Sterilization in HIV infected women in Thailand.

Camille Lallemant[1], Sophie Le Coeur[2], Nelly Briand[2], Marc Lallemant[3].

1. London School of Hygiene and Tropical Medicine
2. Institut National d'Etudes Démographiques
3. Institut de recherche pour le Développement

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Introduction

Over the past 20 years, the population of Thailand experienced a rapid demographic transition, with one of the most rapid fertility decline in the world (Knodel et al., 1987, Hirschman et al. 1994). According to the United Nations estimates in 2000-2005, the total fertility rate is 1.9 (World Population 2002, United Nations). The prevalence of contraceptive use is very high, with overall 75.2% of the currently married women aged 15-44 years using any method of contraception (Thailand, Report on Population Characteristics 1995-1996). Among these contraceptive methods, female sterilization is the second most prevalent, with 23.8% of currently married women being sterilized, and oral contraception being the most common contraceptive method, used by 28.4% of the women.

Thailand was the first Asian country affected by the HIV epidemic, and it is estimated that approximately one million of its 60 million inhabitants have been infected with HIV (World Bank Report, 2000). The HIV prevalence in pregnant women was estimated at 1.4% at the national level in 2003 (Ministry of Public Health, 2004). Since 1999, a very successful program for the prevention of mother-to-child HIV transmission using Zidovudine (AZT) has been implemented nationwide, reducing the risk of transmission from 35% to less than 10% (Le Coeur S, et al. 2003, Kanshana S, et al, 2002).

While the prevention of mother-to-child transmission of HIV is one mean of reducing the number of AIDS cases in children, family planning among HIV-infected women can be considered as another strategy. HIV-infected women, especially after delivery, may be strongly advised not to have any more children, and among the various contraceptive options proposed to women, sterilization may be offered as the optimal choice.

Although several surveys have been conducted among Thai women regarding their contraceptive choices (Thailand, Report on Population Characteristics 1995-1996, Report of the 996 survey of fertility in Thailand), none have taken into account their HIV status. In this study, we were able to assess the prevalence of sterilization in a population of *postpartum* HIV-infected women, and explore its possible determinants.

Methods

Data were collected within the Perinatal HIV Prevention Trial-2 (PHPT-2), a clinical trial evaluating the efficacy of nevirapine in addition to ZDV for the prevention of mother to child transmission (Lallemant M. et al., 2003).

During pregnancy, women were interviewed about their socio-demographic characteristics, including date of birth, education level, occupation, marital status, previous unions and their outcome. Their reproductive history was also recorded with, for each pregnancy, the year of occurrence, the outcome and the vital status of the child at the time of the interview. Women were also asked about some socio-demographic characteristics of their partner such as their age, education level and occupation. Some information about the current pregnancy were recorded such as whether the current pregnancy was planned and also the mode of delivery –vaginal versus caesarean section—. Women were asked whether or not they knew their HIV status prior to the current pregnancy and if they were aware of their partners' HIV status. In addition, baseline biological characteristics such as the CD4 count, HIV viral load and CDC stage were recorded. Finally, 6 weeks after delivery, *post-partum* women were asked about their desire for additional children and their current contraceptive use.

The association between sterilization and all the above-mentioned variables was first studied in a univariate analysis. To compare percentage by categories, a logistic regression was performed. Odds ratios (OR) with 95% CI were used to show comparison between groups. P-values less than 5% were considered statistically significant.

In order to assess the role of key variables independently of the others and therefore to control for possible confounding factors, a multivariate logistic regression model was performed. All variables significantly associated with sterilisation (p-value less than 20%) in the univariate analysis were considered for possible entry into the model. The analysis was performed using SAS statistical software (version 8; SAS Institute Inc., Cary, NC, USA).

Results

From January 2001 to March 2003, 2028 HIV-infected pregnant women were identified in 37 hospital sites all over Thailand. Among these women, contraceptive choices at 6 weeks *post-partum* were known for 1764 women. The 264 women for whom contraception data were not available had either declined participation in the trial, were lost to follow-up before delivery, or did not attend their 6 week post-partum visit (foetal loss, neonatal death, or lost to follow-up after delivery).

The study population was composed of young women, median age 26 years (Inter quartile range, 23-30). Only 26% of the women had an education level higher than secondary school. Most of the women (95%) were married or cohabitating with their partner and over half had been previously married. Over 62% had at least one previous pregnancy, 57% had at least one living child and 24% had experienced a foetal loss. Only 16% of the women in our study population knew their HIV status before their current pregnancy. Finally, the majority of women were at an early stage of HIV infection with only 18% having a CD4 count below 200 cells/mm^3 and 48% having a viral load greater than 10,000 cells/ml.

Overall, 92% of women in our study population said that they were using a contraceptive method, and the overall prevalence of sterilization 6 weeks after delivery was 55.6% (981/1764).

Table 1 presents the results of the univariate analysis. The socio-demographic variables associated with sterilisation were the maternal age, marital status, and region of residence. Among the variables exploring the obstetrical history, previous pregnancy, number of live-births and living children, and history of child death, were all positively associated with sterilisation. Women who knew their HIV status prior to the current pregnancy were more likely to be sterilized as well as women who delivered by caesarean section. Among the characteristics related to HIV disease, an advanced maternal CDC stage and a low CD4 count were associated with sterilisation. Finally, women who said that they intended to become pregnant 6 weeks after delivery were less likely to be sterilized. None of the characteristics of the partner were associated with sterilization.

Table 2, provides the results of the multivariate analysis. The variables independently associated with sterilization were: the region of residence ($p<0.001$), the marital status ($p<0.001$), having at least one live birth ($p<0.001$), one living child ($p=0.017$), knowing the HIV status prior to the pregnancy ($p=0.004$), having delivered by caesarean section ($p=<0.001$) and the intent to become pregnant in the future (0.041).

Discussion

The overall prevalence of sterilisation in our study population, 55.6%, was very high in a population of young women (median age, 26 years). Furthermore, this rate was underestimated since it was obtained very soon after delivery (at the 6 weeks *post-partum* visit), and is likely to increase over time when women will get more exposed to pregnancy. This rate was, nevertheless lower than in a study by Paisarntantiwong et al (1995), which took place between 1988 and 1994, in a hospital in Bangkok. In this study, 74% of HIV infected women having given birth or terminated their pregnancy, had a tubal ligation. At this time no method to prevent HIV perinatal transmission was available, and most HIV pregnant women were choosing to terminate their pregnancy after learning their HIV status.

Still, in our study, the prevalence was higher than the overall 23.8% sterilization rate observed in the general population of 15-44 years old currently married women, and considerably higher than in the 25-29 years age group, which is 14.7%. Finally, this prevalence was also much higher than the 28.0% sterilization rate observed in the general population of currently married women with at least one child, a group more comparable with our study population (Thailand, Report on Population Characteristics 1995-1996).

Our results can be compared with a study looking at the impact of knowledge of HIV serostatus on contraceptive choice and repeat pregnancy, by Lindsay et al (1995), reporting that seropositive women were almost three times as likely to undergo tubal ligation as seronegative women.

Overall, 92% of women in our study population were using a contraceptive method, a rate much higher than the 75% in the general population of currently married women. It is possible that the contraceptive utilisation rate is higher during the *post-partum* period, shortly after systematic family planning counselling, at a time when another pregnancy is not envisioned.

In the multivariate analysis, age was not significantly associated with sterilisation, suggesting that other factors such as the reproductive history had a greater impact on the decision of women to undergo sterilization.

The fact that single, divorced or widowed mothers were less likely to be sterilized may be explained by the fact that these women were probably hoping to engage in another relationship in which childbearing should remain an option.

The heterogeneity between regions needs further analysis. It may be related to the background HIV prevalence in the regions. Indeed, it is in the North that the HIV seroprevalence and the percentage of sterilization are the highest. It is possible that the counselling provided by the medical staff in the regions where HIV prevalence is highest was more persuasive towards sterilization. The role of family, partner and other care-givers may have a great influence on a women's reproductive decision-making and should be assessed further.

As expected, in the absence of a live-birth or a living child, women were less likely to undergo a tubal ligation. This is well illustrated by the increase in sterilization rate with parity in our population of HIV-infected women, which parallels what is observed in the general population of Thai women. Figure 1, compares the prevalence of sterilisation in the women enrolled in our study (PHPT-2) with the prevalence in the general population of currently married women, according to their number of living children. Clearly the prevalence of sterilization in our study population follows the same trend as in the general population, but it is much higher in HIV positive women. Similarly, a study in Mexico looking at factors associated with the acceptance of tubal ligation after childbirth among HIV-infected patients shows that a prior childbirth was the most important predictor of tubal ligation acceptance (Figueron-Damian R, 2001).

The fact that women who became pregnant while knowing their HIV status were more likely to undergo a tubal ligation would suggest that their desire for a child was strong enough to overcome the fear of HIV transmission but that, after participating in a prevention program during their pregnancy, they were not willing to take a second chance.

Women who delivered through caesarean section were much more likely to undergo a tubal ligation. Indeed, tubal ligation procedure is very easy to perform during the surgical procedure for caesarean section and additional counselling for sterilization is usually provided before the surgery is performed.

Finally, as expected, women who said that they intended to have an additional child were less likely to be sterilized. Surprisingly, among the few women (n=30) who wanted another child, still 11 were sterilized (37%). It is possible that they did not receive appropriate counselling, or that they did not understand the definitive nature of tubal ligation or did not understand the question about "intent to have an other child" properly.

In a study in the United States, Bedimo et al. (1998) looked at the reproductive choices among HIV-positive women and found that a higher CD4 count and having one or more children were positively associated with tubal ligation subsequent to HIV diagnosis, while

living with a family member was negatively associated. They also found that healthier women were more likely to undergo tubal ligation than less healthy women. In our study, although the CDC stage and CD4 count were associated in the same way with sterilisation in the univariate analysis, the association did not remain significant in the multivariate analysis.

In the Thai context of high contraceptive use, sterilisation may appear, for the care-givers, as a method of choice for both family planning and reduction of HIV perinatal transmission. However, in a culture where there is a one way interaction between care-providers and clients and where patient's refusal may not be appropriate, the "voluntary" nature of the consent should be questioned. Several studies have expressed their concern on the role of the health professionals on the patients' decision to adopt a permanent method of contraception (Figueron-Damian R. et al., 2001; Bedino A. et al., 1998). The differences in prevalence according to region may also be a reflection of health professional's influence as well as hospital policy, and should be explored further.

With the increased availability of antiretroviral treatments both for the prevention of mother to child transmission of HIV and for the treatment of immunocompromized mothers, sterilisation as a contraceptive method for young HIV-positive women may not be the method of choice. Because of their vulnerability, specific attention should be given to HIV-infected women to ensure their knowledge and understanding of the implications of sterilization and the availability of other contraceptive methods, as well as the access to antiretroviral treatments.

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Table 1. Sterilization prevalence according to site, women's characteristics and women's current partner's socio-demographic characteristics.

Characteristics	# sterilised/Total	%	P value	Odds ratio (95% CI)
Women's socio-demographic characteristics				
Age (in years)				
<25	328/671	48.88	<0.0001	1
25-34	563/955	58.95		1.50 (1.23-1.83)
>35	91/142	64.08		1.87 (1.28-2.71)
Age difference between women and partner (in years)				
Wife older	293/519	56.45	0.5226	0.98 (0.78-1.26)
Husband 0-4 older	285/502	56.77		1
Husband >5 years older	375/696	53.88		0.89 (0.71;1.11)
Marital status				
Living together or married	935/1661	56.29	0.0091	1
Single, Divorced or Widowed	33/80	41.25		0.55 (0.35;0.86)
Previous marriage				
No	364/676	53.85	0.2461	1
Yes	616/1087	56.67		1.12 (0.92-1.36)
Women's education level				
Lower than secondary	733/1311	55.91	0.6666	1
Higher than secondary	248/453	54.75		0.95 (0.77;0.18)
Site Region				
North	279/412	67.72	<0.0001	2.91 (2.21-3.84)
Northeast	129/248	52.02		1.51 (1.11-2.05)
Central	197/469	42.00		1
East, West and South	376/635)	59.21		2.01 (1.58-2.575)
Obstetrical History				
Previous pregnancies				
No	292/669	43.65	<0.0001	1
Yes	687/1092	62.91		2.19 (1.80-2.66)
Number of previous pregnancies per women				
0	292/669	43.65	<0.0001	1
1	433/702	61.68		2.08 (1.68-2.58)
≥2	254/390	65.13		2.41 (1.86-3.12)
Age at first pregnancy (in years)				
<15	35/60	58.33	0.2224	1.02 (0.60-1.74)
15-19	372/630	59.05		1
≥20	528/983	53.71		0.85 (0.70-1.035)
Delay between last and current pregnancy (in years) in women who had at least one pregnancy				
<5	290/451	64.30	0.5893	1
≥5	366/584	62.67		0.93 (0.72-1.20)
Number of live births				
0	398/883	45.07	<0.0001	1
≥1	572/867	65.97		2.36 (1.95-2.87)
Number of living children				
0	330/749	44.06	<0.0001	1
≥1	646/1003	64.41		3.00 (1.090-2.79)
Abortion				
No	765/1375	55.64	0.9454	1
Yes	214/386	55.44		0.99 (0.79-1.25)
Foetal Loss (abortions, still births, tubal pregnancies)				
No	744/1343	55.40	0.7680	1
Yes	235/418	56.22		1.03 (0.83-1.29)
Children deceased				
No	936/1705	54.90	0.0019	1
Yes	41/53	77.36		2.81 (1.47-5.38)

Characteristics	# sterilised/Total	%	P value	Odds ratio (95% CI)
Information on Current Pregnancy				
Planned pregnancy				
No	217/360	60.28	0.1726	1
Yes, but not at this time	126/222	56.76		0.90 (0.64-1.25)
Yes, at this time	633/1171	54.06		0.80 (0.631-1.02)
HIV status known				
No	780/1476	52.85	<0.0001	1
Yes	195/275	70.91		2.17 (1.64-2.88)
Mode of delivery				
Vaginal	668/1376	48.55	<0.0001	1
Caesarean	306/380	80.53		4.38 (3.33-5.77)
Health Status				
Mother's CDC stage				
Stage A	926/1677	55.22	0.0126	1
Stages B and C	45/63	71.43		2.03 (1.16-3.53)
CD4 Absolute (cells per ml)				
<200	195/322	60.56	0.0453	1.29 (1.00-1.65)
≥200	787/1446	54.43		1
Viral Load (cells per ml)				
<10,000	507/923	54.93	0.5876	1
≥10,000	475/845	56.21		1.05 (0.87-1.27)
Information on contraception and desire for more children at 6 weeks post-partum				
Intend to have an other pregnancy 6 weeks Post-Partum				
No	901/1596	56.45	0.0349	1
Yes	11/30	36.67		0.45 (0.21-0.95)
Socio-demographic data on infant's father				
Father's age (in years)				
<25	156/299	52.17	0.1310	1
25-34	556/1017	54.67		1.06 (0.83-1.36)
>35	241/403	59.80		1.31 (0.98-1.75)
Father's education level				
Lower than secondary	655/1165	56.22	0.5141	1
Higher than secondary	316/579	54.58		0.94 (0.77-1.14)
Father's HIV status				
Negative	135/256	52.73	0.1968	1
Positive	200/335	59.70		1.32 (0.96-1.81)
Don't know	631/1148	54.97		1.08 (0.84-1.40)

Table 2. Multivariate analysis of women's socio-demographic characteristics, region, obstetrical history and health status for sterilization.

Characteristics	Odds ratio	P>|z|	[95% Conf. Interval]	
Women's socio-demographic characteristics				
Marital Status (living together or married vs single, divorced, widowed)	0.362	<0.001	0.200	0.655
Region		<0.001		
Central	1			
North	3.112		2.246	4.312
Northeast	1.506		1.052	2.156
East, West and South	2.248		1.690	2.989
Obstetrical History				
Previous pregnancy (no vs. yes)	0.632	0.1265	0.351	1.138
Live births (no vs. yes)	2.182	<0.001	1.488	3.198
Living children (no v. yes)	2.094	0.0174	1.139	3.852
Information on Current Pregnancy				
Knowledge of HIV status (no vs. yes)	1.617	0.004	1.170	2.234
Mode of delivery (vaginal vs. caesarean)	5.055	<0.001	3.698	6.910
Information on contraception and desire for more children at 6 weeks post-partum				
Intend to have an other pregnancy 6 weeks Post-Partum (no vs. yes)	0.413	0.041	0.177	0.964

Figure 1. Percentage of sterilization in our study compared to the general population of ever-married women according to the number of living children.