A RETROSPECTIVE STUDY OF QUINACRINE STERILIZATION IN VIETNAM

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

A RETROSPECTIVE STUDY OF QUINACRINE STERILIZATION IN VIETNAM

INTRODUCTION

Quinacrine has been used on a limited basis as a method of nonsurgical female sterilization since the 1970s. In a number of developing countries quinacrine represents an effective, simple and inexpensive way to provide sterilization services to large segments of the population.

Quinacrine has been used in 13 countries by an estimated 80,000 women (Contraceptive Technology Update, 1994). In the 1970s and 1980s, clinical trials with quinacrine were conducted in several countries including Chile (Zipper et al., 1980), Egypt (El Kady et al., 1993), India (Bhatt & Waszak, 1985), Pakistan (Bashir, 1993), Malaysia (Arshat et al., 1987) and Indonesia (Agoestina & Kusuma, 1992). In 1989, the Ministry of Health in Vietnam conducted two preliminary clinical trials of quinacrine on 200 women in two provinces. With promising results in these two sites, quinacrine services were expanded to include 24 provinces, though only those providers who agreed to client follow-up to monitor method failure and complications were allowed to participate in this introduction. By the end of 1992 nearly 32,000 Vietnamese women had undergone a quinacrine sterilization. A paper describing the clinical experience of these women was published in ***The Lancet*** in 1993 (Hieu et al., 1993).

Most previous research on quinacrine users has involved relatively small data sets and has focused on issues of safety and efficacy. No published studies have described the acceptability of quinacrine to women or their satisfaction with the method and service delivery. The large number of participants in the Vietnam program presented an opportunity to gather information from a sizeable number of users and to fully examine women's perspectives on the method. With funding provided by the U.S.-based Buffett Foundation, Family Health International conducted a retrospective survey of quinacrine users in conjunction with the Vietnamese Ministry of Health.

Family Planning in Vietnam

The results of the 1988 National Demographic and Health Survey (DHS) suggested that Vietnamese women's contraceptive needs were not being met. At that time, nearly 60% of the women of reproductive age indicated that they did not want any more children. There are no published statistics on the numbers of women who do not want children and who are not using contraception. However, in the DHS report it was estimated that for the five years preceding the survey the total wanted fertility rate for women between the ages of 15 and 44 was 2.5 children while the actual total fertility rate of this group was 4.5 (National Committee for Population and Family Planning (NCPFP), 1990).

Contraceptive prevalence in 1988 was estimated at 53% (39% modem methods), and the IUD was found to be the method most commonly used and most widely available. However, reports suggest that there is dissatisfaction with the IUD and that failure rates are high (Allman et al., 1991). In addition, other reports indicate a reluctance on the part of providers to distribute pills because of a lack of confidence in women's ability to take them properly and a preference

for IUDs (UNFPA, 1993). Almost 45% of contraceptive users were supplied at the commune health centers and 37% at a district hospital. WhileIUDs are usually inserted at the commune health centers, pills and condoms are generally not available at the commune level and must be obtained from the district hospital (NCPFP, 1990) making access to resupply of these methods more difficult than for the IUD. Abortions and menstrual regulations(MRs) are very common, and apparently many women perceive pregnancy termination as a means of fertility control (Hieu et al., 1994). The government however, does not recognize abortion and MR as methods of family planning, but rather as a means of addressing method failures.

At the time the quinacrine trials were initiated in Vietnam, quinacrine sterilization was viewed as a possible way to fill the gap in demand for permanent contraceptive services. According to the quinacrine program's administrator, the demandfrom women themselves for this permanent method of contraception motivated a number of providers to request training and supplies so that the method could be introduced within their own district's family planning programs. Unfortunately, the demand outweighed the resources available; officials acknowledge that the training for insertors was done in an informal way and often was inadequate. Furthermore, supervision of insertors was minimal.

Policy required that women who received quinacrine were to be at least 30 years old and have at least two children; the youngest of these should have been at least three years old (though a third child could be younger than three years) prior to insertion. Variations in this policy allowed younger women with a greater number of children to be eligible for quinacrine sterilization. There were no incentives for quinacrine sterilization from the central level of the Ministry of Health, but a number of officials at the district and commune level did provide women undergoing quinacrine sterilization with food or money. This was viewed by officials as a means of compensating time or lost wages rather than as incentives. This kind of compensation was not limited to quinacrine sterilization and was given for other methods as well, such as the IUD and surgical sterilization.

History of Quinacrine Sterilization[1]

The use of quinacrine as a method of nonsurgical sterilization was first proposed by Dr. Jaime Zipper in Chile (Zipper et al., 1968). Different methods of administration were tried, but the procedure most commonly used now involves the transcervical insertion of seven pellets of quinacrine into the uterus using a modified IUD inserter. The pellets dissolve within about 30 minutes. Most commonly, two insertions given one month apart are performed during the proliferative phase of the menstrual cycle (days five to 12). As the pellets dissolve they produce necrosis of the endometrial lining of the uterus and inflammation of the intramural portion of the fallopian tubes. Although the endometrium regenerates itself, the fallopian tubes are permanently fibrosed and closed in a high percentage of women.

In the 1970's, quinacrine suspensions or slurries were studied; however, these studies were discontinued due to concerns about toxicity, cases of serious central nervous system (CNS)

'For a more complete review of the history of quinacrine sterilization, see Sokal, et al., in press.

excitation and three deaths which were reported to the U.S. Food and Drug Administration (USFDA). There have been no reports of similar severe complications following the use of quinacrine pellets and, in fact, major complications from the use of quinacrine pellets are rare (Sokal et al., in press). In *The Lance?* paper on the clinical experience of over 30,000 women in Vietnam, eight cases of major complications were reported (Hieu et al., 1993). This is a rate of 0.03% or one in 4000 women. There were no cases of uterine perforation reported in Vietnam although three cases in other trials have been reported (Zipper et al., 1983; El Kady et al., 1993). No investigators have reported a case of acute CNS excitation with the use of quinacrine pellets, and no deaths have been reported immediately following quinacrine pellet insertions. However, following multiple (but not single) insertions of quinacrine pellets, abnormal endometrial lesions may occur (El Sahwi, 1992; Merchant et al., 1986). Also, occasional cases of uterine synechia (adhesions within the uterus), including one in Vietnam, and hematometra (an accumulation of blood in the uterus) have been reported (Zipper, 1987 & Hieu, 1993).

Although few major complications have been associated with quinacrine pellets, minor side effects or complaints have been documented in the various clinical trials. From 9 to 25% of women who have participated in various trials of this method have reported cramping or lower abdominal pain following the insertion, similar to that often experienced during an IUD insertion. Other transient complaints include backache, bleeding, headaches and dizziness. The leakage of quinacrine into the vagina causes vaginal pruritus (itching) in some women. Amenorrhea and irregular menstruation of several months' duration have been reported in 1 to 20% of women undergoing this procedure and may be more frequent in women who have had multiple insertions (Sokal, in press).

Currently available human data on the possible risk of cancer from the intrauterine use of quinacrine are not sufficient to draw any firm conclusions. A cluster of eight cancers of different types, including a uterine leiomyosarcoma, was detected during long-term follow-up of 572 women in Chile, but the results of a retrospective cohort study suggest that the cluster was probably a random occurrence, not causally related to quinacrine. This cohort is being followed up for at least an additional five years, through 1996 (Sokal et al., in press).

Despite the many trials that have been conducted, there is still no standard regimen for administering quinacrine, and studies have varied in terms of number of doses, insertion technique and the use of adjuvants (a supplemental drug given to increase effectiveness). In Vietnam, the standard protocol required two insertions, though at least one provider implemented a one-insertion protocol for older women. In some districts, treatment included the use of an intrauterine insertion of ampicillin as an adjuvant. The use of different adjuvants has been studied by Dr. Zipper, who found a low failure rate after three years (one pregnancy in 114 women), using a combination of quinacrine, betamethasone and copper sulfate (Zipper et al., 1993).

Because of the differences in these studies and the lack of controlled clinical trials, it is difficult to estimate the efficacy of quinacrine, although pregnancy rates are higher than those seen after surgical sterilization. Examples of pregnancy rates found in studies without the use of adjuvants include: 5% at one year after one insertion (Hieu et al., 1993), 3.7% at four years after three insertions (Bhatt & Waszak, 1985) and 8% at 10 years after three insertions (Mullick, manuscript in preparation). A recent study which used adjuvants and supplementary

contraception for the first few months after quinacrine insertion, however, found a pregnancy rate of 0.7% at 18 months following one insertion (Mullick, manuscript in preparation).

The available data suggest that the risk of ectopic pregnancies after quinacrine sterilization is less than among noncontraceptors. Data from women in Vietnam indicate that in the short term, the risk of ectopic pregnancy is similar to the risk in IUD users. More recent data from Chile show that ectopic pregnancies can occur up to 10 years after quinacrine sterilization (Sokal et al., manuscript in preparation).

The Quinacrine **Controversy**

The introduction of quinacrine in Vietnam on such a large scale has sparked a debate among the world's reproductive health providers, researchers, donors and women's health advocates. Quinacrine has been studied since the 1970s, and its short-term safety has been documented. In approximately 80,000 quinacrine sterilizations, no deaths have been reported immediately following quinacrine pellet insertion yet three to eight deaths would be expected based on the same number of surgical sterilizations in the developing world (Khairullah et al., 1992). This method is inexpensive and easy to administer, which means that health workers who are not physicians can be trained to perform the insertions. Overall, it has the potential to greatly increase access to sterilization services at a price (about US $1.00/insertion that is affordable to most family planning programs.

However, many fear that not enough is known about the safety and efficacy of the method. Quinacrine has not been approved by the USFDA for intrauterine use. Questions have been raised about toxicity and the possibility of a link to cancer. Furthermore, quinacrine has not been proven to be as effective at preventing pregnancy as surgical sterilization, and method failure has led to concerns about an increased risk of ectopic pregnancies. The possibility of coercion is an issue that has also been raised. In response to these concerns, the government of Vietnam suspended the quinacrine program in December 1993, pending additional information on the method. There were also concerns that women would worry about their quinacrine sterilizations when, as a result of the suspension and reports coming from international meetings on quinacrine, articles were published in Vietnamese newspapers and magazines, which claimed that quinacrine was unsafe and could cause cancer.

The Retrospective Study

The retrospective study described in this report was developed prior to the suspension of Vietnam's quinacrine program, but the results may answer some of the questions defining the controversy. The study was designed to evaluate the strengths and wealmesses of the quinacrine sterilization program from the users' perspectives, and thus, provides information about how the method has been experienced by the women themselves. Of primary interest are women's perspectives on how they made the decision to use the method, the method itself, the care received, the impact method use has made on their health and personal lives, and their satisfaction with quinacrine. In order to place the results of the survey of quinacrine users into the overall context of family planning in Vietnam, interviews were also conducted with a comparison group of IUD users. IUDs are the most widely used method of contraception in

Vietnam and would have been the most likely alternative used if quinacrine were not available. Surgical sterilization was relatively unavailable during the same time period; though it seems logical to compare quinacrine with another permanent method, not enough acceptors of surgical sterilization were available to permit comparison.

This study addresses many of the issues of interest to the medical community, such as side effects and complications, pregnancy, and informed consent as reported by users. When this study was being developed, it also had been hoped that some additional analyses could explore factors related to method failure using the logbook data on the original 30,000 women; unfortunately, the logbooks often lacked data on last menstrual period and previous contraceptive use, and this plan had to be changed.

Questions about toxicity, teratogenicity, potential carcinogenicity, and the best insertion technique for quinacrine sterilization are beyond the scope of this project, however, and cannot be answered in this report. These issues will only be resolved with further research, such as pre-clinical toxicology studies and additional well-controlled clinical trials (Phase I/II) to better assess the most effective regimen of quinacrine. Favorable results from the Phase I/II trials could be the basis for initiation of larger Phase III clinical studies (Sokal, personal correspondence 10/15/94).

METHODOLOGY

Objectives

The purpose of this study was to evaluate the quinacrine sterilization program from the users' perspectives. The specific objectives were to answer the following research questions, which were asked in the context of the family planning program in Vietnam at the time of the initiation of the quinacrine program:

1. What factors influenced acceptance of quinacrine sterilization?
2. What were women's experiences with quinacrine sterilization services?
3. What were women's experiences with the method itself in terms of side effects, complications and illness, method failure and its effects on their daily lives?
4. What were the levels of satisfaction and regret among quinacrine acceptors?

Study Design

The study was designed to retrospectively obtain information from women who had undergone the quinacrine sterilization procedure during its introduction in Vietnam from 1989 through 1993. A sample of IUD users was also interviewed to get comparative data on the outcomes of interest. The sample populations were drawn from three provinces: Nam Ha, Thai Binh and Hai Hung (Figure 1). These provinces are located near Hanoi and were selected because they were the first provinces in which quinacrine sterilization was provided and had the greatest numbers of quinacrine insertions from 1989 through 1993. The four districts in each of

these provinces with the greatest number of quinacrine acceptors were chosen for the study. The comparison sample of IUD users was drawn from the same 12 districts.

Selection of participants. The sampling frame was developed by using logbooks which recorded data on quinacrine insertions at all service delivery sites within the chosen districts. A database was created which included the logbook information on all 6535 quinacrine insertions in these districts between April 1989 and December 1993. A random sample of women to be interviewed was drawn from this database using a SAS program, which stratified the population according to province, district, and five-year age intervals. The probability of being selected was equal across strata.

The sample of IUD acceptors. in these districts was drawn from a sampling frame constructed using logbooks kept at the district hospitals. The logbooks listed women who had IUDs inserted at the hospital itself and at commune health facilities visited by mobile team personnel from the district hospitals. A total of 6446 IUD insertions, performed from January 1989 to December 1993 in the same 12 districts, comprised the sampling frame for randomly choosing IUD acceptors to be interviewed. The IUD sample was frequency matched to the quinacrine sample on the same three stratification variables in the quinacrine sample: province, district and age. As a result, these factors are not expected to be confounders in comparisons of characteristics at insertion, complications experienced, satisfaction or other variables between IUD and quinacrine acceptors.

Sample size. The sample size chosen for the quinacrine users was 1815. Assuming 25% non-response, a planned sample of 1800 subjects per group would yield sufficient power (greater than 80%) to detect a 5% difference in any dichotomous outcome variable. For outcomes that occur in less than 10% of the population, the sample size would allow sufficient power to detect absolute differences of 3% or less. A total of 1679 of 1815 quinacrine users selected and 1511 of 1685 IUDs users selected were interviewed. The IUD sample was smaller because some strata had fewer IUD users available in the sampling frame. The number responding in each group was greater than the number needed (1350 per group) to achieve the planned power.

The **Questionnaires**

Two questionnaires were developed for this study: one for the quinacrine acceptors and one for the IUD acceptors (Appendix A). The two questionnaires were similar, and both were designed to provide information on sociodemographic characteristics; contraceptive knowledge, attitudes and practices; the decision to accept a particular method; service delivery characteristics, such as care and counseling received; complications and side effects associated with the method, including pregnancies; other clinical and non-clinical outcomes associated with the method; and user satisfaction. In addition, for quinacrine acceptors, questions on regret were included. The questionnaires contained both pre-coded and open-ended questions.

The questionnaires were originally developed in English and were translated into Vietnamese by research staff at the Hanoi Medical College in Hanoi. Independent translators in the U.S. backtranslated the questionnaires to English. Questionnaires were pretested prior to and

during the interviewer training. Revisions after the backtranslations were made on the basis of these pretests.

Data Collection

Interviews for the quinacrine acceptors took place between March and April 1994 and for IUD acceptors between July and August 1994. The implementation of the survey was coordinated by the Hanoi Medical College. The study coordinator and interviewer supervisors were staff members at the College. They were responsible for managing logistics related to implementation as well as the verification of questionnaires. Personnel from the Maternal and Child Health/Family Planning Centers (MCH/FP) in each of the study provinces also facilitated the interviews and verified the addresses of the respondents.

Primary and secondary school teachers from each study district were recruited and trained to serve as interviewers. One supervisor was responsible for the interviewers in each district. Local teachers were chosen over health workers to reduce participants' reluctance to be critical about the method or the services they received and to increase their comfort during the interview.

Potential respondents were informed of their right not to participate in the study. Every respondent who agreed to participate signed an informed consent form, which explained her rights to terminate the interview at any time or to refuse to respond to any particular question she did not want to answer. Respondents were paid the equivalent of $1 .OO (US) to compensate for the time spent answering questions.

The interviewers were able to locate and interview 1679 women (93%) of the quinacrine sample and 15 11 women (90%) of the IUD sample. The reasons interviews were not conducted with the remainder of the samples are given in Appendix B. The data presented in Table 1 show that the groups of respondents for each method had similar geographic distributions. All quinacrine users who reported a pregnancy were reinterviewed by health workers from the provincial MCH/FP centers with a second questionnaire to verify the pregnancy and its outcome.

Data Processing **and** Analysis

Data were entered into a personal computer by the staff of the Hanoi Medical College and the Ministry of Health in Hanoi using the Epi Info data entry program (Dean et al., 1990). The Ministry of Health was responsible for coding open-ended questions. The data were cleaned in Hanoi with the assistance of an FHI staff member and were jointly analyzed by the MOH and FHI in Hanoi and North Carolina using Epi Info (Dean, A. et al., 1990), SPSS-PC (Norusis, 1990) and SUDAAN (Shah, B. et al., 1991).

Results presented in this report are descriptive comparisons of answers to interview questions given by quinacrine and IUD acceptors. Weights were calculated to account for both non-response among quinacrine and IUD acceptors selected and insufficient numbers of IUD users in the sampling frame for some strata. The Ns reported in the tables are the unweighted Ns, but the percentages, means and standard deviations reported in the text and tables are the weighted results. Likelihood chi square and t-tests of significance were performed to compare most outcomes as they were related to the two methods. SUDAAN was used to conduct these

comparisons. SUDAAN incorporates the correlation within a stratum (province-district-age) and the increased variability due to the weights when calculating error terms for these statistics.

Age at insertion and insertion dates were obtained from logbook data. There was no way to identify women who were supposed to get only one insertion from those who did not return for an intended second insertion. The number of quinacrine insertions were &fined as the number of insertions prior to a method failure if there was one. A few women obtained two or three insertions but may have had the last insertion after a method failure. For example, a woman who got pregnant after one insertion, but then had two more insertions after the pregnancy was terminated was counted in the one insertion group. Method failures were confirmed for the women in the quinacrine group on the basis of a second interview, conducted with the women who indicated during the first interview that they had gotten pregnant after the quinacrine insertion.

To calculate failure rates for quinacrine users and to examine the relationship between method failure for quinacrine users and several other factors, lifetable analyses were conducted using the SPSSPC "survival" program. Failure rates were compared on the following variables: age at insertion (< 35 years vs. 35 or more years); number of insertions (one insertion vs. more than one insertion (before pregnancy diagnosed)); age by number of insertions; prior IUD use (women who had been using an IUD immediately prior to quinacrine insertion vs. those who had not); prior IUD use by age; and district (as a proxy for service delivery differences). These subgroups were compared using Cox's proportional hazards regression procedure in SUDAAN. Failure rates for the IUD acceptors could not be calculated because the question about the date of the pregnancy was inadvertently omitted from the IUD questionnaire.

Although questions posed to IUD acceptors regarding IUD failures, results of the pregnancy, menstrual patterns, etc., were intended to refer to the reference IUD (i.e., the IUD inserted on the date given in the IUD logbooks), this was not always the case. For a few women, the reference IUD was removed and another was later reinserted. In these cases, answers given refer to the most recent IUD, not the reference IUD.

The analyses presented in this paper were designed to address the questions set forth in the objectives. Subsequent papers will address additional questions and hypotheses generated by the results presented in this report. Secondary data analysis appropriate for addressing any follow-up questions will be performed at that time. All data analyses were verified by FHI's Division of Biostatistics.

Human Subjects Review

Prior to implementation of the study, the protocol and questionnaires were reviewed and approved by Vietnam's Ministry of Health and FHI's Protection of Human Subjects Committee, an institutional review board conforming to U.S. Public Health Service Regulations.

RESULTS AND DISCUSSION

1. What factors influenced women's decisions to obtain a quinacrine sterilization?

Contraceptive decisions are made based on knowledge, experience, individual and family needs, personal preferences and availability. Specifically, factors which may influence a woman's decision to accept a contraceptive method include sociodemographic characteristics (age and parity); contraceptive history; information about the method; social influences; and perceptions of availability and advantages of a method. Concerns have been raised about the possibility of coercive measures taken to pressure women to accept quinacrine in Vietnam and its role was investigated.

So&demographic characteristics. At the time of insertion, the quinacrine respondents were on average 34.9 years old and the IUD users were 34.3 years old (Table 2) indicating that the frequency matching and weighting led to quinacrine and IUD samples which were quite comparable on age, as desired.

The quinacrine respondents had a mean of 3.6 children while the IUD group had 2.9 children ($p<.001$). These results are consistent with the expectation that controlling for age, women with more children would be more inclined to accept apermanent method.

Most women met the age and parity criteria for receiving quinacrine sterilization services, though the results indicate that some respondents were younger or had fewer or younger children than stated policy. Ten percent of the women were under age 30 at the time of insertion, and all had at least two children. Only six women had one child, and all of these women except one were over 30 years old.

Contraceptive history. The majority of women in both groups had experience with contraceptive methods before their quinacrine or IUD insertion (Table 3). Not surprisingly, the IUD was the predominant method used. Other modem methods, such as condoms, oral contraceptives and injectables, had been used by a much smaller percentage of women (less than 15% for any of these methods).

Over 40% of the quinacrine users and 15% of the IUD users had experienced at least one method failure ($p<.001$), and the IUD was the method which had failed for the majority of these respondents. The average number of abortions and MRs was greater for quinacrine users as compared to IUD acceptors ($p<.001$).

Sources **of information. The** first source of information for the majority of women in both groups were service providers (Table 4). A larger percentage of IUD acceptors than quinacrine acceptors knew someone who had used the method (88% vs. 60%, respectively; $p<.001$) —not surprising since quinacrine was a new method at the time many of them underwent the procedure.

Social influences. The data indicate that women felt themselves to be in control of the decision to obtain their chosen method of contraception though it is clear that women also discussed their methods with people within their personal realm —husbands, neighbors and

relatives. An overwhelming majority of women in each group identified themselves as the person who most influenced their decision to get the method (Table 4). The percentage of IUD users who discussed the method with their husbands was slightly higher than that of quinacrine acceptors. A higher percentage of quinacrine users (17%) than IUD users (8%) did not discuss the method with anyone else ($p<.001$). A higher percentage of IUD users (91%) compared to quinacrine users (77%) reported that their husbands approved of their method before insertion; 20% of the quinacrine acceptors compared to 8% of the IUD acceptors did not tell their husbands they had gotten the method ($p<.001$) (Table 5).

Most quinacrine users were offered food or money as compensation for time lost or transportation costs or even as an incentive to accept the method (Table 6). This practice is not unique to the quinacrine program in Vietnam and has been used for IUD and surgical sterilization services (Hieu et al., in press). Eighty percent of the quinacrine acceptors and 54% of the IUD acceptors said that they received something when they obtained their method. Over 50% of the quinacrine acceptors received food (usually rice) compared to 16% of the IUD acceptors. Thirty-four percent of the IUD acceptors said they received medicine (usually ampicillin). Close to 100% of the women in both groups said that they felt no pressure to accept the method that they chose (Table 7).

Ninety-seven percent of the quinacrine acceptors said that they signed a consent form before obtaining the method, and 84% said that the risks and benefits were explained to them prior to getting the method (Table 8). Since no consent form is required for IUD use in Vietnam, these two questions were not asked of IUD users.

Perceptions. To provide insight into their perceptions of the advantages of the method chosen, respondents were asked to identify reasons why they preferred the method they had chosen over other methods (Table 9). The most commonly given reason for women using both methods was that their chosen method was "more convenient;" 65% of the quinacrine users and 73% of the IUD users responded in this way. "Convenience" as the primary reason for method choice is expected for methods that are not user- or coitus-dependent. Quinacrine users were more likely than IUD users to say they chose the method because it was reliable or because it did not require surgery; reliability as a motivating factor makes sense in light of the high percentage of quinacrine users who had experienced a method failure prior to their quinacrine insertion. A higher percentage of quinacrine users than IUD users citing "no surgery required" perhaps indicates that they had been considering quinacrine as an alternative to surgical sterilization. No one spontaneously cited incentives as one of the reasons for undergoing the sterilization.

In order to further understand reasons for their contraceptive choices, women were asked which method they would have chosen if their current method were not available (Figure **2).** Over half the quinacrine acceptors answered "IUDs," and 17% answered "tubectomy." Four percent of the quinacrine users said "no method" while in contrast, 29% of the IUD acceptors responded that they would be using no method if IUDs were not available ($p<.001$). Over 20% said they would be using a permanent method such as tubectomy or quinacrine, and 40% said they would be using user-dependent methods: condoms, abstinence or withdrawal. Although some quinacrine and IUD users indicated that they would have had a tubectomy, this may not