, separation and death of spouses, children; (2) Education; (3) Health: disease history—mode of infection, date of diagnosis; disease stage as assessed by the immunologic status before and after antiretroviral treatment (again assessed by CD4 cell count before treatment initiation, based on hospital records); treatment history, date of antiretroviral initiation, type of treatment; overall appreciation of health status before and after antiretrovirals.

Statistical analysis

Descriptive statistics were performed using Stata™ version 9. The percentages were compared using a Pearson's chi-square test or a Fisher's exact test according to the sample distribution. Means and medians were compared using the student t test, and Kruskal-Wallis test, respectively (medians and Kruskal-Wallis tests were only applied to variables with sufficient value range).

Ethical considerations

The study was reviewed and approved by the Ethics Committee of Chiang Mai University, Faculty of Associated Medical Sciences. Interviewers were psychiatric nurses, who received specific training on the life-event history survey process and HIV/AIDS counselling.

¹ Per protocol, individuals with perinatal infections had to be excluded so as to ensure a homogeneous study population. However, among patients aged > 18 years, there were no cases of perinatal infection.

Results

A total of 578 patients on antiretroviral treatments were contacted for an interview; 513 agreed to participate, a response rate of 89%.

Population characteristics

Socio-demographic and clinical characteristics of respondents and non-respondents are reported in Table 1. There were slightly more men non-respondents than women (54% versus 46%, respectively), but the difference was not statistically significant ($p = 0.296$). Non-respondents were younger than respondents (median age of 37 versus 40 years respectively, $p = 0.015$). Immune status of the patients, before and after antiretroviral treatment, and treatment regimen were similar among the two groups. This indicates that there was no self-selection of the respondents according to their disease stage. Among the reasons provided for not participating in the study, unavailability due to work was reported by 61% of non-respondents while confidentiality concerns was reported by 22%. This is consistent with data on serostatus disclosure, showing non-respondents to be more reluctant to disclose their HIV status compared to respondents (37% versus 16% respectively, $p < 0.001$).

Data on the socio-demographic characteristics of the respondents by gender are provided in Table 2. The sex distribution was relatively balanced, with slightly more women than men, 53% versus 47%, respectively. The mean age of participants at the time of interview was 40 years for both sexes. Overall women had a lower

Table 1

Comparison of the demographic and HIV characteristics of non-respondents and respondents.

	Non-respondents N = 65	Respondents N = 513	p Value		
Sex	%	%			
Men	53.9	47.0	0.296		
Women	46.1	53.0			
Current age^a (in years)					
20–34	30.7	25.0	0.120		
35–39	35.5	25.1			
40–44	16.1	23.6			
≥45	17.7	26.3			
Antiretroviral treatment					
Thai generic ARV combination	76.9	79.7	0.599		
Others	23.1	20.3			
Patient's immune status					
CD4 < 50 cells/mm ³ before ARV initiation ^b	52.8	45.6	0.504		
CD4 ≥ 200 cells/mm ³ after ARV treatment ^c	87.7	82.6	0.399		
Reasons given for not responding^d					
Working	60.9				
Concern about disclosure risk	21.7				
Others ^e	17.4				
HIV status disclosure	63.1	84.4	<0.001		
	Median	Range	Median	Range	p Value
Age (in years)	36.7	19–58	40.0	23–70	0.015
CD4 before ARV initiation (cells/mm ³)	37.0	0–385	60.0	0–508	0.194
CD4 after ARV treatment (cells/mm ³)	381.0	0–904	352.0	6–1343	0.465

^a N = 62 non-respondents, N = 513 respondents.

^b CD4 cell count before ARV, as recorded in the hospital file. N = 61 non-respondents, N = 480 respondents.

^c Most recent CD4 cell count, as recorded in the hospital file. N = 60 non-respondents, N = 480 respondents.

^d N = 46 non-respondents (9 non-respondents did not give any reason).

^e Including 2 patients who did not want to be interviewed; 3 could not come to the hospital because of illness, 3 who forgot to come to their appointment.

Table 2
Comparison by gender, of the age and education level of the respondents.

	All respondents		Men		Women		p Value
	N = 513	%	N = 241	%	N = 272	%	
Current age (in years)							
20–34	25.0		24.5	24.5	25.4		0.759
35–39	25.1		24.5	25.7	25.7		
40–44	23.6		25.7	21.7	21.7		
≥45	26.3		25.3	25.3	27.2		
Education level							
None	3.7		1.7	1.7	5.5		0.003
Primary	63.6		59.8	67.3	67.3		
Secondary	22.6		24.5	20.6	20.6		
Vocational college	7.8		11.6	4.4	4.4		
University	2.3		2.4	2.2	2.2		
Health coverage							
Universal Coverage	91.2		91.3	91.2	91.2		0.965
Others ^a	8.8		8.7	8.8	8.8		
Current age (in years)	Median	40.0	Median	40.2	Median	39.8	p Value
Current Income (in baht)	Range	23–70	Range	23–70	Range	23–63	0.953
		0–50,000		0–50,000		0–30,000	<0.001

^a Including 1 patient who declared not having any health coverage, 27 patients who receive benefits from the Social Security Scheme, 11 patients who receive benefits from the Civil Servant Medical Benefits Scheme and 4 patients who have health coverage.

education level than men ($p = 0.003$): 27% of women attended secondary school or more compared to 39% of men. This reflects the gender difference in education in the adult population of this age group in northern Thailand (National Statistical Office, 2007). The median individual income were 4000 baht for men (US\$100) compared to 3000 baht for women (US\$75) ($p < 0.001$). This is within the low income range for Thailand (National Statistical Office, 2007). The vast majority of the patients (91%) were receiving treatment under the universal coverage system with no difference by gender (Table 2).

Characteristics relating to marital life and children are outlined in Table 3. “Spouses” were defined as people living in a cohabiting union for more than 6 months, mostly in marriage settings. The mean number of spouses reported was lower for men than women (1.5 versus 1.8, $p < 0.001$), although there was a wider range in men compared to women (0 to 12 spouses versus 0 to 4 spouses, respectively). A much higher proportion of men reported never having a spouse (13.3%) compared to only one woman (0.4%). Importantly, among the respondents who ever had a spouse, women were more likely to have experienced a spouse death (64% versus 22%, $p < 0.001$), while men were more likely to have been divorced or separated (92% versus 74%, $p < 0.001$). Sixty-five percent of women had had more than one spouse compared to 38% of men. Whether the second union occurred before or after widowhood – mostly AIDS-related – needs to be investigated further. In a previous study in Thailand performed at a time when antiretroviral treatments were not available, we observed that HIV infected persons often to remarry within the people living with HIV networks (Le Cœur, Im-Em, Koetsawang, & Lelièvre, 2005).

The average number of children was significantly different for women and men (1.2 versus 0.7 respectively; $p < 0.001$). Less than

Table 3

Comparison by gender, of the marital and children history of the respondents.

	All respondents		Men		Women		p Value
	N = 513	%	N = 241	%	N = 272	%	
Number of spouse(s)							
0	6.4		13.3	13.3	0.4	0.4	<0.001
1	41.5		49.0	49.0	34.9	34.9	
2	35.9		24.0	24.0	46.3	46.3	
≥3	16.2		13.7	13.7	18.4	18.4	
Experienced a spouse's death(s)^a							
0	54.4		77.9	77.9	36.2	36.2	<0.001
≥1	45.6		22.1	22.1	63.8	63.8	
Experienced a spouse's separation(s)^a							
0	18.3		8.1	8.1	26.2	26.2	<0.001
1	44.8		56.0	56.0	36.2	36.2	
≥2	36.9		35.9	35.9	37.6	37.6	
Number of children							
0	34.9		51.9	51.9	19.9	19.9	<0.001
1	38.0		30.3	30.3	44.9	44.9	
≥2	27.1		17.8	17.8	35.2	35.2	
Experienced a child death(s)^b							
0	91.9		89.7	89.7	93.1	93.1	0.316
≥1	8.1		10.3	10.3	6.9	6.9	
	Mean	Range	Mean	Range	Mean	Range	p Value
Number of spouse(s)	1.7	0–12	1.5	0–12	1.8	0–4	<0.001
Number of spouse's deaths	0.5	0–3	0.2	0–3	0.7	0–2	<0.001
Number of separations	1.3	0–12	1.4	0–12	1.2	0–4	0.002
Number of children	1.0	0–5	0.7	0–5	1.2	0–4	<0.001

^a Number of respondents who ever had a spouse: $N = 480$ all respondents; $N = 209$ men; $N = 271$ women.

^b Number of respondents who ever had a child: $N = 334$ all respondents; $N = 116$ men; $N = 218$ women.

Table 4
Comparison by gender, of the age at HIV diagnosis, the mode of infection of the respondents.

	All respondents	Men	Women	p Value
	N = 513	N = 241	N = 272	
Age at HIV diagnosis (in years)	%	%	%	
15–29	30.6	27.0	33.8	0.109
30–34	24.0	22.0	25.7	
35–39	20.1	23.2	17.3	
≥40	25.3	27.8	23.2	
Year of the HIV diagnosis				
<1999	28.8	24.4	32.7	<0.001
1999–2001	15.4	10.0	20.2	
2002–2003	20.7	22.0	19.5	
2004–2005	22.2	27.0	18.0	
2006–2007	12.9	16.6	9.6	
Reported mode of infection^a				
Sexual	88.5	81.7	94.4	<0.001
Injected Drug Use	4.1	8.3	0.4	
Medical procedure	3.9	5.0	3.0	
Not sure/don't know	3.5	5.0	2.2	
	Mean Range	Mean Range	Mean Range	p Value
Age at HIV diagnosis (in years)	34.4 17–66	35.0 18–66	33.8 17–62	0.110

^a N = 510 Total respondents; N = 240 men; N = 270 women.

a quarter of women had no children compared to more than half of the men (20% versus 52% respectively, $p < 0.001$). We investigated if these contrasting family situations could explain differences in HIV test-seeking behaviors.

Reasons for undergoing HIV test, route of infection

To better assess the difference in HIV test-seeking behavior by gender, we analyzed the age of respondents at the time of HIV test, the year of test and the reasons for having a test. In cases where participants had more than one HIV test, this refers to the test which first confirmed their HIV-positive status.

Women were about one year younger than men at the time of HIV diagnosis (mean age 33.8 years versus 35.0 years, respectively, $p = 0.110$) (Table 4). Interestingly, more women than men tested for HIV before or during 2003, the turning point for the national scale-

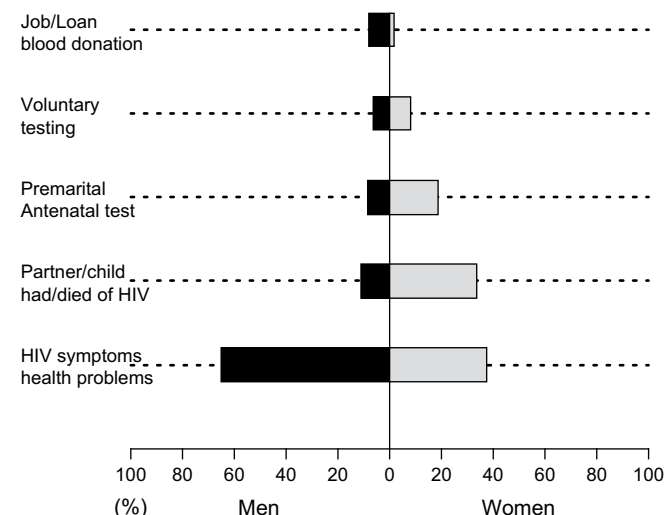


Fig. 1. Reasons for HIV testing among men and women.

up of free access to antiretroviral treatment, while more men were tested after this date (Table 4). This suggests that the scale-up of antiretroviral treatment boosted health-seeking behavior for HIV testing among men. As shown on Fig. 1, the reasons reported for HIV testing differed significantly according to gender ($p < 0.001$): health problems in 65% of men versus 38% of women; spouse or child death in 11% of men versus 34% of women; voluntary HIV counselling and testing – with no specific reason reported – was similar among men and women (7% and 8%, respectively); 9% of men and 2% of women had the test for social reasons such as to take a loan, a job application, blood donation or during military service. Interestingly, antenatal testing accounted for 17% of HIV tests in women compared to 7% in men. Premarital testing was the reason for very few tests, only 1.5% of the tests in women and 2.0% in men.

These gender differences highlight that over two-thirds of men (65%) underwent HIV testing due to health problems, i.e., when symptomatic, while the majority of women (52%) sought an HIV test in relation to either their spouse's illness/death, or through premarital/antenatal testing, at a time when they were generally asymptomatic.

Table 4 shows the reported mode of infection: In both sexes, the large majority were sexual transmission, injection drug use was much higher in men (8.3%) than women (0.4%), which is consistent with other studies from Thailand (Razak et al., 2003).

Antiretroviral treatment initiation

The mean age at antiretroviral initiation was 37.4 years for men and 37.0 for women ($p = 0.67$) (Table 5). The delay between the HIV-positive test and treatment initiation was about one year shorter in men compared to women ($p = 0.004$). Interestingly, before 2004, significantly more women had started antiretroviral treatment than men (42% versus 31.0%), while more men initiated treatment after, when free access to treatment was widely available. Fifty-four percent of men initiated treatment within one year of diagnosis, compared to 33% of women. This is most likely due to the fact that more men were symptomatic at time of diagnosis, while most women were tested earlier in the course of infection. This was reflected in the clinical condition at time of initiation of treatment: a higher proportion of men had CD4 cell count less than 50 cells/mm³ (55% in men versus 38% in women, $p < 0.001$) and their median CD4 count was 45 cells/mm³ compared to 84 cells/mm³ in women ($p < 0.001$) (Table 5). In contrast, the most recent median CD4 count did not significantly differ by gender, suggesting comparable efficacy of treatment. Finally, the more advanced disease stage in men was also reflected in the patients' health status perception at time of treatment initiation, which was significantly poorer in men compared to women ($p = 0.038$) (Table 6).

Discussion

Our results show a higher proportion of women receiving antiretroviral treatments compared to men. While over-representation of women has been reported in sub-Saharan Africa, where there are generally higher proportions of women in need of treatment than men (UNAIDS, 2006), it is surprising for Thailand where there is a higher proportion of HIV infected men (UNAIDS & WHO, 2008). Our findings are consistent with two reports on adults on antiretroviral treatment in Thailand, (Braitstein et al., 2008; Leusaree et al., 2002), however a selection bias towards women is possible in these studies partially linked with PMTCT-Plus programs.

A key strength of our study was that adults were treated in a community hospital setting providing standard of care and that we were exhaustive in reaching all patients. The percentage of non-respondents was low (about 10%) and when recalculating the sex-

Table 5

Comparison by gender, of the age at ARV initiation, delay between HIV diagnosis and ARV initiation, and patient's immune status before and after ARV initiation.

	All respondents		Men		Women		p Value
	N = 513		N = 241		N = 272		
Age at ARV initiation (in years)	%		%		%		
15–29	17.1		15.4		18.8		0.686
30–34	23.6		22.8		24.3		
35–39	22.8		23.6		22.1		
≥40	36.5		38.2		34.9		
Year at ARV treatment initiation							
<2002	9.8		9.4		9.9		0.028
2002–2003	27.0		21.6		32.0		
2004–2005	40.2		46.2		34.9		
2006–2007	23.0		22.8		23.2		
Delay between HIV diagnosis and ARV initiation^a							
< 1 year	42.9		53.9		33.1		<0.001
1 year	12.1		11.6		12.4		
2 to 4 years	16.6		11.2		21.3		
5 to 7 years	14.4		9.5		18.8		
≥ 8 years	14.0		13.7		14.3		
Duration of the ARV treatment							
Less than 2 years	23.0		22.8		23.2		0.018
2 to 4 years	40.2		46.1		34.9		
≥ 5 years	36.8		31.1		41.9		
Patient's immune status							
CD4 <50 cells/mm ³ before ARV initiation ^b	45.6		55.3		37.6		0.001
CD4 ≥ 200 cells/mm ³ after ARV treatment ^c	82.6		75.7		88.3		<0.001
	Mean	Range	Mean	Range	Mean	Range	p Value
Age at ARV initiation (years)	37.2	18–66	37.4	20–66	37.0	18–62	0.666
Delay between HIV diagnosis and ARV initiation (years)	2.6	0–14	2.3	0–14	2.9	0–13	0.017
Duration of the ARV treatment (years)	3.1	0–13	2.9	0–13	3.2	0–13	0.051
CD4 before ARV initiation (cells/mm ³)	60.0	0–508	45.0	0–508	84.0	0–417	<0.001
CD4 after ARV treatment (cells/mm ³)	352.0	6–1343	304.0	6–1338	399.5	6–1343	0.314

^a Total respondents N = 509; N = 238 men; N = 272 women.^b Total respondents N = 480; N = 219 men; N = 261 women.^c Total respondents N = 482; N = 226 men; N = 256 women.

ratio taking into account the gender of non-respondents, the gender balance remains unchanged (52% women). One limitation may be that, for confidentiality reasons, some patients chose to be treated in hospitals outside of their residence area or in private hospitals and therefore were not included in this study. Under both circumstances, patients would no longer receive free care and would have to pay for the cost of the treatments by themselves, options not readily available for a population whose income is generally low, although men's incomes are slightly higher than women's. This is because the cost of the cheapest antiretroviral treatment is 1200 baht (US\$30) per month, not including the cost of out-patient visits and monitoring. However, our study population is likely to be representative of adults receiving antiretroviral therapy in public hospitals in semi-rural Northern Thailand. There are regional variations in the HIV epidemic trends (UNAIDS & WHO, 2008), therefore one should be cautious in extrapolating the results on gender balance to the rest of the country. A study on a random sample of hospitals throughout the country would be ideal, but problems of cost and logistics would have to be resolved.

Many factors at the population and individual level may explain the gender distribution observed in our study. At the population level, one should consider the evolving dynamics of the HIV epidemic, the initial prioritization of mothers for treatment and earlier access to HIV testing for women. These issues are entangled with gender differences at the individual level in the reasons and timing to HIV testing.

Firstly, as explained in the introduction, women were late comers in the epidemic: the HIV epidemic wave among women in the general population started a few years after the epidemic wave among men and was of a lower magnitude. Therefore the mortality peak occurred earlier and reached a higher level among men

(Surasiengsunk et al., 1998). This was confirmed in our study by the higher proportion of women (64%) who experienced a spouse death, mostly assumed to be AIDS-related, compared with men (22%). Due to this time lag, it is possible that, in the course of the epidemic, we stand precisely at a time when there is a diminishing gap between the number of surviving men and women in need of treatment, particularly in northern Thailand, which was the first region affected by the HIV epidemic and the most hard hit (Surasiengsunk et al., 1998). In the absence of reliable data on the HIV prevalence by age and gender in the general population for the Chiang Mai region, it is difficult to assess the extent to which men are underrepresented in our population on antiretroviral treatment. However, as there are

Table 6

Comparison by gender, of the health status perception before and after ARV treatment.

	All respondents		Men		Women		p Value
	N = 513		N = 241		N = 272		
	%		%		%		
Health status perception before ARV initiation							
Very poor	27.7		33.2		22.8		0.038
Poor	28.4		29.1		27.9		
Fair	23.0		20.3		25.4		
Good	12.3		9.1		15.1		
Very good	8.6		8.3		8.8		
Health status perception after ARV treatment (current)							
Very poor	0.5		0.4		0.7		0.784
Poor	5.4		6.6		4.4		
Fair	27.7		26.6		28.7		
Good	45.4		44.8		46.0		
Very good	20.8		21.6		20.2		

still more men than women living with HIV in Thailand, this epidemiologic factor does not fully explain the gender balance of patients on antiretroviral treatment.

Secondly, the initial prioritization of HIV infected mothers for antiretroviral treatment may partly explain the lower proportion of men in the care system. Indeed, at a time when antiretroviral treatments were limited, the Access to Care program, first prioritized mothers, then women mostly seen as victims of the epidemic, and lastly men who were perceived as those who brought HIV into the family/community. This is confirmed by our data showing that before 2003, when access to antiretrovirals was severely limited, patients who received therapy were mostly women.

A third factor may be the earlier HIV diagnosis and treatment initiation in the course of the disease observed in women compared to men. Indeed, symptomatic patients represent only the tip of the iceberg, i.e., 10–20% of the HIV infected population. Asymptomatic patients are more numerous and generally unaware of their HIV status. Therefore, earlier diagnosis and treatment initiation contributes towards a higher proportion of women on antiretrovirals.

One key strength in our study methodology, retracing the life histories of the patients, is the ability to assess gender differences in access to treatment but also to disentangle their relationships to access to HIV testing at the individual level.

Men and women underwent HIV testing in very different circumstances. The large majority of women in this study had been married and had children while men were more likely to never had a spouse and children. This key difference in family situation may partly explain the gender differences in HIV test-seeking behavior. As part of their family responsibilities, as in most countries, women have more contact with the health care system, where HIV testing is more likely to be suggested to them (Mane & Aggleton, 2001). For example, over one-third of women were tested for HIV while caring or grieving for a spouse or child, and interestingly, more women (47.4%) whose spouse had passed away reported that they were tested because of their spouse's death compared to men (36.1%) in the same circumstances. Women are often under significant social and family pressure to be tested following a suspected AIDS-related spousal death, particularly in semi-rural villages, hit hard by the epidemic, as they are assumed to be HIV infected unless proven otherwise.

During their life-course, women also have access to HIV testing during pregnancy and uptake for testing at this point is very high in Thailand (Amornwichee et al., 2002). This was the reason for HIV testing in 17% of women in this study, enabling them to be identified and followed up prior to onset of AIDS-related disease. The strong incentive to accept the routine HIV testing during pregnancy to preserve the child's health—at a time when PMTCT is widely available—may help overcome women's own fear of being tested. The PMTCT-Plus strategy attempts to extend this incentive from “motherhood” onto “parenthood”, aiming at protecting the welfare of the family as a whole and targeting future fathers for HIV testing. However, our data show that although a non-negligible proportion of men (7%) underwent HIV testing during their spouse's pregnancy, the majority of men had no children and a significant proportion had never had a spouse, and therefore would be excluded from such targeted interventions.

In contrast, two-thirds of men underwent HIV testing due to their own health problems, often when symptomatic. A small proportion of men (4%) were tested under institutional circumstances – job or loan application, to become a member of an association, or at military service. These policies, discriminatory in essence, and where confidentiality is not systematically protected, generate fear of testing in the population and do not improve people's access to treatment as there is no referral to health care services for follow-up.

To ensure equal access to HIV care, interventions to improve access to and uptake of voluntary HIV testing should be promoted.

Indeed, contrary to women who are offered testing while already *inside* the medical setting, somehow captive of it, for men, testing requires a more personal motivation. Interestingly, our data indicate the percentage of patients diagnosed through voluntary testing to be similar among men and women, when ideally a larger proportion of men should be tested in this setting due to lack of alternative systematic channels.

Finally, other barriers to HIV testing and care such as low risk perception of disease prognosis, poor access to medical care, lack of social support, and actual or anticipated HIV/AIDS-related stigma have been mentioned (Krawczyk et al., 2006; Mane & Aggleton, 2001; Muula et al., 2007). For example, Muula and colleagues (Muula et al., 2007) argue that in sub-Saharan countries, women are less stigmatized when seeking HIV testing as it is widely perceived that women acquired HIV from a spouse, while men are perceived to have acquired the infection outside of marriage. In addition, HIV test-seeking behavior was perceived as an expression of weakness in some settings where male strength was expected (Greig & Lang, 2000). Further barriers may include denial of the risk of HIV infection or fear of confidentiality breach. While such obstacles probably apply in Thailand, qualitative research is needed to further assess their level of influence on access to HIV testing and care and how they may be overcome.

In our study, women appear to have a double advantage in both diagnosis and treatment. However, if men had been diagnosed and treated earlier, HIV transmission to their spouse may have been avoided and their spouse may not have been widowed. In terms of policy implications, there is an urgent need for a concerted effort to promote voluntary HIV counselling and testing both inside and outside of the family setting, with interventions specifically targeted for men. Both women and men stand to benefit from lessening of gender stereotypes and their attached stigma, as it would ensure better equity in the access to antiretroviral treatments.

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