

Original research article

# Pregnancy among sex workers participating in a condom intervention trial highlights the need for dual protection

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## Abstract

**Background:** Little is known about pregnancy rates among sex workers (SWs) or the factors that predispose SWs to this risk. We aimed to estimate the pregnancy incidence rate among Madagascar SWs participating in an intervention trial promoting use of male and female condoms and assess the influence of various predictive factors on pregnancy risk.

**Methods:** SWs from two study clinics in Madagascar participated in a randomized trial to assess the effect of peer education and clinic-based counseling on use of male and female condoms and prevalence of sexually transmitted infections (STIs). Women were seen every 2 months for up to 18 months; they received structured interviews at every visit, and physical exams at baseline and every 6 months thereafter. Site staff recorded information on pregnancies during interviews; pregnancy data were then merged with trial data for this analysis.

**Results:** Of 935 SWs in the analysis population, 250 became pregnant during follow-up. The cumulative probability of pregnancy was 0.149 at 6 months and 0.227 at 12 months. Comparable proportions of nonpregnant and pregnant SWs reported using highly effective contraception at baseline (~16%); these users were younger and were more consistent condom users. Method switching and discontinuation were frequent. In multivariate analysis, nonuse of effective contraceptives and any self-reported unprotected sex were associated with higher incidence of pregnancy. Approximately 51% of women delivered, 13% reported a spontaneous abortion, 13% reported an induced abortion and 23% had missing pregnancy outcomes.

**Conclusions:** Women traditionally targeted for STI/HIV preventive interventions need more comprehensive reproductive health services. In particular, SWs could benefit from targeted family planning counseling and services.

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**Keywords:** Pregnancy rate; Sex workers; Contraception; Dual protection; Cohort study; Poisson regression

## 1. Introduction

Public health interventions commonly target female sex workers (SWs) for disease prevention, largely ignoring their broader reproductive health needs. Most public health research involving SWs focuses on risk factors for HIV and other sexually transmitted infections (STIs). Inadequate attention has been dedicated to preventive behaviors and health outcomes associated with the other direct risk of sexual activity: pregnancy [1]. Addressing SWs' dual needs

for contraception as well as STI/HIV prevention is essential given their high risk of pregnancy stemming from frequent sex with multiple partners. Comprehensive prevention services could help reduce the risk of adverse outcomes associated with unintended pregnancy, ranging from the dangers of unsafe abortion to poor birth outcomes caused by compromised maternal health status. Furthermore, in SW populations with high HIV prevalence, provision of contraceptives to SWs not desiring pregnancy is a means of preventing vertical HIV transmission by reducing the risk of unplanned pregnancy in HIV-infected women [2].

The few studies that have reported on pregnancy among SWs have shown high incidence of undesired pregnancy. In

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a survey conducted with 475 SWs in Kenya, for example, 86% of the respondents admitted to having at least one lifetime abortion, and 50% reported more than one [3]. Qualitative research conducted with Cambodian SWs found that current use of contraceptives (besides condoms) was rare and abortion was widely practiced [4].

Here we report on secondary data collected during a trial conducted with Madagascar SWs to measure the effect of male and female condoms on STI outcomes. We also recorded data on contraceptive use and pregnancy occurrence and outcomes during 18 months of follow-up. This paper presents the results of analyses of pregnancy incidence and the influence of various predictive factors on pregnancy risk and presents the pregnancy outcomes among these women.

## 2. Methods

### 2.1. Outline of randomized controlled trial

Female SWs in two cities in Madagascar (Antananarivo and Tamatave) were enrolled in a randomized controlled trial (RCT) to measure the effect of peer education only vs. peer education plus clinic-based counseling on protected sex and STIs [5,6]. Participants were seen every 2 months for up to 18 months, at which time they received structured interviews. They underwent physical exams at baseline and every 6 months thereafter. At each study visit and through ad hoc contact in the community, participants were counseled by peer educators on the importance of consistent condom use for the prevention of both STI and pregnancy. The study protocol was approved by the ethical committees of the Laboratoire National de Référence VIH/SIDA in Madagascar and Family Health International in North Carolina.

### 2.2. Pregnancy outcome

Pregnancy was not a predetermined study outcome and was not part of routine visit procedures. Pregnancy tests were done if:

- a participant reported spontaneously that she was pregnant or experienced pregnancy symptoms such as nausea or vomiting;
- the physician suspected pregnancy at clinical exam;
- the date of last menses suggested possible pregnancy.

Site staff recorded the following information on pregnant women in monthly monitoring reports:

1. Participant identification number.
2. Date of last menstrual period (LMP).
3. Date for the visit that was closest to the estimated date of conception.
4. Whether the pregnancy was planned or unplanned.<sup>1</sup>

5. Pregnancy outcome.

6. Date of outcome.

No medical records were available. Pregnancy outcomes were ascertained during subsequent study visits by the participants, via home visits by the peer educators or through reports of friends. We estimated missing or incomplete date information (LMP, conception, outcome) from preceding nonpregnant dates. Pregnancy data were entered and merged with the behavioral and laboratory data collected in the main RCT.

The outcome was limited to the first detected pregnancy that occurred during the study period. Women who withdrew or were lost to follow-up prior to the detection of pregnancy and women who completed the study with no pregnancy detected were considered censored observations. We calculated total exposure time as the number of days from study enrollment up to the time the woman was found to be pregnant or censored.

### 2.3. Analysis population

We excluded women from the pregnancy analysis population if they were sterilized; older than 49 years old at enrollment; pregnant at enrollment; or not followed up after the baseline visit.

Table 1  
Characteristics of study participants in RCT cohort by inclusion status in the pregnancy analysis

Characteristics: risk and protective factors	Included in pregnancy analysis (n=935)		Excluded from pregnancy analysis (n=65)	
	No.	%	No.	%
<i>Baseline (% of women)</i>				
Younger age (<30)	554	(59.3)	47	(72.3)
Use of highly effective contraception	152	(16.3)	8	(12.3)
Married, cohabiting, steady boyfriend	368	(39.4)	22	(33.8)
No unprotected sex with paying clients	198	(21.2)	11	(16.9)
No unprotected sex with nonpaying partners <sup>a</sup>	583	(62.4)	38	(58.5)
No unprotected sex with any partners	123	(13.2)	8	(12.3)
<i>Study site</i>				
Tamatave	474	(50.7)	26	(40.0)
Antananarivo	461	(49.3)	39	(60.0)
<i>Randomized assignment</i>				
Peer education only	471	(50.4)	29	(44.6)
Peer education+clinic	464	(49.6)	36	(55.4)
<i>Time varying (% of visits)</i>				
Use of highly effective contraception	1283	(15.0)	47	(12.0)
Married, cohabiting, steady boyfriend	4844	(56.6)	225	(57.5)
No unprotected sex with paying clients	4791	(56.0)	212	(54.2)
No unprotected sex with nonpaying partners <sup>a</sup>	5271	(61.6)	204	(52.2)
No unprotected sex with any partners	3079	(36.0)	119	(30.4)
Female condom phase of RCT	2523	(29.5)	108	(27.6)
Later phase: Phase 3 of RCT	2393	(28.0)	105	(26.9)

<sup>a</sup> Includes women with no nonpaying partner or with no reported act in the interval.

<sup>1</sup> A single question was asked of the participant.

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